

WORKING P A P E R

Enhancing Public Health Preparedness: Exercises, Exemplary Practices, and Lessons Learned, Phase III

Task G: Lessons Learned from the State and Local Public Health Response to Hurricane Katrina

JEANNE S. RINGEL
ANITA CHANDRA
KRISTIN LEUSCHNER
YEE-WEI LIM
KAREN A. RICCI
AGNES GEREKEN SCHAEFER
MOLLY V. SHEA
LISA R. SHUGARMAN
JEFFREY WASSERMAN

This product is part of the RAND Health working paper series. RAND working papers are intended to share researchers' latest findings and to solicit informal peer review. They have been approved for circulation by RAND Health but have not been formally edited or peer reviewed. Unless otherwise indicated, working papers can be quoted and cited without permission of the author, provided the source is clearly referred to as a working paper. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors.

RAND® is a registered trademark.

WR-473-DHHS

August 2007

Prepared for Department of Health and Human Services, Office of the Assistant Secretary for Preparedness and Response



TABLE OF CONTENTS

Summary	i
Chapter 1: Introduction	1
Purpose of Study and Specific Objectives	2
Organization of the Report.....	4
Chapter 2: Analytical Approach	5
Document Review.....	5
Site Visits	5
Chapter 3: Background and Context	10
Overview of Major Reports	10
Overview of the Magnitude and Effects of Hurricane Katrina.....	12
Chapter 4: The Role of Public Health in an Emergency	18
Traditional Roles of Public Health	18
Public Health and Emergency Response	19
Key Observations.....	20
Implications for Public Health	29
Chapter 5: Workforce Issues	32
Key Observations.....	33
Implications for Public Health	42
Chapter 6: Medical Supply and Pharmaceuticals	45
Key Observations.....	45
Implications for Public Health	54
Chapter 7: Communications	58
Key Observations.....	58
Implications for Public Health	67
Chapter 8: Special Needs Populations	69
Key Observations: Community-based Special Needs Populations	70
Key Observations: Nursing Home Populations	79
Implications for Public Health	87
Chapter 9: Concluding Thoughts	90
Recommendations.....	92

ACKNOWLEDGEMENTS

The authors would like to thank the state and local health organizations that participated in the study for sharing their experiences from the public health response to Hurricane Katrina. We appreciate their thoughtful responses. We also wish to thank Dr. Benjamin Springgate for commenting on an early draft of our workplan and for helping to make connections with local health organizations and personnel in Louisiana. Finally, we thank Ms. Lara Lamprecht who reviewed and commented on earlier drafts of this report. Of course, any errors or omissions are the sole responsibility of the authors.

LIST OF FIGURES

Figure 1: Public Health Functions and Cross-cutting Issues in the Response to Hurricane Katrina: A Conceptual Framework 7

Figure 2: The Distribution of Public Health Functions: Day-to-Day and in an Emergency.....23

SUMMARY

Hurricane Katrina was one of the largest and most costly natural disasters in U.S. history, and its effects will be felt for many years to come. Though there were many compelling stories of individual acts of heroism in response to the disaster, it is widely agreed that most aspects of the response, including the public health and medical response, fell short of expectations. Hurricane Katrina tested the public health system in terms of its emergency response role; a number of problem areas were exposed in the process. It is important to examine the public health response to Hurricane Katrina to determine what worked well and what did not, so that public health agencies can learn from its experiences and improve its preparedness before another disaster (whether natural or manmade) strikes.

This study seeks to contribute to this effort by collecting and synthesizing the public health lessons learned from the response to Hurricane Katrina. We focused our efforts on areas that we knew were tested by Hurricane Katrina and around which significant problems arose, including the coordination of the medical workforce, the coordination of medical supplies and equipment, communications, and caring for special needs populations. Our findings are based on a review of relevant documents such as government reports, newspaper articles, and national and state-level emergency response plans, as well as a series of interviews with public health officials and other governmental and emergency management personnel in Louisiana, Mississippi, Georgia, Texas, and Florida.

THE CHANGING ROLE OF PUBLIC HEALTH

Hurricane Katrina revealed new challenges for the public health system with respect to its roles and responsibilities in emergency response. Traditionally, public health agencies have had responsibility for three broad types of functions: addressing population health issues by collecting and analyzing data on the health needs of a community (assessment), implementing the necessary action steps to meet the community's health needs through direct service provision and/or regulation (assurance), and advocating for the use of evidence-based research in the implementation of public policy that promotes the public's health (policy development).

The heightened attention in the United States toward emergent infectious disease, the threat of bioterrorism, and the inevitability of natural disasters has placed new emphasis on how well emergency response is reflected and/or incorporated in these three public health functions. At the same time, public health agencies have been required to marshal resources and build competencies in new areas, including command and control in emergency response, use of protective equipment, flexible problem solving, and disaster communications.

There Remains a Lack of Consensus Regarding the Role of Public Health in an Emergency

Our analysis found wide disagreement regarding the role of public health agencies in the provision of health care during an emergency. While it was clear to all that public health has the responsibility to *assure* that health care services are available in an emergency, there was disagreement over the extent to which public health agencies have the responsibility to *provide* that care. The majority of interviewees (cutting across public health, hospitals, emergency management, and other government agencies) felt that public health agencies do not have the skills or capacity to assume significant responsibility for providing direct health services. However, a sizeable minority argued that public health has an obligation to supply direct health services, and that this duty is expanded during an emergency response given the immeasurable need.

Incorporating Emergency Response Functions and Approaches into Public Health Has Reshaped the Field

The experience of Hurricane Katrina represents a definitive milestone in post 9/11 preparedness in terms of the incorporation of emergency management in public health. All states are now using emergency management approaches such as the use of the Incident Command System (ICS). Public health leaders noted that the incorporation of emergency management into the role of public health has raised public health's visibility to the community, focused more attention on the assurance core function, and emphasized new partnerships with other emergency responders, the private sector, and the community as well.

At the same time, tensions remain between those who want public health to fully embrace emergency management approaches and those that are more reluctant. Public health leaders in states impacted by Katrina cautioned that a complete transformation of public health to the emergency management model might overshadow public health's community assessment skills (which emphasize careful and deliberate examination of an issue from all sides).

Public Health Role in Emergency Response Should Be Better Defined

Our findings suggest that public health agencies need to work with the other agencies involved in public health emergency response to better define their respective roles in disaster response and develop a plan that institutionalizes these roles. In particular, agencies must coordinate with their response partners to specify how medical care services will be provided in an emergency and by whom. The experience of Katrina indicates that emergency management practices could be better integrated into traditional public health functions, and several characteristics of traditional public health work (e.g., ability to work in communities and use multidimensional approaches to assess need) could be more fully incorporated into emergency response planning and training.

LESSONS LEARNED FROM THE PUBLIC HEALTH RESPONSE TO HURRICANE KATRINA

We now summarize key observations from our analyses of workforce, medical supplies and pharmaceuticals, communications, and special needs care.

Responsibility of Public Health in Hospitals and Nursing Homes with Workforce Issues Is Not Well Established

In all the states we visited, there was an obvious need for additional health care personnel to assist with the patient surge in hospitals, the patient and evacuee volume moving through triage centers, the general shelter population's primary care needs, and the specialized health care needs of those in the special needs shelters. Maintaining a sufficient workforce was challenging because of the level of physical and emotional stress experienced by first responders.

The role of public health in addressing workforce issues is unclear. Other than providing regulatory oversight and managing its own clinics, public health has no designated role in managing the public or private health care workforce. During an emergency, the role of public health in this capacity is to *assure* that health and medical services are provided to the public, not necessarily to deliver acute health care services. Local and state public health departments' roles varied regarding care at triage sites and general mass care shelters in the aftermath of Hurricane Katrina (e.g., monitoring for infectious diseases, providing nurses to help staff the triage centers and shelter clinics, opening and staffing special needs shelters).

Coordination of Health Care Personnel Was Difficult in All Care Settings

As news spread of Hurricane Katrina's devastation, many health care professionals volunteered their time and effort. However, public health lacked systems to coordinate volunteers and match their skills to sites' identified needs. The absence of an agreed-upon method for verifying the credentials and skills of the health care professionals was problematic.

Public Health Might Build on Its Traditional Roles to Assist in Addressing Workforce Issues

In preparing for future emergency situations, it will be useful for public health practitioners to consider how it might use some of its traditional functions to assist other health care organizations in addressing workforce issues. For example, public health could apply its traditional responsibility of educating the public to improve the public's awareness of sheltering issues in a disaster. Information could be provided regarding appropriate shelters, which would likely relieve some of the hospital staffing burden that can occur when the public goes to the hospitals for shelter rather than the appropriate sites. As another example, public health could develop systems to match better volunteer personnel resources with identified needs.

There Were Problems in Managing Supply and Distribution of Pharmaceuticals and Medical Equipment

Responsive medical support in the form of medical supplies and pharmaceuticals was crucial to enable health care providers to provide medical care to hurricane victims and evacuees. Interviewees noted that while supplies were delivered to the affected areas, there was no effective way to inventory and allocate them in efficient and equitable ways.

Supplies lacked medications and medical equipment required by people with special needs. Many patients with chronic medical problems either did not receive their medications in a timely fashion, or did not receive the exact or equivalent medication. A deficiency in oxygen supplies in some states caused serious problems for oxygen dependent evacuees and caused health department staff to spend substantial time and resources attempting to replenish oxygen supplies.

Public and Private Organizations' Efforts Lacked Coordination

After the hurricane had passed, both public and private organizations provided medications and supplies to evacuees. The state of Florida had caches of supplies pre-positioned around the state. Many states relied upon the Strategic National Stockpile (SNS), although some reported

that many of the supplies in the SNS did not match their needs because it was configured for responses to a bioterrorist attack.

Private-sector companies, including large drug store chains, played important roles in addressing pharmaceutical shortfalls but did not have a clear picture of what supplies were needed. Public health agencies also had difficulties in getting the funds to reimburse private-sector companies in a timely fashion. In particular, interviewees felt the Stafford Act, the federal reimbursement mechanism for emergency situations, created unnecessary delays.

Better Planning Can Help Address Supply and Distribution Issues

To expedite the delivery of medical supplies to storm-hit areas, public health agencies at the state and local level may, as part of their preparedness planning, want to pre-designate strategic areas for supplies and consider establishing advance arrangements with private suppliers. It will also be important for public health to 1) develop a comprehensive and rapid system to conduct a needs assessments and 2) provide a centralized means of receiving, inventorying, and allocating resources at the state level. Current reimbursement rules should be clarified as part of preparedness planning efforts.

Communication Within and Across Organizations Was Poor

Some communications problems during Hurricane Katrina were due, not so much to technical failure on the part of the communications infrastructure, but to a lack of coordination between the relevant parties, whether within public health agencies or between public health and other public or private entities. For example, in some cases, one part of the health department did not know what another part was doing, leading to a duplication in tasks. In other cases, hospital administrators noted that they had received multiple visits by public health personnel asking them to fill out the same paperwork multiple times.

The Incident Command System Typically Facilitated Agency Communication

One of the communications success stories arising from our analysis concerns the implementation of an Incident Command System (ICS) and the National Incident Management System (NIMS). Interviewees indicated that when personnel across agencies were familiar with ICS, the response ran more smoothly because people knew both their individual roles and the responsibilities of the agencies they represented. In addition, interviewees indicated that ICS provided a common language and process to all responders, so personnel could focus on decision making rather than trying to explain the process, thus saving time.

Public Health Requires Mixture of Communication Technologies, Better Planning

Many of the communications problems that public health departments encountered during Hurricane Katrina can be overcome through improved planning and training. Interorganizational communications could be improved significantly if participating organizations know precisely who they will interact with during an emergency, know their respective roles and responsibilities, and know what to expect from each other. In particular, public health needs to incorporate non-traditional partners (e.g., the military, NGOs, private-sector organizations, and other government agencies, including mental health) into the planning process--and to do so at an early stage. On a technical level, an effective communications plan requires a mixture of communications technologies and techniques to ensure that when one method fails, another is available.

States Faced Challenges in Defining Special Needs Populations

As has been widely reported, the evacuation and sheltering of special needs populations were put to the test by Hurricane Katrina. Individuals with special needs who live in the community (as opposed to nursing homes or assisted living facilities) require separate shelters, which in some states are the responsibility of the public health department. One underlying challenge for states is to establish criteria for identifying special needs populations, particularly during an emergency to ensure their prompt evacuation and to direct them to appropriate shelter arrangements. "Special needs" is a generic term that can be applied to a number of different disabled and elderly populations, as well as low-income populations, people with serious mental illness, people with intellectual or cognitive disabilities, people with sensory impairments (e.g., low vision, impaired hearing), and those with mobility problems or activity limitations. Also included may be those who rely on special equipment such as oxygen or wheelchairs, or those who lack transportation during a disaster.

Even in states with clear definitions of what constitutes a special need, finding those populations can be challenging, especially in the aftermath of a hurricane or other emergency. Many special needs populations do not have regular contact with the health care system and therefore may be overlooked. Florida allows special needs populations (defined in terms of medical needs) to pre-register, although most of these populations are not required to do so; state

and local officials noted that only a small portion of those who show up at special needs shelters were pre-registered.

Procuring Transport and Shelter for Community-Based Special Needs Populations Was Often Difficult

Transportation of special needs populations became a serious issue in the aftermath of Hurricane Katrina. Individuals who were triaged to special needs shelters often lacked any means of getting to the shelter, to medical facilities for treatment, or doctors' appointments (once at the shelter). In some cases, transportation was also needed to move special needs populations from one shelter to another to manage overflow.

In each state we visited, public health had an important role in assuring that shelter was provided to special needs populations. However, the exact role of the public health department in setting up and operating the shelters differed across states. In Louisiana, for example, the Department of Social Services has responsibility for administering special needs shelters while the Department of Health and Hospitals is responsible for the medical care provided in the shelters. In Georgia, the Department of Public Health established a special needs shelter, but required help from local hospitals with staffing and supplies.

The Magnitude of the Need for Mental Health Services Was Unanticipated

The need to provide mental health care in shelters posed another significant problem. Prior to the storm, many shelter operators had not anticipated the magnitude of the need for mental health care, nor had they realized the extent to which a disaster such as Katrina would itself cause mental health problems, transforming individuals who would otherwise be self-supporting and healthy into special needs populations. The states we visited generally did not have sufficient professional staff to care for mental health populations, and inpatient psychiatric beds were scarce.

Nursing Homes Faced Challenges in Evacuating, Finding Host Facilities

Although the responsibility for nursing home populations normally falls to the nursing home administrators, public health occasionally played an important role in coordinating with administrators to ensure that nursing home residents received adequate care in the aftermath of

the storm. Many nursing home administrators, especially in Louisiana, faced challenges in deciding when to evacuate and in making plans for how the evacuation would be carried out.

Prior to and during Hurricane Katrina, many nursing homes in the affected areas experienced problems related to the poor execution of emergency plans. In some cases, facilities ignored their own emergency plans completely. In other cases, the impact of the storm was far greater than anticipated and existing resources were woefully inadequate. Nursing facilities that are part of a larger corporate chain often had corporate resources to support their decision to evacuate; however, the “mom and pop” owned facilities did not have the same resources available to them. There were also some reported problems in tracking nursing home residents after evacuation.

Public Health Needs to Lead Effort to Define Special Needs Populations

Public health should continue to lead the effort to define special needs and develop methods for identifying individuals in the community meeting these criteria in advance, if possible. Public health also needs to clarify its role in providing staff and assuring transportation to shelters. States might consider establishing a team-based approach to staffing, under which multi-capability teams divide responsibilities across shifts. Public health might identify opportunities to partner with other organizations to provide transportation for special needs patients and ensure adequate security at shelters. Public health should also work to establish better relations with nursing homes and to ensure that they are involved in emergency response planning. Special effort also needs to be directed toward caring for mental health needs during an emergency.

CONCLUSIONS AND RECOMMENDATIONS

Many of the breakdowns we observed in communications, the distribution of needed medical and other supplies, and serving special needs populations primarily occurred because there was considerable ambiguity regarding the respective roles of federal, state, and local public health agencies and other governmental institutions. This finding highlights the idea that coordination between all involved organizations must be improved to mount an effective response. In this regard, we were particularly struck by how public health's experience during Katrina raised issues related to its assurance function –i.e., linking people with services–and whether, and to what extent, health departments should engage in the direct provision of care during public health emergencies. This issue became especially critical in caring for special needs populations.

Many of the problems that arose in the response to Katrina could have been prevented or minimized if public health agencies had done a better job in educating the public beforehand on the individual's roles and responsibilities in emergency response. Stronger partnerships and improved planning among the partners, should also lead to the more effective use of volunteers.

We close with a brief set of recommendations that reflect largely cross-cutting concerns. We should point out that although these recommendations relate to the lessons learned from Hurricane Katrina and in some cases are specific to hurricane preparedness, most apply more broadly to other types of disasters, whether natural or manmade.

Conduct Drills and Exercises with Multiple Levels of Government and Non-Governmental Partners. A good way to address the need for clarifying roles and responsibilities for public health partners is for state and local health departments to make a greater effort to include a wider range of community partners in planning activities and exercises for both natural and manmade disasters. Exercises should cover a variety of scenarios, including natural disasters, especially those that might require evacuation of a large number of people. Moreover, it is important to conduct drills and exercises that test specific capabilities because they are much more likely than generic exercises to result in performance improvements.

Explore Prospect of Extending ICS Training and Planning to Key Private Sector Partners. The effectiveness of ICS in public health emergencies could be strengthened if private sector partners were included in the training and planning processes. Such partners include, but are not limited to, school officials, pharmacies and pharmaceutical companies,

medical equipment suppliers, long-term care facility operators, and representatives from large local businesses.

Develop Systems for Quickly Matching Available Resources with Needs. Effective matching requires coordination between state and local officials. At the local level, communities need to be able to quickly conduct a needs assessment, so they can request the specific set of resources that will serve their needs. At the state level, officials need to identify the resources that are available both within the state and from outside sources and determine how to best allocate those resources to address needs across the affected areas.

Each Community Must Examine How it Can Increase Its Level of Public Health Preparedness. To mount an effective and efficient response, officials at all levels of government, business owners, and individuals must all contribute their resources and ingenuity. Due to differences in how the public health system is organized across geographic areas, there is no single definition of the public health's role in an emergency. Rather, each community must bring the relevant organizations together to determine how to best allocate responsibility for the public health emergency response within their community. The outcome of such a meeting should be institutionalized through incorporation into the emergency response plan, the use of Memoranda of Understanding (MOUs) between organizations, and any other mechanism that will allow the community to hold organizations accountable for the roles and responsibilities they have agreed to take on.

CHAPTER 1: INTRODUCTION

Hurricane Katrina was a devastating storm that wreaked havoc on the gulf coast. The vast scope of the destruction and displacement makes Hurricane Katrina one of the largest and most costly natural disasters in the nation's history, the effects of which will remain for many years to come.

Since the terrorist attacks of September 11, 2001, the Federal Government has sharpened its focus on emergency preparedness and provided substantial resources for related planning, exercising, and equipment. While there is little doubt that this infusion of resources has improved general preparedness at the federal, state, and local levels, the response to Hurricane Katrina highlights that there is still much work to be done. Though there are many compelling stories of individual acts of heroism, it is widely agreed that most aspects of the response to Hurricane Katrina, including the public health and medical response, were substandard. Hurricane Katrina exposed a number of gaping holes in the public health system's emergency response capabilities.

Underlying many of these problems was a lack of consensus regarding the roles and responsibilities of public health agencies in an emergency. Public health is but one of a number of sectors involved in the response and must coordinate its efforts with other partners (e.g., hospitals, emergency management, law enforcement, transportation). While some roles such as disease surveillance and infection control, are clearly in the realm of public health, it is less clear how public health fits into other roles such as patient evacuation and patient care. There are still other roles such as mortuary services, body recovery, and identification that perhaps only become part of public health's domain when the scope of the disaster is particularly large.

Defining public health's role is complicated further by the fact that there is wide variation in the organization of the public health and medical care systems across geographic areas. This difference in structure leads to variation in how responsibility for emergency response functions is best allocated across the participating organizations. In other words, there is no "one-size-fits-all" definition for public health's role in a disaster. Nonetheless there appears to be expectations on the part of the public, hospitals, and nursing homes, and other stakeholders about what public health agencies *should* be able to do (whether it is legally or formally the responsibility of public health). For instance, many people have expectations that public health agencies will serve as

the direct care safety net in a disaster, in addition to assuring that services are available. However, in many cases, public health agencies do not have the resources to effectively play this role (e.g., do not have personnel to provide medical care services). These potentially misguided expectations illustrate the need to clearly delineate the emergency response roles and responsibilities of public health agencies within each community.

PURPOSE OF STUDY AND SPECIFIC OBJECTIVES

It is important now, approximately two years later, to take a step back and examine the public health response to Hurricane Katrina to determine what worked well and what did not, so that public health can learn from its experiences and prepare to do better the next time a disaster (natural or manmade) strikes. More specifically, Hurricane Katrina provided the opportunity to test the nation's response capabilities through direct experience and make improvements in response. It is important to implement the needed changes, so that the lessons learned from Hurricane Katrina are acted upon and not lost as life returns to normal and personnel changes occur. The RAND Corporation was asked to contribute to this effort by collecting and synthesizing the public health lessons learned from the response to Hurricane Katrina and making them available to federal, state, and local responders.

From a practical standpoint, this study could not examine all areas of the public health response, so we focused our attention on a few key areas. That is, we faced a tradeoff between breadth and depth, and we chose to explore a few areas in substantial detail rather than increasing coverage and considering each area only superficially.

In choosing the areas to emphasize, we sought to focus on those public health functions that were tested by Hurricane Katrina and around which significant problems arose. For example, the coordination of medical care personnel was seriously tested by Hurricane Katrina and in some cases led to significant problems; thus, we chose to emphasize this function because of its potential to provide lessons learned. In contrast, we chose not to focus on disease investigation and control and surveillance because, even though these functions of public health were used in the response to Hurricane Katrina, on the whole these functions were carried out effectively. By focusing on those functions in which the most significant problems arose, we maximize the opportunity to learn from the experience, identify potential improvements, and contribute to what is known about effective emergency response. At the same time, we recognize

that this chosen emphasis will result in a story that focuses more on failures than successes (though there are some of the latter as well).

To choose the functions on which to focus, we began by creating a master list of potential public health functions gleaned primarily from the National Response Plan (NRP) (US DHS 2004) Emergency Support Function #8 (ESF-8) and state-level emergency response plans (ERPs). We then conducted a review of Hurricane Katrina-related reports (from government agencies, foundations, and research institutions) and newspaper articles. To ensure that we had identified the most relevant public health functions, we shared our shortened list with a number of people involved in the response and requested their feedback.

The critical public health functions that we identified through our research include the coordination of the medical workforce, the coordination of medical supplies, and communications. These functions are critical to many other important medical and public health response functions. As a result, when there are breakdowns in these functions, the effects can be widespread. To illustrate this point, we also examined the evacuation and treatment of special needs populations during Hurricane Katrina as a means of highlighting workforce, medical supply, communication, and other issues.

Our research was guided by three basic questions:

- What is the role of public health in an emergency (e.g., direct provision of care vs. an assurance role)?
- Which elements of the response worked well and which did not?
- What changes could be made to improve response capabilities?

