Emergency Response and Public Health in Hurricane Katrina: What Does it Mean to Be a Public Health Emergency Responder?

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Since 9/11, federal funds directed toward public health departments for training in disaster preparedness have dramatically increased, resulting in changing expectations of public health workers' roles in emergency response. This article explores the public health emergency responder role through data collected as part of an oral history conducted with the 3 health departments that responded to Hurricane Katrina in Mississippi and Louisiana. The data reveals a significant change in public health emergency response capacity as a result of federal funding. The role is still evolving, and many challenges remain, in particular, a clear articulation of the public health role in emergency response, the integration of the public health and emergency responder cultures, identification of the scope of training needs and strategies to maintain new public health emergency response skills, and closer collaboration with emergency response agencies.

KEY WORDS: disaster preparedness training, Hurricane Katrina, natural disaster, oral history, public health emergency response competencies

In the early hours of August 29, 2005, Hurricane Katrina made landfall with winds up to 145 m/h in the City of New Orleans and the Gulf Coast of Louisiana, Mississippi, and Alabama causing the death of more than 1800 people, catastrophic destruction to property, and the temporary and permanent displacement of hundreds of thousands of people including the entire New Orleans metropolitan area and surrounding parishes. Within hours, the levees protecting New Orleans breached, flooding the city. Along with the rest of the city, the health care and public health infrastructure of the area was devastated. Though much has been written about the role of federal, state, and local emergency response agencies, little is known about the role of the state and city health departments in these events.[1-3]

Hurricane Katrina placed tremendous strain on the public health systems of the Gulf Coast region of Louisiana and Mississippi. The actions of the state health departments in Mississippi and Louisiana, along with the City of New Orleans Department of Health (CNODH), were critical in the management of this public health disaster. Working side by side with traditional emergency response agencies (*Emergency responder* is defined by the US Department of Homeland Security as those individuals, including emergency response providers, who, in early stages of an incident, are responsible for the protection and preservation of life, property, evidence, and environment) including fire, police, and emergency medical workers, public health workers themselves undertook emergency responder roles. To better understand the role of public health in emergency response, an oral history was conducted with representatives of the Louisiana Department of Health and Hospitals (LDHH), CNODH, and the Mississippi State Department of Health (MSDH). This article examines the public health emergency responder

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role in Hurricane Katrina, public health workers' acceptance of the role, and the challenges they experienced in carrying out these responsibilities.

Public health departments have historically played a role in responding to emergencies, particularly in the management of infectious disease outbreaks through the delivery of mass immunizations, often in collaboration with local health partners.[4,5] As a consequence of the terrorist attacks on New York City in September 2001, expectations of the public health workers' role have greatly expanded. Public health workers are now considered an integral part of the community-level emergency response system.[6,7]

In 2002, the Columbia Center for Health Policy, Columbia University School of Nursing developed public health worker competencies for emergency response.[8] Subsequently, a group of federal, state, and local public health experts were asked to assess to what degree state and local public health agencies performed the identified competencies.[8] In the opinion of these experts, public health agencies were under- or unprepared in some critical emergency response competency areas: (1) well-developed emergency response plans, (2) knowledge of agency mission and their specific roles in emergency response, (3) knowledge of the Incident Command Structure ([ICS] the national organizational structure for emergency response), (4) round-the-clock response, and (5) collaborative partnerships with other emergency response agencies. Since that time, the training of public health workers has dramatically increased nationally.[7] A study conducted in 2004 of 2300 local public health departments revealed that 92% had participated in emergency preparedness drills or exercises, 71% had assessed workforce competencies for preparedness, and 87% had provided preparedness training to staff.[9] Salinsky and Gersky[10] suggest that despite the increase in funding and training, the level of funding has not been sufficient to support the additional burden on local health departments. There is an urgent need to know how public health workers are functioning in this new role and how to best meet the challenges they may be experiencing.

