

The Engagement of Academic Institutions in Community Disaster Response: A Comparative Analysis

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ABSTRACT

Objective. Using comparative analysis, we examined the factors that influence the engagement of academic institutions in community disaster response.

Methods. We identified colleges and universities located in counties affected by four Federal Emergency Management Agency-declared disasters (Kentucky ice storms, Hurricanes Ike and Gustav, California wildfires, and the *Columbia* space shuttle disintegration) and performed key informant interviews with officials from public health, emergency management, and academic institutions in those counties. We used a comparative case study approach to explore particular resources provided by academic institutions, processes for engagement, and reasons for engagement or lack thereof in the community disaster response.

Results. Academic institutions contribute a broad range of resources to community disaster response. Their involvement and the extent of their engagement is variable and influenced by (1) their resources, (2) preexisting relationships with public health and emergency management organizations, (3) the structure and organizational placement of the school's disaster planning and response office, and (4) perceptions of liability and lines of authority. Facilitators of engagement include (1) the availability of faculty expertise or special training programs, (2) academic staff presence on public health and emergency management planning boards, (3) faculty contracts and student practica, (4) incident command system or emergency operations training of academic staff, and (5) the existence of mutual aid or memoranda of agreements.

Conclusion. While a range of relationships exist between academic institutions that engage with public health and emergency management agencies in community disaster response, recurrent win-win themes include co-appointed faculty and staff; field experience opportunities for students; and shared planning and training for academic, public health, and emergency management personnel.

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Academic institutions of higher education possess a tremendous range of resources relevant to a community's overall disaster resilience. Their multidisciplinary construct inherently fosters interdisciplinary thought and collaboration, valuable when considering novel solutions for challenging problems. Their leadership is also aware that the health and resilience of the communities in which they reside directly impact their institutions. Recognizing the role of universities in revitalizing communities and addressing local problems, the U.S. Department of Housing and Urban Development established the Office of University Partnerships in 1994 to encourage academic-community partnerships. Academic/public health department collaborations afford academic institutions a broad spectrum of opportunities for service, training, and research.¹ A description of the myriad ways in which universities have supported local communities by facilitating economic development, delivering social services, and providing technical assistance is available,² but their disaster preparedness and response activities have largely not been cited or addressed by the current body of research. Emergency managers and public health preparedness officials recognize that the response to disasters is a local one and, ultimately, the responsibility of the lowest jurisdictional level,³ suggesting that relationships forged among community partners contribute to the community's preparedness and resilience.

The literature provides several examples of academic institutions applying their resources for the benefit of the community during disaster events. These examples demonstrate the operational capabilities of academic institutions in public health surge capacity, surveillance, information technology, health and research, language, business, engineering, law, ethics, and faith to mitigate public health crises.⁴⁻⁸ A review of the literature aimed at characterizing the role of academic institutions in community disaster response since 9/11 found 98 published or Internet-accessible reports describing 106 instances in which academic institutions participated in the community response to 11 Federal Emergency Management Agency (FEMA)-declared disaster events through February 1, 2009. Academic institutions' assistance could be categorized as contributing either to community disaster resilience, by reducing the consequences or likelihood of an event, or to specific dimensions of public health preparedness and response, or both.⁹

The U.S. public health system is a complex network that requires the integration of services from public and private agencies and organizations.^{10,11} This research addresses the Institute of Medicine priority

of "creating and maintaining sustainable preparedness and response systems."¹¹ The objective was to gain an understanding of the factors that influence the engagement of academic institutions in community disaster response.

METHODS

We used a success case method approach¹² to perform a comparative analysis of academic institutions that participated to varying degrees or not at all in the community disaster response. We applied a public health systems lens to (1) determine the common elements of a successful interface between an academic institution and the public health system and (2) illustrate novel preparedness, mitigation, and response initiatives resulting from the interface. We hypothesized that specific characteristics of the academic institution or the academic-public health relationship facilitate effective collaboration.