To provide a comprehensive assessment of the lessons learned in each of the critical areas of the public health response, we were guided by two additional objectives. First, we sought to collect varied perspectives on the public health response to Hurricane Katrina. Public health emergency preparedness requires public health agencies to partner with a number of entities. Thus, we felt it would be important to include perspectives from these other organizations (e.g., emergency management, police, fire, and health care) in our study. In addition, our findings were informed by the perspectives of key informants in states directly affected by the hurricane as well as those indirectly affected through the receipt of evacuees. Second, we sought to document and disseminate the lessons learned in a manner that is accessible and useful to all state and local

public health officials because many of the lessons learned will not only be applicable to hurricane preparedness, but to emergency preparedness overall.

ORGANIZATION OF THE REPORT

The remainder of the report is organized as follows. In Chapter 2, we describe our methodology for collecting and synthesizing the lessons learned from the public health response to Hurricane Katrina. In Chapter 3, we provide an overview of other key reports that have examined Hurricane Katrina and summarize important issues for each of the states included in our study. This information is meant to provide the context for interpreting our findings. In Chapter 4, we discuss the role of public health agencies in emergency response, how this role has changed over time, and how the lack of consensus regarding the roles and responsibilities affected the response to Hurricane Katrina. In Chapters 5 through 7 we present our findings for each of the primary functions of the public health response: workforce issues, medical supplies and pharmaceuticals, and communications. In Chapter 8, we consider the evacuation and sheltering of special needs populations as an example of what can happen when there are breakdowns in the critical areas of the public health response. In Chapters 4-8, we highlight key observations and discuss their implications for public health emergency preparedness. In the final chapter, we summarize the overarching lessons learned and make recommendations regarding changes that might improve public health emergency preparedness.

CHAPTER 2: ANALYTICAL APPROACH

In this chapter, we describe the two-step approach used to collect and synthesize the lessons learned from the public health response to Hurricane Katrina. First, we discuss the approach used to identify and review relevant documents, including government reports, newspaper articles, and national and state-level emergency response plans. Then, we discuss the methods used to conduct a series of site visits, which aimed to collect detailed information concerning the key functions of the public health response (coordination of the medical workforce, coordination of medical supplies, communications, and treatment of special needs populations) described in the previous chapter.

DOCUMENT REVIEW

We conducted extensive web-based searches for reports from government agencies, foundations, and research institutions to document the public health response to Hurricane Katrina. In addition, we monitored the progress of congressional hearings on the subject and collected relevant testimony as well. To better understand the range of roles and responsibilities taken on by public health agencies during a disaster response, we obtained and reviewed copies of the NRP as well as emergency response plans from several different states.

To capture a more local perspective, we searched Lexis-Nexis for newspaper articles about the response to Hurricane Katrina. Besides providing important background and contextual information about the local response, these stories facilitated the identification of key local-level interviewees.

SITE VISITS

There were five main components to the approach used during the site visits: site selection, development of the interview guide, selection of interviewees, data collection, and data analysis.

Site Selection

We selected five states for in-depth site visits. We visited Louisiana and Mississippi in order to capture perspectives from states that were directly affected by Hurricane Katrina. We also selected three states (Texas, Florida, and Georgia) that were indirectly affected by Hurricane

Katrina, yet face a direct risk from hurricanes in general. We chose to examine the indirectly affected states in order to explore the issues surrounding the receipt of evacuees as well as to understand whether these states had altered their hurricane preparedness planning in response to what they observed with Hurricane Katrina.

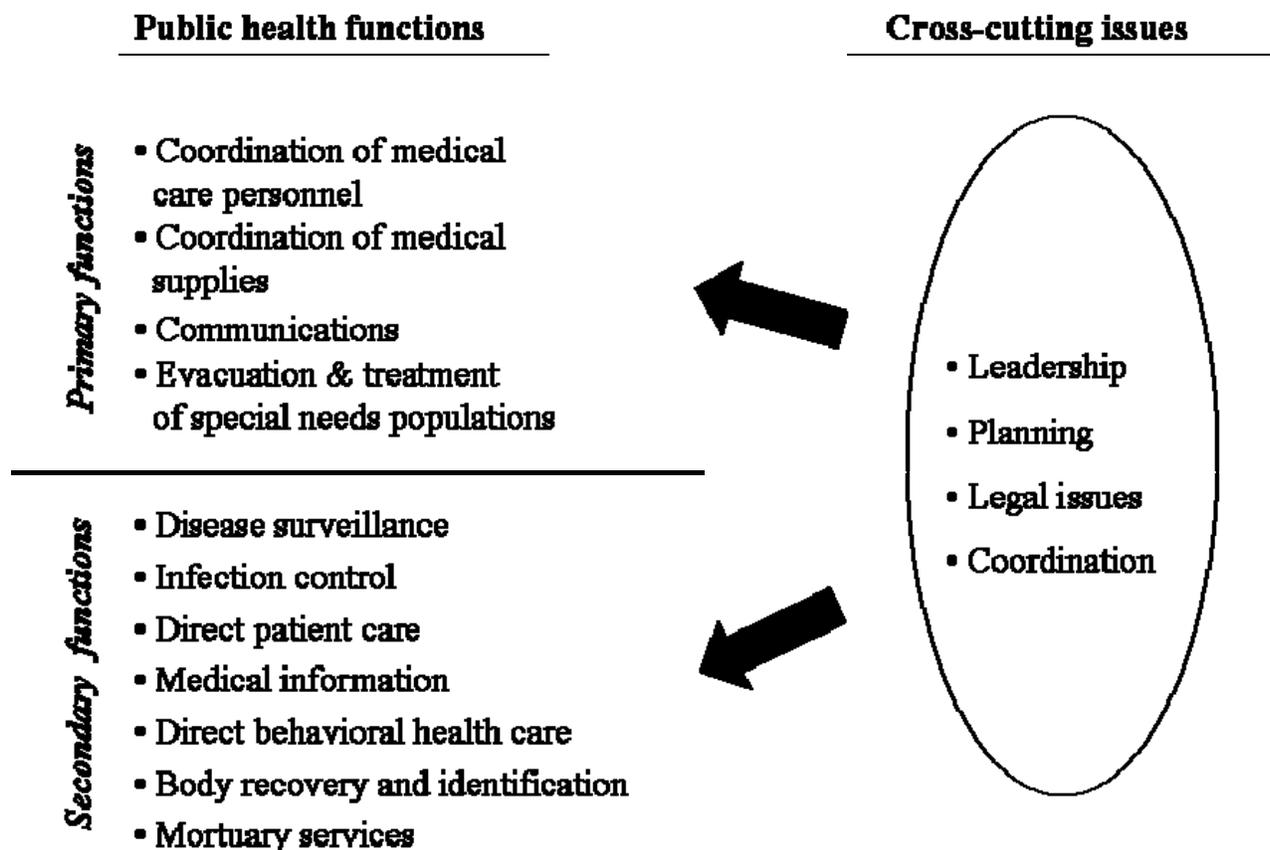
Within each state, we selected one or more local regions to visit. Selection of local regions was informed by our document review. In the directly affected states, the primary criterion for selection was that the local region was significantly affected by the hurricane. In the indirectly affected states, criteria included receipt of evacuees from Hurricane Katrina in the local region and a location in a coastal region that is vulnerable to hurricanes. To protect the privacy of study participants and to encourage frank discussions, we did not identify the specific local regions that we visited in this report but instead summarize information at the state level.

Development of the Interview Guide

We used a multi-step process to develop the interview guide. As part of this process, we developed a conceptual framework to guide our selection of the public health functions on which to focus and to identify cross-cutting topics to address in the interviews. The conceptual framework (see Figure 1) illustrates the relationship between public health emergency response functions and issues such as leadership, planning, and coordination that cut across all functions and support their effective implementation.

To build the conceptual framework, we reviewed the NRP ESF#8: Public Health and Medical Services as well as state emergency response plans on the roles and responsibilities of public health agencies in a disaster. These documents provided a master list of public health functions, from which we identified the functions that we felt were most relevant to the Hurricane Katrina response. We then circulated our shortened list to several individuals involved in the response to Hurricane Katrina and requested feedback. Suggestions from these experts were incorporated into our final list of public health functions. We then divided the public health functions into two basic categories--primary and secondary--based on the function's relevance in the response to Hurricane Katrina.

Figure 1: Public Health Functions and Cross-cutting Issues In The Response to Hurricane Katrina: A Conceptual Framework



Once the list of functions was finalized, we used information from the document review to identify cross-cutting issues that would be relevant to consider for each function. The cross-cutting issues included leadership, legal issues, status of planning (e.g., plan in place and exercised), and breadth of coordination with a wide range of partners at the federal, state, and local level.

We developed separate interview guides for directly and indirectly affected states. For directly affected states, the interview guide focused on the primary public health functions (i.e., evacuation of special needs populations, coordination of medical care personnel, coordination of medical supplies, and communications). For each of these functions, the interview discussion guide included questions focused on:

- Organizations that are involved in this activity
- The role public health plays
- Key successes during the response (i.e., what worked well)
- Problems that arose during the response (i.e., what didn't work well)
- How things might be done differently in the future

For the secondary public health functions, the interview guide probed about key successes, problems that arose, and any potential changes. The complete interview guide for directly affected states is provided in Appendix A.

For the indirectly affected states, the interview guide covered two broad topics: experiences with the receipt of evacuees and planning for future disasters. To probe about experiences with the receipt of evacuees, the interview was quite similar to that of the directly affected states. It focused on the primary public health functions and addressed the main topics outlined above. To address planning for future disasters, the interview guide probed interviewees about what they observed during the response to Hurricane Katrina and whether those observations prompted changes in emergency preparedness planning in their state and/or local area. The complete interview guide for indirectly affected states is provided in Appendix B.

Selection of Interviewees

Interviews were conducted at both the state and local levels. We first identified potential interviewees through searches of state and local health department websites and through our document review. Following this, we contacted potential interviewees, discussed the project and its goals, and used a snowball sampling approach to identify additional people to contact both inside and outside the health department. Within the health department, we sought to interview people with a variety of perspectives, including high-level health department officials (e.g., the director, the deputy director), the emergency preparedness coordinator, the public information officer, and the chief epidemiologist. We also sought to interview other community representatives, including emergency management personnel, hospital personnel, first responders, volunteers (primarily the Red Cross), and politicians.

Data Collection

Interviews were typically conducted in person, with the exception of the interviews conducted in Georgia, which were done by telephone and served as pilot tests for the interview protocols. Telephone interviews were also conducted with other sites when schedule conflicts arose, when a potential interviewee was identified during a site visit but not immediately available to be interviewed, or when we had follow up questions. In most cases, two RAND researchers and one note-taker participated in the interview. In addition to the interview data, we asked for relevant documentation from each state and local area visited, including emergency response plans and after-action reports.

Data Analysis

We conducted a descriptive analysis of the qualitative data. Our process comprised three basic steps: data reduction, data analyses, and drawing conclusions. In the data reduction phase, we abstracted the relevant information from the interview notes and organized the data around the primary public health functions and our research questions. The data analysis phase compared data both within states and across states. For the within-state comparisons, we examined the level of correspondence in the observations made and key themes noted by interviewees across different levels of government (i.e., state and local) and organizations (e.g., public health, emergency management, hospitals). In the cross-state comparisons, we focused on identifying similarities and differences in the key themes that emerged across states. Going a step further, we sought to identify any factors that helped explain any observed differences across interviewees within a state or across states. In the final stage, we synthesized the information from the within-state and cross-state analyses to identify the lessons learned and drew conclusions regarding steps that could be taken to improve public health emergency preparedness.

CHAPTER 3: BACKGROUND AND CONTEXT

Given the scope of the disaster and the near-universal disappointment in the response, it is not surprising that there have already been numerous studies of Hurricane Katrina. Here, we provide a high-level overview of the major reports that have been released in an effort to provide some background and context for interpreting our findings and, more importantly, to highlight how our findings contribute to the existing literature.

OVERVIEW OF MAJOR REPORTS

Federal Level

The most comprehensive studies of the response to Hurricane Katrina have been produced at the federal level by the White House, the Senate, the House of Representatives, and the Government Accountability Office (White House 2006; US Senate 2006; US House of Representatives 2006; GAO 2006a). By design, the reports focus heavily on the Federal Government's role in the response. Moreover, these reports are comprehensive in nature and thus, public health and medical care comprise only a portion of the overall response considered in these reports. While the reports differ to some extent in their purpose, approach, and level of detail, a number of common themes arise. First, all of the reports acknowledge that there are aspects of the medical response to Katrina that went well. For example, these reports all commend the medical personnel, including both local and out-of-state volunteers, who made heroic efforts in very difficult situations to help care for storm victims. While the death toll from Hurricane Katrina was high--approximately 2,000 people—it is widely thought that it could have been much worse if not for the efforts of the volunteer medical personnel. Second, there appears to be general consensus across the federal reports on the aspects of the response that were most problematic. Breakdowns were noted in communication, the understanding of roles and responsibilities, resource coordination and distribution, and the evacuation of special needs populations. Finally, the GAO report notes that many of the problems that arose during the response to Hurricane Katrina were similar to those that arose in previous disasters (e.g., Hurricane Andrew), indicating that a better process is needed for developing and implementing improvement plans based on lessons learned (GAO 2006a).

State and Local Levels

In addition to these federal reports, many of the involved states and communities have produced after-action reports. These after action reports are meant to help identify what went well and what went poorly, so that improvements can be made in advance of future disasters. Looking across these reports, we found that many of the same breakdowns noted at the federal level were also found at that state and local levels. The aspects most commonly cited as requiring change were communications, planning, evacuation, and sheltering (Morrill et al, 2006; North Carolina Division of Emergency Management 2006).

Contribution of This Report

This report contributes to the existing literature on the response to Hurricane Katrina in a number of important ways. First, we have narrowed our focus to the public health response and, more specifically, to several key areas within public health. The aspects we have chosen to focus on are consistent with the key problem areas identified in the prior reports: communications, resource supply and distribution, and the evacuation of special needs populations. In doing so, we are able to explore the lessons learned in these areas in considerable depth, thus providing a more comprehensive understanding of what worked well and what did not.

Second, our study presents lessons learned from two basic perspectives: those states directly hit by Hurricane Katrina and those states that were indirectly affected through the receipt of evacuees. Previous reports have focused primarily on the directly affected states. Considering the perspective of the indirectly affected states as well adds depth to the analysis and potentially broadens the applicability of the lessons learned captured here.

Finally, the report is aimed at outlining the lessons learned from Hurricane Katrina for authorities at the state and local levels to aid in their emergency preparedness planning efforts. Elements of the disaster and its response can inform other planning scenarios. Whereas the response to the hurricane-force winds and storm surges could begin prior to landfall (e.g., evacuation notices), the levees breaking in New Orleans and the subsequent flooding presented response issues more akin to a no-warning disaster such as a bioterrorist (BT) attack. The goal of this report is to synthesize the lessons learned from Katrina and frame them in a way that makes them useful for all-hazards emergency response planning.

OVERVIEW OF THE MAGNITUDE AND EFFECTS OF HURRICANE KATRINA

To provide context for interpreting our findings, here we present a general overview, culled from our review of the documents summarized above, of the magnitude and effects of Hurricane Katrina. As part of this overview, we provide synopses for each state in our study (LA, MS, FL, TX, GA) in order to facilitate understanding of each state's key issues and to contextualize the information gleaned from the interviews.

General Overview

Hurricane Katrina was the most expensive hurricane ever recorded in the United States. The storm formed over the Bahamas on August 23, 2005 and grew in strength to a Category 1 storm by the time it crossed Southern Florida on August 26. Once in the Gulf of Mexico, it became a Category 5 hurricane. On August 29, 2005, Katrina, now a Category 3 storm, made landfall in Louisiana (DeLozier and Kamp, 2005).

The storm was large in magnitude. The hurricane force winds extended 100 miles from the storm's center and the associated storm surge was as high as 37 feet in some places. Severe flooding and wind damage occurred throughout the coastal communities and across a wide swath of the gulf states. In New Orleans, levee failure resulted in flooding for weeks after the hurricane hit (DeLozier and Kamp, 2005).

Directly Affected States

Louisiana

On the evening of Friday, August 26, 2005, Hurricane Katrina increased in strength and changed its course from a Florida panhandle path toward the Louisiana-Mississippi coast. Landfall was expected on Monday morning, August 29, allowing only 48 hours for preparations and evacuation (U.S. DOT, 2006). Damage from Hurricane Katrina was widespread, affecting approximately 93,000 square miles across the Gulf region (White House, 2006). The storm disrupted basic utilities—electricity, water and sewage disposal—as well as food and supply distribution systems and communications. As a result, many hospitals, nursing homes and other health care facilities across the Gulf, not just those sustaining direct damage, were significantly impacted by the Hurricane. This interfered with the delivery of health care services. Although Mississippi suffered extensive destruction, Louisiana was most severely affected due to the

massive storm surge-induced flooding in New Orleans. At the peak of the flooding, 80% of the city was under water. Thousands were trapped, over 400,000 residents were displaced (CDC, 2006), and over 1,000 people died in Louisiana, most as a result of the flooding and its aftermath (US House of Representatives, 2006).

Approximately 500 Evacuation Centers (ECs) or shelters--a term referring to any facility that housed displaced persons overnight--were established across the state by local governments, faith-based organizations, the American Red Cross, and others. More than 50,000 displaced residents were housed in these ECs, which held from fewer than ten to as many as 7,000 evacuees (CDC, 2006). The majority of evacuees fled their homes quickly and did not have time to gather personal belongings. Although most were generally healthy, some were injured; furthermore, many had chronic medical conditions (e.g., diabetes, asthma, hypertension, psychiatric disorders) that required medications and ongoing monitoring. The abrupt withdrawal from medications caused many people in the shelters to become acutely ill or to be at risk of becoming ill. Shelters varied in their capacity to deliver health care; some shelters had staffed, on-site clinics, but many had no health care services (CDC, 2006). Seven special needs shelters that cared for approximately 2,000 special needs evacuees were also opened across the state by the Louisiana Department of Health and Hospitals. Many of these special needs shelters remained open for two months (Guidry, 2006).

The health care delivery system suffered greatest loss of functionality in Louisiana, especially in the New Orleans area. Flooding caused three of the largest acute-care health facilities in New Orleans - Tulane, Charity and University Hospitals – to experience unprecedented equipment and communication failures that resulted in a lack of electrical power and sanitation and limited food, water, and medical supplies. Eventually all three hospitals were evacuated and still remain closed, thus significantly weakening the health care infrastructure in the New Orleans area.

In the state of Louisiana, the public health system is centralized. The Office of Public Health (OPH) is part of the Louisiana Department of Health and Hospitals and all OPH employees are state employees. However, the City of New Orleans is separate from the state-wide public health system and has its own City Health Department. The state is divided into 64 “parishes” (analogous to counties in other states) of varying size. The public health system is divided into nine public health regions, with each region encompassing 4 to 12

parishes. Although all coastal regions of Louisiana were hard-hit by Hurricane Katrina and later by Hurricane Rita, the most devastated areas were in Region 1, which included Orleans (including the City of New Orleans), St. Bernard, Plaquemines and Jefferson Parishes in the southeast area of the state.

Mississippi

The Mississippi Gulf Coast experienced some of Hurricane Katrina's most powerful winds and its highest storm surge (Knabb et al, 2006). Parts of the Mississippi coast experienced an immense storm surge that exceeded 27 feet above normal sea levels (US Senate, 2006) and in some places stretched almost 10 miles inland, past Interstate 10. After surveying the region from the air, Mississippi Governor Haley Barbour likened the scene to that of a nuclear detonation, stating, "I can only imagine that this is what Hiroshima looked like sixty years ago."

Mississippi Emergency Management Agency (MEMA) activated its Emergency Operations Center (EOC) one day before Hurricane Katrina made landfall in Florida (White House, 2006). At that time, Mississippi's three coastal counties began urging residents to evacuate, especially those living in low-lying areas and mobile homes (White House, 2006). In the end, 231 Mississippians died as a result of the storm (White House, 2006).

Hurricane Katrina devastated the medical and public health infrastructure in Mississippi (White House, 2006). The storm damaged 14 of 16 hospitals in the affected region, three of them so severely that they were forced to close (US Senate, 2006). In addition, more than one-third of all primary care clinics in the region were closed due to storm damage (US Senate, 2006). Similarly, 73 nursing homes were affected by Hurricane Katrina, with two being fully destroyed (US Senate, 2006).

The Mississippi Department of Health is a centralized system in which all Department of Health employees are state employees. It is organized into nine districts, with the district health officers reporting to the state health officer in Jackson. The three coastal counties in Mississippi that suffered the greatest financial and structural damage from Hurricane Katrina (Hancock, Harrison and Jackson) comprise District IX of the Department of Health.

The Department of Health is designated as the lead agency for the medical and public health response (ESF #8) according to Mississippi's Comprehensive Emergency Management Plan. As such, the Department of Health is responsible for providing leadership in directing,

coordinating, and integrating the overall state efforts to provide health, medical, and public health assistance. In this capacity, the Department of Health plays an assurance role rather than being a direct provider of services. On August 27, two days before landfall, the Department of Health opened its EOC in Jackson and began preparing for the storm. Preparations included repositioning medical personnel and medical supplies and sending representatives to the EOCs in each coastal community. In addition, the Department requested and worked with Disaster Medical Assistance Teams (DMATs) to assure the provision of care to storm victims. Ultimately, these teams treated approximately 15,000 patients in the days after Hurricane Katrina made landfall (US Senate, 2006).

After the storm made landfall, the Mississippi Department of Health sent teams out to assess local medical facilities, many of which were found to be lacking security and fuel for generators (US Senate, 2006). The Department began to procure and distribute fuel to the medical facilities. Maintaining security at the medical facilities was problematic because these facilities had electrical power, water, and food, and thus attracted members of the general population who otherwise did not have access to these resources.

Indirectly Affected States

Florida

As Hurricane Katrina moved toward Florida on August 25, 2005, Governor Jeb Bush declared, pre-landfall, a Florida state of emergency (DeLozier and Kamp, 2005). State and local emergency management and public health responders prepared for a significant storm. Upon Hurricane Katrina's departure for Mississippi and Louisiana, Florida sent medical personnel teams and supplies to Mississippi and, to a lesser extent, Louisiana. The Florida Department of Health sent 384 medical assistance personnel to Mississippi and Louisiana. Emergency Medical Service (EMS) personnel, advanced life support units, logistical support vehicles, oxygen tanks, and vaccines were all shipped as part of the Emergency Management Assistance Compact (EMAC)(floridadisaster.org).

The Florida Department of Health is a centralized system that provides state funding to support local health departments (Wasserman et al., 2006). Each locality responds locally, but the state provides guidance (e.g., plan templates) and extra support when needed. The state typically pre-positions supplies in logistical staging areas before a storm, whether or not local

officials have requested assistance. The major role of the Health Department during hurricanes is to stand up shelters for populations with special needs such as the chronically ill, people requiring oxygen, and the disabled.

Texas

Even though Texas was not directly affected by Hurricane Katrina, it was heavily involved in the immediate and long-term responses to the disaster. Before Katrina made landfall, Texas sent many medical emergency personnel and other health care resources to Louisiana. More importantly, the state served as a major receiving site for Katrina evacuees, particularly those from New Orleans. Texas received over 450,000 evacuees from Louisiana and Mississippi, and opened over 177 shelters throughout the state. Two of the major sites receiving evacuees were Houston and San Antonio. Houston received 250,000 evacuees, and San Antonio received between 25,000 and 35,000 evacuees (Godoy, 2006).