Methods

Oral history has previously been utilized as a tool in public health research most recently with the New York City Department of Health in 2002 following the September 11 attacks on the World Trade Center and the subsequent anthrax investigations.[11,12] An oral history is a systematic collection of personal accounts and observations by participants in a specific event. The story is told by the participants in their own words. The researcher begins with a central question or issue that guides the collection of data; however, that question is likely to evolve over time as more data becomes available. This approach allows researchers to document events and identify themes as they emerge naturally from the data, provides opportunities to examine the interface between organizational and environmental issues, and allows for historical data to be gathered for future research.

TABLE 1 Participants by Agency and Organizational Level

	LDHH	MSDH	CNOHD	Total, N (%)
Senior management	6	4	4	14 (31.8)
Middle management	10	8	2	20 (45.4)
Line staff	4	3	3	10 (22.7)
Total	20	15	9	44 (100)

Abbreviations: CNOHD, City of New Orleans Health Department; LDHH, Louisiana Department of Health and Hospitals; MSDH, Mississippi State Department of Health.

Sample and recruitment

Leaders of the 3 health departments directly involved in responding to Hurricane Katrina in Louisiana and Mississippi were contacted by the investigators about the study and agreed to participate. A purposive sample of key public health leaders and managers was identified using organizational charts provided by the state and local health departments. These individuals were selected on the basis of their knowledge of the strategic and tactical decisions and actions taken by their departments in response to Hurricane Katrina and, in a number of cases, were involved in their pre-Katrina development as well. This sample consists mainly of senior leadership and management along with a smaller sample of line staff who were directly involved in responding to the emergency. It is not intended to be a representative sample of all public health providers but fairly reflects those in the agencies who could provide information related to the goals of the study. Leaders in each agency informed those identified that they would be contacted by one of the investigators. From June to November 2006, 44 of the 50 identified public health staff were contacted, agreed to participate, and were interviewed. The remaining 6 individuals identified for the study were no longer working at the health departments and were not reachable by phone. Table 1 describes the agency affiliation and organizational role of 44 participants. Louisiana Department of Health and Hospitals represented the largest group of participants (N = 20), followed by MSDH (N = 15) and CNOHD, the smallest agency (N = 9). The agency sample size reflects the number of individuals in each agency who were directly involved in the response. The study was described to potential participants as an oral history

being conducted to better understand the role of public health in responding to disaster that would become a permanent record of these historic events and be available in local universities for future studies. Participants were told that they would receive a copy of the transcribed interview to review for accuracy of transcription. After completion of the review, they would have the option of depositing the transcribed document and audiotape to a Hurricane Katrina Oral History repository. The study was reviewed by the institutional review board of Columbia University and New York University and deemed exempt as an oral history.

Data collection

An interview guide organized around topic areas related to the study goals was used to conduct the oral history. Participants were asked to recount their experience in the disaster beginning with when they became aware of the storm and later as events unfolded. Specific roles and responsibilities of the individuals and the department during the initial disaster and in the weeks and months that followed were explored. Participants were asked about prior disaster training and experience and existing agency emergency policies and procedures (chain of command, communication role). Study investigators conducted and audiotaped all interviews, approximately 1 to $1\frac{1}{2}$ hours in length.

Data analysis

Audiotaped interviews were transcribed verbatim and sent to participants for review. Participants made minor changes to the transcripts such as spelling of proper names and clarification of words the transcriber could not clearly hear. The research team then conducted an initial review of the narrative data to identify broad analytic themes related to the study's goals. Thematic analysis of narrative data is designed to systematically identify relatively comprehensive topics present in the text and the specification of relationships that exist among these themes or between themes and contextual factors. Core codes, secondary codes, and a final codebook were developed as the investigators engaged in an iterative process with the data. All interviews were coded and entered into a database utilizing the qualitative data analysis software ATLAS.ti 4.2 (Atlas ti Scientific Software Development GmbH, Berlin). A random sample of 20% of transcripts was then independently coded by a second coder. Interrater agreement on codes was excellent (>90%).

