

Regional Disaster Response Coordination to Support Health Outcomes

Summary of a Workshop Series

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Forum on Medical and Public Health Preparedness
for Catastrophic Events

Board on Health Sciences Policy

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Willing is not enough; we must do.”*
—Goethe



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This workshop summary has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the National Research Council's Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published workshop summary as sound as possible and to ensure that the workshop summary meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the process. We wish to thank the following individuals for their review of this workshop summary:

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Although the reviewers listed above have provided many constructive comments and suggestions, they did not see the final draft of the workshop summary before its release. The review of this workshop summary was overseen by **KRISTINE M. GEBBIE**, Flinders University School of Nursing and Midwifery. Appointed by the Institute of Medicine, she was

responsible for making certain that an independent examination of this workshop summary was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this workshop summary rests entirely with the rapporteurs and the institution.

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Introduction¹

When disaster strikes, it rarely impacts just one jurisdiction. Many catastrophic disaster plans include support from neighboring jurisdictions that likely will not be available in a regional disaster. Bringing multiple stakeholders together from sectors that do not routinely work with each other can augment a response to a disaster, but can also be extremely difficult because of the multi-disciplinary communication and coordination needed to ensure effective medical and public health response. As many communities within a region will have similar vulnerabilities, a logical step in planning is to establish responsibilities and capacities, and be able to work toward common goals to address all-hazards when the entire region is affected. To explore these considerations, the Institute of Medicine's (IOM's) Forum on Medical and Public Health Preparedness for Catastrophic Events organized a series of three regional workshops in 2014 to explore opportunities to strengthen the regional coordination required to ensure effective medical and public health response to a large-scale multi-jurisdictional disaster. The purpose of each regional workshop was to discuss potential mechanisms to strengthen coordination among multiple jurisdictions in various regions to ensure fair and equitable treatment of communities from all impacted areas.

Each of the three workshops covered different topics that may strengthen regional disaster response. The first workshop, held in Irvine, California, explored issues of community planning and engagement. Dis-

¹The planning committee's role was limited to planning the workshop. This workshop summary has been prepared by the rapporteurs as a factual summary of what occurred at the workshop. Statements, recommendations, and opinions expressed are those of individual presenters and participants, and are not necessarily endorsed or verified by the IOM and should not be construed as reflecting any group consensus.

cussions centered around the concepts of engaging non-traditional partners in the community around emergency planning and broadening health care coalitions to include these partners and encourage stronger community involvement. The forum convened a second regional workshop in Minneapolis, Minnesota, bringing together key stakeholders to examine how information and incident management can augment response efforts in a complex, regional emergency. Coordination of information among stakeholders during a disaster can often be a challenge, especially when introducing multiple levels of government and nonprofit and private-sector involvement. Improving this type of communication, especially in real-time, could improve situational awareness throughout a region. The third and final workshop in this series was held in New Orleans and considered how the first two topics of community engagement and information sharing could impact issues of surge management across the public health and health care spectrum. This includes patient tracking and evacuation, reducing the surge burden on clinical health care facilities, and improving services available within public health and community programs.

For the purposes of this workshop series, a “region” is defined as a multi-county or multi-state affected area, not necessarily abiding by the defined Federal Emergency Management Agency (FEMA) or U.S. Department of Health and Human Services (HHS) regions. As discussed in the 2009 IOM report *Guidance for Establishing Crisis Standards of Care for Use in Disaster Situations*, regional health care coalitions are generally organized around functional medical referral areas. They may be within a jurisdiction, represent an entire jurisdiction, or overlap several jurisdictions or even states (IOM, 2009). That same concept was used across this workshop series, as defining specific regions, within and/or across states, can be particularly challenging because sectors often have overlapping regions. For example, one town may belong to one region for regional health planning, but in the case of regional law enforcement planning, they belong to another one with a separate set of partners. The need for integration and coordination of federal funding streams and cooperative agreements² is discussed in further detail throughout this report. In addition, considerations for the coordination and integration of

²These include, but are not limited to, the Public Health Emergency Preparedness (PHEP) grant, the Hospital Preparedness Program (HPP) grant, Federal Emergency Management Agency (FEMA) preparedness grants, and the Urban Area Security Initiative (UASI) grant.

regions for robust regional emergency preparedness planning will be shown as well.

NATIONAL HEALTH SECURITY PREPAREDNESS INDEX (NHSPI)

Released in 2013, the NHSPI is designed to provide an accurate portrayal of our nation's health security using relevant, actionable information to achieve a higher level of health security preparedness.³ Consisting of 5 domains, 14 subdomains, and 128 individual measures, the NHSPI offers a snapshot of national preparedness levels and identifies areas for improvement. Development of the NHSPI was coordinated by the Association of State and Territorial Health Officials (ASTHO), in conjunction with about 30 public and private organizations, including the Centers for Disease Control and Prevention (CDC), American Red Cross, and American Public Health Association. The workshop series planning committee chose to focus each of the regional workshops on one of three domains of the NHSPI that were ranked in 2013 as warranting greater attention: community planning and engagement; information sharing and incident management; and surge management. As this type of measurement and evaluation will change with corresponding progress or failures, the 2014 NHSPI was released in December 2014 with updated data and new content, including new categories. "Surge Management" has been reframed as "Health Care Delivery" and "Environmental and Occupational Health" was created as a new domain.

Community Planning and Engagement

Community Planning and Engagement measures the coordination of organizations, partners, and stakeholders in a community, their collaborative efforts to plan and prepare for health incidents, and their capacity to respond to and recover from such incidents when they occur (NHSPI, 2013). Vigorous community planning and engagement are marked by cross-sector collaborations, plans to support vulnerable populations within a community, the existence of a pool of volunteers to assist in emer-

³More on the methodology and background of the NHSPI can be found at <http://www.nhspi.org> (accessed January 30, 2015).

gency situations, and strong social cohesion within a community (Bies and Simo, 2007).

Information Sharing and Incident Management

Information Sharing and Incident Management measures the ability of a community to mobilize and respond to all aspects of a health incident. Factors include a community's ability to marshal all necessary resources, establish and maintain command and control and coordinate during a health incident, provide legal and logistical support, and work across jurisdictional and disciplinary boundaries (NHSPI, 2013). Increasingly, health information technology (HIT) has become a large part of information sharing during response to an incident, and those issues are explored in this summary as well.

Health Care Delivery and Surge Management

Health Care Delivery measures a community's capacity to prevent, diagnose, treat and manage illness, and to preserve mental and physical well-being through the services offered by the medical, nursing, and allied health professions (NHSPI, 2013). Because a community's ability to deliver health care during a health incident is inextricably tied to its ability to deliver health care under conventional conditions, Health Care Delivery incorporates both environments into preparedness measurements (Hick et al, 2004). Surge Management, the label this category was given in the first iteration of the NHSPI, refers to the ability to augment the health care system in a way that accommodates a large increase in patient flow throughout jurisdictions.