An unprecedented coalition of local agencies, health departments, and not-for-profit organizations quickly organized to provide shelters, health care and social services to the incoming victims. It has been estimated that nearly 60,000 volunteers assisted with the support efforts in Houston alone.

Because Texas's public health system is relatively decentralized compared to that of other states, much of the local health and emergency response to the hurricane was initiated and implemented by local health departments. In Houston, for example, the Harris County Department of Public Health and Environmental Services worked closely with the Houston Department of Health and Human Services to provide medical services to evacuees and to manage two large shelters in the city (Astrodome and George R. Brown Center). Similarly, management and sheltering of special needs population were provided by local health departments and non-governmental organizations. (Morill et al, 2006)

Georgia

Georgia received many of the evacuees from Alabama, Mississippi, and Louisiana. Georgia's governor, Sonny Perdue, mobilized the Georgia National Guard and several state agencies to assist in processing incoming evacuees and to provide disaster relief to Mississippi, Louisiana, and Alabama. Governor Perdue signed several executive orders on August 31, 2005

in anticipation of the arrival of evacuees and called on all state agencies to develop plans for assisting the states affected by Katrina and preventing price gouging on motor fuel. A State Operations Center (SOC) was activated and staffed with representatives from the Office of Homeland Security-Georgia Emergency Management Agency (OHS-GEMA), Georgia State Patrol, Georgia Division of Public Health, Georgia Department of Human Resources, and Georgia Department of Defense.

Georgia has a decentralized health system; thus, the public health district in which the evacuation site was located operated relatively autonomously, with some technical assistance from the state. Airplanes landed at the evacuation site every other hour over the course of two days, and the site ultimately received 14,000 people (22 airplanes). Staff from the district Department of Public Health and the Veterans Affairs (VA) hospital mobilized to respond to the needs of people arriving at the evacuation site. Members of the District Health Emergency Response Team (DHERT), a local group (with branches across the state) that plans public health emergency exercises and helps craft policy, was called to assist at the military base. The DHERT, and particularly nurse members, met basic needs while the VA conducted triage as evacuees arrived.

CHAPTER 4: THE ROLE OF PUBLIC HEALTH IN AN EMERGENCY

Hurricane Katrina revealed new challenges for the public health system, particularly with respect to roles and responsibilities of public health agencies in emergency response (Daley, 2006). Public health's presence in emergency or disaster response is not new, but the last five years have sharpened the focus on the need for better integration of emergency preparedness and more traditional public health functions. It has been argued that emergency preparedness has not only transformed the response of public health agencies in catastrophic events, but also has precipitated changes in how the discipline of public health organizes and addresses a range of public health issues (Gebbie and Merrill, 2002; Gebbie and Turnock, 2006; Katz et al., 2006, Lurie et al., 2006)

This study of the public health response to Hurricane Katrina presents two critical perspectives on the relationship between emergency preparedness and public health. First, the multi-state analysis of the public health experience in the aftermath of Hurricane Katrina provides a unique status report on how the discipline has incorporated new emergency management methodologies and how health leaders perceive these approaches. Second, the experience of Hurricane Katrina highlights continued challenges for the field of public health in emergency response.

The first sections of this chapter briefly describe the traditional roles of public health agencies and how emergency preparedness has transformed the functions of public health. The rest of the chapter outlines key themes about Hurricane Katrina from our study interviews; this discussion is intended not only to further our knowledge of the hurricane response, but also contributes to our understanding of the emergency response capabilities that public health will need in the future.

TRADITIONAL ROLES OF PUBLIC HEALTH

The public health system is vast, including governmental agencies, private entities, community-based organizations, and academia (IOM, 2002). Historically, public health agencies work to address population health issues by implementing educational programs, developing policies, administering services, and conducting research. The Institute of Medicine report on the *Future of Public Health* (1988) outlines the three core functions of public health agencies:

assessment, assurance, and policy development. Public health's role in *assessment* includes the systematic collection and analyses of data on community health needs, including epidemiologic surveillance. Through *assurance*, public health agencies implement the necessary action steps to meet communities' health needs through direct service provision and/or regulation. In addition, public health is charged with *policy development*, or advocating for the use of evidence-based research in implementing public policy that promotes the public's health.

PUBLIC HEALTH AND EMERGENCY RESPONSE

In the last five years, public health emergency preparedness has moved to the top of the national agenda, and much attention has focused on how well emergency response is reflected and/or incorporated in the core public health functions. The CDC's Public Health Emergency Response Guide for State and Local Public Health Directors (CDC, 2004) outlines a set of key preparedness activities for public health departments, and these activities closely match the core functions. Specifically, the Response Guide indicates that public health agencies should conduct capacity and risk assessments (*assessment*); ensure that public health personnel are trained in safety practices and that procedures have been developed for all-hazard response and communications (*assurance*); and participate in the design and evaluation of preparedness exercises, which can be used to inform procedures and guidelines (*policy development*).

Gebbie and Merrill (2002) contend that emergency preparedness is now a responsibility of both public health agencies and individual public health staff. Preparedness requires marshaling resources and building competencies in command and control, use of protective equipment, flexible problem-solving, and disaster communications. These demands have led to changes in the roles of the public health workforce (e.g., new staff who can respond to biological agents) and advances in information technology. Health departments have implemented various public health preparedness and disaster training curricula (Weiner et al., 2005; Rottman et al., 2005; Parker et al., 2005). In addition, public health has begun to actively cultivate a corps of volunteers to support public health staff in emergency response (Matthews et al., 2005).

Despite these changes, challenges still remain with respect to leadership, performance measurement, and integration of preparedness activities into other public health functions (Asch et al., 2005; Lurie et al., 2006). For instance, it is unclear whether public health is fully prepared for another disaster event. Moreover, some in public health are concerned that the emphasis on

public health emergency preparedness has overshadowed other public health activities (McHugh et al., 2004).

KEY OBSERVATIONS

The following sections outline overarching themes concerning the integration of public health and emergency response during and following the hurricane, and identify lessons and challenges to inform public health's future emergency response efforts. In particular, we highlight themes that emerged from the interviews about the role of public health. In reviewing interview notes, we looked for frequently shared perspectives as well as views that revealed important contradictions regarding this role. Two main observations emerged from our analysis: 1) there remains a lack of consensus regarding the role of public health agencies in an emergency; 2) the field of public health has been reshaped by the integration of emergency response functions and approaches.

There Is No Consensus Regarding the Role of Public Health in an Emergency

There is wide disagreement as to whether public health should be the lead agency in emergency medical response. In addition, while our interviewees agreed that public health has the responsibility to assure that health care services are available in an emergency, there was disagreement over the extent to which public health agencies have the responsibility for providing that care. Below we discuss each of these areas of disagreement in more detail.

Public health's role as the lead agency in emergency medical response

Significant debate continues regarding the position of public health as the central agency in emergency medical response. Public health agencies received funds to address bioterrorism and related public health threats well before Hurricane Katrina. However, the hurricane represented a watershed moment during which state government agencies as a whole had to test their roles and negotiate the role of the public health department relative to other agencies (e.g., military, fire, EMS). Our interviews indicated that public health agencies played a pivotal role during and after Hurricane Katrina in all the states visited, but did not serve as the sole lead agency in the public health and medical response. Indeed, there was no consensus among public

health leaders about whether public health should take the sole leadership role. Some interviewees, particularly those with public health backgrounds, indicated that public health should assert itself as the lead agency in future emergency medical response efforts. However, a few public health leaders as well as individuals with more traditional emergency management backgrounds indicated that public health should be in a support role, while recommending that another agency (e.g., Emergency Management) should take the lead in providing command and control during an emergency. This split tended to occur between those with an academic health background who thought public health should play a support role and others focused on public health practice who thought public health should be the sole lead agency; we did not see a division between those concentrated in states with centralized health department structures (Florida, Mississippi, Louisiana) compared to those with more decentralized (Georgia) or mixed models (Texas).

For many public health officials, Hurricane Katrina revealed that public health should be identified as the lead agency, due to the level of expertise, experience, and quality of training found among public health as well as public health's knowledge of the community. For example, a Georgia official asserted:

"I see us as a lead agency and no one knows this community like we do so we should take a key role in any kind of a disaster. We are still carving out this role as we go along."
(GA official)

Those who believed that public health should be the lead agency during an emergency argued that the emergency management responsibilities required in a hurricane or other disaster are appropriately matched to all of public health's core functions. A Florida official noted:

"I think that everything we are given (which is basically the oversight of the system) is appropriate for public health. We are a logical choice [as lead agency] because that is our role and it includes coordinating with the hospitals. Coordinating that the health system is up and running and our traditional public health role: epidemiology and vector born diseases and injury prevention is also part of our role. Assuring access to care should also be our role (including everyone having pharmaceuticals that they need). And in the bigger picture would we have the capability to take care of all of these things." (FL official)

Those who supported the role of public health as the lead agency during emergencies expressed concern that there was no plan for public health to undertake that function, nor was there necessary support or funding. Those who believed that public health should *not* assume a lead role but rather take on a partnership or supporting role stated that, while it was appropriate that federal and state plans assign public health as the responsible agency for Emergency Support Function (ESF)-6 and ESF-8, public health did not have the skill set or staff to go beyond these duties and therefore must partner with other agencies. A Mississippi respondent explained that public health's primary role should be in the surveillance of health need:

“Public health should be working in collaboration with other agencies if for nothing else to articulate what problems exist from a medical perspective. For example, we have this many patients with special needs, this many with medications who have no way of getting medications, this is what happens when people dehydrate. Public health plays a role to articulate the health problems related to it.” (MS official)

Those who claimed that public health should not take on the lead role reasoned that public health should be in charge of more targeted health activities in conjunction with the capacity that the discipline brings. For example, public health's well-established capabilities in sanitation, injury prevention, post-acute phase disease care, and health education were of utmost importance in the Katrina response. In Mississippi and Louisiana, the public health response to address polluted water systems and poor environmental health conditions due to standing flood waters, lack of sewage facilities, and unrecovered bodies was effective. Because these functions were carried out relatively smoothly they have not received as much media attention as those aspects of the response that were problematic.

Public health's responsibility in providing direct health services during an emergency

Another theme concerned the extent to which public health agencies should provide direct services during an emergency response effort. The perspectives in this area were also mixed. A sizeable minority argued that public health has an obligation to supply direct health services, and this duty expands during an emergency response given the immeasurable need. However, the majority of interviewees (cutting across public health, hospitals, emergency

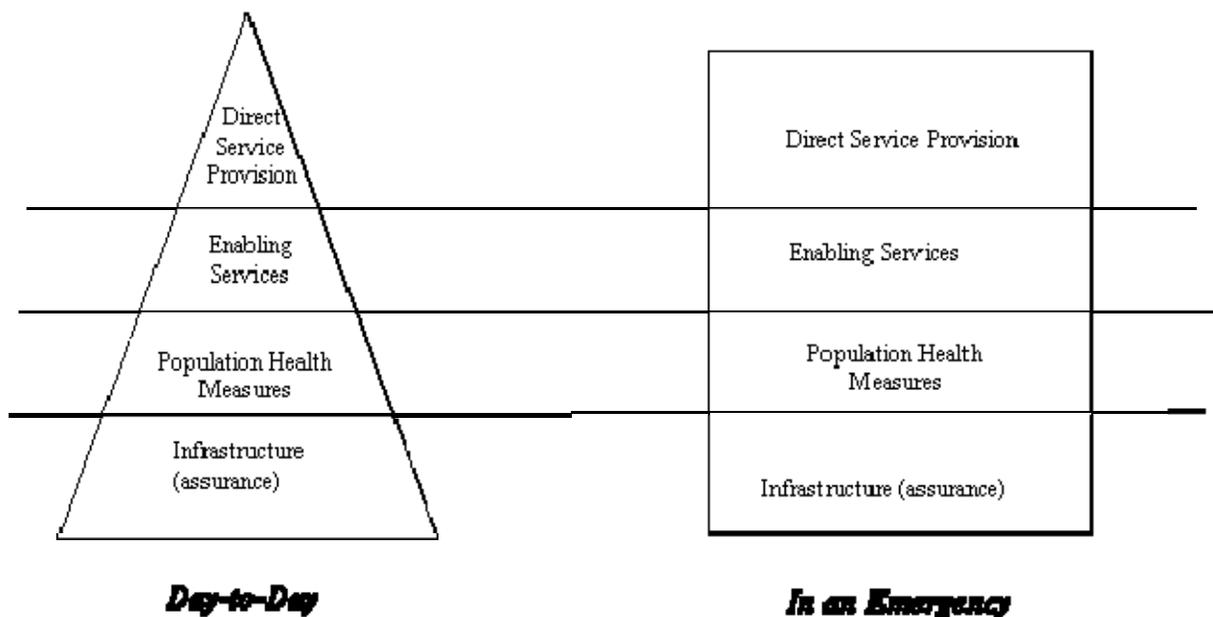
management, and other government agencies) were concerned that public health agencies do not have the skills or capacity to assume significant responsibility in providing direct health services.

Interviewees who asserted that public health should have responsibility for direct service provision believed that public health needs to be involved when the health care need outweighs resources, particularly in a disaster situation in which a significant part of the population has acute health issues requiring immediate attention. One Louisiana official remarked:

“Absolutely. It depends on the type of disaster because the private sector cannot do it alone. We [public health] must keep the capacity to expand open, because when the chips fall public health will be the one to treat the masses as the private sector becomes overwhelmed.” (LA official)

Another Louisiana official described a model illustrating the typical roles of public health agencies and the modified distribution of resources and activities in an emergency (see Figure 2). According to this perspective, the direct provision of health care services on a day-to-day basis constitutes a small portion of public health’s functions. However, when emergency strikes, the role of public health agencies changes and activities become more evenly distributed, indicating an increase in public health’s provision of direct health services.

Figure 2: The Distribution of Public Health Functions: Day-to-Day and in an Emergency



Despite the support from some interviewees regarding this altered model (right side of Figure 2) of public health functioning during an emergency, many shared concerns about how long public health’s responsibility to provide direct health care would continue after a disaster due to limited funding and the density of destruction. They argued that public health could be more efficient if it devoted more time to the educational arm of direct health services, such as informing people about evacuation and other emergency response issues, rather than providing health care services.

While a few interviewees asserted that public health agencies should provide direct health service provision, many public health and emergency management leaders cited obstacles to this approach. Interviewees maintained the belief that traditionally trained public health staff do not have the clinical skills needed to serve the population’s health needs and should have an oversight role only. Therefore, the scope of functions (Figure 2) would not shift markedly in emergency response. One Georgia respondent commented on the challenges when public health agencies had to staff a special needs shelter while caring for Katrina evacuees:

“Public health stood up one [special needs shelter] but didn’t put people in it because they didn’t have staff members who were comfortable providing the needed care (e.g.,

starting IV, doing procedures). Public health finally came to the realization that they have to carve out their role; the role of public health is assurance, but not providing care. Now, public health has more consideration to linking with home health agencies and nurse volunteers with different skills.” (GA official)

These interviewees thought that public health was already well-equipped to organize systems, develop information portals for health care providers, and ensure that the public receives health care. Public health agencies should be in control of asset matching in order to link providers with resources. One Louisiana leader remarked:

“Public health should say these are our goals and we want to enable you as a provider to work on the highest level possible.” (LA official)

The Integration of Emergency Response Functions and Approaches into Public Health Has Reshaped the Discipline

Another theme from our interviews concerned the integration of emergency response functions and approaches into public health and the challenges associated with that integration. Many interviewees noted that using Incident Command System (ICS) improved their response capabilities, but also generated tension between traditional public health and emergency management. More broadly, interviewees argued that the move toward emergency management requires public health departments to reevaluate their priorities, capabilities, and related staffing needs.

Public health’s integration of emergency management approaches and the associated challenges

The experience of Hurricane Katrina represents a clear post-9/11 milestone in emergency management public health integration. States that experienced the direct impact of the hurricane and states that were instrumental in the receipt of evacuees shared examples of how pre-storm training improved their response to Hurricane Katrina. This experience showed how well states incorporated these tools. However, it also revealed continued tensions between those desiring public health to fully embrace emergency management approaches and those in opposition. In particular, public health officials in the states directly impacted by Hurricane Katrina expressed

caution about the potential effects on other more traditional public health functions if public health transformed completely to an emergency management model, asserting that public health has skills in community assessment that would be overshadowed by exclusively using this model.

Katrina demonstrated how all states are using emergency management approaches, including the Strategic National Stockpile (SNS), Incident Command System (ICS), and the processes of the National Disaster Medical System (NDMS). In Georgia, the understanding of NDMS was instrumental in quality care for Louisiana evacuees:

“Public health staff were familiar with NDMS 2 years prior to Katrina. We thought we might have to participate with regards to the war and didn’t know how many casualties would be returning. We went to the VA [Veteran’s Administration] to get briefing on NDMS and 1 month before Katrina we did an exercise. We had familiarity and knew our respective roles.” (GA official)

In Mississippi, bioterrorism preparedness and the SNS were significant factors in the success of the Katrina response. Prior to the hurricane, the state gave public health nurses \$200 per month in standby pay as part of the bioterrorism grant to participate in emergency training and secured the commitment of these nurses in a disaster. A state leader commented:

“It made nurses commit ahead of time and they had to be up-to-date on training... By them signing up in advance they couldn’t wait to help. They were prepared.” (MS official)

Public health officials responded positively to using the ICS system, although it was clear that the adoption of this practice was not yet fully complete. In several states, interviewees described how ICS is becoming more integrated into public health. One Georgia official shared his/her thoughts on the matter:

“ICS was initially confusing but worked well over time and will work much smoother over time. It is an issue of knowing exactly what your role is; it is an innate response for individuals to want to help how ever they can and not stick with the small task assigned to them. The need to jump in and do whatever needs to be done must be controlled for the sake of organization.” (GA official)

Some public health officials believed that the discipline needs to embody all aspects of emergency management in public health preparedness. They maintained that public health is not traditionally part of a response culture, and should change its orientation from a “public health system” to a “public health response system.”

The Hurricane Katrina response indicated that, while public health agencies are becoming increasingly adept in using emergency management strategies, continued tensions remain between public health and emergency management due to differences in staff backgrounds, training, and working styles. Staff with backgrounds in military health and/or emergency management were appreciative of public health’s ability to engage in high levels of methodical analysis but were concerned about the field’s reluctance to assume leadership. They argued that public health training teaches the importance of examining an issue from all sides, but that the time required for such an analysis can impede action in emergency situations. This problem is partially attributed to the fact that traditional public health staff do not work in short-term, quick-response modalities like other fields. A Texas leader matter-of factly stated:

“Public health needs to have more of a shift change/sign out mentality similar to hospitals and emergency responders. Knowledge was lost in shift changes.” (TX official)

Despite increasing acceptance that emergency management needs to be incorporated into public health’s focus on disaster preparedness, several public health leaders warned that the discipline cannot completely adopt this model. Public health needs to retain its intrinsic qualities and capacities related to care of the public and understanding of community health needs. One Mississippi respondent commented:

“Public health folks learn the vernacular of ICS but we still have to look at the people. ICS is not specifically designed to totally encompass Public Health. It is not them versus us. The emergency folk tell me I can’t go out alone, that it’s a war zone, but I know the people. How does it work with public health and emergency response? We learn the terminology of ICS but you still can’t forget public health. The people are missing as a part of this. You have to address and survey the needs of the community.” (MS official)

Many interviewees were concerned about the limitations of taking an exclusively military focus in emergency response. In Louisiana, there was praise for the military’s organizational

skills, yet some interviewees acknowledged that security concerns need to be balanced with empathy and a more intimate approach.. One respondent remarked:

“The military did a great job and they understand a military detail, but they ran the Superdome like a military operation. They need to have a more touchy-feely attitude. For example a bus got stopped at midnight and their bus got searched while all of the occupants were in need of care and did not need to be searched. I think this is another lesson we need to look at but we need to cross-train the military for domestic details.”
(LA official)

Impact of emergency response on the discipline of public health

This study of the response to Hurricane Katrina also provides insights on how the newfound emphasis on preparedness has affected the discipline as a whole. Interviewees noted that the emphasis on emergency management has raised the visibility of public health in the community, focused more attention on the core function of assurance, and emphasized new partnerships. In addition, the emphasis on emergency response has introduced new priorities in public health staffing and related capabilities.

Interviewees noted that the focus on preparedness and emergency management methods has changed the way public health agencies perceive their mission and their responsibility to the community. For many southeastern states, which have traditionally viewed public health only as a “safety net” agency, the Hurricane Katrina response has propelled public health into a more prominent position. Interviewees argued that emergency response shifted attention toward the assurance function of public health and has broadened public health’s responsibilities to assume more control in linking health services. In addition, interviewees reported that the regular exercising for emergency readiness has forced public health to build relationships with agencies that may be beneficial in responding to future health issues. One leader stated:

“Exercises put us in better shape to respond to anything. It made them [public health] have conversations with long-term care facilities and faith communities for less acute needs. For example, the partnerships with the faith community also showed the value of additional partnerships-looking at nontraditional partners and trying to push down to the most local level by asking who those nontraditional partners are.” (GA official)

Public health staffing needs have changed in the wake of the Hurricane Katrina response, especially with respect to nursing and disease surveillance. Interviewees explained that the shift towards emergency response has threatened to diminish the current pool of nurses because they are less comfortable with this role, as they have received less training in this area and the job requirements are generally less well articulated. One-third of public health staff consists of nurses, and public health already faces obstacles in retaining and adequately compensating these nurses. As public health departments receive funding for staffing and training related to preparedness, key questions loom about nursing and the general public health staff structure-- namely, what nursing capacity is required during an emergency and how is the nurse's role defined between emergencies?

Additionally, interviewees indicated that certain recent hires are likely to benefit public health's disease monitoring and clinical care activities. Interviewees described how preparedness funds have been spent on hiring surveillance nurses and enhancing lab techniques, thus augmenting the quality of disease surveillance activities in general. This finding is consistent with other studies that have indicated that the preparedness "all-hazards approach" has facilitated investments in multiple-use systems for the entire public health system (Katz et al., 2006). One Mississippi official hypothesized that staff enhancements in one area are likely to produce benefits in other aspects of public health, such as clinical programming:

"So basically we have enhanced the epidemiology surveillance function and one might argue that this may relieve pressure from other staff so they can spend more time in clinic operations. If you enhance one vital activity it provides staffing to make that function independent. We do have extra manpower in our districts as a result of terrorism/CDC monies. This may indirectly benefit heavily clinical programs." (MS official)

IMPLICATIONS FOR PUBLIC HEALTH

This analysis of public health and Hurricane Katrina illustrates how far the discipline has progressed in developing emergency response capabilities and adopting new organizational approaches (e.g., ICS). This study also reveals that states continue to grapple with how public health agencies should function during disasters, how the assets of the discipline can be maximized, and how public health works with other agencies not only during a crisis but in day-to-day activities. Here we offer some considerations for both practice and research.