Results

Proximity to the Gulf Coast where hurricanes are a common occurrence has provided frequent opportunities for each health department to play a role in emergency response. Participants from all 3 health departments reported that until the mid-1990s, their role was largely to insure environmental health such as monitoring the safety of water, food, and sewage disposal in times of disaster. In the late 1990s, all 3 departments began to take a major responsibility in caring for vulnerable populations in "special needs shelters." These shelters were created to safeguard individuals with chronic illnesses whose care needs exceed the capacity of the general shelter system, but who do not require hospitalization. Public health workers (mainly nurses and physicians) set up and staff these shelters where they provide medical as well as supportive care to those seeking shelter.

As this oral history of Hurricane Katrina demonstrates, the public health emergency responder role has increased significantly as a result of the attacks of 9/11. Data presented next demonstrates public health workers' perspectives on 2 overarching themes that emerged from the data related to the public health emergency responder role: (1) The role of public health has changed since 9/11 and is still evolving and (2) there are significant challenges to the adoption of the new emergency responder role for traditional public health professionals.

The role of public health has changed since 9/11 and is still evolving

More than 90% of participants, both leaders and line staff, described changes in the expectations for public health workforce as a result of the attacks of 9/11. Federal funding to increase capacity for public health emergency response was specifically directed toward preparedness for bioterrorism. These state and local health departments expanded on that mandate to adopt an *all hazards* approach as they believe, practically, that they are more likely to experience a natural disaster than a bioterrorism event. The infusion of federal funding to build public health capacity for disaster response has been a significant factor driving change in the public health role. The formalization of the role of state public health departments in the emergency response system has also been a catalyst for change. Although some emergency response functions are similar to routine core public health activities—such as surveillance, vector control, and environmental quality assurance and regulation—many functions represent either new responsibilities or new roles for public health, particularly when the conventional providers of those services are either overwhelmed by the disaster or absent. These new responsibilities include either assurance or direct provision of medical equipment and supplies, victim identification and mortuary services, veterinary services, patient evacuation, worker health safety, and the direct provision of clinical care and mental health care.

The formalization of these functions significantly expanded the role of public health departments in emergency response. A senior official at LDHH described the impact of the post-9/11 role expansion on the public health workforce:

> And when 9/11 came it added further to our public health roles in disasters and those kinds of events. . .. Certainly 9/11 made that clearer to folks so there was a lot of emphasis in how do you get people to start thinking differently about their roles in public health, to move beyond preventing the spread of disease to perhaps being emergency responders. There is just [a] huge difference.

Strategies to increase emergency response capacity

In response to these challenges the 3 health departments engaged in 2 different strategies to increase public health emergency response capacity: (1) extensive training of existing workforce including disaster simulation exercises and training in the Incident Command Structure and (2) recruitment of new staff with traditional emergency response experience.

Louisiana Department of Health and Hospitals utilized new federal funding to support workforce development through extensive training and limited recruitment of new staff with emergency response experience. As a result of those efforts, the emergency response expectations for the public health workforce in Louisiana are widely understood and accepted. An LDHH senior social worker described the staff expectations:

> It's a rule, it's policy. I mean no one is exempt. We all have to report in the event of a disaster.

This participant explained that there are some differences among public health workers in their understanding of what it means to be a public health emergency responder noting that nurses, the largest group of professionals in the public health workforce,[13] and others who have designated emergency response roles have the clearest understanding of their responsibilities.

When new federal disaster preparedness funds became available after 9/11, MSDH primarily used funds to increase state-level emergency response capacity through recruitment of traditional emergency response professionals. A senior official with the MSDH Office of Health Protection recruited emergency response coordinators for each of the 9 public health districts in Mississippi. He reflected on this approach

> . . .I didn't go hire public health people to be the emergency response coordinators. I went and either got police officers, firefighters, paramedics, an ex-military person, someone that was used to responding and then trained them in public health instead of the other way around. And I tell you it was probably a very good decision, because those people are public servants in an emergency, or have served as public servants in an emergency and they have helped public health people understand that role.