MEETING OBJECTIVES

On March 26, July 24, and November 15, 2014, the IOM's Forum on Medical and Public Health Preparedness to Catastrophic Events organized a series of 1-day workshops at locations around the country to gather input from varied participants about the opportunities to strengthen regional coordination to ensure effective medical and public health response to a large-scale, multi-jurisdictional disaster. Represented sectors included state and local public health, emergency management, emergency medical services, hospital preparedness planners, academic

researchers, city and regional planners, community organizations, federal agency stakeholders, and others. Each regional workshop included discussions of mechanisms to strengthen planning, response, and recovery to disasters among multiple jurisdictions in individual regions to ensure fair and equitable treatment of communities. The specific meeting objectives for each workshop in the series are listed in Box 1-1.⁴

BOX 1-1
Community Planning and Engagement:
March 26, 2014 – Irvine, CA
Meeting Objectives

- Examine how Community Planning and Engagement strengthen regional preparedness initiatives.
- Discuss community collaboration with schools, businesses, and community organizations across regions.
- Explore needs of at-risk populations and programs to assist them in emergencies.
 - Identify gaps that still exist for specific populations.
- Discuss management of volunteers in emergencies across regions.
 - Explore ways to better coordinate groups on regional use of national networks.
 - Identify ways to incorporate local organizations into coordination planning.
- Consider factors that improve social capital and cohesion and the effect on community resilience during emergencies.
- Consider how grant guidance can be aligned with existing needs.

Information and Incident Management:
July 24, 2014 – Minneapolis, MN
Meeting Objectives

- Examine best practices for information sharing and incident management in disasters.
- Explore pieces of information management during disasters through various recent case studies.
 - Identify gaps that still exist for specific disasters (i.e., slow moving, no-notice, natural disaster, etc.).

⁴The full statement of task can be found in Appendix C.

- Discuss best uses of information sharing, integration of health systems, and private-sector partners in information centers.
 - Explore ways to better coordinate groups regionally using national networks.
- Consider potential for using systems to augment response and situational awareness during an incident.
- Discuss coordination at the federal, state, and local levels.
 - Highlight challenges leading to an uneven knowledge base or gaps in information.
 - Explore methods to leverage private partnerships.
- Consider how improved information sharing and data collection capabilities can support decision making of policy makers.

**Surge Management:
November 15, 2014 – New Orleans, LA
Meeting Objectives**

- Define and discuss the challenges of evacuation and rapidly surging health systems across a region.
 - Examine coordination of patient tracking within and across jurisdictions.
- Explore processes that are built into a region to successfully integrate public health and human services into a surge response.
 - Discuss possible strategies to enhance medical capabilities and ameliorate burden on hospitals.
- Describe strategies that help to protect acute care hospitals in a region from being overwhelmed, and maximize use of other health care facilities across multiple communities.
- Discuss coordination across the diverse health sector players to achieve surge capability for health, medical, and social services.
 - Discuss coordination of all organizations in a region that are active in emergency planning.

ORGANIZATION OF THE REPORT

This workshop series summary is organized around three main topic areas that encapsulated much of the discussion throughout the three meetings. At the end of each content chapter, ideas highlighted by speakers or participants on how to strengthen preparedness in each domain are described. Chapter 2 explores issues of evacuation, patient tracking, and information sharing. Chapter 3 explores common remarks related to pub-

lic health surge capacity and community resilience. Chapter 4 looks at the overlapping presentations and discussion areas of coordination of a community response across the meetings. Chapter 5 summarizes challenges presented and potential opportunities for moving forward.

TOPICS HIGHLIGHTED DURING PRESENTATIONS AND DISCUSSIONS⁵

Throughout the series, several participants highlighted many important opportunities for advancing regional, multi-jurisdictional response to a large-scale disaster. A number of ideas emerged across multiple workshop presentations and discussions on the topics above. The topics below are discussed further in the report that follows.

Importance of Inclusive Coalition Building and Sustainability

Government agencies, whether federal, state, or local, have difficulties handling disaster preparedness alone. By forming partnerships and creating regional coalitions that represent the diverse needs of communities, more progress can be made. As many speakers pointed out in the workshop on community engagement, these health care coalitions typically include the obvious partners, such as the Red Cross, Salvation Army, and local health care providers, but also non-traditional partners, such as schools, community organizations, special needs organizations, and large employers. Coalitions are not only crucial during the planning and engagement period prior to disasters, but also during a disaster and the recovery process. These partners can help in disseminating preparedness information to their diverse populations, as well as potentially assist in the event of mass vaccinations across a region by becoming a closed point of dispensing for countermeasures. Following a disaster or emergency, they can also be valuable during recovery and rebuilding representing the whole community.

⁵Rapporteurs' summary of main topics and recurring themes from the presentations, discussions, and summary remarks by the meeting and session chairs. Items on this list should not be construed as reflecting any consensus of the workshop participants or any endorsement by the IOM or the Forum.

Collaborating with the Private Sector

In addition to planning and recovery improvement, sharing and strong management of information during a disaster across multiple spectrums can be much more dynamic and transparent when members from a broad spectrum of the community are included and systems are pre-established to enable the cross sector communication. These types of members can also be leveraged to transmit informational messages to the public. For example, non-traditional private-sector partners such as Amazon, Facebook, or Google are adept at personalizing messages and engaging the public and use their methods often in their daily business. Richard Serino, former deputy administrator for FEMA, commented that a new initiative called Operation Dragonfire is working along with the White House initiative on Innovations for Disaster Response and Recovery⁶ to better analyze available data to improve disaster response. He said Facebook and Google have expressed interest in becoming involved. They can already track items that are “trending” and quickly analyze large amounts of data, so leveraging their abilities can assist health authorities working across large regions. Working more to engage them in this type of regional planning on the front end could lead to better data surveillance in the future, suggested Dan Hanfling, contributing scholar at UPMC Center for Health Security. Building out regional coalitions can also help to address specific gaps within smaller communities—as a weakness in one jurisdiction could be a strength in another—so working at a regional level can help to ensure weaknesses are accounted for and resources are appropriately dedicated if available.

Keeping Partners Engaged

Erosion of collaborations and sustained partnerships have been occurring due to loss of key staff, and failure to maintain the regional communication and trainings that have been built in the past decade, asserted Rosanne Prats, executive director of emergency preparedness at the Louisiana Department of Health and Hospitals. This decrease in funding and overall support from the national level makes it difficult to persuade hospital administrators that regional preparedness is a valuable effort to their institutions. One of the key challenges within the area of

⁶For more information on the White House initiative and efforts, see http://www.whitehouse.gov/sites/default/files/microsites/ostp/white_house_innovation_for_disaster_response_-_2014-july29.pdf (accessed March 2, 2015).

coalition building, also pointed out by Prats, is to sustain coalitions in so-called “peace time,” that is, the period between disasters. All too frequently coalitions that arise during or immediately following a disaster fade later. This not only hinders planning between disasters but can also thwart the disaster response if new groups are coming together in a piecemeal fashion. Jim Craig, director of health protection, Mississippi State Department of Health, argued that communities need to devise ways to sustain coalitions so that partnerships need not be dissolved and reassembled for each disaster and recovery. One approach is to develop registries of coalition partners indicating what resources they can and cannot contribute during a disaster. Other alternatives include engaging the “whole of community” in frequent planning and tabletop exercises. Active coalitions consisting of broad-based nongovernmental organizations (NGOs) can contribute to community cohesion and social capital that also can contribute to community resilience in the wake of a disaster.