- **Clearly define the role public health agencies will play in a disaster and develop a plan that institutionalizes those roles.** The response to Hurricane Katrina highlighted the need for the public health system to reflect on how a public health agency should operate in a community, both during disasters and in daily practice. While several public health leaders asserted that public health should be a lead or coordinating agency in emergency response, the continued resistance to this model (e.g., public health lacks coordination skills) highlights the need to revisit this issue and formalize the structure of the disaster management process. If public health assumes a lead role, staffing and capacity need to be augmented. On the other hand, if public health has a support role, functions and boundaries need to be defined. Clearly, continued discussions are necessary regarding public health's emergency response role relative to other stakeholders. The relevant organizations within each community should meet to develop a coordinated plan that clearly delineates each organization's roles and responsibilities. Without such a plan, there is no accountability, and response efforts will continue to be hampered by confusion over roles and responsibilities.
- **Develop a plan for how medical care services will be provided in an emergency.** Within the broader emergency response plan, public health agencies must come together with their response partners to determine precisely how medical care services will be provided in an emergency and by whom. The analysis of public health's responsibility in providing direct health services revealed two opposing points: a) public health must be involved, given the extensive need during emergencies; and b) public health has limited skills to provide these health services and should focus on its assurance role. This tension is important and indicates that public health should consider if and how its capacities (e.g., staffing, training, resources) can be improved to incorporate more direct health service activities. If it is decided that public health's role should only encompass the assurance of services, the field of public health needs to critically examine how it is going to relinquish any direct health service responsibilities and partner with hospitals, community health organizations, and other providers to streamline the provision of these services.
- **Work to incorporate the best elements of public health and emergency management into disaster response plans.** While the response to Hurricane Katrina revealed that

significant progress has been made in bringing the public health and emergency response sectors together in terms of communication and understanding, there is still more to be done. From the perspective of several public health officials interviewed for this study, the merging of the two sectors has not fully reflected the assets of both. The experience of Hurricane Katrina indicates that there are several aspects of traditional public health (e.g., ability to work in communities, use multidimensional assessment approaches) that should be reflected in emergency response planning and training. Future studies should also explore how principles of public health are communicated to the new public health workforce (e.g., traditional emergency responders).

- **Identify opportunities to apply emergency management approaches in more traditional public health functions.** Many public health officials hypothesized about the ways in which emergency management has influenced the discipline of public health, particularly with respect to new staffing and new capacities. This study further endorses research that explores how to maximize the multiple benefits of integrating emergency management resources into other public health activities (e.g., how the principles of ICS can be used to address chronic disease).

CHAPTER 5: WORKFORCE ISSUES

In this chapter we examine health care workforce issues that arose during Hurricane Katrina and its aftermath. Workforce issues pose a particularly complex challenge for public health. Other than providing regulatory oversight and managing its own clinics, public health has no role in managing the workforce of public and private health care organizations. At the same time, public health is the designated agency responsible for ESF-8: Health and Medical Services. The role of public health in this capacity is to *assure* that health and medical services are provided to the public, not necessarily deliver acute health care services. However, many view public health as the health care safety net for the community when disaster strikes. Whether or not workforce management is an official public health function, hospitals, nursing homes, and other health care organizations, as well as many members of the public, often rely on public health agencies to provide stability and control in a situation that is overwhelming and chaotic.

Health care workforce issues are especially challenging for another reason. The process of building a health care workforce is typically slow and deliberate by design. Job candidates are carefully screened and their credentials verified. After all, these individuals are being hired to perform duties and make decisions that directly affect people's health and well-being. In contrast, during an emergency, organizational structures and processes—and the related paperwork—are often left behind or lost, or cannot be procured or established in time to meet the need of the immediate crisis. During a crisis, workforce needs must be met by attempting to strike a balance between the desire to maintain established organizational procedures for the workforce and the immediate demands of those in need of care.

Adding to the complexity of workforce issues is the fact that the health care workforce provided services in a range of different settings during the response to Hurricane Katrina including triage centers, mass care shelters, and special needs shelters. Triage centers were areas set up to receive evacuees, for example in Georgia at the Dobbins Air Force base; the medical conditions of the evacuees were assessed at these triage centers. People who needed immediate acute care were sent to a hospital; nursing home patients were sent to a nursing home in the receiving region. And, evacuees with no immediate problems were sent to a shelter. Shelters of

various sizes were set up by many different groups (e.g., faith groups). However mass care shelters established by the Red Cross housed and fed large numbers of evacuees (in some cases 2,000 - 5,000 people); many of these large shelters contained improvised clinics to provide medical support to the shelter residents. Special needs shelters were centers set up by public health officials to care for people with a wide range of ongoing medical needs such as continuous oxygen, mental health problems, or functional limitations.

As seen in this chapter, many of the workforce problems that arose in the aftermath of Hurricane Katrina are not fully within the scope of public health's control. At the same time, the public health workforce did play an important role in addressing health care needs in the aftermath of the hurricane. We explore the problems that arose, and discuss the implications for planning to address similar emergencies in the future.

KEY OBSERVATIONS

Health Care Staffing Needs Caused Problems for Hospitals and Nursing Homes Leading Some to Call on Public Health for Assistance

Hospitals directly affected by the hurricane faced many staffing challenges. There were situations in which the public flocked to local hospitals seeking care and shelter, overwhelming staff capacity and creating security problems. In general, few health care institutions plan for sheltering and feeding people from the community during a disaster, yet hospitals are often viewed by the public as a refuge. As one hospital official stated,

“We emptied out the long-term patients who had places to go. So we planned for beds but I never planned for Public Health capacity.” (MS Official)

In other hospitals, storm damage and flooding isolated hospitals from outside assistance for a number of days. Health care personnel were exhausted and faced increasingly stressful conditions as generators failed, supplies of food and water dwindled, and basic patient care supplies became scarce.

In the hospital setting, the initial staffing need during a disaster is for additional physicians and registered nurses who can deliver care to an influx of people with acute injuries, illnesses, and chronic conditions. If the emergency lasts longer than 24 hours, there is a demand

for “relief” staff so that medical providers can obtain ample rest . In events such as hurricanes where there is advance notice, most hospitals will call in off-duty staff, discharge as many patients as possible, and cancel elective procedures. Many hospitals in the states we visited require staff to participate in disaster response as a condition of employment, and staff are allowed to bring their families and in some instances, their pets.

Nursing homes also require additional staff in emergencies, primarily practical nurses and nursing assistants as opposed to physicians and registered nurses. Volunteers can play an important role, but only if their skills match the needs of the facilities. As one official stated,

“The problem we had is that we had a lot of [general] volunteers, but we needed CNAs and LPNs” (LA Official)

Nursing homes differ from hospitals in that the former are more likely to evacuate in anticipation of hurricanes or other predictable emergencies. With the help of the Nursing Home Association staff, 21 nursing homes in Louisiana were evacuated pre-event and another 35 were evacuated after the storm. Nursing homes are also more likely than hospitals to be part of a larger chain, thus increasing their ability to transfer patients out of the path of the hurricane and in some cases to send staff to facilities in need. Although this occurred to some extent in Louisiana and Mississippi, the precise scope is unclear.

Although hospitals and nursing homes in the directly affected states had their own plans in place, the magnitude of Hurricane Katrina exceeded the ability of many to meet staffing needs. Although a few hospitals that are part of larger corporations were able to request and received additional staff from other locations, such as from Federal Disaster Medical Assistance Teams (DMATs), most hospitals had little capacity to increase their staffing. In addition, emergency conditions lasted more than 24 hours, thus increasing the strain on the existing staff.

Hospitals and nursing homes receiving evacuated patients in the states we visited were faced with large increases in patient volume for an extended period of time. Although a few hospitals received assistance from Federal DMATs and some brought in nurses from other areas, most hospitals had few additional staffing resources. One hospital official in Florida expressed frustrations with the staffing problems encountered during the storm,

“When we requested nurses and physicians the [emergency management] bureaucracy was so thick we could not get the people we needed in the time we needed them... This is a work force challenge.” (FL Official)

The Role of Public Health in Helping Hospitals and Nursing Homes with Workforce Related Issues is Not Well Established

While our interviews confirmed the enormous need for health care staff during the event, the research did not result in any clear answer as to what the role of public health agencies should be. Public health does not have surplus health care staff for mitigating surge needs. However, there has been increased pressure on public health departments (through the CDC PHEP and the Bioterrorism Hospital Preparedness Program (BHPP) Cooperative Agreement requirements administered by the Assistant Secretary for Preparedness and Response (ASPR)) to develop a cadre of volunteer health professionals to rely on in a public health emergency (such as the need to vaccinate populations in a short period of time). There is also pressure on hospitals and public health departments to collaborate to develop groups of volunteer health professionals who are available to meet the increased need for health care providers in the hospitals, in shelters, and in the community during disaster situations. This organized effort to increase the workforce during emergencies is still early in the development phase in Louisiana and Mississippi.

State regulations, Medicare rules and accrediting bodies such as JCAHO require health care institutions to establish disaster plans for responding to emergencies, and these plans include a staffing component. However, each institution is responsible for its own staffing. The workforce details of these disaster plans are left up to each institution, and public health is typically not involved and thus the role that public health agencies can or should play is not well established. Moreover, the extent to which the hospital disaster plans are integrated with public health preparedness plans was uncertain.

Coordination of Health Care Personnel Was Difficult in All Care Settings

During which there was tremendous need for medical personnel, there were, fortunately, many health care professionals willing to volunteer their time and efforts. However, while the supply of medical personnel may have been sufficient, systems were lacking to coordinate volunteers and match their skills to sites with identified needs (clinics, shelters, etc.).

For example, interviewees who helped with receipt of evacuees in Georgia reported that the disorganization of arriving health care volunteers created chaos. As a result of this experience, Georgia added to their emergency plans an access point for checking in and briefing volunteers. Louisiana and Mississippi also had many volunteers, yet little organization for processing and training them. At the EOC in Baton Rouge, Louisiana employees from the Department of Health and Hospitals attempted to match volunteers with areas of need. However, communications were so poor in the affected regions that it was unclear where health care services were being provided and which sites were in need of personnel.

An overwhelming number of interviewees noted problems in matching available resources to needs. For example, in Houston, available personnel were overwhelmed by the volume of evacuees (approximately 68,000) who arrived at the triage center in a short period of time. One interviewee reported that DMAT teams were requested but never sent. The Houston Fire and Police departments worked closely with the medical team to provide manpower for the convention center, as well as transportation and other logistical support. Health professional volunteers from the local hospitals and medical schools, as well as personnel from the health department, helped staff the triage center.

To accommodate the large number of evacuees with varied needs, the triage teams had to make real-time adjustments to their plans and maintain flexibility. Interviewees reported that triage procedures were generally satisfactory. Sick patients who required hospital care were promptly identified and those requiring further medical attention at the shelter were given care at clinics set up at the shelter. One Texas public health official suggested that, in the future, they more effectively utilize community resources, such as community clinics, to provide medical care:

“I want to establish a closer relationship with the community based clinics to help do the work and not create an imaginary structure that may never be used – we want to build on structures already in place.” (TX Official)

Staffing needs for triage centers could change rapidly depending on who arrived in need of care. For example, in Georgia, the NDMS was activated and a triage center was established in a military hangar to receive adult patients who had been evacuated from hospitals in Louisiana and Mississippi. A medical team from the Department of Veterans Affairs (VA) was poised to

accept and triage the evacuated patients, who were expected to bring their medical records, at the hangar and then transfer them to one of the region's 37 NDMS participating hospitals in the Atlanta region, all of which were prepared to take patients. However, the patients arriving at the triage center came not only from hospitals but also from nursing homes, and few had medical records. In addition, many pediatric patients arrived at the center. Although the medical team did not have the equipment or the training to care for children, staff in the operations center were successful in quickly bringing in physicians, nurses and pediatric equipment from Children's Healthcare of Atlanta.

The Georgia triage center not only received large volumes of hospital and nursing home patients, but also evacuated citizens in need of medical care. The arrival of citizens in need of care was totally unexpected and thus created a staffing problem. In order to adequately triage the large volume of patients and evacuees, a second ICS team was quickly assembled and brought in to manage a second hangar. Volunteer physicians and nurses, many from hospitals in the metropolitan Atlanta area, staffed this hangar and triaged evacuated citizens for medical needs before they were sent to a shelter.

Mechanisms Were Lacking to Verify Credentials and Skills of Volunteers

A related problem was the lack of an agreed-upon method for verifying the credentials and skills of the health care professionals who volunteered to help. As many interviewees noted,

"People just came and showed up to say they were here to help." (MS Official)

This situation created a dilemma for triage centers, hospitals and shelters, eager for help, yet concerned that volunteers had proper credentials and training to provide quality care. There was special concern about the potential liability of hospitals and public health agencies in the event a volunteer accidentally caused harm to a patient.

State licensure laws limit practice to those professionals licensed in that state. Louisiana relaxed those requirements and allowed licensed professionals from other states to practice; however, Mississippi did not. In states that were not directly affected by the hurricane there was not as much of a problem with unsolicited out-of-state volunteers. However, even though a volunteer health professional holds an active license to practice in that state, there is no way to promptly verify his or her license or to determine skill levels. One Mississippi hospital accepted unsolicited volunteers with a Mississippi license, but then either limited their practice to low-risk

activities such as administering tetanus injections, or paired the volunteers with qualified hospital employees.

There are efforts underway in each state we visited to improve the coordination and to address the credentialing issue. In Texas public health officials are in the process of organizing a registry of volunteers and planning how to mobilize a workforce for future emergencies. They have identified medical schools, professional associations and licensing boards as potential sources of volunteer health professionals and are also exploring ways to make better use of federal, state and local personnel assets.

A public health official in Louisiana suggested a tiered approach to categorize the levels of ability possessed by volunteers--a ranking system for volunteers to insure that those volunteers sent into the disaster sites have the required skills to provide quality care. Other options for recruiting volunteers include a national registry. There are currently federal efforts to provide this resource through HHS's Emergency System for Advanced Registration of Volunteer Health Professionals (ESAR-VHP) program. However, the system has not been fully implemented in any of the states that we visited.

Florida has taken steps to build a base of volunteers after its experience in past emergencies such as Hurricane Andrew. One public health official explained that, when a hurricane is in the gulf, 5000 volunteers are initially e-mailed. When the storm is 48 hours from landfall, volunteers are placed on standby. Florida uses an online database both to track standby volunteers and to allow volunteers to indicate their availability. Florida has also pre-credentialed approximately 400 nurses from North Carolina.

Although Florida's practice is exemplary in comparison to other states we visited, there are still many difficulties in establishing a pre-credentialed on-call volunteer health professional workforce. Florida has been involved with implementing the ESAR-VHP program, but some interviewees stated that that the program is moving too slowly. One official was concerned that keeping credentials up to date would be a major issue even as the new system becomes more widespread.

"We work on bringing nurses through other states and credentialing is a huge problem. I cannot move staff from one hospital to the other and that is really absurd. I think ESAR-VHP is moving very slowly and this is a tremendous problem. Credentialing people within the state if you do not have credentials in the hospital then state credentials should

be enough during a disaster. How can we have more flexibility in the medical system?...Liability and reimbursement are the major issues for credentialing.” (FL Official)

Public Health Provided Valuable Assistance at Triage Sites and Mass Care Shelters

Local and state public health departments had varying roles at triage sites and general mass care shelters. In some cases, public health’s role was to monitor for infectious diseases, while in others, they provided nurses to help staff the triage centers and shelter clinics. In Georgia, the public health epidemiology team assessed residents of the shelter to identify medical conditions in need of treatment, such as diarrhea, respiratory infections, and cuts and sores. The team took an initial health status history on each resident and then returned to the shelter each day to monitor conditions. The public health nurse on the epidemiology team worked in conjunction with the Red Cross nurses and the nurses in the shelter’s clinic.

At times, public health personnel provided treatment at mass care general shelters. Such shelters, run primarily by the Red Cross, were opened in all of the states we visited and many stayed open for weeks, sometimes housing more than 3,000 evacuees. The Red Cross typically does not provide medical care beyond first aid, and was thus unable to provide sufficient staff to address the medical needs of a number of evacuees, mostly for chronic conditions. In various locations, medical clinics were set up in or adjacent to the shelters to treat injuries, illnesses and chronic conditions. Local health departments exercised a role in staffing these clinics, working alongside staff from medical schools, hospitals, and other volunteers. In addition, the US Public Health Service federalized a group of volunteers from Southern California so that each day, physicians and nurses could be assigned to help in different places. Louisiana State University helped organize and staff clinics along with volunteers from the local area and from out of state. But again, the major problem was matching staff resources to areas of need.

In Georgia there was a different organization of health care services, which could be a model for public health. A “Mega Center,” organized by the Red Cross and supported by the Georgia Emergency Management Agency (GEMA) and other local agencies, was set up close to the shelter and housed all of the health and social services needed by shelter residents. Health care was provided by volunteers from a local health system and included social workers and pharmacists. Social workers proved invaluable in discharge planning, and the pharmacists

worked closely with the physicians to provide primary care medications and medication consulting. Involving pharmacists in the care of evacuees worked well in Georgia, and this practice may have resulted in fewer emergency room visits and hospitalizations for evacuees with chronic conditions requiring regular medications. Often, the pharmacist was able to decipher medications that residents were taking and to recommend doses based on what the super center had available. Thus, evacuees could go to the Mega Center to obtain all of their needed health and social services.

Staffing Special Needs Shelters Was a Major Problem

Special needs sheltering during a disaster response has been a problem in every state we visited, whether in the aftermath of Hurricane Katrina or during a previous hurricane response. Because the issue of special needs shelters will be covered in detail in Chapter 8, we will only briefly touch upon a few points relevant to workforce issues here. Although public health officials generally agree that state and local public health agencies are responsible for *assuring* the care of special needs populations, there are different views as to who should *provide* that care.

“Special needs shelters pose tremendous challenges. We don’t have the skill set and staff. We can’t do it all alone. Our partners are critically necessary. We don’t DO these things but must make sure they are done.” (GA Official)

In Georgia, for example, state public health officials assert that the role of public health is ensuring that people receive care, but not providing the care. In Texas, public health staff set up special needs shelters, but Texas officials believed that public health workers needed more first response training in order to be better prepared to assist special needs populations in future emergencies. In Mississippi, hospitals and public health agencies staffed the few special needs shelters that were established.

Perhaps the most challenging workforce issues emerged in Louisiana, where a legislative mandate required the public health department both to open and staff special needs shelters during public health emergencies. This requirement has posed a significant challenge for the health department because they lack sufficient personnel to staff the shelters, and the majority of their health care personnel either have no training to care for special needs patients, or have not

provided patient care in many years. In addition, the patient acuity level was much greater than anticipated.

“The staff is more comfortable with the special needs shelter, but it turned into much more during Katrina. It turned into (GI bleeders, gunshot wounds, hospitals were off loading to us) a field hospital over night. So everyone was coming for help from us. Nurses who do STD, well child exams, pap smears and pelvic exams were running an ER. We were doing IVs, drawing blood...” (LA Official)

The challenge increased after Hurricane Katrina because the volume of special needs patients was also much greater than expected.

The Physical and Emotional Stress of the Disaster Intensified Workforce Problems

All of the workforce issues highlighted in this chapter were made more difficult due to the physical and emotional stress experienced by those working during and after the hurricane. Long hours, less than ideal working conditions, and a sense of tragedy were the norm in all of the response sites. Health care workers were exhausted. Some interviewees described workers falling asleep on the hospital floor. Others noted crowded and austere living conditions such as sleeping in a tent with 386 other people. The situation was made more difficult because there was no place to escape the disaster. One interviewee remarked,

“There needed to be a tent or something during the event and not just after, where the workers could release. You need a place to go to and someone who is not actually part of the disaster to run it; someone from the outside to come in and listen and let people unwind.” (GA Official)

Another interviewee reported,

“My (nursing) staff worked 16 days without a day off; no one came prepared and no one had anything. We took care of 11,000 people.” (LA Official)

Although health care workers in all areas were stressed by the emergency, the situation was much worse in states directly affected by the hurricane, where the workers were also victims of the storm. As one Mississippi official stated,

“Health care providers worked around the clock without knowing the status of their own home and family.” (MS Official)

“We did the best we could with what we had. We did the best we could.” (LA Official)

In a sense, one of the key lessons of Hurricane Katrina lies in the difficulty health care personnel had in serving as caretakers when they too were victims of the disaster. Many responders suffered emotional distress over their own losses or from observing tragedies first-hand.

“One of our emergency responders showed up dazed and he lost his home and they told him to go home but all he wanted to do was work. It was very stressful. We had to get mental support for our folks to deal with it.” (MS Official)

Others experienced (and are still suffering from) longer-term mental health conditions such as depression and post-traumatic stress disorder. In addition, some health care workers were victims not only of the storm but also of the strain of rebuilding the community and health care infrastructure. One public health official stated,

“We didn’t think enough about mental health. We underestimated the stress and strain on our own workforce...That is the invisible thing that has to be addressed.” (MS Official)

IMPLICATIONS FOR PUBLIC HEALTH

In all the states we visited, there was a clear need for additional health care personnel to assist with the surge in many of the hospitals, the high volume of patients and evacuees moving through triage centers, and the primary care needs of the general shelter population as well as the specialized care needs of those in the special needs shelters. Further, there was a need for “relief” staff in all care settings as the emergency extended longer than 24 hours. Although the number of volunteer health professional staff may have been adequate to meet the demand, there was poor matching of staff resources to places of need. This was likely the result of breakdowns in communications as well as a lack of organization and coordination. Other major barriers to effectively using volunteer health professionals were lack of systems for verifying licensing

credentials and determining skill levels, state laws prohibiting legal practice by health professionals licensed in other states, and liability and reimbursement concerns.

Most of these issues have no easy solutions. While there are steps that public health agencies can take to improve their internal response capability, many of the most significant questions raised in this chapter ultimately require planning and coordination across the medical and public health sectors. Who should be staffing a hospital when hospital staff themselves are victims of disaster? How can the immediate health care needs of the injured and the ill be addressed while also ensuring that adequate organizational safeguards are in place to check and approve the credentials of health care volunteers? Who is responsible for managing those volunteers and ensuring the quality of their service?

The development of standardized procedures might be useful to address some of the needs described in this chapter, but uniform standards would be nearly impossible to implement because workforce licensing laws are state-based. Each state will ultimately need to make its own decisions about how workforce needs can be better addressed in future crises.

Although some significant issues are not likely to be resolved soon, we note the following issues that might be given additional consideration in preparing to respond to future emergencies.

- **Consider ways in which public health can build on its traditional roles to assist other health care organizations in addressing workforce issues.**

Although many interviewees felt that the role of public health should be limited to assuring that care is delivered to the populations at risk, most recognized that public health must be involved in planning for health care workforce needs during a disaster. While public health agencies cannot keep extra health care staff on hand to assist during a crisis response, there may be ways for public health to use its more traditional roles as a means of assisting in the process of meeting workforce needs. For example, public health could use its traditional responsibility of educating the public about sheltering during a disaster in order to direct people to appropriate shelters and relieve some of the hospital staffing burden that occurs when the public tries to use hospitals as a source of shelter. This could be accomplished by further publicizing the location of general shelters, and educate the public about what to do (and not do) during a disaster via public

information campaigns. In addition, preparedness information distributed by public health agencies should encourage people to go to hospitals only in the event of injuries and illnesses.

- **Develop systems to better match personnel resources with identified needs.**

The difficulty faced in coordinating health care personnel and matching them with identified needs was a common theme that emerged in many of our interviews.

With this in mind, state and local health departments must work with their public health response partners to develop systems that can better assess needs, coordinate resources, and allocate them across affected areas.