This strategy provided a highly trained emergency response leader in each district. However, traditional public health staff were less familiar with the emergency response role. Federal funding was used to train MSDH Central Office staff in the Incident Command Structure and specific staff were oriented to the Strategic National Stockpile (federal program providing essential medications to supplement state and local public resources during an emergency) but few, especially at the district health office level, had extensive formal disaster preparedness training. In the central office of the health department in Jackson, one midlevel manager stated:

> We were prepared from the standpoint of knowing that we had to work in teams. We had established those teams and a lot of that worked well during Katrina, knowing the stockpile folks. We weren't prepared for what we went through. And I don't know if anybody could ever be that prepared. We could have been better prepared.

Another official in Office of Emergency Planning and Response at MSDH described the tremendous efforts of public health workforce in responding to Hurricane Katrina despite limited training in emergency response.

> We mobilized about 1400 of our 2400 or so employees from Davidson, virtually all of which were acting outside of their knowledge base, and did so for the most part very graciously. We're thankful for that. I would say less than 100 had actually had disaster preparedness training.

Similar to the other health departments, the CNODH had responsibility for staffing the special needs shelter for a number of years prior to Hurricane Katrina. As a local health department, they received a modest amount of federal funds to increase capacity for emergency response that went primarily toward training in the Incident Command Structure and developing emergency response protocols. Senior staff had participated in disaster simulation exercises and had a clear understanding of the emergency responder role. Among line staff, many long-time health department employees, some were less comfortable in adapting to the public health emergency responder role. When contacting staff to report to the Superdome where the special needs shelter would be set up, several participants described reticence on the part of some staff to report for duty:

> So many people I called were adamant that "I'm not going to do special needs."

TABLE 2 Challenges to Adoption of the Public Health Emergency Responder Role Across Health Departments[a]

Domains	LDHH	MSDH	CNOHD
Cultural differences	x	xx	x
Public health/emergency response skills differences	xxx	xxx	xxx
Integration of public health and emergency response systems			
Internal	x	xx	x
External	xx	x	xx
Barriers to ER role adoption (physical, social, and administrative)	xx	x	xxx

Abbreviations: CNOHD, City of New Orleans Health Department; LDHH, Louisiana Department of Health and Hospitals; MSDH, Mississippi State Department of Health.
[a]Number of "x" reflect participants' description of problem severity: x = minimal, xx = significant, xxx = considerable.

There are significant challenges to public health adoption of the emergency responder role

About two-thirds of participants from all 3 public health departments identified significant challenges for public health workers in integrating public health and disaster response roles. Four subthemes of this overarching theme were identified: (1) traditional public health and emergency response represent distinct cultures; (2) some different skills or competencies are required to carry out these roles; (3) differences in culture and skills present challenges to integration of the 2 roles; and (4) public health workers may experience physical, social, and administrative barriers to performing emergency response roles. Table 2 compares the degree to which the subthemes described next differed across the 3 health departments.

There are differences in the cultures of public health and emergency response

More than half of the participants in all 3 agencies referred to the evolution of the public health emergency response role as a culture change. For those who had spent much of their public health career in primary prevention activities, the functions of emergency response were very different, as is the pace of the work and a "24/7 versus a 9 to 5 expectation." A senior nurse at LDHH described this new role as a culture change:

> What I think when I say it "changed the face of public health," primarily we were looking at our core functions. . .looking at public health programs and providing those services. And when you bring in emergency preparedness into the mix. . .and now you tell public health nurses who have been in the clinics working. OK, now it's our duty to respond, and now you have to respond, it's this new public health preparedness role, you know it was a culture change.