Incorporating the Medical Community into Intelligence Centers

Although some of the discussions about inclusion during the meeting series revolved around NGOs and private-sector partners, several participants also highlighted the challenges of bringing health expertise into law enforcement and public safety intelligence centers. Serino described the operations of the Medical Intelligence Center in Boston and how the partnership with the Boston Regional Intelligence Center allows synergy of health-related information exchange. Even if a strong synergy like his example cannot be accomplished right away in other regions, John Osborn, operations administrator at the Mayo Clinic, noted that adding health expertise into fusion centers⁷ around the country could allow for better situational awareness in health emergencies. The impact on health from a disaster may not always be seen immediately, so having that expertise included as the response unfolds could be valuable.

The Integration of Information Technologies

Many types of software programs are used to monitor the movement of evacuees, to conduct pre-hospital tracking of patients, and to keep

⁷(Fusion centers) serve as primary focal points within the state and local environment for the receipt, analysis, gathering, and sharing of threat-related information among federal, state, local, tribal, and territorial (SLTT) partners. For more information, see <http://dhs.gov/national-network-fusion-centers-fact-sheet> (accessed April 6, 2015).

electronic health records (EHRs) in the hospital. This is becoming increasingly common both during a disaster and in everyday routine care, thanks to recent regulations and incentives through the Health Information Technology for Economic and Clinical Health Act (within the American Recovery and Reinvestment Act)⁸ in 2009 and the Patient Protection and Affordable Care Act (ACA)⁹ in 2010.

Interoperability

Expanding interoperability among all of these systems and their operators remains an ongoing challenge. As reported to Congress in a June 2013 update, “enabling exchange will involve reducing the cost and complexity of electronic health information exchange, ensuring trust among the key participants of exchange, and encouraging exchange of information, particularly during transitions of care” (ONCHIT, 2013, p. 10). Jim Blumenstock, chief program officer for public health practice at ASTHO, emphasized the need for an interoperable, universal tracking platform for different modules to collect real-time data on patients and evacuees. He added that the information should be kept “unsiloed” so if one system is down during a disaster, information can be transferred easily to another system without any data loss. But until then, the lack of integration of the programs across different health care settings, as well as across jurisdictions, can lead to redundancies and a lack of situational awareness among local, state, and regional levels. The lack of interoperability means that evacuees cannot be tracked across jurisdictions, patient record transfer across state lines is difficult if not impossible, and patient care itself is delayed, unnecessarily duplicated, or adversely affected.

Patient Tracking Standardization

To add to the confusion, there is an absence of standardization across systems as far as what fields are reported and what information can be input. Because of certain information that federal agencies request during disasters, some jurisdictions have trouble using software “off the shelf” and instead develop their own tracking systems and work with their re-

⁸For the full text on the Health Information Technology for Economic and Clinical Health Act, see <https://www.govtrack.us/congress/bills/111/hr1/text> (accessed March 2, 2015).

⁹For the full text on the Affordable Care Act, see <http://www.gpo.gov/fdsys/pkg/BILLS-111hr3590enr/pdf/BILLS-111hr3590enr.pdf> (accessed March 2, 2015).

gional catchment areas, as Cynthia Davidson, Region 1 emergency management coordinator at Louisiana Department of Health and Hospitals, described. Blumenstock added that the federal systems, such as the Joint Patient Assessment & Tracking System (JPATS), run through HHS may also be collecting similar information, but there was a lack of clarity about how all of these systems could most efficiently and effectively interact. Understandable challenges lie in the difficulty in sharing proprietary information among competing hospitals, accountability of completing information correctly, as well as rules under the Health Insurance Portability and Accountability Act.¹⁰ But continuing emphasis in this area, seeing where the gaps lie within large-scale events such as Hurricanes Katrina and Gustav, and achieving standards and interoperability among systems in this area, can assist in ensuring successful outcomes and greater transparency for a regional disaster. Opportunities for the integration of HIT systems are described further in Chapter 2.

Connecting Disciplines to Change Approaches

As discussed throughout this report, federal preparedness funding streams and program objectives can often be limited in scope, targeted to accomplish a narrow set of goals within a specific sector. As Blumenstock mentioned previously, this can sometimes lead to duplication of efforts, inefficient uses of funding, or lack of situational awareness between entities working toward similar goals. Bruce Clements, preparedness director at the Texas Department of State Health Services, noted that in their region they often have multiple risk assessments being completed across sectors as a requirement of cooperative agreements or funding. This results in multiple risk assessments being conducted in a non-systematic manner. With regard to public health and primary care, a 2012 IOM report also showed that competing funding streams from the federal level discourage integration at the local level and instead create silos among entities (IOM, 2012a). Recently, more emphasis has been placed on the integration of programs and intersection of fields to accomplish common objectives, as with coordinated objectives within Public Health Emergency Preparedness (PHEP) and Hospital Preparedness Program (HPP) cooperative agreements from CDC and the HHS Office of the Assistant Secretary for Pre-

¹⁰More information on HIPAA privacy rule and regulations can be found at <http://www.hhs.gov/ocr/privacy/hipaa/understanding/index.html> (accessed March 2, 2015).

paredness and Response (ASPR),¹¹ respectively. However, traditional methods and the acknowledged funding issue can be challenging. The IOM report also found that problems that stem from this separation have long been recognized, but new opportunities are emerging for bringing the sectors together in ways that will yield substantial and lasting improvements in the health of individuals, communities, and populations (IOM, 2012a). Building diverse coalitions and combining efforts can allow for more innovation, through variations in abilities and knowledge, in accomplishing goals important to a range of stakeholders (Niebuhr, 2010).

Trying a Multi-Use Approach

Across all three meetings in this series of workshops in 2014, individual participants highlighted ideas that were “multi-use”—solve more than just one problem—or approach problems in sync to affect greater overall improvement. In an era of uncertain funding and program support, Craig Vanderwagen, senior partner at Martin, Blanck & Associates, noted that governments, community groups, and the private sector across regional boundaries can accomplish greater regional preparedness as well as improved overall health and sustainability if sectors can successfully integrate goals and objectives. Through this integration, new innovations and approaches could be realized to address common problems that have historically been undertaken in a more insular manner. For example, building communities that encourage social cohesion, active living, and resilient infrastructure can contribute to healthier residents overall, but also safer and more resilient communities during a disaster. Engaging members of the community and collaborating across sectors can not only build community resilience and mitigate exposure to some disasters, but it can also reduce the clinical surge burden and keep people out of hospitals by leveraging other community services. A few participants also noted that broadening coalitions to include the private sector, including information technology, can help to disseminate important public messages quickly in a health emergency, and they can increase capabilities for systems monitoring during an ongoing response. In addition, recognizing children, especially unaccompanied, as an at-risk population and broadening coordination efforts with local and state human service agencies to address their needs could improve a comprehensive response.

¹¹For more information on this alignment of agreements, see http://www.cdc.gov/phpr/documents/HPP-PHEP-BP3-Continuation-Guidance_Supplemental-Information.pdf beginning on page 3 (accessed March 2, 2015).