- **Identify means to attend to the emotional and mental health needs of the population, including public health staff who are themselves victims of disaster.**

Many of our interviewees experienced physical and/or emotional stress first-hand or knew someone who did. Short-term and long-term mental health issues were more pronounced than anticipated and were particularly prevalent among workers who were also victims of the storm. These issues need to be addressed.

- **Give special consideration to the realities of staffing special needs shelters during an emergency.**

Staffing the special needs shelters was especially problematic during the hurricane and remains, to this day, an unresolved issue.

Although public health officials generally acknowledge that state and local public health staff are responsible for assuring the care of special needs populations, it is inexplicit as to who should actually provide this. The experience in Louisiana in particular highlights the need for more attention to the realities of staffing special needs shelters during a major disaster where large numbers of displaced people require sheltering.

CHAPTER 6: MEDICAL SUPPLY AND PHARMACEUTICALS

Responsive medical support in the form of medical supplies and pharmaceuticals was crucial to enable health care providers to provide medical care to hurricane victims and evacuees. Medical supplies and pharmaceuticals were also needed to support evacuees with chronic illness and/or those who require long-term medications or medical equipment. A variety of public and private organizations were involved in supplying and distributing medical supplies and pharmaceuticals in the aftermath of the hurricanes, but, as will be discussed in this chapter, there were noticeable gaps in the supply and distribution process.

In some cases, the available supply of pharmaceuticals and medical equipment was insufficient to meet the needs of the population, and distribution processes were also problematic. Problems also arose surrounding the extent to which various public health and other government agencies as well as nongovernmental and private-sector organizations were successful in coordinating their efforts to provide medications and equipment to those in need. At the end of the chapter, we discuss the implications of our findings for public health and offer some recommendations to improve planning for future disasters.

KEY OBSERVATIONS

There Was No Comprehensive System for Managing Supplies

The systems in place to match available supplies with need were inadequate during Hurricane Katrina. Many interviewees noted that there were many supplies from a wide array of sources (e.g., from other states through EMAC, private companies) flowing into the affected areas, but there was no effective way to inventory the supplies (i.e., identify and catalog what they were receiving) and allocate them equitably and efficiently. Many public health officials noted they did not always know exactly what supplies had been sent. This had negative implications for patient care as it created delays in getting the supplies out to people in need. One official in Louisiana stated that,

“It [managing supplies] definitely needs to be more organized. A lot of the time was spent on the phone (sometimes from 7 am – midnight) talking to people who wanted to help.” (LA Official)

If the resource allocation system had been more organized, officials would not have had to turn to these more time-consuming and labor-intensive methods, such as phone calls, to take inventory and match supplies with needs.

There were some important gaps in supply, which appeared to have affected some states more than others. Public health departments in some states were overwhelmed with calls from hospitals or individual patients in need of medications. For example, a public health official in Mississippi noted:

“Initially, there was trouble with everything...we were getting individual calls that someone in a rural county was going to die if they didn’t get their meds... We just didn’t turn down any calls and help them get help – there’s chaos in that. It was very stressful”.
(MS Official)

Other reports from the region have also noted that on occasion, support teams in the field lacked supplies. For example, interviewees noted that Disaster Medical Assistance Teams (DMATs) arrived in disaster areas without adequate medical equipment and drugs and there was a lack of standardization among some types of equipment, which inhibited efficient delivery of care.

Supply problems also arose in the states receiving evacuees. Officials in Georgia noted that when receiving hospital evacuees they did not have the supplies that they needed for effective patient care.

“We didn’t have enough medical staff and equipment to fully assess people at the hangars [triage centers]. Now we are looking at what equipment we should have but didn’t.” (GA Official)

Some of these supply problems were due to lapses in communications. For example, officials in Georgia were not expecting to receive any pediatric cases and thus did not have pediatric equipment or specialists on hand. Fortunately, as infant evacuees began arriving, Georgia officials were able to identify suppliers and obtain the needed equipment. As one official noted,

“The other unexpected surprise was the receipt of pediatric patients. In their [National Disaster Medical System (NDMS)] plan they were only prepared for adults and did not

have pediatric equipment. They called Children's Healthcare of Atlanta and were immediately sent the needed equipment.” (GA Official)

In response to this problem, officials in Georgia are updating their NDMS plan to include the personnel and equipment needed to treat a broader range of patients and conditions.

Supplies Were Not Always Well Matched with Needs

Many supply problems arose because the resources flowing into the area were not well matched with needs. Such mismatches created shortages in some areas and surpluses in others. As one Mississippi official put it:

“...there was no mechanism for needs matching. Ice, water, etc just showed up. There were real needs but they weren't matched up correctly.” (MS Official)

The problems during the event appear to have stemmed primarily from an inefficient, and in some cases, nonexistent system for organizing and managing supplies in any centralized way. Effective matching requires coordination between state and local officials. At the local level, communities need the ability to promptly conduct a needs assessment, the purpose being to request the specific set of resources that will serve their needs. At the state level, officials need to identify what resources are available and determine how to best allocate those resources to address the needs across the affected areas.

Interviewees suggested various options for addressing future problems with the management of supplies. For example, some suggested that it would be useful to develop a system that could inventory and track the distribution of supplies during a disaster. In addition, some of our interviewees noted that standardized inventory lists could be used to help with the set-up of clinics or mobile pharmacies during a crisis.

“We need to create a pallet or list of things you need in order to open a clinic. We created a system. Otherwise you would get donated parts of a clinic but not what you needed in total.”(LA Official)

Inventory lists would be useful in producing a realistic assessment of the needs in a community and thus enable a better matching of resources with needs.

The Size of the Disaster Contributed to Supply Problems

The scope and magnitude of Hurricane Katrina also contributed to supply and distribution problems. The scope of the disaster was greater than expected and surpassed what most facilities had planned for. As a result, their stockpiles of food and other supplies were not sufficient to meet their needs in the immediate aftermath of the storm. To address this concern, public health officials in both Louisiana and Mississippi plan to revise their stockpiling recommendations. In Louisiana, one official articulated that,

“For Katrina for the most part everyone had 3 to 5 days worth of supplies. We are telling them this year to have 5 to 7 days worth of supplies.” (LA Official)

Mobile hospital units proved to be very useful in the response to Hurricane Katrina. However, due to supply problems in Mississippi, interviewees noted that in the future they would recommend that the mobile hospitals increase their stockpiles of supplies.

“In a disaster [the mobile unit] has stuff to keep it alive for the operational period. We had a 3-day supplyThat was nothing. Florida changed to 5 days. We recommend 10 days.” (MS Official)

There Were Shortages of Medications and Supplies for Special Needs Populations

Many gaps in supply involved medications and medical equipment required by people with special needs. Shortages of prescription medications created significant strain on providers' ability to deliver care, particularly to patients with chronic medical conditions.

“There was a lot of fear about contagious infections in the aftermaths of disasters but probably more problems arose from chronic disease because they couldn't get medications” (MS Official)

Many patients with chronic medical problems either did not receive their medications in a timely fashion or did not receive the right medication at all.

Other reports from the region have also noted shortages in supplies. For example, Kerber (2005) described how evacuees with diabetes were often unable to obtain adequate medications. Our interviews revealed a similar problem. In some cases, the lack of medication caused diabetic patients to become acutely ill, to the point that some people developed complications requiring hospitalization.

In addition to medication shortages, deficiency of oxygen supplies generated major health care emergencies in some states, as one public health official from Louisiana noted:

“We had a night with 70-90 people in O2 wards and we could not find oxygen anywhere in the state. The state hospital gave me the last supply that they had.” (LA Official)

Health departments spent time and resources attempting to replenish oxygen supplies. In many cases the local health departments found the needed assistance from local and national pharmacies willing to donate supplies or fronted supplies on good faith.

Tragically, the lack of needed medical supplies for special needs populations ended in death in some cases.

“One of the ventilator facilities had deposited patients without ventilators and they had dropped them off at Charity, LSU and the dome. We were there to do the assessment and there are 8 ventilator-dependent patients without ventilators. They were all just lying there and the doctor said, “there is nothing to do except make them as comfortable as possible because they are going to die.” There was some electricity but there were no ventilators.” (LA Official)

While the lack of ventilators was a key reason for the death of these patients, it was a fundamental gap in planning and communication that was the underlying source of this problem. In the future, to avoid this type of problem there will need to be better coordination and planning amongst the organizations responsible for providing care for special needs populations.

Both Public and Private Organizations Contributed to the Response, But Some Efforts Lacked Coordination

In the aftermath of the hurricane, both public and private organizations provided medications and other supplies to evacuees. In Florida, for example, the state public health department had caches of supplies pre-stationed around the state (coming from all directions). This preparation allows the state to push supplies to the affected areas as soon as a hurricane subsides.

“There is statewide coordination. The state knows what is happening with the counties and our role is the support role. We have Logistical Staging Areas (LSA) and supplies would be pushed forward from the stockpile cache. The state has their own logistics and supplies and they are supported by the national infrastructure.” (FL Official).

As this statement implies, logistical staging not only allows for the prompt distribution of assets, but also provides better region-wide coordination of resources across the state, and with surrounding states as well.

In Florida, separate staging and distribution areas have been set up according to the source of the assets provided. For example, the county distribution area is separate from SNS distribution area (i.e., local assets are kept separate from federal assets). The rationale for the distinction is to better manage coordination of resources coming into an impacted area.

Private-sector companies also played an important role in addressing shortfalls. Many interviewees believed that the generous and prompt response from private medical supplies and pharmaceutical companies, and local pharmacies had helped in reducing the impact of the disaster. Many of these companies fronted supplies without assurance of reimbursement.

“When pharmacies became needed we got truckloads of samples, expired drugs, etc. I called Wal-Mart on the phone and moments later all of the major chains on a conference call and they had loads for trucks when they open a new store and they sent them down. They had portable stocks. They never asked about reimbursement.” (MS Official)

A Florida official said he had learned to work with pharmaceutical companies prior to the storm to organize medication and oxygen supplies:

“Some county health departments have pharmacies and we work with them and our local providers. Work with Walgreen’s and others and we have warehouses across the state. It is a problem when people are unable to get their 30-day supply of medication.” (FL Official)

Similarly, a Mississippi official noted that when oxygen supplies were needed Wal-Mart took the lead in organizing all of the local suppliers to help address the shortage.

“Most of [the facilities] indicated they needed additional oxygen because of the additional patients. So after landfall I didn’t know what to do. Wal-Mart called me. About an hour later he had all 8 companies that supply oxygen and by morning they had refilled all the oxygen.” (MS Official)

While the private-sector contribution was critical, the role played by private companies in the aftermath of Hurricane Katrina was ad hoc and unorganized. Private companies did not

always have a clear picture of what supplies were needed, particularly for special needs persons. For example, in Houston, national corporations such as Walgreen and CVS set up pharmacy at the large Reliant Park shelter, but were reported not to be fully prepared to meet the immense medical needs of mental health patients. They lacked sufficient inventories to fill the astonishingly high amount of prescriptions (Appleseed, 2006).

Interviewees noted that a number of supply chain problems resulted because many private pharmaceutical companies were not trained in ICS communication structure. Though this did not create major difficulties, it affected the distribution of medical supplies and medications in some cases. An official from Georgia cited the following example:

“We used at least one business to dispense pharmaceuticals and supplies that was not being trained in ICS. We are trying to reach out ...to educate people about ICS.” (GA Official)

Interviewees emphasized the importance of increasing the involvement of private companies in the emergency preparedness planning process and ICS structure.

In some cases, supply problems arose because the suppliers with whom the health departments had contracts were themselves victims of the storm. In Mississippi, one official noted that,

“The biggest supply issue was linen. We have services here but the company was in New Orleans. Within 2 days we did a contract with a company in Florida.” (MS Official)

While they were able to address the problem swiftly during Hurricane Katrina, there was nevertheless a general consensus that public health needs to establish relationships with a wider array of organizations in order to manage the medical supply chain effectively. Many interviewees indicated that they would consider having multiple contingency contracts in the future so that if one supplier was unable to provide the contracted goods there would be an immediate alternative. Some felt that public health agencies should plan for the worst case scenario in which private companies provide no supplies.

Funding for Supplies Was Also Problematic

In cases when public health agencies did not have adequate supplies on hand and needed to purchase them, a number of officials had difficulty in obtaining the funding to purchase the material. As a public health official from Georgia stated,

“The biggest challenge was getting funding. Simple things like we needed baby formula there was so much red tape we could not provide the supplies that were needed to treat evacuees.” (GA Official)

This conformed to what others had reported in the field. Public health officials were especially frustrated by their inability to identify sources of short-term funds to procure medical supplies and equipment (Morill et al., 2006).

Florida has addressed this problem by establishing pre-existing arrangements with suppliers and providing purchasing cards in advance:

“There is no way to avoid going to Wal-Mart a lot. The whole idea is to be prepared locally and we have purchasing cards for a local Wal-Mart. We have already met with everyone and talked about ordering supplies” (FL Official)

Many interviewees also expressed concern that problems in reimbursing private sector pharmaceutical or medical supply companies may affect the willingness of these corporations to provide support in future emergency response efforts. They noted that the current system of reimbursing private companies for their assistance is inadequate. Indeed, some of our interviewees felt that the experience of Hurricane Katrina might provide an incentive for some private companies *not* to help in future disasters. In particular, interviewees felt the Stafford Act, a federal mechanism designed to address reimbursement during emergency situation, created unnecessary barriers and delays. Many local pharmacies that have donated resources and time, set up mobile pharmacies, and provided medications for free, still have not been reimbursed as of this writing. Our interviewees commented:

“The local pharmacies stepped up to the plate, but they have not been reimbursed and so they are not going to be able to help in another storm” (LA Official).

“The Stafford act states that FEMA will only reimburse after the disaster hit. What we had to do was take the EMS people and get them to give us supplies to the tune of

\$65,000 in supplies in the superdome. I could not get the money back to pay him for the supplies” (LA Official).

Interviewees worried that in the event of another major hurricane, restocking supplies using local businesses may not be feasible ,since businesses might be concerned that they will not be reimbursed for replenishing medications and other supplies.

There Were Also Problems in Distribution

Some public health officials noted that the distribution process was disorganized. Interviewees reported difficulties in storing and transporting supplies to the populations in need. For example, in Louisiana, one public health official talked about the difficulties they had in keeping track of supplies, which were stored wherever space could be found.

“There was not organized distribution....Drug companies donated supplies. We would store [supplies]...[in the] back of our car, in our garage, etc.” (LA Official)

Delays in receiving supplies were one outcome of the distribution problems. An official in Louisiana stated simply that:

“By the time the supplies got here all of the evacuees were gone” (LA Official).

Experiences with the Strategic National Stockpile (SNS) Were Mixed

State and local public health agencies also called upon the Federal Government and the SNS to supplement medical supplies in the response to Hurricane Katrina. The use of the SNS in the response generated both positive and negative experiences for the affected states. On the positive side, interviewees in both Mississippi and Louisiana noted that once SNS arrived in the state, distributing the supplies typically went well. Officials in Mississippi attributed the efficiency in distributing supplies to frequent exercise and practice.

“Because we had practiced SNS so much...8 18-wheelers were here the next morning and it took us 29 minutes to unload. In 3 hours and 35 minutes had broken down and stuff was going to hospitals. Practice makes flawless execution. We are still the only state who has ever gotten and dispersed an SNS push pack. One thing we did right was take an all hazards approach and we practiced a lot. If people are trained nothing makes them afraid. They weren’t afraid to go into a hurricane because they knew what they were going to do.” (MS Official)

While interviewees in Louisiana indicated that the overall SNS release was a success, they did note one glaring issue that arose. The pre-identified sites for SNS warehousing and distribution were not available during Hurricane Katrina because they were already being used as shelters.

“Your regional and local PODS were pretty much all used up. We were trying to find places at the last minute trying to find a location to store (SNS) supplies.” (LA Official)

Officials were able to identify new sites and the distribution was able to proceed. However, interviewees noted that they will revise their SNS distribution plan accordingly.

Both states that called upon the SNS to supplement their own caches of medical supplies found that the supplies available through the SNS did not match their needs. The SNS was configured for responding to a bioterrorist attack and as a result did not contain basic medications needed to treat chronic conditions. As one Mississippi official put it,

“...the interesting thing about it is if you have a bioterrorism problem SNS is great. The types of things we needed were not available in the ways we needed. We need to modify it so that it has different kinds of things” (MS Official).

An official in Louisiana noted the same issue,

“...the SNS is configured [for] bio-terrorism stuff. The supplies in the SNS were wrong.” (LA Official)

To address this problem, officials in Louisiana are developing formularies for chronic disease issues, so that in the future the right types of medications will be available in an emergency.

IMPLICATIONS FOR PUBLIC HEALTH

Issues of pharmaceutical and medical supply coordination and distribution are crucial to public health related emergency response. Careful pre-planning and coordination with public, nongovernmental, and private sector organizations is important in mounting a prompt response, yet not all health departments are engaged in such dialogues.

There are two issues to address: first, whether there are supplies available and who supplies them; and second, how the supplies are being distributed. Going forward, health departments may benefit by formally integrating private entities into the preparedness planning process through formal agreements such as memoranda of understanding (MOUs). It will also be important to exercise preparedness plans based on these relationships to identify and eliminate any problems in their execution.

Once suppliers have been identified and relationships established, the planning is still not complete. We found that communication issues affected the response and the ability to distribute supplies. ICS has been instrumental in coordinating efforts and improving communication between governmental entities. Public health departments may want to expand ICS to include private pharmaceutical and medical supplies companies as a means of improving communication with these groups. If all parties were familiar with ICS and communicated with a common language, the distribution of supplies during an emergency could be carried out more effectively and efficiently. Many public health departments are also working to involve private companies in the planning process. Such participation plays an important role in developing the relationships that will improve response capabilities (e.g., knowing who to call within the company).

We were encouraged to learn of many positive steps that are being taken by public health departments and other organizations to improve preparedness in the area of pharmaceuticals and supplies. Below, we highlight several key issues for public health officials to consider including in their own plans for emergency response.

- **Pre-stage supplies before storm.** To reduce delays in delivering medical supplies to storm-hit areas, public health agencies at the state and local level may want to pre-designate strategic areas for supplies. As described above, Florida has used this method successfully in its disaster response efforts.
- **Make arrangements with suppliers before storm.** As our interviews and experiences with past hurricanes have demonstrated quite clearly, local and private entities play a big role in responding to the medical needs of victims in a local area. To better work together and coordinate local efforts to respond to the next emergency, public health departments should consider establishing arrangements---whether formal or informal---to coordinate

the response. Florida provides an example of how such arrangements might work. It must be noted that contracts, MOUs and informal relationships with private entities do not ensure positive outcomes, but, at a minimum, these relationships provide local health departments with additional options to call upon in a disaster. Another advantage, as reported by one Georgia official, is that, by knowing that they will be able to get supplies from private suppliers, public agencies will require less warehouse capacity for their own supplies.

- **Develop a system to better match available resources with needs.** Interviewees noted that many supply problems stemmed not from shortages, but rather from a mismatch between resources and needs. A comprehensive system would entail rapid needs assessments at the local level and a centralized system for receiving, inventorying, and allocating resources at the state level. This sort of system would be able to distribute supplies more efficiently and equitably across the affected areas.
- **Develop standardized inventory lists for use during a crisis.** Standardization helps identify needs in advance and thus facilitates the ability to respond during an emergency. This process can be especially important to ensure that adequate supplies of medications for chronic disease are available during a disaster. A standardized inventory list can help public health agencies and other organizations know exactly what is available where, thus making it easier to respond to requests when they come in. Standardized request forms are equally important. Similarly, creating a standard drug formulary allows local jurisdictions or health departments across the state to work more effectively with local vendors to identify what is required and where best to obtain the medications. Some states, including Louisiana, have begun to develop such formularies to address chronic disease issues.
- **Clarify rules and streamline the reimbursement process.** There is a need for clarification of current reimbursement rules for assistance given in advance. In addition, a critical path analysis that would identify the key roadblocks in the reimbursement process seems warranted. Such an analysis might indicate the need to revisit the Stafford Act to identify the barriers and streamline the process of reimbursing private companies for assistance (e.g., pharmaceuticals, medical equipment) provided in an emergency.

- **Practice the plan with all partners.** As with any component of emergency preparedness response, practicing medical supply plans contributes to the success of the plan's implementation. Moreover, it is important for exercises to include all partners, including private companies, if warranted. Inclusion of the full set of distribution partners in exercises and planning more generally will aid in clarifying the roles and responsibilities of each in an emergency.

CHAPTER 7: COMMUNICATIONS

One common theme in the many after-action and “lessons learned” reports generated after Hurricane Katrina is that communications posed a serious problem both during the storm and in its immediate aftermath (GAO, 2006a; North Carolina Division of Emergency Management, 2006; US House of Representatives, 2006; US Senate, 2006; White House, 2006). As indicated in these reports, communications problems touched all levels of government, including the public health agencies that are the focus of this study.

While communications problems are not solely a public health issue per se, the need for effective communications is critical to nearly every aspect of public health’s response during an emergency – including: providing care, coordinating with response organizations, informing and educating the public, and engaging the media. Many of the public health officials we interviewed cited the criticality of communications:

“Our problems almost all boiled down to communications breakdowns.”

(TX Official)

“Communications were the main problem and ineffective communication was a downfall.” (LA Official)

“Communications were the worst thing that happened to us in the storm.”

(MS Official)

In this chapter, we examine the communications problems that confronted local and state agencies that were involved in the public health response to Hurricane Katrina and identify lessons that can be used to better prepare for future emergencies. Much of the discussion in this chapter focuses on communications *policy*--e.g., who needs to be communicating with whom, what information needs to be conveyed, how different kinds of information can best be conveyed. However, we also focus on technical considerations surrounding the communications media used, i.e., which communications technologies worked well and which did not.

KEY OBSERVATIONS

Some Forms of Technology Did Not Function Well After the Storm

As has been well documented, breakdowns in communications technologies affected the ability of public health agencies to carry out their response functions. In any storm's immediate aftermath public health staff assess the situation and identify where public health resources are needed. Conducting these assessments can be very difficult and time-consuming without basic communications technologies such as landline telephones, cell phones, and email. In these situations, public health staff may have to visit affected sites and cannot easily coordinate with one another. During Hurricane Katrina, the most problematic forms of communication were land lines and cell phones. In some areas, cell phone service was down for days and in many cases, weeks. One Louisiana official said that cell phone service was down for about five weeks after the storm and some landlines were down until January (five months). In areas where the cell phone infrastructure was not completely destroyed (such as parts of Louisiana), some officials noted that cell phones were useful in sending text messages; however, their utility was limited without electrical power to recharge batteries.

Successful Technologies Included Satellite Phones, Nextel Devices, HAM Radios, and Others

Satellite phones proved to be an effective means of communication. For the most part, interviewees said that the use of satellite phones was helpful during and after Hurricane Katrina. In several places in Mississippi, satellite phones were the only means of communication that remained in place after the storm. During our interviews, we heard only one comment regarding the poor functioning of satellite phones during the storm. However, several interviewees mentioned that they have not been able to purchase satellite phones because they are prohibitively expensive.