From among the FEMA-declared disasters occurring since 9/11, we selected four for study:

1. The Kentucky ice storms of 2009 were catastrophic, described as among the worst natural disasters in Kentucky's history. They affected 93 counties and resulted in widespread power and utility outages; loss of radio, television, and Internet communications; impassable roads; flooding; and mud and rock slides.
2. In 2008, Hurricanes Gustav and Ike were large Category 2 storms affecting broad swaths of land and millions of people in the coastal counties of Texas and Louisiana.
3. The California wildfires of 2007 began burning across seven counties in Southern California, destroying more than 500,000 acres and 1,500 homes and resulting in widespread evacuation and displacement of residents.
4. In 2003, the disintegration of the *Columbia* space shuttle scattered debris, which had the possibility of containing chemicals hazardous to humans, over sparsely populated counties in East Texas and Western Louisiana.

We selected the Kentucky ice storms and the California wildfires because our academic partners were conducting research on public health and emergency management agencies involved in responding to these events, which allowed us to more richly contextualize the disaster response. We selected the other two events to achieve geographic and temporal spread of the disasters and institutions being studied.

We used FEMA and U.S. Department of Education

websites to identify four-year colleges and universities, including those with and without advanced graduate degree programs, geographically located in counties declared by FEMA to have been affected by one of the selected disaster events.^{13,14} We characterized the academic institutions according to their public or private status, the degrees and programs of study offered, facilities available, and types of faculty and staff.

We combined three techniques to determine whether the identified academic institutions did or did not participate in the community disaster response and to learn more about how they were engaged, what resources and services they provided, and the extent to which their response was integrated with the wider public health and emergency management response. First, we conducted key informant interviews with at least one individual from the state or local public health or emergency management agencies involved in responding to the disaster events, asking them about academic institutions responding to the disaster event, and employing the snowball sampling technique to identify additional key informants.¹⁵ Second, we sent an electronic survey to the president of each identified academic institution. The survey questions specifically addressed (1) whether or not the institution was involved in the community disaster, (2) the resources or services the institution provided, and (3) the individual to be contacted for further interview. Third, we reviewed the published and unpublished literature to identify academic institutions participating in the community disaster response, resources or services they provided, and contact information for individuals knowledgeable about the response.

Next, we performed a comparative case study analysis¹⁶ to explore particular resources provided by responding academic institutions, processes for engagement, and reasons for engagement or lack thereof in the community disaster response. Data collection involved the completion of semi-structured interviews with key informants from emergency management, public health, and academic institutions. Trained interviewers performed telephone interviews using a semi-structured interview guide developed by the research team to probe topics related to (1) resources and services provided by academic institutions, (2) the process of engagement of the academic institution, (3) the extent of integration of the academic institution's response with that of emergency management and/or public health agencies, (4) reasons for engagement or lack thereof, and (5) perceived facilitators and barriers for engagement. For each disaster event, we interviewed at least one individual from the responding emergency management agencies and at least one

individual from the responding public health agencies, as well as any individuals (i.e., from emergency management, public health, or academic institutions) identified as important to interview. When the emergency management or public health agency identified an academic institution as having participated in the community disaster response, we sought to interview the individual identified as the lead of the institutional response, and we interviewed others affiliated with the institution who were identified as important contributors. We also sought to interview at least one individual from an academic institution with similar characteristics or resources located in the affected area that did not respond, to facilitate a comparative analysis.

All key informant interviews were audio recorded and transcribed verbatim. Textual transcripts were qualitatively analyzed using a thematic content analysis approach¹⁷ in which code development was guided by research objectives, literature review, and interview content. The research team read the interview transcripts and identified emergent themes. Two trained coders working independently using MAXQDA version 10¹⁸ applied the final thematic coding strategy (Figures 1 and 2). Coded transcripts were compared, coding discrepancies were discussed among the coders and the investigative team, and consensus was used to resolve any discrepancies. Across the four selected disaster events, we conducted a total of 54 in-depth key informant interviews.