2

Evacuation, Patient Tracking, and Information Sharing in a Regional Response

Highlights and Main Points Made by Individual Speakers and Participants¹

- Considering surrounding area limitations and augmenting their resources when creating evacuation plans can prevent adverse situations on evacuation routes and meet the demand of travelers. (McClendon)
- Creating an integrated tracking system can improve information sharing and coordination of evacuation planning among the impacted state(s), hosting state(s), and the local receiving jurisdiction. (Blumenstock, Hanfling, Upton)
- Existing trauma system models for patient catchment used in day-to-day care can assist in patient transfers in a regional disaster. (Ward)
- Integrating the health and medical component into regional intelligence centers already in place can improve information processing and risk assessment in an ongoing emergency. (Osborn)

A regional disaster ushers in the need for tracking large numbers of evacuees and patients, including at-risk, vulnerable populations. When multiple groups have shared access to robust information technology systems with multi-use capabilities, better tracking of evacuees and patients is enabled, as well as increased situational awareness. If the technology is not interoperable, different jurisdictions and different levels of government (i.e., state, regional, or local) are unable to communicate with one another during a disaster in real-time and often lack the awareness of

¹This list is the rapporteurs' summary of the main points made by individual speakers and participants, and does not reflect any consensus among workshop participants.

where patients or evacuees are moving. This chapter discusses lessons learned from evacuations and patient tracking in past regional disasters. The challenges and barriers of coordinated information sharing between private entities is also explored, with possible suggestions for ways around those barriers to better protect patients, families, and efficiency of operations.

CHALLENGES IN EVACUATION AND PATIENT TRACKING

Whether focusing on sick hospital patients or the healthy general public, evacuation of residents can be extremely challenging for government agencies in preparation for a known event (e.g., an advancing hurricane), or in response to flooding, power failure, or other unforeseen problems. This can be difficult when just limited to one building or one community, but when scaled up to a regional level, it becomes even more important to have decision support, strong communication among entities, and transparency among systems.

Evacuation Routes

One of the first priorities during a disaster is to make sure that evacuation routes do not become clogged. During Hurricane Rita, Harris County, Texas, which comprises much of the Houston Metropolitan Statistical Area, was right in the path of the storm. Speaker Michael McClendon—director of the Office of Public Health Preparedness of the Harris County Public Health and Environmental Health Services—said that because of the very recent memory of Hurricane Katrina just a few weeks prior, many more people elected to leave Harris County than needed when Hurricane Rita's path was projected. Evacuees from Harris County flocked to interstate highways all at once, causing mammoth traffic jams. Because of the location of the city of Houston, with the surrounding areas en route to Dallas being very rural, there were few resources for thousands of evacuees (see Figure 2-1). Many motorists desperately needed fuel, water, and food on the road, which were not plentiful even before communities along the highways were stripped bare of provisions.



FIGURE 2-1 Photograph of the highways surrounding Houston ahead of Hurricane Rita's arrival in 2005.

SOURCE: McClendon presentation, July 24, 2014.

Many local communities exercised their legal authority to shut down interstate exits and instead of evacuating to safe locations, thousands of Harris County residents spent more than 12 hours stranded on the highways. As a result of this experience, McClendon said, the state convened local, state, and federal stakeholders to develop a better evacuation plan. The plan developed a color-coding system to stagger departure times and mapped multiple evacuation zones. The plan also called for pre-positioning of fuel, water, and food stations along the highway throughout different communities to meet the demands of thousands of travelers, which would be staffed by the Texas Department of Transportation, with protection from law enforcement. The plan also created supply caches for medical equipment and other important items for first aid. Perhaps most importantly, he said, the plan delineated all responsibilities by sector for each local, city, county, and state agency involved, to minimize confusion about roles.

Information Sharing Across State Lines

McClendon also shared his region's response activities when receiving evacuees as compared to evacuating the region's own residents elsewhere. Reliant Park—more commonly known as the Astrodome—in Houston, became the temporary home for more than 26,000 evacuees from New Orleans following Hurricane Katrina. Coordination among

multiple levels and jurisdiction is not uncommon; however, such an event involved multiple layers of communication among local officials in Houston and New Orleans, as well as the regional counties and state of Texas and state of Louisiana officials. At that time in 2005, no integrated system existed to assist with the flow of information from an impacted neighboring state, to the hosting state, to the local receiving jurisdiction, causing conflicting information to reach local personnel in Harris County.

McClendon said they set up their shelters in Reliant Park, and planned for the shelter's capacity of 11,000 persons. Buses began showing up the next day, and did not stop arriving until they had far more than they were told they would be receiving, and thousands more than they could accommodate. Additionally, there were several unknown factors, such as whether evacuees would have clothing, whether animals would be arriving as well, and most importantly, what the final count of evacuees would be. While not an ideal solution, to at least get some concrete information, the Texas State Department of Public Safety sent spotter helicopters along the interstate to gather correct intelligence about what the county should plan for arriving. While this sufficed at the time, better communication practices both vertically and horizontally throughout a multi-jurisdictional region could help to alleviate confusion and misallocation of resources.

Impacts of Unintegrated Health Information Technology (HIT) Systems

Lori Upton, director of regional preparedness for the SouthEast Texas Regional Advisory Council (SETRAC), spoke about patient evacuation and tracking in the wake of several storms. The current SETRAC framework began in 2001 with tropical storm Allison. It caused extensive flooding in the Houston area, which received 30–40 inches of rain over 5 days. One of the major areas hit was the Texas Medical Center, which houses 162 buildings, including 2 trauma centers, a nursing school, a medical school, and a U.S. Department of Veterans Affairs hospital. The Center has more than 93,000 employees and over 6 million patient visits per year. The flooding from Allison caused evacuation of some 3,000 acute care beds and more than 500 intensive care unit beds in one of the two trauma centers. The affected trauma center was down for 1 month. Consequently, at the request of the emergency medical services (EMS) medical director, the two workforces of the trauma centers were combined so that the region could maintain trauma care. There was no

coordinating entity and the flooding throughout hospitals was massive and widespread. Only one trauma center was able to remain open, and she said they quickly understood a coordinated infrastructure needed to be in place, regardless of whether it was private or state run, as everyone needs to join forces when a disaster happens.

Testing Regional Coordination

Hurricanes Katrina and Rita in 2005 were the first time their regional coordinating entity, the Catastrophic Medical Operations Center (CMOC), was called into service. While there was no formal plan or designation, she said there was a commitment to their medical community. Even with just a rudimentary patient tracking system listing patient's name, chief complaint, and location, they were able to move more than 1,000 patients to other health care facilities during Hurricane Katrina. However, she noted one of the first drawbacks was that none of the participating hospitals had access to the data. Having the chief complaint listed also gave them added information on potential outbreaks. For example, if many gastrointestinal complaints in one area were found, they could quickly notify public health and begin epidemiological testing and surveillance. As noted previously in McClendon's Texas experience, Hurricane Rita followed just 2 weeks after Hurricane Katrina, so an opportunity arose for a system improvement. The upgraded system was a computer program called "Where's Mommy?" that could be accessed on everyone's desktop. The program's error rate was 0.08 percent, meaning that only two patients had to be moved out within 24 hours because the receiving facility did not have the capability or capacity to provide proper care for them. Not one patient was lost during the tracking following Hurricane Rita, and 2,400 were moved through CMOC.

Integrated Patient Tracking

Upton's organization subsequently upgraded their patient evacuation tracking system to software called "EM Track," so that the state and the region were interoperable. The new system has the ability to take pictures of evacuees and has searchable fields. The program includes information on transport status, nature of complaint, medical record, and disposition. It can attach children's records to parents' in order to ensure that families remain united. The new system is seen as a successful means of tracking patients and is integrated with public health and spe-

cial needs. The integrated technology has helped to provide a broader common operating picture, as well as to increase situational awareness throughout the region and interface with the state for complete transparency. Other important lessons described by Upton can be found in Box 2-1.