Web-based communications were used successfully by some public health agencies. During Hurricane Katrina Georgia successfully used WEBEOC, a real-time internet-based collaborative tool designed to coordinate response activities and resources. As a result of this experience, the state health department is working to train more clinical personnel on the system and keep their training up to date. Texas also uses WEBEOC and Louisiana is considering

adopting its use. In addition, the Georgia public health department set up a website that served as a mechanism for all shelters to use to communicate. According to one Georgia official:

“wireless broadband Internet access and mini-laptops were invaluable.”

(GA Official)

In Louisiana, the Greater New Orleans EMS website provided information on bed availability at local hospitals. According to interviewees, this website proved very helpful in providing real-time information regarding bed availability and facilitated the directing of patients to hospitals that were not overwhelmed. In Florida, the state is moving toward a web-based database to provide information on the condition of nursing homes during a storm, emergency contact information and the types of assets that are needed at each facility. Of course, web-based communications require a reliable Internet connection, and so would not be useful in some situations.

Other technologies, such as HAM radios, were also used successfully during and after Hurricane Katrina. Their use was especially important in Mississippi, where a local HAM radio operator served as the only lifeline from one local EOC to the rest of the outside world:

“We lost contact with the outside world at 10am the day the storm hit.

The only thing we had was our Ham Operator who climbed the tower at

50 MPH winds to get his radio back up.” (MS Official)

Officials in Florida, Georgia, Louisiana and Mississippi all indicated that HAM radios were now a component of their preparedness plans and that public health personnel would be trained and certified to use the devices. One Georgia official said:

“Our new communication plan incorporates HAM operators – you have to plan for the worst. HAM operators will be in hospitals, emergency operations centers, one in each center. This is new in the plan. They are routinely in emergency operations but were not part of the plan before.”

(GA Official)

Two-way radios often proved a functional means of communication in the aftermath of the storm, but many were unfamiliar with their use. Training has been an issue both for public health and for hospitals that have purchased 800 MHz radios as part of the PHEP and HPP Cooperative Agreements. In one of the states that received evacuees, an official mentioned that public health personnel received assistance in using their new 800 MHz radios from fire and rescue personnel who were more familiar with them.

One overarching conclusion to be drawn from our findings on communications technologies is that a mix of redundant communications technologies seems to be the best approach to planning. While technologies such as satellite phones may be cost-prohibitive for some health departments, other less expensive technologies like HAM radios seem to be successful backup alternatives to cell phones and landlines.

Interoperability Problems Inhibited Communications

Our analysis also found that interoperability problems inhibited communication during and after Hurricane Katrina. Difficulties arose because public health departments were not using common communication devices. For example, in Georgia, some agencies were using cell phones and 800 MHz radios, while others were using 400 MHz radios. They finally needed to use a mobile command center communications van to allow the different agencies involved to talk to one another. This finding reinforces what other state and federal reports have found and emphasizes the need for interoperability across state, federal and local agencies (US House of Representatives, 2006; US Senate, 2006; White House, 2006).

Communications Problems Made It Difficult for Public Health to Assess What Was Needed

The extensive damage to the communications infrastructure in the affected areas and the failure of some communication technologies left many facilities, most notably those in New Orleans, isolated for several days. The communications breakdown made it difficult for public health personnel in some areas to get a clear picture of what was needed in hospitals, nursing homes, and shelters. Moreover, as discussed in the previous chapter, these breakdowns negatively affected the coordination and distribution of medical equipment and supplies. In Mississippi, the state lost contact with several nurses in shelters for 48 hours, and local public

health agencies had trouble tracking down personnel after the storm because cell phone service and landline telephone service were down.

The technological breakdown in communications was problematic, but it was intensified by the rural nature of the areas impacted by the storm. For instance, some rural counties in Mississippi did not have phone service for a week and therefore, a public health official had to go to the facilities, such as nursing homes, in person and check on them. In Louisiana, communicating with nursing homes was made more difficult because most of the state's nursing homes are "mom and pop operations." Most small, independent nursing homes did not have redundant technologies in place and were not part of a corporate network that could have tracked their status and forwarded that information to the state.

There Was Often Poor Communication Within and Across Organizations

Some communications problems during Hurricane Katrina were due, not so much to technical failure on the part of the communications infrastructure, but to lapses in communication between the relevant parties, whether within public health agencies or between public health and other public or private entities. Breakdowns in communications tend to undermine the credibility of public health departments and can damage relationships between public health departments and the organizations with which they need to coordinate during an emergency.

For example, in some cases, one part of the health department did not know what another part was doing, leading to a duplication in tasks. In one instance, a public health official noted:

"There was duplication with calling facilities. We were calling twice a day checking on status and another group upstairs was checking on bed capacity for the trauma care system. They thought the Department of Health was always calling them." (MS Official)

If there had been better communication within the health department, the same information could have been collected with one telephone call and thus reduced the efforts of the health department and the burden on the facilities

Similar concerns were expressed by hospital administrators in Florida and Mississippi, who said that they received multiple visits by public health personnel asking them to fill out the same paperwork multiple times. In these cases, hospital personnel felt very strongly that the public health department became more of a hindrance than a facilitator. In Louisiana, one interviewee emphasized that:

“Public health became a hindrance to us – we need this information and what is your status? People were asking for duplicative information. We had one phone line and public health was clogging it for status reports while we were trying [to use that line] to place people....” (LA Official)

Officials in Texas stated that many of that state’s problems with evacuee populations could be attributed to “poor communication between the evacuating agency and the receiving counterpart.” While it was clear that some states were overwhelmed by the difficulties of communicating within their own state’s organizational structure, such problems were exacerbated when evacuee issues crossed state lines. For instance, in Georgia, the NDMS responders were prepared to receive adult patients from hospitals in the affected areas. However, as the planes began to arrive, it was quickly apparent that they contained a mix of adult, pediatric and nursing home patients, as well as large numbers of general population evacuees—information that had not been communicated from those sites sending evacuees. In addition, Georgia officials assumed that evacuees had been checked for weapons and drugs before boarding the military planes. They later discovered that this was not the case, and needed to confiscate weapons and drugs from a number of evacuees.

Community Partners Need to Be Incorporated into the Planning Process Early

To address the interpersonal and interorganizational communications problems that arose during Hurricane Katrina, interviewees indicated that public health can benefit from the early involvement of both traditional and non-traditional partners in the process of planning for disaster response. Examples of non-traditional partners include private-sector organizations, NGOs, the military, and mental health organizations. As noted in the previous chapter, some public health officials argued that in order to improve communication and overall response

capabilities, non-traditional partners should not only be included in the planning process, but also trained in ICS.

Communication across organizations could be substantially improved through the planning process. Planning requires organizations to work through the details of their respective roles and responsibilities and helps forge relationships among all relevant parties in the process. Such relationships could be further strengthened through the use of exercises and drills to practice emergency response capabilities. These relationships are particularly important in maintaining the flow of information during an emergency.

Interviewees in all five of the states in our analysis mentioned the important role played by the private sector in the response to Hurricane Katrina and many emphasized the value of including community partners in preparedness exercises and plans. For example, one Louisiana respondent said:

“It’s important to train, respond, and plan with community partners. Knowing community partners was a big help; we didn’t need to introduce anyone – we all knew each other. Much of the relationship came out of SNS planning.” (LA Official)

Another described the importance of including the private sector in state planning:

“You need to call in your private sector so they know their role and where to go during a disaster. You have to communicate with the private sector with many methods to disseminate information. They have to understand the state plan and the rules by which we were playing.” (LA Official)

Interviewees also noted the need to include mental health departments in the planning and exercise processes. One state official said, “the downstream communication did not happen. The plans were made in a vacuum without telling the partners.” In Mississippi, officials stated that:

“Mental health wasn’t [at the state public health EOC] and I have learned and fixed that for this coming year. They are going to be with us at the command center this year. I saw that as a big deficit and they were late getting in.” (MS Official)

Many interviewees stated that, although they had not included mental health as planning partners in the past, given their experience from Hurricane Katrina, they plan to give mental health a seat at the planning table as well as at the state EOCs. In addition, we heard that there needs to be better planning and coordination (including ICS training) between civilian and military agencies so that they speak a common language and can better coordinate their efforts.

The Incident Command System Typically Facilitated Agency Communication

While many communications problems arose in the aftermath of Hurricane Katrina, there were a number of important successes as well. One such success story that arose from our analysis concerns the implementation of an Incident Command System (ICS) and the National Incident Management System (NIMS). For example, officials in Texas indicated that “the presence of an ICS was regarded as the key to the success of response to Katrina.” Officials from Louisiana remarked that “language and semantics are crucial-all of the players have to be able to speak the same language.” Interviewees indicated that when all personnel were familiar with ICS, the response ran more smoothly because people knew their individual roles as well as the responsibilities of the agencies they represented. In addition, interviewees stated that ICS saved time during the response because it provided a common language and process to personnel from various agencies and as a result, personnel could focus on decision making rather than trying to explain the process. Much of the success with ICS during the response to Hurricane Katrina was attributed to the fact that the public health agencies had practiced its use extensively prior to the storm. It should be noted that, while many public health personnel spoke glowingly of ICS and NIMS, not everyone was enthusiastic. We heard in our interviews that in certain cases some public health personnel have been resistant to NIMS and ICS training.

However, interviewees further mentioned that communication problems may have occurred because ICS was not utilized by all emergency responders. For example, officials in Georgia indicated that ICS worked well among public health personnel, who were trained in its

use, but that communications issues arose between public health agencies and the military because the military did not use ICS.

Strong Leadership at the State Level Can Facilitate Communication

Another communications success story concerns the role of state-level leadership in establishing an organizational framework for preparedness. This was seen most clearly in Florida. Interviewees in Florida repeatedly mentioned that Florida's emphasis on preparedness came directly from former Governor Jeb Bush. Through the creation of Regional Domestic Security Task Forces (RDSTFs), Florida has created an organizational framework through which preparedness for both manmade and natural disasters has become a priority. This framework clarified the roles and responsibilities of public health agencies and their partners in emergency response, thus laying the foundation for effective communications during a disaster. Public officials in Florida knew what their responsibilities were and what they could expect from other agencies and partners, regardless of which agency they represented, or what level of government they worked for.

As a component of the RDSTFs, disaster response communications, training and equipment have been standardized across the state. More importantly, by convening various state agencies under the umbrella of domestic security, those agencies have adopted domestic security and emergency response as their priorities. Training and exercises have also allowed stakeholders to understand their respective roles, responsibilities, strengths, and weaknesses. One hospital administrator in Florida told us:

“I think that Florida works so well because you actually do know that an emergency really will happen. You have to have really good communications and a great EOC building in town. That building represents the importance the community places on the EOC function during an emergency. Someone talked about one of the EOCs in Mississippi that was not supported by the community. There needs to be good communications during the event and all through the event. At least once a year we try to have a community drill.” (FL Official)

IMPLICATIONS FOR PUBLIC HEALTH

Our analysis reinforces post-Katrina reports which found that problems with communications further impeded the response to Hurricane Katrina. The discussion in this chapter points to both problems and successes with communications technology—and, perhaps more importantly—with communication planning and procedures.

Our findings point to some alternatives for public health agencies to consider in improving their emergency response capabilities.

- **Improve communications planning.** Many of the communications problems that public health departments encountered during Hurricane Katrina can be overcome through improved planning and training. Interorganizational communications could be ameliorated if participating organizations know who the other players are that they will interact with during an emergency, are aware their respective roles and responsibilities, and are familiar with what to expect from each other. This can be achieved by bringing all relevant parties to the planning table. Communications problems can be prevented or minimized through improved planning, exercising of emergency plans, and increased ICS training for public health staff.
- **An effective communications plan requires a mixture of communications technologies and techniques.** Our analysis reveals that health departments had the most success communicating during and after Hurricane Katrina if they had a mixture of communications technologies and techniques at their disposal. When land lines and cell phones did not function, departments relied on alternative technologies, such as satellite phones and HAM radios. Departments also were successful in using non-technical means of communication, such as distributing fliers by hand, to inform the public. Public health agencies can benefit from having a combination of technical and non-technical communication techniques ready for use during a crisis.
- **Expand the role of community partners in the planning process.** Public health needs to incorporate non-traditional partners (e.g., the military, NGOs, private-sector organizations, including mental health) into the planning process –

and to do so at an early stage. Community partners from many different sectors need to develop a common language so that they can better coordinate their efforts in responding to a natural or manmade disaster.

Many of the alternatives discussed here, with the exception of some communications technologies, can be implemented with relatively few new financial investments. The most important investments are those of time and effort in building relationships, defining roles and responsibilities, and exercising emergency response plans, all of which are critical for improving the ability of public health agencies to respond to future emergencies.

CHAPTER 8: SPECIAL NEEDS POPULATIONS

In this chapter, we take a closer look at the impact of Hurricane Katrina on special needs populations (e.g., the chronically ill, the physically disabled, the mentally ill, nursing home residents) and discuss lessons learned from public health's disaster response. As has been reported, the evacuation and sheltering of special needs populations is a function of the public health and medical response that was seriously tested by Hurricane Katrina. Indeed, all the issues covered in the previous three chapters—workforce shortages, problems in the supply of medications and medical equipment, and breakdowns in communications—were relevant to special needs populations in the aftermath of the storm. Evacuation of these populations, many of whom lived in special facilities, created a substantial demand for specially trained personnel to assist with their care, as well as adequate supplies of medications and special equipment (e.g., dialysis machines) to provide treatment. The challenge of addressing these needs was sometimes compounded by failures to adequately communicate with shelters and facilities about what was needed.

Individuals with special needs who live in the community (as opposed to nursing homes) require separate shelters, which in many states are the responsibility of public health. One reason for separate shelters is to provide safety for people with special needs by separating them from those in the general population. In addition, many special needs populations require more intensive medical care (e.g., dialysis, oxygen, medications) and enhanced facilities beyond those available in general population shelters.

Nursing home residents are treated differently from the “community-based” special needs population during an emergency, and are generally not eligible for special needs shelters. If evacuation is required, it is the responsibility of the nursing home administrators either to transfer residents to another nursing home or to find some other form of shelter for them.

The experiences of both community-based populations and nursing home residents during the response to Hurricane Katrina provide lessons relevant to public health, however, so we address both in this chapter. We present key observations from the evacuation and sheltering of community-based special needs populations and nursing home populations separately. At the

end of the chapter, we discuss the implications for public health and offer some considerations to assist in the process of preparing for future emergencies.

KEY OBSERVATIONS: COMMUNITY-BASED SPECIAL NEEDS POPULATIONS States Faced Challenges in Defining Special Needs Populations

One underlying challenge for states is to establish criteria for identifying special needs populations, in advance if possible, and particularly during an emergency so that they can be evacuated and directed to appropriate shelter arrangements. We found that in the aftermath of Hurricane Katrina, there was much confusion over what constitutes a “special need.” “Special needs” is a generic term that can be used to describe disabled and elderly populations (GAO 2006b), but may also refer to low-income populations, people with serious mental illness, people with intellectual or cognitive disabilities, people with sensory impairments (e.g., low vision, impaired hearing), and those with mobility problems or activity limitations (National Organization on Disability 2005). Also included may be those who rely on special equipment such as oxygen or wheelchairs (US DOT 2006). In a disaster situation, people without transportation may also be included in the definition of “special needs” (GAO 2006b).

Many states faced problems because of inconsistencies in defining special needs populations. For example, the State of Louisiana defines special needs populations as those who are home bound, chronically ill, physically or mentally disabled, have limited mobility or lack the ability to function on their own. However, New Orleans has a broader definition of special needs than does the rest of the state. This inconsistency created problems in determining who belonged in special needs shelters, particularly when populations had to be moved out of New Orleans to other locations within the state.

Some states, including Mississippi and Texas, did not have a clear definition of special needs during Hurricane Katrina. Mississippi is currently considering applying a definition that had been used in Florida, which defines special needs populations as those with medical needs, particularly those who require special equipment. In Texas, local jurisdictions were responsible for their own populations following the hurricane and there was no systematic way of defining a special needs person. Since Hurricanes Katrina and Rita, the state has been working to establish

a special needs definition. Houston conducted a recent exercise with state officials to practice identifying special needs patients with rapid response assessment teams.

Georgia organizes populations into five levels based on need in preparation for sheltering. The five levels of shelter placement are:

Level 1 – capable of self-care and independent and suffering from minor injury or illness

Level 2 – minor assistance needed

Level 3 – persons with conditions that require privacy but not lots of care

Level 4 – requires constant surveillance

Level 5 – needs an emergency room

Although this definition was in place during the hurricane response, Georgia was not well-prepared to accept and shelter special needs populations, in part because the definition did not provide specific enough guidance about what is needed to care for those with special needs. Since the storms, Georgia's Emergency Management Administration has led an effort to get all involved agencies together to discuss who is responsible for what activities related to special needs. Local emergency management officials have been tasked with better categorizing special needs populations and coordinating with other agencies to prepare for their needs.

One other consideration in defining "special needs" is that some populations that do not have regular contact with the health care system may be overlooked during an emergency. Some individuals who typically live independently may require special assistance only during an emergency, due, for example, to a lack of personal transportation. However, most working definitions of special needs populations do not include "lack of access to personal transportation" as a criterion for inclusion in special needs populations.

States Had Problems in Identifying Special Needs Populations During Katrina

Even in states with clear definitions of what constitutes a special need, finding those populations can be challenging, especially in the aftermath of a hurricane or other emergency.

Florida allows special needs populations (defined in terms of medical needs) to pre-register. Individuals complete a form, which is then reviewed by public health staff. Oxygen

providers must also make sure their patients are registered, and at the state level, legislation was recently passed to require home health providers to register their patients. We also learned from public health staff that, since Hurricane Ivan in 2004, dialysis facilities have been required to develop internal plans and prepare patients so that they know where to get dialysis during an emergency if their usual facility is not available. Recently passed state legislation also requires dialysis facilities to participate in identifying and registering special needs populations. Dialysis facilities will be required to pre-dialyze their patients in the days before a storm is expected to make landfall and then provide the patient with instructions on where to go and when to have their next treatment.

However, while Florida makes it possible for special needs populations to pre-register, most special needs populations are not required to do so. Both state and local officials we spoke to in Florida noted that only a small portion of those who show up at special needs shelters were pre-registered. Use of the registry might be improved by engaging more health care providers who have regular contact with special needs populations; nonetheless, the demand for special needs sheltering may still exceed the available supply.

The experience of Hurricane Katrina has inspired several states to improve efforts to identify special needs populations. For example, Mississippi is now considering the distribution of standardized bar-coded identification cards to give to special needs populations; these cards would include information about next of kin, primary caregiver, dietary needs, etc. The cards would be presented to shelter staff when the person with special needs arrives and staff would be able to scan the card, verify that the person should be at the shelter, and determine what his/her needs are. Of course, the cards would only be useful as long as people can find and remember to bring the cards with them to the shelter. Louisiana is working closely with dialysis patients to prepare them in case there is a storm and they need to evacuate. In Georgia, public health officials are working with other agencies to develop a system that geocodes the location of special needs populations so that they can set up a system to transport and shelter those in need. In Texas, where local jurisdictions are responsible for their own populations, one county health department is creating rapid response assessment teams to help identify special needs populations during an emergency. The Texas health department is also conducting a campaign to get people with special needs to voluntarily pre-register, similar to the system in place in

Florida. They are partnering in this effort with local community services such as Meals on Wheels. The State has plans to include information about the program in residents' electricity bills.

Transportation Challenges Became a Problem for Community-Based Special Needs Populations

In the course of the response to Hurricane Katrina, the transportation of special needs populations became a serious issue. Individuals who were triaged to special needs shelters often lacked any means of getting to the shelter, to medical facilities for treatment, or to doctors' appointments once at the shelter. In some cases, transportation was also needed to move special needs populations from one shelter to another to manage overflow. The New Orleans Health Department had evacuation plans that involved Amtrak but could not identify partners along the Amtrak line that would be willing to open up another special needs shelter. Even after dry roads were available, resources were lacking to evacuate people.

Some promising partnerships developed in the course of the response to Hurricane Katrina. The faith-based community in several states, including Louisiana and Georgia, became involved in transporting special needs shelter residents and also helped identify dialysis and other facilities that could support the needs of the shelter residents.

Responsibilities for Establishing Special Needs Shelters Differed Across States

Public health agencies play an important role in assuring that special needs populations are sheltered and receive appropriate care. However, the responsibility for establishing the shelters differed across states:

- In Louisiana, the Department of Social Services was responsible for administering special needs shelters while the Department of Health and Hospitals was responsible for the medical care provided in the shelters. Eight main shelters were established across the state just prior to Hurricane Katrina's arrival, with the shelter in Baton Rouge addressing the most serious medical needs. Hospitals often partnered with the shelters to provide staffing and supplies.
- In Mississippi, special needs populations were the responsibility of the State Department of Human Services prior to and during Hurricane Katrina. However, due

to some confusion over responsibilities concerning the Katrina response, the Department of Health has subsequently taken over responsibility for special needs populations. During the Katrina response, hospitals appeared to provide staffing for shelters in at least some instances.

- In Georgia, the Department of Public Health established a special needs shelter, but required help from local hospitals with staffing and supplies.
- In Texas, local health departments established special needs shelters, which were often located near general population shelters. The State Department of Health Services supported local health department efforts through the provision of various resources, including transportation. A number of additional shelters were set up in and around Houston by non-governmental organizations such as the Red Cross and churches.
- In Florida, county health departments were responsible for sheltering special needs evacuees. To address staffing needs associated with this responsibility, some counties established partnerships with local hospitals.

There Were Staffing Shortages at Some Special Needs Shelters

As discussed in Chapter 5, Hurricane Katrina created a number of workforce challenges for both public health agencies and private health care facilities, such as hospitals. The workforce problems associated with providing care for special needs individuals were particularly acute, though the extent of the problem varied significantly across sites.

In Louisiana, for example, some shelters were severely understaffed, in part because of the sheer demand on their services. One person recounted the experience of walking into the special needs shelter area of the Superdome and finding 30 to 40 individuals in wheelchairs in one room with only two staff members providing care. On the other hand, a public health physician who helped to run another special needs shelter described good working relationships with providers in the local community, some of whom came on a scheduled basis (such as for dialysis) and others who came in to help triage. These efforts helped to relieve the burden for the public health staff. We learned that Louisiana used a variety of means to ensure that sufficient

staffing was available for the shelters, including involving the US Public Health Service and calling in DMAT teams.

A related problem is that public health staff at shelters were sometimes asked to provide care (especially clinical care) for which they were not prepared. While public health nurses have been trained in traditional nursing activities, many have worked outside of a hospital or other direct clinical care setting for many years and in many cases are not qualified or simply not comfortable with providing the kind of care that was needed.

Counties in Florida have successfully used a team-based approach to address staffing needs for special needs sheltering. The staff is organized into multi-capability teams, with one team providing care during the day shift, the other working the night shift. The teams include both clinical staff as well as housekeeping personnel to maintain the shelter. Other states are considering using a similar approach in the future.

Ensuring Security for Special Needs Shelters Was Difficult

As noted at the beginning of this chapter, it is important to separate special needs populations from the general population in order to ensure that special needs populations get the care they need and to provide safety for all. However, the large number of people in need of food and shelter following Hurricane Katrina made it difficult to keep the two populations separate.