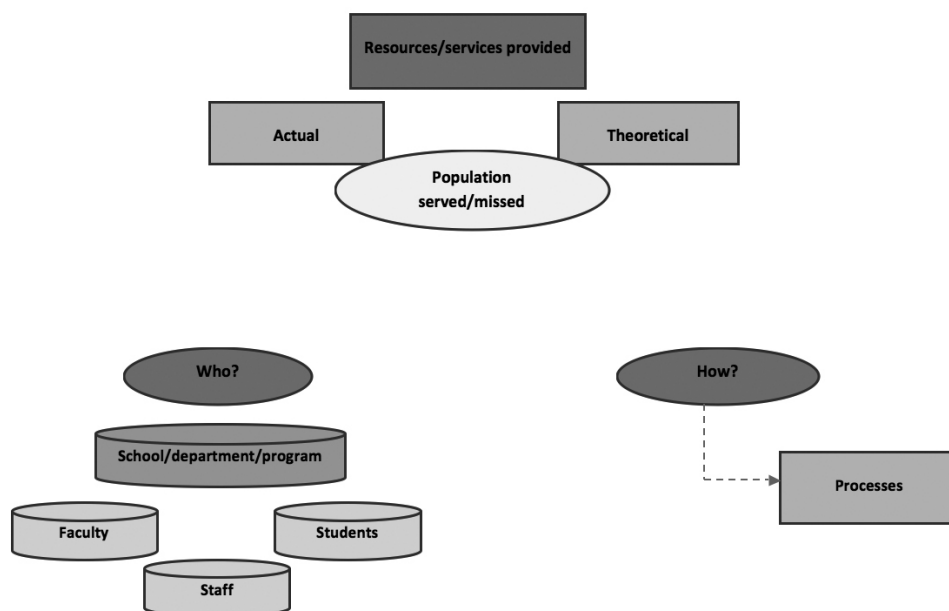
RESULTS

Kentucky ice storms, 2009

We identified 37 academic institutions offering four-year and/or advanced degree programs located within disaster-affected counties. Of these academic institutions, three participated in the community disaster response, all of which were public institutions offering four-year degrees ($n=1$) or advanced degrees in health sciences, including public health and nursing ($n=2$). Thirty-four academic institutions did not participate in the community disaster response, including four public institutions offering advanced degrees in health sciences and communications, 11 private institutions offering advanced degrees in a range of fields including health sciences and communications, and 19 private institutions offering four-year degrees.

The three academic institutions that participated in the community disaster response were all large public universities that coordinated their response with local public health and/or emergency management agencies. The institutions' resource contributions included one or more of the following: (1) provision of facilities

Figure 1. Thematic coding scheme for resources and services provided by academic institutions during a community disaster



(e.g., general shelter, medical needs shelter, site for emergency operations center, staging area for emergency operations, and facility-run radio), (2) services at the shelters (e.g., security), (3) medical needs assessment of shelter inhabitants, and (4) development of training materials to meet needs (e.g., simulation laboratory for public health nurses). Nursing and public health faculty, students of public health and law enforcement, campus police and public safety officers, and administrative officials provided the services.

There was wide variability in pre-event contractual arrangements. For example, one academic institution had a formal contract with emergency management that specified the university would provide shelter facilities and security. Another had a general memorandum of understanding (MOU) with emergency management specifying that the facility would be the designated emergency operations center (EOC). The third university had no formal agreement with emergency management or public health agencies but did have a training agreement with a public health graduate student and nursing faculty who had provided public health training tools in the past.

Of the academic institutions that did not participate in the community disaster response, there were three other large public universities located within disaster-affected counties with similar degree and resource offerings, none of which had formal or informal agree-

ments with emergency management or public health agencies or staff trained in EOC procedures.

In this case, facilitators of collaboration between emergency management/public health and particular academic institutions included (1) preexisting agreements (formal or informal), (2) emergency planning meetings in which the university is represented, (3) university personnel with incident command system (ICS) and EOC training, (4) utilization of Web-based EOC during the event, and (5) training relationships that involve placing students with the public health agency.

Hurricanes Gustav and Ike, 2008

We identified 118 academic institutions offering four-year and/or advanced degree programs located within disaster-affected counties of Texas and 32 within disaster-affected counties of Louisiana. Of the 118 academic institutions in Texas, eight participated in the community disaster response: six large public institutions and two large private institutions offering graduate programs in health sciences and/or geography. Of the 32 academic institutions in Louisiana, all 18 public institutions (including 17 offering graduate and one offering undergraduate degrees) participated in the community disaster response; no private institutions participated.