INFORMATION SHARING ACROSS SECTORS DURING A RESPONSE

Richard Serino, former deputy administrator for Federal Emergency Management Agency (FEMA), described his experience regarding information sharing during the Boston Marathon bombings of 2013. Boston's Medical Intelligence Center (MIC), currently a unique concept, was created in 2009 to coordinate all members of the medical community, including state and local public health, EMS, and city and regional hospitals, and has since grown to include business associations and the private sector in the region. The MIC is also linked to Boston's law enforcement fusion center, called the Boston Regional Intelligence Center (BRIC),

BOX 2-1
Important Lessons Learned at the Regional Level
from Hurricanes Katrina and Rita
Lori Upton Presentation

- Adverse impact of prolonged evacuation times—only move patients once if possible.
- Hidden surge capacity within a regional health care community—need to designate receiving facilities, surge facilities, and support facilities.
- Do not evacuate to another coastal community.
- Prioritize evacuations—that is, first focusing on homebound individuals and then coastal facilities.
 - Plan for high numbers of homebound and special needs individuals.
 - Use brightly colored vests to identify patients while in transit to reduce confusion.
- Stage ambulances—coordinate all ambulances coming from different places to streamline calls and provide shelter and food for the drivers and paramedics and keep them from reaching exhaustion. The year 2005 was the first time it had been done in Texas.
- Repeatedly update the manifest—ensure that if patients are listed as being present they have actually arrived and are physically at the hospital.

which coordinates law enforcement information flow across nine jurisdictions in the metropolitan area. To further ensure this important health connection to law enforcement, the city has a paramedic working full-time in the BRIC who is also responsible for running the MIC. As the entire health care system across the country continues to undergo changes, this type of regional public-private partnership involving health care, public health, and law enforcement could be a model for information coordination during emergencies. Even if a separate intelligence center dedicated to the medical community is not feasible, Osborn of the Mayo Clinic, added that including health expertise into fusion centers could promote better information processing, as well as understanding what risks are immediate and related and should be communicated to the health care sector across communities. Better understanding and communicating the value added in adding a health component to Incident Command System and emergency operations center (EOC) systems already in place could also aid in this transition.

Coordination Through Digital Emergency Operations Centers

Showing how essential good communication and incident management are, Serino highlighted that not one of the Boston area hospitals that received the 260 patients injured in the Boston Marathon bombing was overwhelmed. Although that was also attributable to good relationships and years of planning and practice, being able to monitor needs and status of different hospitals through the region's Web EOC system and notifying member health care organizations of the bombings within minutes aided in the process of dispatching critical patients across multiple EMS companies safely and successfully. This was seen as a success, and could be a good measure for other regions to test scenarios with their Web EOC systems and member hospitals to evaluate whether the same outcomes might be seen.

Law Enforcement

As the EOC notifications and patient transports were occurring, incident command also realized the immediate need for additional law enforcement, as all hospitals reported that they were following protocol after a terrorist attack and going into lockdown mode, and many of the now established facts were very uncertain at the time. Because Boston police and Massachusetts state police teams were already committed to

the marathon course, incident management was able to coordinate and rapidly send law enforcement teams from surrounding cities and towns to each hospital under lockdown. While this event quickly involved the Federal Bureau of Investigation (FBI) and other federal agencies that were in charge of many parts of the response, a unified command structure was active, and several decisions were still made locally. He emphasized the importance of holding full-scale exercises, not just tabletops, to find important gaps in operations, and said doing this in Boston in previous years directly resulted in changes to policies that were called into play after the bombings.

Social Media

Serino also highlighted the utility of social media for real-time information and situational awareness. While at FEMA during Hurricane Irene he was told by regional emergency medical management in New England that residents on the ground in Vermont were faring well enough and did not need support. He simultaneously noticed hundreds of tweets, geo-located pictures, and references to flooding and hurricane-related damage in Vermont. So although official requests were not coming in from state or regional entities, FEMA was able to see immediate needs and start sending resources quickly to the affected communities, thanks to social media.

HIGHLIGHTED OPPORTUNITIES FOR OPERATIONAL CHANGES

The uses and benefits of HIT in disasters have increased similarly to the use in routine patient care, but there are still opportunities for improvement. Because of separate funding streams, there are occasional redundancies in tracking systems, and a lack of interoperability due to proprietary or other technological challenges. Similarly, state and local health authorities may have not spent time considering needs on a regional level, so when large-scale evacuations or patient movements occur, there are gaps in systems or transparency is less than optimal. With this in mind, speakers and participants offered several suggestions for improving practices and policies related to evacuation, patient tracking, and information coordination:

- Some participants during this discussion advocated establishing the next generation of an integrated patient, victim, material, and fatality tracking system based on a review of previous events, and integrating the system with electronic health records (EHRs). Several called for an integrated system that can address multiple needs, look at previous events such as Hurricanes Katrina and Sandy for lessons, and reduce redundancies from creating several different siloed systems (i.e., patient tracking, evacuation tracking, medical countermeasure materiel tracking) by multiple agencies and organizations. However, as pointed out throughout this workshop series, simply looking retroactively to past events may not give the full picture for predicting future needs and capabilities. Taking a nimble, dynamic stance when creating new systems could alleviate this issue, as many models in this chapter explored. Vicki Sakata, senior medical advisor at the Northwest Healthcare Response Network, added that the entire spectrum should be included in tracking, from pre-hospital response and care in the field all the way through to acute hospital care and any future movements or transfers until release.
- Several speakers and participants stressed the need for standards-based interoperability of health information systems in addition to just tracking patients in an emergency. While one centralized database for the country is not expected, standards will allow access to and sharing of information across different databases. There are also opportunities for integration between EHRs and application programming interfaces that allow public and private partners to share data (e.g., to connect federal or state emergency preparedness centers with local emergency departments and emergency responders) (IOM, 2014).
- Trauma systems should share lessons learned about key data points to include in a regional disaster registry, to guide a pre-hospital tracking system, said Jolene Whitney, specialty care program manager at the Bureau of EMS and Preparedness at the Utah State Health Department. This could alleviate problems that arise with multiple tracking systems that are not connected. Integration of patient tracking/pre-hospital systems with hospital and health care EHRs can also improve the care of the patient, said Jennifer Ward, president of the Trauma Center Association of America.

- For patient transfers in a regional disaster, Ward recommended leveraging existing patient catchment systems (e.g., modeled around existing trauma systems) and building on day-to-day care (Lurie et al., 2013). Creating a new system and identifying new players could bring more challenges than simply leveraging the existing daily systems and Memorandums of Understanding that people are familiar with and already understand. However, a robust, daily trauma system is not guaranteed. Ward mentioned federal bills authorizing funding for grant programs supporting trauma system planning, regionalization of emergency care, trauma care centers, and trauma service availability, but monies have not yet been appropriated, and some will need to again be reauthorized before the programs can begin.² Effective, regional health care systems could assist in a stronger response to infectious diseases like Ebola Virus Disease and other public health emergencies.
- Dan Hanfling, of UPMC Center for Biosecurity, said that emergency planners need to define the “buckets” of information that should be prioritized and used widely to ensure that responders and researchers are capturing the same information with the same terminology. Differences in terminology are hampering information sharing between sector partners.
- Including health expertise into law enforcement fusion centers could promote better information sharing, noted Osborn, as well as understanding what risks are immediate and related and should be communicated to the health care sector across communities. Better understanding and communicating the value of adding a health component to Incident Command System and EOC systems already in place could also aid in this transition.