“A big problem was that many times individuals were sent to a shelter when they didn’t belong there – evacuees with special needs. These were people who could not take care of themselves on a daily basis. There were people with mental health problems mixed in with substance abusers and the elderly. It becomes a safety issue when all of these types of people are mixed into the general population shelters.” (GA Official)

The general population often sought shelter wherever they could and if they found a facility with power, they would try to enter. As an official from Mississippi noted:

“There are security issues of trying to keep a special needs shelter ‘special needs.’ Other people are hungry and dazed.” (MS Official)

In some cases, shelters lacked sufficient staff to provide security. For example, a special needs shelter located at Louisiana State University (LSU) in Baton Rouge initially had only two security guards, but the guards did not stay long and replacements were not provided. LSU provided some security staff out of its Sheriffs Unit, but, as more and more individuals arrived at the shelter, existing security was unable to manage the flow. The shelter was closed until more security personnel could be made available. Another shelter in Louisiana had eight doors to secure and only two people to secure them. In some instances, there was insufficient staff to monitor all of the special needs patients.

But while it was important for shelters to provide adequate security to control the flow of people moving in and out of the shelters, other problems arose in relation to the “type” of security provided. For example, in Louisiana, the military provided security at the Superdome, and not surprisingly, both public health personnel and evacuees felt that security was run too much like a “military operation.” The problem was that the military was trying to secure a facility that contained many traumatized individuals, who needed varying levels of care. One official with whom we spoke suggested that security needed to be better integrated with public health in order to make sure that evacuees were well cared for. As this official stated:

“There have to be better ways to ensure security and individuality and respect. I think that...another lesson we need to look at...we need to cross-train the military for domestic details.” (LA Official)

One solution to the security dilemma proposed by interviewees is to facilitate security staff’s duties by ensuring that all shelters have a method to identify shelter residents effectively, such as using color-coded wrist bands and only allowing access to and from the facility from limited entry/exit points.

Electrical Power and Appropriate Food Supplies Were Not Sufficient At Some Shelters

Ensuring that there was power and sufficient food was especially important for special needs shelters, since many individuals with special needs, such as dialysis patients, need medical

equipment or medications requiring refrigeration. Others using oxygen or depending on a ventilator also required electricity. Officials in both Louisiana and Mississippi cited problems with supplying electricity to special needs shelters. Over half of the state of Mississippi was without power.

In the New Orleans Superdome, the special needs shelters were maintained in the “party rooms” in order to (segregate/separate) this population from the general population. Unfortunately, these rooms were not linked to generators as was the rest of the facility; therefore, when the Superdome lost power, these rooms had no back-up source of power.

Although not widely reported to be a problem, many special needs shelters had insufficient food supplies to meet all residents’ dietary needs. For example, many special needs shelter residents were diabetics. As one Mississippi official stated, “(w)e had food issues...diabetics can’t eat peanut butter and jelly three times a day.” Given the length of time that the shelters were operating, food needed to be prepared for the varying dietary needs of the shelter residents. To address this problem in future emergencies, in Mississippi, one community has proposed to collaborate with local community colleges, which have dieticians and a food supply that could support the special needs shelters for their areas.

Shelters Were Not Adequately Prepared to Address the Need for Mental Health Care

Mental health issues were prominent in both the special needs populations and general population shelters. As one Mississippi official stated: “I think mental health was as big as ‘health health’.” However, prior to the storm, many shelter operators had not anticipated the magnitude of the need for mental health care, nor had they realized the extent to which a disaster such as Katrina would itself cause mental health problems, transforming individuals who would otherwise be self-supporting and healthy into special needs populations. Some of the mental health-related need arose because people did not have access to the medications that had kept them stable. In other cases, the stress of the event caused individuals to act out in ways they had not previously. In either case, neither general population shelters nor special needs population shelters were prepared for the extra demands that mental health issues would pose.

The states we visited generally had insufficient professional staff to care for mental health populations. There was a shortage of inpatient psychiatric beds. In most cases, mental

health professionals had not been included in pre-disaster preparedness planning. For example, in Louisiana, the Office of Mental Health had not previously been involved in emergency operations and there was little collaboration between the Offices of Mental Health and Public Health. Since Hurricane Katrina, there has been greater effort to coordinate activities between the offices, both in terms of providing services and in preparing for another emergency. Similarly, although mental health professionals in Mississippi did not have a place at the state EOC prior to Hurricane Katrina, there are now plans for mental health representatives to be at the command center along with public health officials during a future emergency.

In Texas, state public health officials made mental health services available to the local health departments, but had challenges in getting the mental health professionals where they were needed. The Houston Health Department hired Louisiana evacuees to discuss their experiences in Hurricane Katrina with fellow evacuees in the shelters and elsewhere. Many of these individuals formed strong relationships with the people they were helping and continued with the program until funds were depleted. The health department is now looking for ways to continue this program in the long term through non-profit organizations.

Another challenge for shelter operators was to determine whether people with mental health issues should be sheltered separately from other special needs populations. Louisiana officials proposed this idea, which was opposed by mental health advocacy groups, who argued that separate shelters would create an additional stigma for those with mental health problems. Instead, the current plan is to create an area for mental health patients within each special needs shelter and to try to reduce the amount of stimulation these patients receive. Mental health professionals from the Office of Mental Health would be responsible for staffing that area of the shelter under this proposed solution.

Conducting mental health needs assessment within the shelters was important. In Florida, mental health personnel have developed support teams who conduct assessments to identify needs. These teams are comprised of six to ten individuals, (staff and volunteers), to assess the population. These teams determine what resources are needed and report this information to the public health agency, which mobilizes response professionals. As one official we spoke with said:

“This system relies on experts to make decisions during an event. This support is short term and they provide surge capacity for behavioral health.” (FL Official)

The state, community, and faith-based organizations are developing a collaborative for mental health response.

In a Georgia locality, mental health professionals have become members of the District Health Emergency Response Team (DHERT). During the hurricane response, they identified proactively a number of mental health needs by deploying professional teams to areas where evacuees congregated, such as motels, so that they could conduct physical and mental health evaluations and identify individuals who needed additional intervention.

Georgia changed its policies after Hurricane Katrina to improve assessment quality. For example, the initial evacuee assessment did not include a question about psychotropic drug use, as a result many patients in shelters did not receive their psychotropic medications and thus experienced problems. In the future, triage staff will include an assessment question concerning the use of psychotropic drugs. Mental health nurses will also be equipped with a brief mental health assessment tool that includes questions about signs and symptoms, thus enabling nurses to better triage evacuees by providing more information.

KEY OBSERVATIONS: NURSING HOME POPULATIONS

Although the responsibility for evacuating and caring for nursing home populations lies with the nursing home administrators, public health sometimes played an important role in coordinating with administrators to ensure that nursing home residents received adequate care in the aftermath of the storm.

Nursing Homes Faced Challenges in Deciding When to Evacuate

While nursing home administrators had the advantage of understanding the needs of those in their care, they faced other challenges during Hurricane Katrina in terms of deciding when to evacuate and in making plans for how the evacuation would be carried out.

For example, nursing home residents are among the most vulnerable populations and a move from one facility to another can often cause more harm than good.

“The nursing homes were supposed to have a plan for evacuation. It is their responsibility to take their people out. When you move people, they do, and did, die in transport, so evacuating is a big decision.” (LA Official)

Sometimes it is safer to shelter residents in place. In deciding whether to evacuate, nursing home administrators must weigh the risks of evacuation against the risks of sheltering in place and must estimate what the storm might do in terms of damage to the infrastructure and to their access to necessary resources and supplies. In many cases, administrators will choose to shelter in place but the risks are significant:

“[Officials] did not want to see us err on the side of evacuate and if you can shelter in place then shelter in place. What do you do to prevent the greatest loss of life?” (LA Official)

The decision to evacuate is based on the type of storm and the geographic area predicted to be affected as well as other variables that may be region- or facility-specific. In the New Orleans area, there was also the problem of civil unrest. At least one facility, which was not affected by the floods, evacuated after the storm because of safety issues.

For the State of Louisiana, the scope of the nursing home evacuation was particularly challenging. The State is host to 312 free-standing nursing homes and 40 hospital-based facilities. The geographic areas most affected by Hurricane Katrina included about 60 nursing homes. Twenty-one homes evacuated prior to the storm, while 35 evacuated after the storm hit.

Although state and local governments can order evacuations, nursing homes and other health care facilities are often exempt and not required to comply (GAO, 2006b). A recent report released by the Department of Health and Human Services’ Office of the Inspector General (OIG, 2006) reported that nursing homes in the Gulf States, while not required to evacuate, were strongly influenced by mandatory evacuation orders. The only facilities that are required to evacuate are those in storm surge zones. Recently passed legislation in Louisiana also calls for mandatory evacuation for any facility in any storm surge zone. Prior to Hurricane Ivan, in 2004, there was substantial resistance to evacuate in Mississippi. However, after that storm, facilities

were more amenable to evacuation, and local governments have sometimes stepped in to require evacuation:

“We didn’t expect to have as big of a problem because we tell them they are in jeopardy and we use the big stick and say you are closed.” (MS Official)

One official described a situation two years prior in which a facility refused to evacuate and local law enforcement was sent in to inform the facility that if it’s staff did not evacuate the patients, the penalty would be jail time for staff and the facility would lose its license.

Better Coordination Is Needed Between States and Nursing Homes

Prior to and during Hurricane Katrina, many nursing homes in the affected areas experienced problems related to the poor execution of emergency plans (OIG, 2006). In some cases, facilities ignored their plans completely. In other cases, the impact of the storm was far greater than anticipated and existing resources were not sufficient.

The nursing home industry is not always involved in state or local-level emergency preparedness or emergency response. This raises a number of challenges as nursing homes face decisions regarding whether they should evacuate. Most of our interviewees noted that, in an emergency, nursing homes are “on their own.” Nursing home residents are not eligible for relocation to a special needs shelter; rather, the facility is responsible for residents’ welfare whether they decide to evacuate or shelter in place.

As one official in Texas described it, the lack of coordination between the nursing home industry and governmental and other entities resulted in glaring problems:

“The nursing home industry as a whole does not have an overall plan for evacuation during an event; individual providers are supposed to have their own plans. The long-term care industry has received very little direction from policymakers. The state merely requires facilities to have emergency plans in place. This results in poor coordination of evacuation efforts and resources. The after-storm plan is not present too: where are evacuees housed? How are they moved back to their facilities? Where will they get their meds?” (TX Official)

Only Louisiana and Florida had established relationships with nursing homes prior to Hurricane Katrina. These states have state nursing home associations which provide assistance during an emergency. The nursing home associations have a seat in their respective state's EOC. In Louisiana, the nursing home provider association was invited to participate at the EOC following Hurricane Andrew in 1992. In Florida, the state EOC involves the nursing home association in planning, but there is no similar consistent relationship with the nursing homes at the local level. In Pensacola, the hospitals have a local representative who works at the local EOC during a storm but the nursing homes do not. The county has a list of all the nursing homes in the area and it is the local health department's responsibility to call the facilities and ensure that they have the resources they need or to support evacuation.

At the time of Hurricane Katrina, Mississippi, Texas and Georgia EOCs did not have formal relationships with the nursing home provider associations. In Mississippi, the provider associations designated a point of contact to stay in touch with the state EOC to provide information, but it was the association's responsibility to contact the EOC. During the hurricane, Mississippi Department of Health staff—in the EOC—conducted status checks of facilities. In the future, the state is planning to develop a more formalized relationship with the state nursing home association and plans to designate an individual at the State EOC who will facilitate calls from the facilities and manage the information in order to avoid duplication of efforts and streamline the flow of information.

The Texas nursing home association served as a communication network during Hurricane Katrina, “which was the main thing brought to the table when dealing with Katrina, but not so much with high-level activities.” (*TX Official*) Their role was to identify nursing home needs. The availability of beds was determined by facilities locally. i.e., evacuating facilities contacted potential host facilities directly to check on bed availability. The nursing home association in Texas has done little to connect with local government. Their approach “has been to rely on the structure of the state and its long-standing communication systems with the locals.” (*TX Official*) The association emphasizes that it is facilities' responsibility to keep in contact with their local health departments in an emergency.

In Georgia, state officials did not coordinate with nursing homes prior to the arrival of evacuees. Likewise, nursing homes did not expect response involvement and had not been

involved in emergency planning. As a result of the state's experience with Hurricane Katrina, nursing homes were subsequently asked to develop emergency plans, which are reviewed and commented upon by the state and local agencies. Important contacts were made between the health department and the nursing homes and most nursing homes in the area have been involved in recent emergency preparedness planning meetings.

Some Facilities Lacked the Resources to Evacuate

Nursing facilities that are part of a larger corporate chain often had corporate resources to support their decision to shelter in place or evacuate. The larger issue, particularly in Louisiana, was what the smaller, independent facilities would do. The "mom and pop" owned facilities are predominant in the state and did not have the same resources available to them. Since Hurricane Katrina, the Louisiana legislature has passed legislation (Act 540), subsequently signed into law by the governor, that requires the Department of Health and Hospitals, in consultation with the Governor's Office of Homeland Security and Emergency Preparedness, to establish criteria for evacuation of or sheltering in place of nursing home residents during a hurricane.

Given the significant experience Florida has had with hurricanes, the procedures in place for evacuating nursing homes in that state have been well-practiced. Facilities are supposed to have several back-up plans for evacuation so that if 'Plan A' does not work, they have a 'Plan B or C' on which to rely. The state relies on systems in place to predict a storm's path, allowing for early warning and preparation in advance of a storm.

Nonetheless, the nursing facilities in Florida face challenges in their decision to evacuate. Facilities have business interruption insurance that will cover the costs of evacuation; however, the insurance will not pay until an emergency is declared. As a result, facilities may wait until it is too late to conduct a safe evacuation because they do not want to be saddled with the costs of an unnecessary evacuation. Although this issue was specifically raised in Florida, it is likely that facilities in other states face the same consideration.

As with community-based special needs populations, nursing home facilities that choose to evacuate are faced with the challenge of identifying appropriate transportation for their residents and engaging that transportation in a timely manner. There is speculation that the

challenge of getting transportation may have affected nursing home administrators' decisions to evacuate, although there was no evidence brought forth to confirm this during our site visits.

Nursing homes are individually responsible for identifying a transportation company and establishing a contract to provide transportation services during evacuation, but many had problems obtaining needed services. In Louisiana, facilities had contracts in place but the bus companies did not provide the service. In part, this was due to the fact that multiple facilities engaged the same transportation company and the company was unable to meet all requests for transportation services prior to the storm. Florida reported similar problems. Some officials in Louisiana also reported that buses originally en route to evacuate facilities were diverted by FEMA or other federal or state entities for other uses. Facilities that were part of a larger corporate chain were able to call upon the corporate resources to provide evacuation support, but few nursing homes in Louisiana are part of a larger corporation.

Act 540 passed by the Louisiana legislature after Hurricane Katrina requires each nursing home in the state to have written plans, reviewed by the DHH, which detail which company will be providing transportation for the facility in the event of an evacuation. However, if the facility's efforts to obtain transportation fail, this act holds DHH responsible for moving residents to a safe location. Increasingly, nursing homes are asking families about their own evacuation plans in advance and encouraging family members to get their loved ones out of the facility in advance of a storm. Nursing homes in Louisiana are also now working to establish Memoranda of Understanding (MOUs) with bus companies to ensure better coordination for evacuation. Still, officials noted that even when the transportation companies were available, there would be no guarantee that anyone would be available to drive the busses.

Florida officials also raised concerns about the timing of nursing home evacuations:

“[Nursing homes] are not notified any sooner than the general public is and if you do not get them out of there first, you have a disaster with elderly people sitting in traffic. Frail people with health care problems cannot tolerate being tied up in a traffic jam. We need to get people evacuated earlier.” (FL Official)

Still, Florida is well-practiced at evacuating nursing facilities, and other states may learn from this model. Nursing facilities in the Florida Keys must evacuate if a hurricane is heading

toward the state as they are in a storm surge zone. Facilities are responsible for providing transportation to residents and generally begin evacuation approximately 96 hours pre-landfall. They make efforts to transport residents at night when there is less activity on the roads and the residents can avoid the heat of the day. They will, when appropriate, use aircraft for evacuation. The State of Florida provides other forms of transportation if the local facility cannot arrange it and will subsequently bill the facility for the costs of evacuation. The State has set a maximum evacuation distance of 75 miles for nursing home residents so that they do not spend too much time en route but move far enough away from the storm to be out of harm's way.

Nursing Homes Also Faced Workforce Shortages

Like special needs shelters, nursing homes faced problems with maintaining sufficient staffing in nursing facilities that either chose to shelter in place or evacuate. In Mississippi, fuel shortages made it difficult for nursing staff to get to the nursing homes to care for residents. In one county, nursing home staff lived in a tent and worked 16 hour shifts due to limited staff.

In Louisiana, staff who were in the nursing home at the time of the storm had no place to go so they continued to provide care to residents; however, many were concerned about their own families and homes and left the facilities as soon as they could. A number of volunteers arrived to assist in providing care but the facilities needed Certified Nursing Assistants (CNAs) and Licensed Practical Nurses (LPNs), who were hard to find. The state EOC helped solve problems for facilities that were short on staff. For example, the EOC helped one facility to identify volunteers from the local fire departments who could help with resident evacuation. Faith-based organizations also provided help; this is a relationship that will be cultivated for the future.

Florida nursing homes have developed plans that can serve as a model for the future. In preparation for a storm, nursing homes allow staff to bring their families and their pets to the facility to stay with them. The goal is to make the staff as comfortable as possible so that they will remain to provide care to the residents.

Nursing Homes Faced Challenges in Identifying Host Facilities

Nursing homes that evacuate are responsible for identifying a suitable host facility for their residents. Few nursing homes had existing relationships with other facilities prior to

Hurricane Katrina that could be called upon to help absorb the residents that needed to be evacuated. Facilities that accepted additional nursing home residents typically did not have sufficient staffing support to provide complete care to these residents. Nursing homes that were part of a larger corporate chain had an easier time in that they were typically able to move residents to another facility within their system.

In Louisiana, the nursing home association worked with facilities that wanted to evacuate to identify available beds. Officials reported that this effort worked well in most cases. The DHH also provided a bed availability website to help facilities identify sites that could receive evacuees, but coordination problems arose on several occasions when multiple facilities sent residents to the same host facilities.

Some nursing facilities in Louisiana attempted to transfer the entire facility to another location rather than split up residents among different facilities. Some facilities relocated to a gymnasium or other large facility, even when there were still beds available in other nursing facilities. Several officials reported that this was done to ensure that the nursing home would continue to receive reimbursement for the care of those residents. This created an incentive for facilities to shelter in place or to make attempts to shelter the entire nursing home in another facility that may not have been well-equipped to house nursing home residents even if it was not in the best interest of the patients.

In Texas, nursing home residents evacuated from Louisiana were sometimes sheltered in locations such as a gymnasium or a college with a nursing school. In some cases, faith-based organizations, including churches, became the host sites for nursing home residents. Officials from Mississippi reported that they are currently working to identify a large facility that could serve as a central evacuation center.

Tracking Nursing Home Residents and Records

Officials in Louisiana and Mississippi reported problems in tracking nursing home residents and their medical records following evacuation. Families called to ask where their loved ones were, and in some cases neither the facilities nor state public health officials could provide an answer. In these cases, the resident may have been evacuated as part of a federal effort and there was a lack of communication between the different levels of government about

the location of the nursing home resident. Recently, Mississippi facilities are pre-incident planning to identify options for sheltering in place or evacuating. If facilities decide to evacuate, their plan must specify where the residents will go and how the evacuation will be accomplished. The host facility receiving evacuees will be responsible for contacting state officials to inform them of the evacuation. This will facilitate tracking of residents.

Texas also reported challenges in retaining medical records with residents when they were moved, particularly if they were evacuated by emergency airlift. As one Texas official stated, efforts are underway to coordinate with all levels of government and agencies:

“We need to make sure the identification system works without fail, and the state has recognized that. We have been in meetings with the federal Department of Defense, HHS, NDMS—everyone is concerned about that. There needs to be a way to make sure that happens, to make sure basic identification stays with them.” (TX Official)

IMPLICATIONS FOR PUBLIC HEALTH

We conclude this chapter by summarizing some key issues for public health to consider in preparing for future emergencies.

- **Public health should continue to lead the effort to define special needs and develop methods for identifying individuals in the community meeting these criteria in advance, if possible.** The states face significant challenges in defining and identifying special needs populations. Even where specific definitions exist, such as in Louisiana, we learned that the substantial demand for special needs sheltering forced many shelter operators to include individuals that may have not been a part of the original definition, often including those who were far more impaired than allowed by definition. In many states we visited, public health is leading the efforts to better identify special needs in the community. More often, public health agencies are relying on providers (e.g., dialysis facilities, home health, hospice) to help identify and develop emergency plans for their patients. This is particularly true in Florida, but is also an emerging trend among other states. We recommend that public health agencies continue such efforts.

- **Public health agencies need to clarify their roles in staffing and ensuring transportation to shelters.** Staffing and transportation were prominent issues raised during our site visits. Not only were there problems getting obtaining the right mix of staff to work in special needs shelters, but also issues in finding the right staff to care for the special needs populations (e.g., CNAs, LPNs, respiratory therapists, mental health professionals). Public health staff do not always have the training to adequately address the specific needs of shelter residents. There is debate whether the direct provision of shelter staff is the responsibility of public health agencies or whether public health’s role should be to assure that shelters are appropriately staffed. States might consider establishing a “team-based” approach to staffing, such as that used in Florida. Similarly, the role of public health in fulfilling transportation needs for nursing facilities requires clarification.
- **Public health might identify opportunities to partner with other organizations to provide transportation for special needs patients.** Non-traditional partners, such as faith-based organizations, played a vital role in caring for special needs populations, both in the community and in nursing facilities. For example, these organizations were instrumental in both arranging for shelter, and providing transportation to special needs populations, including nursing home residents. States are exploring ways to formalize relationships with these non-traditional partners.
- **Coordination between public health and other agencies is needed to ensure that appropriate security is available for shelters.** Shelter operators face challenges in terms of balancing the need to maintain security at shelters and providing a comfortable place for special needs populations who are already traumatized and impaired. In certain cases, security was insufficient; in others, it was too visible and disconcerting to shelter residents. Public health needs to establish better coordination with law enforcement and other security agencies at the local, state and federal levels to ensure that the appropriate level of security is available to assist shelter operators.
- **Nursing homes need to be involved in emergency response planning.** Nursing homes are currently uninvolved with state and local-level emergency response planning or preparedness, resulting in poor coordination of evacuation efforts and resources. The

establishment of better relationships between nursing homes and government agencies can help improve the quality of future response efforts.

- **More effort needs to be directed toward caring for mental health needs during an emergency.** Although mental health problems were the overriding concern in the general and special needs shelters, mental health services were substandard during Hurricane Katrina. Psychiatric beds were difficult to find and mental health staff were neither well-organized nor sufficiently prepared to provide services to evacuees and shelter residents. Some state and local public health agencies developed innovative responses and others are currently exploring ways to partner with other government agencies and with private partners to better serve mental health needs. These and other efforts should be expanded.

CHAPTER 9: CONCLUDING THOUGHTS

In the preceding four chapters, we presented key observations and public health implications associated with our main areas of study: workforce, medical supplies and pharmaceuticals, communications, and special needs populations. In this chapter, we discuss some of the cross-cutting themes that we identified and offer some concluding thoughts.