The institutions' resource contributions included

one or more of the following: (1) provision of facilities (e.g., general shelter, medical needs shelter, and housing), (2) services including disaster medical assistance teams and training in psychosocial first aid and critical incident psychosocial intervention, (3) medical outreach and service coordination, (4) policing and security at shelters and facilities, and (5) academic continuity for university students. Services were provided by faculty; students of medicine, nursing, public health, social work, and pharmacy; campus police; campus administration; and fraternities and sororities.

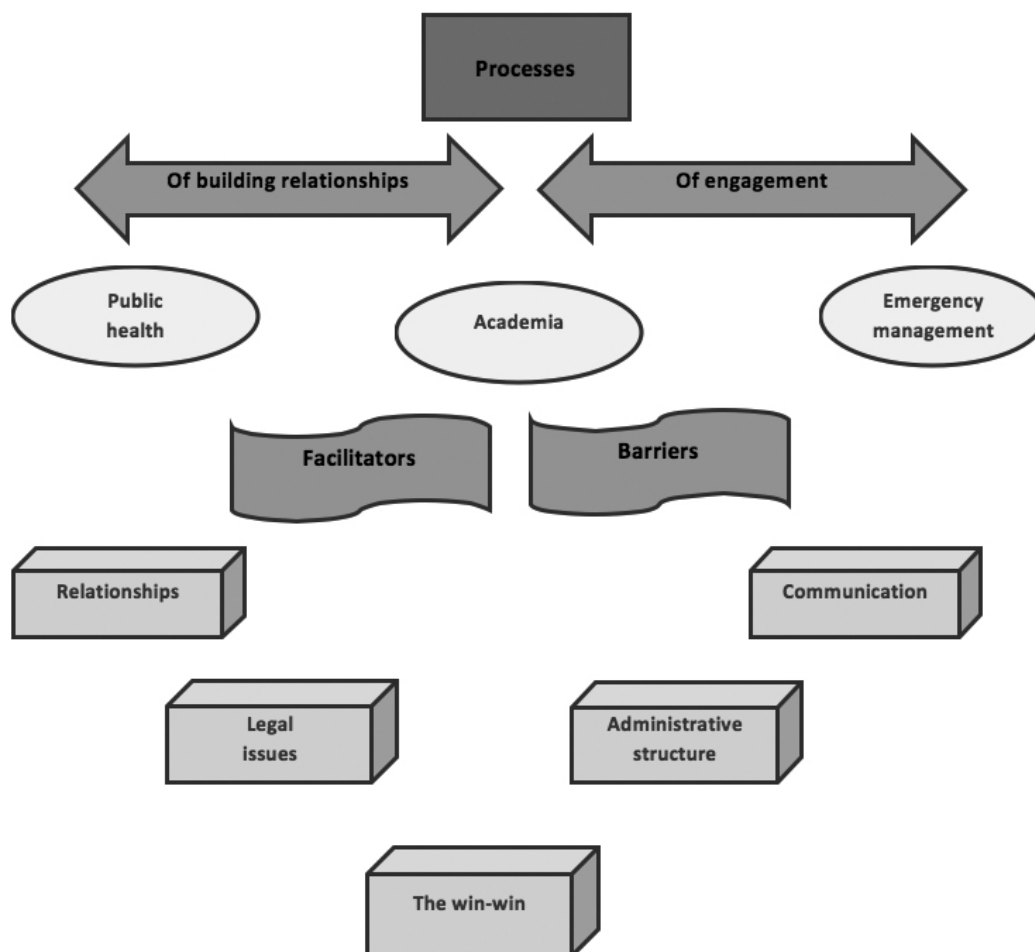
For Texas academic institutions, all those that participated coordinated their response with public health or emergency management agencies. The process for building relationships with public health and emergency management included establishing a state preparedness coordinating council and an academic senior advisory forum with an academic chair, as well as shared training and drills in employment of the ICS and

the national incident management system. Similarly, in Louisiana, there was coordination of the academic response with the state public health and emergency management agencies and shared training and drills. Both Texas and Louisiana had state emergency plans with defined roles for public academic institutions and MOU or mutual aid agreements with public health and emergency management.

Of the academic institutions that did not participate, there were several other large public and private universities with similar degree and resource offerings. All public institutions participated in the community disaster response in Louisiana.