²See <http://www.appropriations.senate.gov/sites/default/files/hearings/Trauma%20Center%20Association%20of%20America.pdf> (accessed April 9, 2015).

3

Public Health Surge Capacity and Community Resilience

Highlights and Main Points Made by Individual Speakers and Participants¹

- Alternative triage services such as the Nurse Triage Line used in Minnesota in 2009 during the H1N1 outbreak can prevent large numbers of in-patient visits and potentially reduce exposure for many residents and hospital patients. (DeVries)
- To reduce the clinical surge burden on hospitals, communities can provide alternative care and medical needs shelters, as well as increase training and use of community paramedicine, and incorporate better coordination and integration of Emergency Support Function (ESF)-6 and ESF-8, prior to and during a disaster. (Davis)
- Including regional partners such as the Administration for Children and Families' regional administrators and pharmacists in planning efforts can help to keep people out of health care facilities and reduce the surge burden. (Adams, Meier)
- Encouraging social cohesion can drive community resilience, and creating an evidence base to inform academia, policy makers, and community organizers can gain support for the methods used. By mapping the methodology used in various cities, neighborhood leaders can leverage successes of individual communities and build linkages across jurisdictions. (Aldrich, Schor)
- Linking ESF-8 and ESF-6 at all levels in a response can reduce the reliance on emergency departments and clinical services. (Meier)
- Tying funding incentives from the Office of the Assistant Secretary for Preparedness and Response and the Centers for Disease Control and Prevention to regional and cross-sector engagement in their agreements can better integrate various sectors at the local level. (McClendon, Shah)

¹This list is the rapporteurs' summary of the main points made by individual speakers and participants, and does not reflect any consensus among workshop participants.

Large-scale disasters affect more than just individual health care facilities; they permeate the entire fabric of communities, demanding resources across sectors and jurisdictions. Having scalable and flexible public health surge capacity, in concert with community and social services, can help to alleviate the surge burden on clinical health care facilities throughout a multi-community region. “Surge capacity” can involve area hospitals, as well as alternative care sites and other medically capable shelters specially set up during a disaster to divert people away from overcrowded emergency departments. This chapter examines the opportunities for public health services and other community services to coordinate across a region and keep hospitals and health centers from overcrowding, as well as ideas for better planning across sectors related to vulnerable populations. A region with robust public health surge capacity during steady state times can also become more resilient in the face of disasters. Participants in this section discuss possibilities for achieving this goal by addressing social determinants of health² and enhancing themes of social capital and cohesion within communities.

REDUCING CLINICAL SURGE THROUGH PUBLIC HEALTH AND COMMUNITY SERVICES

Alleviating burdens on emergency departments and trauma care centers within a region is often a goal for communities in the hours and days following large-scale disasters. This was also the motivation behind several disaster-related initiatives across the country discussed in the following paragraphs. These initiatives, all organized through authorities outside of hospitals and health care centers—from Minnesota to New Jersey to Texas—included a nurse triage line (NTL), Alternative Care Sites, Extended Treatment Areas, and oxygen strike teams.

Nurse Triage Line

Aaron DeVries, medical director of the Infectious Disease Division at the Minnesota Department of Health (MDH), described their experience during the H1N1 pandemic in 2009 to improve access to medical

²The World Health Organization defines social determinants of health as the conditions in which people are born, grow, live, work, and age. These circumstances are shaped by the distribution of money, power, and resources at global, national, and local levels. See more at http://www.who.int/social_determinants/en (accessed December 9, 2014).

care and reduce surge on health care facilities in the state during the outbreak. During the spring and summer of 2009, many Minnesota hospitals and clinics experienced large numbers of ill people seeking care, including those with influenza symptoms and the worried-well. In addition, access to H1N1 antiviral treatment became increasingly problematic. Therefore, MDH leaders created partnerships with existing nurse triage telephone lines operating in the state to create a coordinated statewide nurse triage line that could target high-risk groups across counties and recommend care and treatment where necessary. The Centers for Disease Control and Prevention (CDC) is also exploring other alternate delivery systems for antiviral medications during severe influenza pandemics as well as clear strategies to communicate accurate messages to the public (IOM, 2012b).

DeVries explained the development of the Minnesota-wide integrated NTL, called the Minnesota Flu Line (see Figure 3-1), which began at the suggestion of an infectious disease physician at a Minnesota children's hospital during the pandemic. Because many different nurse

Private Health Partners: All MN health systems with an NTL



FIGURE 3-1 Listing of the Minnesota health systems making up the state's nurse triage line during the H1N1 outbreak in 2009.

SOURCE: DeVries presentation, July 24, 2014.

triage lines already operated independently by private health care systems within the state, an integrated NTL seemed to be the most effective approach and quickest to operationalize to meet the health care surge. The objectives of the NTL were

1. Decrease public confusion by providing accurate information—consistent messaging, and assistance, including use of antiviral medications;
2. Decrease the spread of disease by reducing the volume of sick individuals gathering in health care settings;
3. Reduce medical surge on health care facilities to ensure that other priority medical needs would continue to be met; and
4. Meet the needs of uninsured or underinsured patients and those without easy access to health care.

The NTL provided rapid evaluation, targeting of high-risk groups, recommendation to level of care (home versus clinic versus emergency room), and prescription of antiviral drug by a nurse practitioner if home care is advised. The integrated NTL was a public–private partnership between the MDH and 14 Minnesota health care systems that already operated their own NTLs. DeVries said gathering all of these different organizations in one room was a challenge because they typically saw themselves as competitors and were initially wary of sharing what they thought was “proprietary” information. Having the state as the coordinator and finding the “decision makers” in each organization quickly was critical to keeping the effort moving. All the private partners agreed to coordinate NTL services through a single toll-free number and a standard protocol, which included prescription treatment if necessary. At the designated local pharmacy, if the patient had insurance and there was no market interruption in the supply, a treatment course of oseltamivir was dispensed, and insurance was billed. If the patient was uninsured or underinsured, oseltamivir from pre-positioned state cache antivirals was dispensed at no cost to the patient or with an option of a low-cost fee (Spaulding et. al, 2012). From design to implementation, the integrated NTL took slightly more than 1 month to take shape and began operations in October 2009.

DeVries stated that more than 27,000 individuals from 86 counties called the Minnesota Flu Line during the epidemic, with the highest call volumes from rural, northern Minnesota counties. MDH officials estimated that approximately 11,000 in-person health care encounters may have been pre-

vented by the Minnesota Flu Line (Spaulding et al., 2012), which means possible additional exposures from those individuals seeking in-person care may have been prevented as well. However, because this system was built quickly and created solely for the purpose of clinical triage, there were challenges and gaps in data collection. DeVries said they did not have time to design reporting systems based on this capability but that for future endeavors they hope to gather real-time caller demographics, geo-location, and outcome of patients in order to give even more information to public health officials and state health care partners during a pandemic emergency.