TABLE 3 Core Competencies for Traditional Public Health and Traditional Emergency Response Professionals

Traditional Public Health Professional	Traditional Emergency Responder
Assess data relevant to public health	Hazard identification
Develop public health programs and policies	Hazard mitigation
Communicate effectively and with cultural competence with general public, communities, and organizations	Direction, control, and coordination of disaster response
Apply state-of-the-art public health science, leadership, and management knowledge and skills to public health practice	Conduct emergency response exercises, evaluate and develop corrective action plans
Responsible for the health of the public	Responsible for continuity of operations and government

Several participants noted the difficulty of conceptually integrating the public health and emergency responder roles describing it as "still muddled" for many people. An LDHH physician and senior administrator described efforts of the department to prepare public health workers for new emergency response expectations and the challenge of internalizing the role.

> I think the problem often is that they don't necessarily feel in their day to day life, like emergency responders . . . I think that the same people that man the public health units . . . they weren't necessarily the people that know how to be emergency responders.

Different skills and competencies are required to carry out public health and emergency response functions

About 50% of the participants in all 3 health departments described differences in skills needed to carry out their public health and emergency response roles. Table 3 illustrates the core competencies for traditional public health workers[14] compared with those for traditional emergency responders.[15] Core public health competencies include assessment of data relevant to public health; development of public health programs and policies; effective and culturally competent communication with the general public, communities, and organizations; and the application of state-of-the-art public health science, leadership, and management knowledge and skills to the conduct of public health practice. Core competencies for traditional emergency responders are hazard identification, risk assessment, and impact analysis; hazard mitigation; direction, control, and coordination of emergencies; conduct of emergency response exercises; and evaluation of those efforts and

plans for corrective action. Traditional emergency responders are also responsible for continuity of operations and continuity of government. Although there are important overlapping skills required for fields such as management, leadership, and communication abilities, the primary focus of the core competencies is different. One key distinction is the focus and timeframe for achieving outcomes. Public health activities such as health promotion and disease prevention efforts are typically implemented within a longer timeframe to appropriately engage affected communities and organizations in the planning process. In contrast, most emergency response activities require an immediate action, though the planning for them can involve a longer timeframe as well. The greatest area of overlap between the 2 fields is the area of public health disease monitoring and control, where immediate response to outbreaks is required, responsibilities that are core to the public health mission.

The differences in substance and approach of public health and emergency response professionals are reflected in the observations of an LDHH nurse and senior official:

> Emergency response staff are a certain type of people. Public health people are a certain type of people. And they've been able to come to the table, but when you look at this kind of disaster, all right, you need EMS, you need emergency responder kind of people, you need very dynamic people who can, and I'm not saying that public health don't have those kind of people, but that's not what they're used to doing . . . EMS people. This is what they do every day. They have that adrenaline. They're used to any and everything.

Integrating public health and emergency response systems may present challenges internally and externally with emergency response agencies

In Mississippi, a midlevel administrator for the coastal public health district most impacted by the storm described the difficulties experienced in working within the agency where the emergency response functions were carried out separately from the traditional public health functions. The administrator was familiar with the health district and thus could provide important information to the Forward Command (local arm of the state ICS) team deployed to the area by the health department. However, this administrator was also responsible for reopening the health clinics to meet the needs of the storm survivors in the area.

> I basically had two full time jobs . . . and you certainly shouldn't have two jobs in an Incident Command System and you shouldn't have two ways you are trying to do things. . .. Forward Command worked entirely separately from public health as a day to day function so it was just really hard to do both and they should have been meshed, if there's a way, they need to mesh closer somehow even if that means putting Forward Command in the District Office so that you can be part of it but separate from it.

In contrast, the MSDH emergency response teams had fewer challenges in working with external traditional emergency response agencies. A senior official in the Office of Emergency Planning and Response described the federal resources that were made available to the state immediately after the storm and what facilitated the acquisition of those resources:

> I can tell you why we were able to access those assets. The reason is, we knew who to talk to that has these assets. We knew where the assets were, what the capability was so they could be appropriately assigned and the people and the management that came with them were friends of ours colleagues, we were on a first name basis. . . .

This official noted, however, that the public health role in emergency response was not consistently understood by all response agencies. For example, he described the problems that arose when fuel access was extremely limited after the storm:

> We had issues at the local level where our health care workers were not considered first responders. And so the priority for fuel and transportation, as well as everything else that was afforded to emergency responders, was in many cases not afforded to the health community.