Our analysis of the public health response to Hurricane Katrina brings into sharp relief some of the general lessons learned in recent years regarding public health emergency preparedness. The Hurricane Katrina response highlights the gaps that result when public health officials at all levels of government are uncertain about their respective roles. In fact, we would argue that many of the breakdowns we observed in communications, the distribution of needed medical and other supplies, and serving special needs populations primarily occurred because there was considerable ambiguity regarding the respective roles of federal, state, and local public health agencies and other governmental institutions. This finding highlights the idea that coordination between all involved organizations must be improved to mount an effective response.

In this regard, we were particularly struck by how public health's experience during Hurricane Katrina raised issues related to its assurance function—i.e., linking people with services—and whether, and to what extent, health departments should engage in the direct provision of care during public health emergencies. This issue became especially critical in caring for special needs populations. In all of the affected states, there was virtually no consensus on who should provide the care, the types of care that public health should be responsible for, and whether the skill mixes for delivering such care even exist within most public health agencies.

Moreover, it became clear that even before care could be rendered, public health agencies had to grapple with additional challenges related to special needs populations, including: defining what constitutes a special health care need under various circumstances, determining methods to identify special needs individuals in communities, and resolving a broad range of staffing and transportation issues related to this population.

The response to Hurricane Katrina also illustrates the importance of creating solid partnerships— among public health agencies, other response agencies, the private sector, the public at large, and non-traditional partners such as faith-based organizations— as well as the consequences of failing to do so. For example, as we have seen, faith-based organizations played key roles in arranging shelter and transportation for special needs populations. Partnerships with these and other organizations will be key to ensuring an effective response in future emergencies.

Along these lines, we also believe that it is critical for public health agencies to undertake additional efforts to engage the public at large in public health emergency preparedness activities. Many of the problems that arose in the response to Katrina could have been prevented or minimized if public health agencies had done a better job in educating the public, well in advance of the disaster, on the individual's roles and responsibilities in emergency response. This would include educating the public on disaster-related sheltering issues (both when it's appropriate to shelter in place as well as the locations of shelters that could be accessed during emergencies) and the importance of self-identifying special health care needs. Doing so would have alleviated demands placed on hospitals and other health care facilities. The public message that needs to be conveyed is that people should go to hospitals only if sick or injured.

Stronger partnerships and improved planning among the partners should also lead to the more effective use of volunteers, a critical shortcoming in the Katrina response. Using volunteers to supplement the public health workforce poses a set of challenges: maintaining a current registry, credentialing professionals, and matching needs with skills. Much of this can be done well in advance of emergencies, and illustrates an area where health departments have underinvested in the past. However, although it is clear that more resources need to be devoted to planning for anticipated workforce needs during emergencies and to training individuals to assume various roles during emergencies, a necessary precondition in using such resources effectively and efficiently is the establishment of public health partnerships within and across locales and levels of government.

Finally, the aftermath of 9/11 has led to what amounts to a significant cultural upheaval for public health. Now more than ever before, public health officials are being trained in ICS and are being asked to integrate much of their work with that of other emergency response agencies. However, although progress has been made in this area, tension between these groups remains.

Incorporating elements of both disciplines is essential to mounting an effective response. In many instances, public health has resisted incorporating emergency management techniques into their operations while in others, traditional public health capabilities including the ability to work with community partners and conduct needs assessments, have not been reflected in emergency response planning and training.

Our case studies confirm the value of ICS training in clarifying roles in an emergency and in enhancing communications across agencies at all levels of government. However, as described earlier, there were breakdowns in communication, both technical (e.g., interoperability issues, lack of power to charge cell phones) and intra- and inter-organizational that reduced the effectiveness of the response.

RECOMMENDATIONS

Earlier chapters contained recommendations specific to the substantive concerns discussed in those chapters. Here, we close with a brief set of recommendations that reflect largely cross-cutting concerns. Although these recommendations relate to the lessons learned from Hurricane Katrina and in some cases are specific to hurricane preparedness, most apply broadly to other types of disasters, whether natural or manmade.

Conduct Drills and Exercises with Multiple Levels of Government and Non-Governmental Partners

We believe that a good way to address the need for clarifying roles and responsibilities for public health partners is for state and local health departments to make a greater effort to include a wider range of community partners in planning activities and exercises for both natural and manmade disasters. Doing so will help resolve ambiguities over roles and responsibilities. Here it should be noted that since the terrorist attacks of September 11, 2001 there has been a sharpened focus on preparedness for bioterrorist or other manmade disasters. As such, the focus of many exercises has been on scenarios involving infectious disease outbreaks. However, the experience of Hurricane Katrina illustrates importance of developing exercises for public health departments for a variety of scenarios including natural disasters, especially those that might require evacuation of a large number of people. Moreover, it is important to conduct drills and

exercises that test specific capabilities because they are much more likely than generic exercises to result in performance improvements.

Explore Prospect of Extending ICS Training and Planning to Key Private Sector Partners

Our case study results indicated that ICS training and planning were powerful tools for responding to the devastation caused by Hurricane Katrina. We believe that the effectiveness of ICS in public health emergencies could be strengthened if other government and private sector partners were included in the training and planning processes. Such partners include, but are not limited to, school officials, pharmacies and pharmaceutical companies, medical equipment suppliers, long-term care facility operators, and representatives from large local businesses.

Develop Systems for Quickly Matching Available Resources with Needs

Although opinions differ on whether the overall resources available during Hurricane Katrina and its immediate aftermath were adequate to meet the needs, an overwhelming majority of the people we spoke with in the case studies indicated that most of the problems arose because these resources were not well matched with needs. Such mismatches created shortages in some areas and surpluses in others. Effective matching requires coordination between state and local officials. At the local level, communities need to be able to quickly conduct a needs assessment, so they can request the specific set of resources that will serve their needs. At the state level, officials need to identify what resources are available and determine how to best allocate those resources to address needs across the affected areas.

Each Community Must Examine How it Can Increase Its Level of Public Health

Preparedness

Public health emergency preparedness is a shared responsibility. To mount an effective and efficient response, officials at all levels of government, business owners, and individuals must contribute their resources and ingenuity. Moreover, greater attention must be paid to unique challenges and issues that surround special needs populations in an emergency. But here, as in many areas of public policy, one size does not fit all. Due to differences in how the public health system is organized across geographic areas there is no one right role of public health in an emergency. Rather, each community must bring the relevant organizations together to determine

how best to allocate responsibility for the public health emergency response within their community. The outcome of such a meeting should be institutionalized through incorporation into the emergency response plan, the use of Memoranda of Understanding (MOUs) between organizations, and any other mechanism that will allow the community to hold organizations accountable for the roles and responsibilities they have agreed to take on.

References

- Asch SM, Stoto M, Mendes M, Valdez RB, Gallagher ME, Halverson P, Lurie N. (2005). A review of instruments assessing public health preparedness. *Public Health Reports*. 120 (5): 532-542.
- Appleseed (2006) A continuing storm: The ongoing needs of Hurricane Katrina Evacuees. <http://www.appleseeds.net/servlet/PublicationInfo?articleId=207> Last accessed May 31, 2007.
- CDC (2004) Public Health Emergency Response Guide for State Local, and Tribal Public Health Directors.
- CDC (2006) Surveillance in Hurricane Evacuation Centers Louisiana, September – October 2005. *Morbidity and Mortality Weekly Report*. 55(2):32-35.
- Daley WR. (2006). Public health response to Hurricanes Katrina and Rita-United States. *Morbidity and Mortality Weekly Report*. 55(9):229-231.
- DeLozier E, Kamp N. (2005) Hurricane Katrina timeline. Brookings Institution, <http://www.brookings.edu/fp/projects/homeland/katrinatimeline.pdf>, Last accessed May 31, 2007.
- Gebbie KM, Merrill J. (2002). Public health worker competencies in emergency response. *Journal of Public Health Management and Practice*. 8(3):73-81.
- Gebbie KM, Turnock BJ (2006). The public health workforce 2006: New challenges. *Health Affairs*. 25 (4): 923-933.
- Godoy, M. (2006) Tracking the Katrina diaspora: A tricky task. National Public Radio, <http://www.npr.org/news/specials/katrina/oneyearlater/diaspora/> Last accessed May 31, 2007.
- Guidry J. (2006) Hospital disaster preparedness: Past, present, and future. Presentation to U.S. House of Representatives Committee on Energy and Commerce Subcommittee on Oversight and Investigations. <http://energycommerce.house.gov/reparchives/108/Hearings/01262006hearing1772/Guidry.pdf>, Last accessed May 31, 2007.
- Institute of Medicine. (1988). The future of public health. Washington, DC: National Academy Press.
- Institute of Medicine. (2002) The future of the public's health in the 21st century. Washington, DC: National Academy Press.

- Katz A, Staiti AB, McKenzie KL. (2006). Preparing for the unknown, responding to the known: Communities and public health preparedness. *Health Affairs*. 25 (4): 946-957.
- Kerber, R. (2005, October 5) Diabetes Put at Risk amid Hurricane Exodus; shortages of drugs, supplies reveals holes in government disaster plans for patients. *The Globe*.
- Knabb RD, Rhome JR, Brown DP (2005) Tropical cyclone report: Hurricane Katrina. National Weather Service, National Hurricane Center, Washington DC.
http://www.nhc.noaa.gov/pdf/TCR-AL122005_Katrina.pdf
- Lurie N, Wasserman J, Nelson C (2006). Public health preparedness: Evolution or revolution? *Health Affairs*. 25 (4): 935-945.
- Matthews AK, Sprague K, Girling E, Dapice L, Palumbo MV, Berry P. (2005). Emergency preparedness volunteer training program. *Journal of Public Health Management and Practice*. S63-67.
- McHugh M, Staiti AB, Felland LE. (2004). How prepared are Americans for public health emergencies? Twelve communities weigh in. *Health Affairs*. 23(3): 201-209.
- Morill JB, Litaker JR, Markovich RJ et al. (2006) The Health and Medical Response to Hurricanes Katrina and Rita by the Texas Department of State Health Services: An After Action Assessment.
- National Organization on Disability (2005). Report on Special Needs Assessment for Katrina Evacuees (SNAKE) Project. Washington, DC.
http://www.nod.org/Resources/PDFs/katrina_snake_report.pdf (Accessed April 11, 2006).
- North Carolina Division of Emergency Management, North Carolina Division of Public Health, North Carolina Office of Emergency Medical Services (2006). *Hurricane Katrina After Action Report and Recommendations: Emergency Support Function 8, Health and Medical, State of Mississippi*.
- Parker CL, Barnett DJ, Fews AL, Blodgett D, Links M. (2005). The Road Map to Preparedness: A competency based approach to all-hazards emergency readiness training for the public health workforce. *Public Health Reports*. 120 (5): 504-514.
- Rottman SJ, Shoaf KI, Dorian A. (2005). Development of a training curriculum for public health preparedness. *Journal of Public Health Management and Practice*. S128-31.
- U.S. Department of Health and Human Services Office of Inspector General (OIG) (2006). Nursing Home Emergency Preparedness and Response During Recent Hurricanes. Washington, DC. <http://oig.hhs.gov/oei/reports/oei-06-06-00020.pdf>
- U.S. Department of Homeland Security (US DHS) (2004) National Response Plan., Washington, DC. <http://www.dhs.gov/xlibrary/assets/NRPbaseplan.pdf>

- U.S. Department of Transportation (US DOT) (2006a). Catastrophic Hurricane Evacuation Plan Evaluation: A Report to Congress. Washington, DC.
http://www.fhwa.dot.gov/reports/hurricanevacuation/rtc_chep_eval.pdf
- U. S. Government Accountability Office (2006a) “Statement by Comptroller General David M. Walker on GAO’s Preliminary Observations Regarding Preparedness and Response to Hurricanes Katrina and Rita” (GAO-06-365R).
- U.S. Government Accountability Office (GAO) (2006b). Disaster Preparedness: Preliminary Observations on the Evacuation of Vulnerable Populations Due to Hurricanes and Other Disasters. Washington, DC. <http://www.gao.gov/new.items/d06790t.pdf>
- U.S. House of Representatives (2006). A Failure of Initiative, Final Report of the Select Bipartisan Committee to Investigate the Preparation and Response to Hurricane Katrina, Washington, DC: U.S. Government Printing Office.
- U.S. Senate (2006). Hurricane Katrina: A Nation Still Unprepared, Report of the Committee on Homeland Security and Governmental Affairs, Washington, DC.
- Wasserman J, Jacobson P, Lurie N, Nelson C, Ricci K, Shea M, Zazzali J, Nelson M. (2006) Organizing state and local health departments for public health preparedness. Santa Monica CA, RAND TR-318-DHHS.
- Weiner E, Irwin M, Trangenstein P, Gordon J. (2005). Emergency preparedness curriculum in nursing schools in the United States. *Nursing Education Perspectives*. 26(6): 334-339.
- White House (2006) The Federal Response to Hurricane Katrina: Lessons Learned.

Appendix A: Interview Protocol for Directly Affected States

RAND is working with the US Department of Health and Human Services (HHS), Office of the Assistant Secretary for Public Health Emergency Preparedness to develop resources and to prepare analyses to describe and enhance key aspects of state and local public health emergency preparedness. The project is composed of several tasks. One of these tasks is to investigate and document some of the main, initial lessons learned from the public health response to Hurricane Katrina.

It is not our intent to evaluate the performance of any specific organization; rather, we hope to collect and synthesize information about what did and did not work during the response effort to use as a tool for improving preparedness for future disasters. It is our expectation that this information will be useful in improving public health preparedness in both those localities directly affected by Hurricane Katrina and those that were spared this time, but face the risk of hurricanes each year.

Required (Consent Procedures): Thank you for agreeing to talk with us about the lessons learned from the public health response to Hurricane Katrina. Before we begin, let me assure you that your responses to these questions will be held in strict confidence, except as required by law. Summary information from these interviews, together with material taken from public documents, will be presented at the state level; however, no specific individual or agency will be identified by name or affiliation in any reports or publications. Findings from the study will be shared with all participants.

Your participation in this discussion is completely voluntary. We would like to have your responses to all of the questions; however, if you are uncomfortable with any question we can skip it. We estimate that the interview will take about 1 hour.

Do you have any questions about our confidentiality procedures before we begin? (If yes, respond to all questions. If no, proceed with discussion).

I. Background

- To provide context for the interview, get background information on the respondent.
 - Current position: title and responsibilities
 - How long have you held your current position?
 - How long have you been with the local public health department (LPHD)?
 - What did you do before coming to the LPHD?

II. Evacuation

A. Hospitals

- Organizations that are involved
- The role public health plays
- Key successes (provide probes if needed)
 - Trigger points – weighing risks, legal authorities

- Finding suitable evacuation sites
- Logistics of evacuation – transportation
- Coordination with other organizations/levels of government
- Leadership
- Problems that arose (use above probes if needed)
- How things might be done differently in the future
 - Existing plan in place? Followed? Exercised?
 - Revisions?
 - The role public health should play

B. Nursing home populations

- Organizations that are involved
- The role public health plays
- Key successes (provide probes if needed)
 - Trigger points – weighing risks, legal authorities
 - Finding suitable evacuation sites
 - Logistics of evacuation – transportation
 - Coordination with other organizations/levels of government
 - Leadership
- Problems that arose (use above probes if needed)
- How things might be done differently in the future
 - Existing plan in place? Followed? Exercised?
 - Revisions?
 - The role public health should play

C. Other special needs populations, not in institutions

- Organizations that are involved
- The role public health plays
- Key successes (provide probes if needed)
 - Identifying special needs people for evacuation
 - Logistics of evacuation – transportation
 - Finding suitable evacuation sites
 - Coordination with other organizations/levels of government
 - Leadership
- Problems that arose (use above probes if needed)
- How things might be done differently in the future
 - Existing plan in place? Followed? Exercised?
 - Revisions?
 - The role public health should play

III. Medical Care Personnel

A. Identifying and mobilizing personnel

- Organizations that are involved
- The role public health plays

- Key successes (provide probes if needed)
 - Identifying volunteers
 - Legal issues – licensing, credentials
 - Trigger points – when to mobilize
 - Determining where personnel were needed
 - Logistics – communication, getting people out to affected areas
 - Allocation of scarce resources
 - Coordination with other organizations/levels of government
 - Leadership
- Problems that arose (use above probes if needed)
- How things might be done differently in the future
 - Existing plan in place? Followed? Exercised?
 - Revisions?

IV. Medical supplies

- A. Assessing needs, procuring and distributing supplies
- Organizations that are involved
 - The role public health plays
 - Key successes (provide probes if needed)
 - Assessing needs – type of supplies needed, quantity, and location
 - Obtaining needed supplies – right mix of materials in stockpiles or from other sources
 - Trigger points – accessing SNS or state stockpiles
 - Allocation of scarce resources
 - Distribution logistics – transportation
 - Security of drug supply
 - Coordination with other organizations/levels of government
 - Leadership
 - Problems that arose (use above probes if needed)
 - How things might be done differently in the future
 - Existing plan in place? Followed? Exercised?
 - Revisions?
 - The role public health should play

V. Communications

- A. Within and across organizations
- Key successes and/or problems that arose
 - Any changes to be made for future disasters
- B. With the media and public
- Key successes and/or problems that arose
 - Any changes to be made for future disasters

VI. Disease surveillance

- A. In affected areas
 - Key successes and/or problems that arose
 - Any changes to be made for future disasters
- B. In shelters
 - Key successes and/or problems that arose
 - Any changes to be made for future disasters

VII. Infection Control

- A. In affected areas
 - Key successes and/or problems that arose
 - Any changes to be made for future disasters
- B. In shelters
 - Key successes and/or problems that arose
 - Any changes to be made for future disasters

VIII. The role of public health in a disaster

- A. Define public health
 - Roles/functions that it encompasses
- B. Functions not traditionally in the public health sphere
 - Identify (1) organizations involved, (2) lead organization, (3) public health's role, (4) point at which public health becomes involved, and (5) the role public health should play for the following activities
 - Patient care
 - Medical information (e.g., medical records)
 - Behavioral health
 - Body recovery and identification
 - Mortuary services

Appendix B: Interview Protocol for Indirectly Affected States

RAND is working with the US Department of Health and Human Services (HHS), Office of the Assistant Secretary for Public Health Emergency Preparedness to develop resources and to prepare analyses to describe and enhance key aspects of state and local public health emergency preparedness. The project is composed of several tasks. One of these tasks is to investigate and document some of the main, initial lessons learned from the public health response to Hurricane Katrina.

It is not our intent to evaluate the performance of any specific organization, rather we hope to collect and synthesize information about what did and did not work during the response effort to use as a tool for improving preparedness for future disasters. It is our expectation that this information will be useful in improving public health preparedness in both those localities directly affected by Hurricane Katrina and those that were spared this time, but face the risk of hurricanes each year.

Required (Consent Procedures): Thank you for agreeing to talk with us about the lessons learned from the public health response to Hurricane Katrina. Before we begin, let me assure you that your responses to these questions will be held in strict confidence, except as required by law. Summary information from these interviews, together with material taken from public documents, will be presented at the state level; however, no specific individual or agency will be identified by name or affiliation in any reports or publications. Findings from the study will be shared with all participants.

Your participation in this discussion is completely voluntary. We would like to have your responses to all of the questions; however, if you are uncomfortable with any question we can skip it. We estimate that the interview will take about 1 hour.

Do you have any questions about our confidentiality procedures before we begin? (If yes, respond to all questions. If no, proceed with discussion).

Background

- To provide context for the interview, get background information on the respondent.
 - Current position: title and responsibilities
 - How long have you held your current position?
 - How long have you been with the local public health department (LPHD)?
 - What did you do before coming to the LPHD?
- Define public health
 - Roles/functions that it encompasses

Part 1 – Planning for Future Disasters

I. Evacuation

A. Hospitals

- Existing plans in place before Katrina
 - Organizations involved in planning

- Means of coordination with organizations during planning process
 - Lead organization
 - Changes made since Katrina?
 - Communication of changes in plans with other organizations
 - The role public health currently plays
 - The role public health should play
- B. Nursing home populations
- Existing plans in place before Katrina
 - Organizations involved in planning
 - Means of coordination with organizations during planning process
 - Lead organization
 - Changes made since Katrina?
 - Communication of changes in plans with other organizations
 - The role public health currently plays
 - The role public health should play
- C. Other special needs populations, not in institutions populations
- Existing plans in place before Katrina
 - Organizations involved in planning
 - Means of coordination with organizations during planning process
 - Lead organization
 - Changes made since Katrina?
 - Communication of changes in plans with other organizations
 - The role public health currently plays
 - The role public health should play

II. Medical Care Personnel

A. Identifying and mobilizing personnel

- Existing plans in place before Katrina
 - Organizations involved in planning
 - Means of coordination with organizations during planning process
 - Lead organization
- Changes made since Katrina?
 - Communication of changes in plans with other organizations
- The role public health currently plays
- The role public health should play

III. Medical Supplies

A. Assessing needs, procuring and distributing supplies

- Existing plans in place before Katrina
 - Organizations involved in planning
 - Means of coordination with organizations during planning process
 - Lead organization
- Changes made since Katrina?
 - Communication of changes in plans with other organizations
- The role public health currently plays
- The role public health should play

Part 2 – Receiving evacuees

- I. Identifying and mobilizing medical personnel
 - A. Organizations that are involved
 - B. The role public health plays
 - C. Key successes or problems that arose with (provide probes if needed)
 - Identifying volunteers
 - Legal issues – licensing, credentials
 - Trigger points – when to mobilize
 - Determining whether personnel were needed
 - Allocation of scarce resources
 - Coordination with other organizations/levels of government
 - Leadership
 - D. How things might be done differently in the future
 - Revisions to existing plans
 - Timing of mobilization
 - Coordination between organizations
 - Coordination of volunteers

- II. Assessing needs, procuring and distributing medical supplies
 - A. Organizations that are involved
 - B. The role public health plays
 - C. Key successes or problems that arose with (provide probes if needed)
 - Assessing needs – type of supplies needed
 - Obtaining needed supplies – right mix of materials in stockpiles or from other sources
 - Legal or financial issues – receiving medical supplies
 - Trigger points – accessing SNS or state stockpiles
 - Allocation of scarce resources
 - Distribution logistics – transportation
 - Security of drug supply
 - Coordination with other organizations/levels of government
 - Leadership
 - D. How things might be done differently in the future
 - Revisions to existing plans
 - Coordination between organizations
 - Communication of supply needs to other organizations/levels of government/media/public

Part 3 – Other Public Health Issues for States Receiving Evacuees

- I. Disease surveillance and infection control
 - A. Hospitals
 - Key successes and/or problems that arose
 - Any changes to be made for future disasters
 - B. Shelters
 - Key successes and/or problems that arose
 - Any changes to be made for future disasters

C. General population

- Key successes and/or problems that arose
- Any changes to be made for future disasters

II. Communications

A. With and across organizations

- Key successes and/or problems that arose
- Any changes to be made for future disasters

B. With the media and public

- Key successes and/or problems that arose
- Any changes to be made for future disasters

III. Incorporating shelter populations into public health system

- Key successes and/or problems that arose
- Any changes to be made for future disasters

Part 4 – Reassessing the role of public health in a disaster

I. Functions not traditionally in public health sphere

A. Identify (1) organizations involved, (2) lead organizations, (3) public health's role, (4) point at which public health becomes involved, and (5) the role public health should play for the following activities

- Patient care
- Medical information
- Behavioral health
- Body recovery and identification
- Mortuary services