Medical Needs Shelters, Alternative Care Sites, and Extended Treatment Areas

Monique Davis of the Hudson County, New Jersey, Regional Health Commission presented their experiences in integrating public health and human services to increase surge capacity. The integration represented the linkage of Emergency Support Function (ESF)-6 (mass care) with ESF-8 (public health). The presentation focused on medical needs shelters, alternative care sites, and extended treatment areas—sites that are designed to handle surge capacity when hospitals and emergency departments are inundated. Sites with these capabilities were used in New Jersey during Superstorm Sandy. As background, Davis noted that New Jersey has a population of 8.1 million, divided among five public health regions. The state has 75 hospitals and some 21,000 hospital beds, most of which are located in the northeast and central eastern regions of the state. Hudson County was deeply affected by Superstorm Sandy, with all but 1 of the 12 municipalities in the county bordered by some body of water. Every one of the communities experienced power outages of some duration, she commented. Hudson County was still sheltering 17 days after the storm primarily due to lack of power. She explained that the storm left five of six hospitals out of service in Hudson County.

Medical Needs Shelters

Superstorm Sandy emphasized that dedicated medical needs shelters were imperative. Hospitals faced an onslaught of patients who simply needed an outlet to plug in medical equipment or to obtain oxygen support. General population shelters were not properly staffed to assist those whose medical needs required some clinical oversight, but were not

acutely ill and warranted hospitalization. During and immediately following Superstorm Sandy, the lack of medical needs shelters—or similar capabilities at general emergency shelters—led to hospital surges, overwhelming emergency departments.

The purpose of a medical needs shelter, as Davis explained, is to provide short-term supportive medical care during a disaster when the evacuees are displaced from their homes and cannot be accommodated in the general population shelter due to medical needs. The medical needs shelter can be located in a general population shelter or be freestanding. The ESF-6, which includes mass care, emergency assistance, human services, and temporary housing, is led by the American Red Cross and the Federal Emergency Management Agency (FEMA) and supported by human services. ESF-6 closely coordinates with ESF-8 for staffing and to make sure medical needs are met. ESF-8 personnel conduct environmental assessment of the shelter to ensure that there are the proper number of bathrooms, hot running water, showering facilities and toileting, and food that is served at the proper temperature. Davis explained that public health also has a role in disease surveillance. In the wake of Superstorm Sandy there was a norovirus outbreak in one of the shelters caused by contaminated food. Also involved in the operation of a medical needs shelter is the Salvation Army, and Volunteers Active in Disaster (VOAD).

While they might seem an easy fix in concept, staffing of medical needs shelters can be problematic. Consequently, family members who are caregivers are encouraged to stay and continue their role at the medical needs shelters. Although it tends to break up families, with non-caregiving family members sent to general population shelters, it is crucial to have help at the medical needs shelters, Davis said. Furthermore, Davis's organization is working with schools of nursing and home care health agency programs to contribute to staffing of medical needs shelters in lieu of using registered nurses for tasks that can be handled by lesser-trained professionals. For staffing issues and any other issue of concern, Davis noted that her county set up a Special Needs Advisory Group to ensure input from the special needs community.

Alternative Care Sites and Extended Treatment Areas

Another common approach to decompress emergency departments is by standing up alternative care sites and extended treatment areas. In New Jersey, planning for these sites began 2 years before Superstorm Sandy, Davis noted. An alternative care site is a community-based loca-

tion that is owned or operated by an entity other than the health care facility to which lower acuity health care patients may be directed for treatment. They are community-based sites—such as a school or community center—converted to provide patient care during a medical surge. When up and running during Superstorm Sandy, Medical Reserve Corps (MRC) volunteers staffed the alternative care sites. Extended treatment areas are similar in intent—to siphon nonemergency patients away from the emergency department—but are places established by a health care facility, typically on a site they own. For example, they can be located in tents constructed in the parking lot belonging to a hospital or in mobile vans, rehab hospitals, or triage sites set up by emergency medical services (EMS). Both extended treatment areas and alternate care sites are scalable in size for the numbers of beds, medical supplies, and equipment needed. They can be adjusted based on available resources or the nature of the medical surge emergency.

As mentioned previously with medical needs shelters, staffing of these alternate sites is also a key issue, because hospitals are not expected to staff them. Davis said potential sources of staff can include the MRC volunteers, Emergency System for Advance Registration of Volunteer Health Professionals (ESAR-VHP), and volunteers with the Red Cross and other private philanthropic organizations. Additionally, ensuring the staff members recruited to work these alternative care sites are trained appropriately has also proven challenging. During Superstorm Sandy, many nurses in the MRC turned out to be school-based nurses who needed training to take care of a common patient presentation, such as a diabetic patient who needed wound care. In the case of New Jersey, the state assumed responsibility for their training, but this is not always the case across the country, and could present complicated issues in a multi-state, regional disaster with volunteers crossing borders to respond. A main concern that continues to arise during and between disasters across the country is liability for the MRC volunteers and other professionals working at alternative sites. In some states, they are covered by significant state tort protections, but in other states they are not. If a staff member is assigned to work at an alternative site on behalf of a hospital, then the usual source of malpractice applies. While states and volunteer agencies work to address liability concerns and best recruiting strategies, spending time during the planning process to answer some of these questions can contribute to a lesser burdened emergency department and a community with potentially greater capacity to care for residents in a large-scale disaster.

Planning for At-Risk Populations

Teresa Ehnert, bureau chief of Public Health Emergency Preparedness of the Arizona Department of Health Services, spoke about the progress made by the state of Arizona in ensuring that public shelters can accommodate at-risk populations. The conceptual footing for the state's efforts was established in 2010, with a planning exercise called Arizona Partners in Preparedness. One of the five strategic priorities created by the planning exercise was "to sustain and develop programs for at-risk population preparedness."³ Within this priority, planners came up with four strategic objectives: (1) strengthen preparedness planning with access and functional needs stakeholders; (2) integrate behavioral health, public health, and health care system response capabilities; (3) engage and establish partnerships with non-English speaking/limited English proficiency stakeholders; and (4) implement strategies for communicating with geographically isolated populations.

To achieve these strategic objectives, Arizona has found it essential to forge community partnerships, especially between emergency management and disability groups such as the Arizona Center for Disability Law and the Arizona Independent Living Council. One example of progress is that Arizona routinely incorporates deaf and hard of hearing individuals into standard hospital decontamination exercises.

Under its new strategic framework arising from the 2010 planning exercise, Ehnert explained, Arizona is trying to break the historical paradigm that designated functional needs populations as "special" or "vulnerable." That paradigm left people with special needs being served by shelters that were "separate and unequal." Arizona's new goal is to ensure equality by integrating the planning for people with functional needs and mainstream populations (see Figure 3-2). Under this approach, all Arizona shelters have become completely accessible for people with functional needs; in contrast to Davis's approaches of Medical Needs Shelters in New Jersey, Arizona no longer sponsors special health care or medical needs shelters. The integrated approach incorporates all types of functional needs, including physical, sensory, cognitive, and multiple medical needs. Shelters now routinely provide equipment that is used for

³The four other strategic priorities were to (1) improve community resilience through cross-sector collaboration; (2) maximize public health and health care system response capabilities; (3) expand regional health care coalitions; and (4) integrate information-sharing systems and protocols.

activities of daily living: power wheelchairs, audio input/output electronic devices, text devices, and video telephones.