Louisiana Department of Health and Hospitals and CNODH experienced fewer challenges within their own agencies in integration of public health and emergency response functions but encountered some challenges with external traditional emergency response agencies. For example, LDHH officials in attempting to send resources into the disaster area encountered barriers from state and federal emergency response agencies:

> We were sending teams in, search and rescue like EMS teams and they were getting turned away. I guess there were state police or National Guard guarding the road, they weren't letting them in.

City of New Orleans Department of Health experienced challenges in the Superdome where communication with traditional emergency response agencies was at times lacking or very difficult. A senior clinician described her frustration at the lack of response to her requests for assistance from some of the military units assigned to the Superdome.

> I would talk to the Generals, the Colonels . . .I could never get a sense that my message was getting to the right people. I needed some men to help move cots (for patients). I didn't have enough Health Department staff to do it. . .they said they would call but nothing ever happened. Other than a few people it was very difficult to get anything done.

These external interagency barriers appeared to emerge where there was a lack of awareness or understanding of the public health emergency response role on the part of traditional emergency responders. In Louisiana, the public health emergency response was lead by senior public health officials with considerable emergency response experience. Louisiana Department of Health and Hospitals participants' extensive emergency response training and experience with the Incident Command Structure may have reduced the problems of integration of public health and emergency response activities within its own agency but not necessarily to external emergency response agencies.

Public health workers may experience physical, social, and administrative barriers to being emergency responders

Aging of the public health workforce and the potential impact on the field of public health has been widely documented.[16-18] These concerns were articulated by several participants. A few raised concerns about the ability of the aging public health workforce to take on the strenuous physical burden of functioning as emergency responders. A senior nurse at LDHH described the consequences of the extraordinary demands on public health nurses responding to Hurricane Katrina.

> You know, our workforce is an aging workforce and I think the mindset of our older nurses was like—OK this is enough for me—and this was the final straw that broke the camel's back. And that was . . .we'll call it quits after this. And so we've had a lot of our older workforce to early retirement.

Family demands were also identified as challenges for some public health workers to respond in an emergency. A quarter of participants described situations in which public health workers were either exempt from responding to emergencies or were resistant because they had not made plans for their families in the disaster. One CNODH official described the barriers nurses experienced in reporting for duty at the Superdome:

> Dr. Stevens had declared every employee essential but some of them were single parents, some of them had husbands that were in police and fire so they were exempt, some of them had elderly parents that they had to take care of so they were exempt from really reporting.

A few participants spoke about the administrative challenges to paying public health workers for responding in an emergency noting the lack of policies on overtime payment.

> Another thing is that people who responded. . .were paid from the city. I'll use myself as an example. I came out, I worked, I'm a salaried person. Because the city had nothing in place, I was paid seven hours a day whether I was working around the clock or not. And then those people that did not show up at work at all [were] paid seven hours a day and they didn't have to endure anything. I have said you have got to put something into place to compensate those people who are making things happen.

As Table 2 illustrates, there were clear differences across the 3 health departments in the degree to which they experienced challenges to integration of the public health and emergency response roles. In general, LDHH and CNODH faced similar challenges, although CNODH experienced greater physical and social challenges to workers reporting for duty as a result of having a smaller workforce and fewer resources. Challenges to integration of the 2 roles were greater at the 2 state health departments because of their larger scope of responsibilities and the need to operate within the complex organizational network of state, federal, and voluntary agencies. As noted earlier, although the gap in skills between traditional public health and emergency response workers was great in both, the 2 agencies have taken very different strategies to address it resulting in better integration with external agencies in Mississippi and greater internal agency integration in Louisiana.