In this case, facilitators of academic-community partnerships for disaster response in both Texas and Louisiana included the experience of collaborating in settings of recurrent disaster events (particularly hurricanes) and the ongoing engagement of academic institutions with public health and emergency management. In

Figure 2. Thematic coding scheme for engaging academic institutions in a community disaster response



Louisiana, state and local public health and emergency management agencies emphasize outreach to public academic institutions. In Texas, there is a Higher Education Coordinating Board with established regional coordinating networks of public and private universities, which focus on home rule from the “bottom up” (i.e., from the local to regional levels).

California wildfires, 2007

We identified 146 academic institutions offering four-year or advanced degree programs located within disaster-affected counties. Of these academic institutions, a total of six participated in the community disaster response: three were public institutions offering advanced degrees in veterinary medicine and geology, and three were private institutions (two offering four-year degree programs and one offering graduate training in law). The remaining 140 academic institutions did not participate in the community disaster response, including public and private institutions offering four-year and graduate degrees in health sciences, law, business, geography, and other fields.

The institutions’ resource contributions included one or more of the following: (1) facilities (e.g., staging area for rescue workers and shelter for large animals), (2) technical equipment and expertise (e.g., remote cameras, aerial images, and geocoded maps of affected areas), (3) services to the affected population (e.g., meals for shelters, service coordination, and counseling), and (4) means for communicating with the public (e.g., website to help evacuated individuals locate one another). Faculty and students of agriculture, geology, law, civic government, and architecture as well as campus police and school administration officials provided the services.

All participating public academic institutions coordinated their response with local public health or emergency management agencies, and the process for building relationships included mutual aid agreements for animal care ($n=1$), training relationships with faculty in the EOC and students in the local public health agency ($n=1$), and knowledge of the availability of key technological resources within a graduate program ($n=1$). In contrast, the private academic institutions participating in the community disaster response did not coordinate their response with local public health or emergency management agencies; rather, they engaged in the community response due to faculty engagement with nonprofit disaster relief, professional, and civic organizations.

Columbia space shuttle disaster, 2003

For the *Columbia* space shuttle disintegration, which affected counties in both Texas and Louisiana, we identified 62 academic institutions offering four-year or advanced degree programs located within disaster-affected counties in Texas and 30 within disaster-affected counties in Louisiana. Of these academic institutions, two of the Texas academic institutions participated in the community disaster response, both of which were large public institutions offering graduate programs in geography and training in geographic information systems (GISs). A single Louisiana academic institution participated, which was a large public institution affiliated with a poison control center.

The institutions’ resource contributions included (1) the provision of GISs and global positioning satellite mapping for the recovery teams, (2) leadership of the GIS command center, (3) coordination and protocols for volunteers searching for debris, (4) the printing of large maps to facilitate searching for debris, and (5) a telephone line providing information about hazards and precautions for exposure to debris. The services were provided by staff of a poison control center affiliated with a school of pharmacy, faculty and students of geography, and volunteers trained by faculty.

All of the participating Texas public academic institutions coordinated their response with local public health or emergency management agencies. For the poison control center in Louisiana, there was an established formal agreement for engaging with public health and emergency management agencies for disaster events. For the other two Texas institutions, there was no formal agreement; however, within the emergency management agency was a former graduate student who was affiliated with the GIS training programs and knowledgeable of the technological resources available at these institutions. There were several large public and private Texas universities that did not participate in the community disaster response, and these institutions lacked the academic and technological resource offerings in the field of geography that were sought by the emergency management agency.

DISCUSSION

The contributing academic institutions represented a diverse array of schools and departments as well as a great range of capabilities relevant to community disaster response. Schools and departments of health sciences, law, geography, communications, and architecture as well as campus administrative, police, and security personnel contributed to the community response to the selected disaster events. The resource