Discussion

Between 2002 and 2005, training of public health workers to increase capacity for emergency response increased exponentially. A study conducted in 2002 found that public health staff at all levels were underprepared to respond in an emergency in 5 areas: (1) availability of well-developed emergency response plans, (2) knowledge of agency mission and individual specific roles in emergency response, (3) knowledge of the ICS, (4) round-the-clock response capacity, and (5) development of collaborative partnerships with other emergency response agencies.[8]

This article exploring the public health emergency response role in Hurricane Katrina reveals, in the opinion of the participants, significant progress in some emergency response competency areas and the need for more work in others. Progress in each of the 5 competency areas is described next.

1. All participants at the 3 agencies report having emergency response plans that are known to the participants and available within the agencies.
2. More than 90% of participants described their understanding of the agency's role and their individual role in emergency response, although some participants believe that line staff within their agencies are not as knowledgeable. More than half of the participants described the challenges to public health

workers of adopting this new role that requires a different set of skills from those needed to carry out their usual responsibilities and insufficient opportunity to practice and reinforce new emergency response skills as a contributing factor. Some recent literature supports this observation noting that emergency response skills are highly specialized and require reinforcement through regular practice.[10] Others have pointed out the need for a clearer understanding of the scope of training required to achieve public health emergency response competency.[4] Given the current climate of decreased federal funding for emergency response training and severely limited state budgets, *it is essential to identify the optimal training required to achieve competency and strategies to sustain those skills*.

3. About 80% of participants were familiar with protocols and terminology of the ICS. Most indicate that they believe other agency staff are also familiar with ICS terminology though it is less clear whether they are familiar with other protocols related to emergency response. For example, many participants were familiar with the Strategic National Stockpile as a federal resource during an emergency but protocols for vaccination of the general population after the hurricane were lacking.
4. Progress has also been made in the public health workforce's ability to respond to a round-the-clock demand. All study participants report being prepared for round-the-clock response and in many cases report that this expectation is well understood by the entire workforce. There are exceptions to this finding, however. Some participants indicate that not all agency staff are prepared for this response as a result of personal barriers such as family responsibilities, personal health, or physical incapacity. In other cases, perceived lack of skills to carry out assigned emergency response functions are inhibiting factors. These findings are consistent with those of Barnett and colleagues[6] who stress the importance of addressing family, personal, and environmental safety concerns of public health workers to reduce what may be an inaccurate perception of risk. They suggest that public health workers may be unclear about what is expected of them and the importance of their contribution to emergency response. *The safety concerns and role expectations of public health workers as well as barriers to their ability to respond round-the-clock in an emergency should be carefully assessed by agencies and clarified in job descriptions.* Where legitimate exceptions to round-the-clock response expectations are needed, they should be communicated within the agency. *There is a need for well-developed agency-level policies and procedures regarding the scope of responsibility for the public health emergency responder role.*
5. The competency area where many participants report room for improvement is *establishing collaborative relationships with other emergency response agencies*. The integration of public health into statewide ICS is now well established; however, the role of public health in emergency response is reportedly not well understood by the other responders, according to many participants. The most common difficulty occurred when public health officials were attempting to get much needed medical and other supplies into New Orleans and were stopped on the highways and not allowed to proceed. Several participants referred to the intense experience of this disaster as providing opportunities for other response organizations to learn what public health contributes to the response effort. In Mississippi, emergency response public health officials interacted effectively with federal emergency response agencies; however, they encountered difficulties at the local level. These findings support those of several other studies where lack of role clarity across agencies impact interagency collaboration and inhibit effective response. Tierney's[1] report on the lessons of Hurricane Katrina described the urgent need for clarification of the roles of the different emergency response organizations and all levels of government. In their recent study of planning efforts for pandemic flu, Avery and colleagues[19] identified the lack of role clarity among public health, emergency management, and health care officials as a significant barrier to effective emergency response. Finally, Salinsky and Gersky[10] suggest that the lack of a clearly defined *national* public health emergency response model is a significant barrier to effective coordination with other emergency response agencies.

This oral history provides important information that bridges the gap between the generic public health emergency response competencies and the reality of the public health workforce experience as emergency responders in this "real world" event. It is now clear that the field of public health has a critical role in emergency response, particularly following their designation in 2005 as the agency responsible for coordinating with the Federal Emergency Response System for Health and Medical Issues (ESF-8). As the study here reveals, however, the role is still evolving. The interface of public health and emergency response cultures presents challenges to both that should be acknowledged and addressed. Former Deputy Health Commissioner for New York City, Benjamin Mojica, MD, noted following the 2001 terrorists attacks there, "Historically there have been significant challenges to integrating the cultures of public health with that of the OEM (Office of Emergency Management).[20] These result from the

nature of the mission of each agency. Public health must always be focused on the larger population issues while emergency responders are concerned with the health and safety of the individual" (Oral communication, 2008). Despite the differences in foci, the 2 fields share a common mission of protecting the health and safety of their community.[7]

The study illustrates 2 primary strategies that have been applied by health departments in Louisiana and Mississippi to build emergency response capacity: (1) training of public health professionals in emergency response procedures and (2) recruitment of traditional emergency responders into public health settings. Mississippi State Department of Health and LDHH have utilized both strategies in combination with a greater emphasis on one or the other in each state. These strategies are important initial steps in building workforce emergency response capacity but do not appear to be sufficient to bridge the public health and emergency response cultures at this point in time. *The data suggest that continued research is needed to identify the most effective structural strategies for integration of the 2 public health functions. Clear guidelines and expectations are needed for the emergency response roles of traditional public health workers that are consistent with their skills and training.* Not every public health professional will be able to assume the range of emergency response activities now expected.

The data corroborate concerns that have been raised by others that increased demands on an aging workforce may accelerate the public health workforce shortage.[16,18] It is estimated that among the current workforce almost 50% will be eligible for retirement in the next few years.[17] Experts have warned that the increasing demands on the public health workforce resulting from disasters such as 9/11 and Hurricane Katrina are compounded by the aging out of these professionals over the next 5 years.[17] There is no easy solution to this issue. Careful assessment of older public health workers may clarify whether they would be more willing to take on emergency response functions with sufficient training to increase confidence in their ability to carry out the role or whether their role should be a more limited one. Turnock[4] points out that public health emergency response competencies were intended to augment basic public health competencies but to date there has been little progress in creating a common framework that fully integrates both types of skills. In fact, the most recent version of core public health competencies makes minimal reference to public health emergency response competencies.[4]

Recruitment of new public health professionals must include clear expectations and training for their emergency response roles. Emergency responders recruited into public health also need to be educated about the public health environment and its primary mission. Traditional public health professionals and emergency responders need ongoing training and opportunities to train together to more fully understand their roles and find areas for collaboration. An integrated training approach will increase their effectiveness and decrease the potential for the development of parallel rather than integrated systems of emergency response. Development of collaborative relationship with other emergency response agencies as discussed earlier is also critical to bridging the cultural gap.

Finally, it is important to note that following the initial post-9/11 infusion of funding to expand public health emergency response capacity, both federal and state funding have continued to decline over the last several years while public health responsibilities have increased.[17] These funding reductions coupled with the responsibility for provision of medical care to vulnerable populations pose a serious threat to public health emergency response capacity that must be addressed by policy makers. There is a danger of continued expansion of public health responsibilities without adequate resources, diluting the ability to carry out core public health functions.[10]

The study has a number of limitations. As with all oral histories, the data presented is subject to the failings of the participant's memory, self-serving motives, differences between the spoken and the written word, inaccurate perceptions of the participants, and the power relationship between the interviewer and the participant. The data presented here are self-reported opinions of those who responded to Hurricane Katrina. In addition, participants are largely senior and middle management officials in the health departments responsible for responding to the emergency. To address theses limitations, the analysis of the data focuses on points of agreement among multiple sources while noting areas of disagreement. The ability to identify common themes across 3 different health departments lends credence to the findings. Though findings can not be generalized, the data offer insights and suggestions for strategies to strengthen emergency response competencies among public health workers.

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