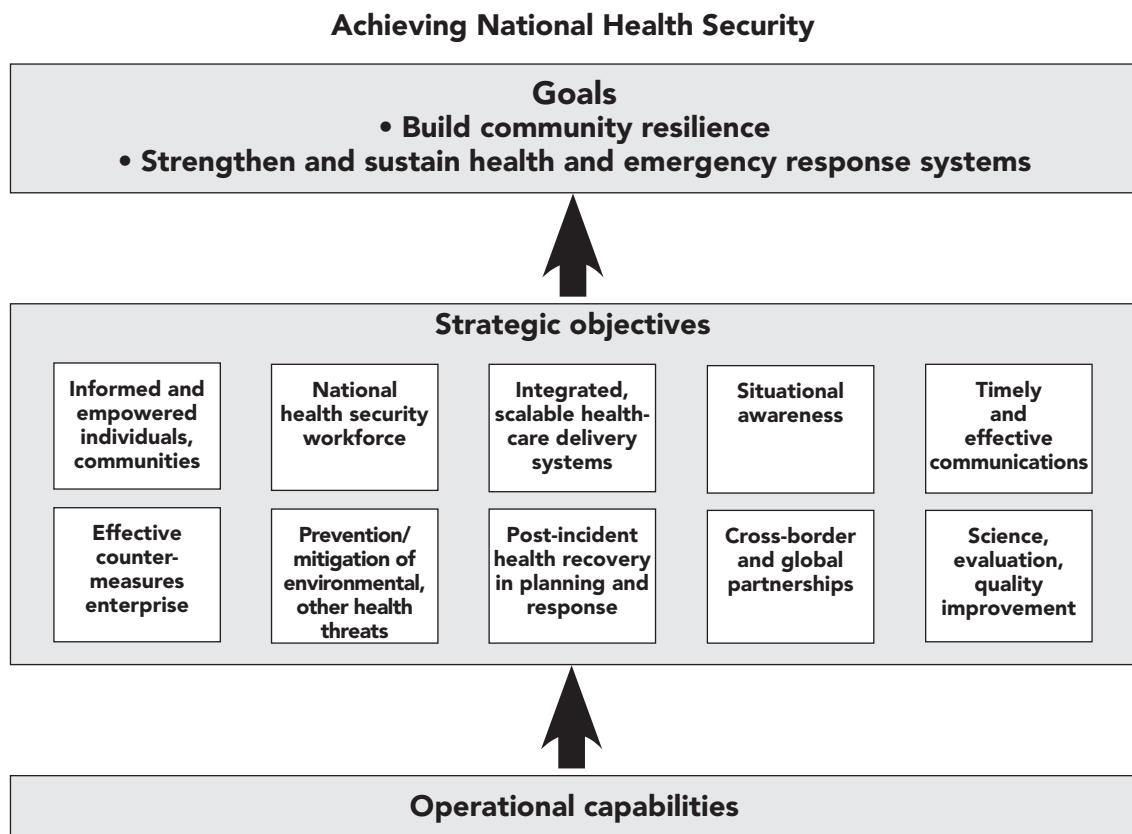
contributions of academic institutions can be classified as:

- Medical: surveillance and screening of needs, as well as special-needs shelters
- Human services: care coordination, counseling and specialized advice, and outreach
- Training: online and in-person nursing skills training and volunteer skill development
- Facilities: shelters, animal shelters, medical units, and staging areas
- Equipment: radios, Internet, and cameras
- Communication: public information dissemination
- Personnel: security, fire, and police
- Geographical: situational awareness and imaging of events and conditions in real time

The participation of academic institutions in the community response to the selected disaster events contributed to the fulfillment of several strategic

objectives (Figure 3a) and operational capabilities (Figure 3b) described in the National Health Security Strategy (NHSS).¹⁹ The U.S. Department of Health and Human Services created the NHSS with the aim of strengthening and sustaining health and emergency response systems and contributing to community disaster resilience. The achievement of national health security requires the commitment of a broad range of stakeholders to include all levels of government, individuals, families, and community organizations, such as academic institutions. In addition, the Public Health Preparedness Capabilities (PHPC)²⁰ establish national standards for state and local preparedness and describe 15 capabilities along with related functions, tasks, performance measures, and resources necessary for achieving each capability. Capability 1 is the ability of communities to prepare for, withstand, and recover from public health incidents. According to the PHPC guidance, Capability 1 consists of achieving functions to include building community partnerships to support

Figure 3a. Goals and strategic objectives of the National Health Security Strategy framework^a supported by academic institutional engagement with public health and emergency management



^aDepartment of Health and Human Services (US). National health security strategy of the United States of America. Washington: HHS; 2009. Also available from: URL: <http://www.phe.gov/preparedness/planning/authority/nhss/strategy/documents/nhss-final.pdf> [cited 2014 Aug 27].

Figure 3b. Examples of operational capabilities of the National Health Security Strategy framework^a supported by academic institutional engagement with public health and emergency management

<i>National Health Security Framework strategic objectives</i>	<i>Examples of operational capabilities</i>
Informed and empowered individuals and communities	<ul style="list-style-type: none"> • Legal and architectural consultation post-event (California wildfires) • Websites to find separated family members (Hurricanes Gustav and Ike)
National health security workforce	<ul style="list-style-type: none"> • Public health nurse training (Kentucky ice storms)
Prevention/mitigation of environmental and other health threats	<ul style="list-style-type: none"> • Deployment of information via poison control centers (<i>Columbia</i> space shuttle)
Integrated, scalable health-care delivery systems	<ul style="list-style-type: none"> • Use of facilities as shelters, special medical needs shelters, and training/housing of rescue and relief workers (California wildfires, Hurricanes Gustav and Ike, and Kentucky ice storms)
Situational awareness	<ul style="list-style-type: none"> • Aerial cameras, GIS mapping services of wildfires and rescue teams (California wildfires) • GIS mapping services of shuttle debris (<i>Columbia</i> space shuttle)
Timely and effective communications	<ul style="list-style-type: none"> • University-run radio and Internet to transmit public messages (Kentucky ice storms)
Cross-border and global partnerships	<ul style="list-style-type: none"> • Medical outreach, disaster medical assistance teams, and student transfers for housing and education (Hurricanes Gustav and Ike)

^aDepartment of Health and Human Services (US). National health security strategy of the United States of America. Washington: HHS; 2009. Also available from: URL: <http://www.phe.gov/preparedness/planning/authority/nhss/strategy/documents/nhss-final.pdf> [cited 2014 Aug 27].

GIS = geographic information system

preparedness; engaging with community organizations to foster public health, medical, and mental/behavioral health social networks; and coordinating training or guidance to ensure community engagement in preparedness efforts. Given academic institutions' potential to contribute to the fulfillment of national strategic objectives and preparedness capabilities, the NHSS and PHPC frameworks could explicitly identify the academic institutions' role in support of public health and emergency management agencies' efforts to meet national preparedness standards and highlight the value of academic-public health partnerships for sustainable preparedness and response systems.

This comparative analysis revealed that important facilitators of academic-community collaboration for community disaster response included (1) the presence of special resources (e.g., faculty expertise and training programs); (2) personnel placement and ongoing relationships through shared training of students and staff; (3) participation in community-level partner meetings (e.g., academic staff on an EOC or planning board, faculty contracts, and student practice in public health agencies); (4) the structure and placement of the disaster response office (e.g., having a recognizable point of contact who comprehensively represents academic institutional resources); (5) training of academic staff in ICS and EOC; and (6) the existence of mutual aid and MOU agreements between academic institutions and public health and emergency management organizations. Barriers to academic-community partnerships

included unfamiliarity with organizational personnel, concerns about ownership of outputs resulting from the collaboration, and differences in organizational culture and modus operandi. Legal issues were identified as both facilitators of (e.g., contracts) and barriers to (e.g., liability concerns and lines of authority) engagement.

Limitations

Our comparative analysis focused on only four types of FEMA-declared disaster events. While this analysis facilitated a depth of information for each particular event, it is possible that our reported findings are not generalizable to the broader range of disasters that a community might face. The range of capabilities available at academic institutions and the facilitators and barriers affecting academic-community partnerships may differ depending on the community crisis. Despite this limitation, the data illuminate academic institutional engagement with public health and emergency management for enhanced health security and the fulfillment of community preparedness standards. Further research could help broaden the generalizability of the findings.

CONCLUSION

In this comparative analysis, the fraction of academic institutions contributing to the community disaster response was low, particularly in states that did not have state plans with defined roles for academic

institutions. The U.S. is home to 4,726 degree-granting post-secondary institutions, of which 1,623 are public.²¹ As academic institutions have an abiding tradition of community service, these numbers suggest untapped capacity and resources important for greater community disaster resilience and response.

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