The state also has conducted an exercise planning for a common consequence of floods and fire, namely extended power outages. From the exercises the state learned a lot about equipping all shelters with sufficient battery power to meet the needs of people with functional needs. Shelters have a durable medical equipment cache that allows people with basic medical needs to stay in general population shelters, keeps families/caregivers together, and reduces the need for medical surge. The state also has numerous ongoing projects with disability partners to further its goal of integrating at-risk populations with mainstream shelter populations and it vigorously works with tribes to ensure their members with functional needs are accommodated.

As shown by these two examples, there is not one right answer to ensuring capable response to residents with functional needs or complex medical needs. However, working across regions and states prior to a disaster—shown by both Ehnert and Davis—can aid in planning so state and local health authorities know what systems to expect if their residents need to cross jurisdictional lines for shelter assistance.

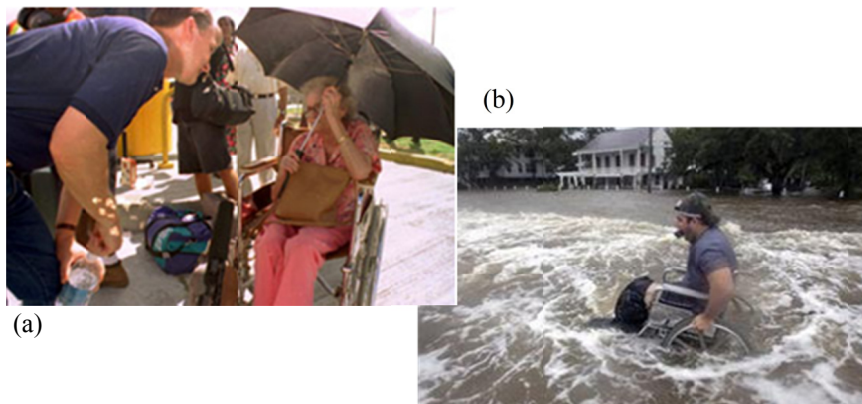


FIGURE 3-2 Examples of at-risk populations that may require extra planning considerations in a disaster.

SOURCES: (a) FEMA photo, September 15, 1995; (b) Ehnert presentation, March 26, 2014.

Community Paramedicine

Jolene Whitney of the Utah State Health Department, suggested considering community paramedicine, the field of medicine focused on assisting individuals, families, and communities in attaining optimal health, often following acute or sudden onset of medical or traumatic events—but outside of the hospital setting (Bigham et al., 2013). With worries of physician shortages in coming years, there is an opportunity for EMS professionals to expand their scope of work outside the typical hospital environment. During an IOM workshop in November 2013, Matt Zavadsky of MedStar Mobile described their Mobile Integrated Health Care Program. It trains community paramedics and others to triage patients in their homes and with the help of physicians on the phone, to either treat them or refer them to appropriate services. In addition to receiving care in their home, he noted the benefits to the community by keeping patients out of the emergency department—on a routine basis but also during an emergency:

The Mobile Integrated Health Care program has helped the community by increasing the capacity of the hospital and the health care system, returning thousands of emergency department and inpatient bed hours, in other words, freeing up beds and staff time that were previously used because all 911 calls resulted in transports to the hospital. It has improved collaboration across the health care continuum, and providers in the program work very closely with primary care and emergency department physicians. (IOM, 2014, p. 46)

In a similar example of paramedicine, Lori Upton, recounted her experience with “strike teams” of paramedics in southeast Texas during Hurricane Ike in 2008. One problem frequently encountered in a disaster is the need to refill oxygen tanks for the homebound ill. Those patients call 911, hoping to get their oxygen tanks refilled at the hospital. However, what many do not realize is that hospitals do not possess the capability to refill oxygen cylinders, even when not under duress. Upton’s agency worked with 911 dispatch to create a so-called oxygen-strike team of paramedics whose purpose was to go to homes and refill oxygen from specially-equipped ambulances. If patients were stable, the paramedics conducted the cylinder swap and put patients on a return schedule for as

long as necessary. Upton's agency also created a plan for homebound patients needing dialysis. They set up a call center where patients could locate the closest operational center and in this way were able to avoid going to the overcrowded emergency department. Though local emergency medical services may already be stretched fielding regular emergency calls, adding coordinated regional ambulances and emergency medical assets during a disaster and expanding the scope of practice of paramedics can help to keep many people out of hospitals— both keeping them safer at home and reducing surge in crowded emergency departments.

BUILDING COMMUNITY RESILIENCE

The discussions on public health surge capacity and community resilience built off of multiple meetings on both surge management and community engagement. Much of the conversation included how to build sustainable and inclusive health coalitions that can allow for greater resources, communication, and surge capacity when needed. Many of the suggestions by participants and discussion leaders Umair Shah, director of Harris County Public Health and Environmental Services in Texas, and Andrew Stevermer, regional emergency coordinator for the Office of the Assistant Secretary for Preparedness and Response (ASPR), focused on long-term goals of making communities more resilient by addressing social determinants of health, mentioned previously in this chapter. If public health can address those determinants such as housing, transportation, education, access to health care and nutrition, access and functional needs of children, and others prior to a disaster—in addition to fostering stronger community bonds through social capital and cohesion—then communities could become more resilient in disasters and experience less of a clinical surge burden on regional hospitals. In addition, having a framework for broad, cross-sector community risk assessment, allowing better understanding of which areas will be rebuilding and how, could be a crucial linkage to disaster recovery on multiple levels, including funding.

Inclusive Health Coalitions

One of the opportunities discussed to increase services outside the hospital included widening the net for coalition inclusion. Alex Adams of the National Association of Chain Drug Stores commented that there are 120 pharmacy organizations across the country with thousands of

actual pharmacies. Because of their complexities, he said, planning at the local level for them is very challenging, and regional planning would be far more advantageous. He also noted that with the explosion of pharmacies as “minute clinics,” pharmacists are often doing point of care flu/strep testing, and have the ability to provide vaccinations—adding that one in five flu shots is given in a pharmacy. Especially as the emphasis on community and population health from Affordable Care Act (ACA) continues, Adams said pharmacies could be a public health asset in mitigating surge issues in the community, also reducing the burden on hospitals.

In addition to pharmacies, Carolyn Meier, deputy regional administrator for the Administration for Children and Families (ACF), highlighted ACF’s regional emergency management specialists who can serve as liaisons between ESF-6 and ESF-8 in coalitions’ planning efforts to provide services that residents might otherwise seek in a hospital or health care setting (e.g., crisis counseling, mental health services, child reunification and social services for children, help securing or renewing prescription medications, or special needs support). In recent years, some states and local jurisdictions have also been developing Children’s Emergency Task Forces to respond to children’s needs in disasters.⁴ These are models of community collaboration that include ESF-6 and ESF-8 partners, including pediatricians, 211 call centers, behavioral health, child care providers, schools, public health, VOAD, and local social services. Such regional collaboration could help to further address the access and functional needs of children or other planning, especially for children with no caregivers present in neighborhoods, hospitals, and shelters. Connecting the work of the Children’s Emergency Task Forces with medical and public health coalitions could provide meaningful collaboration for community response and recovery, and reduce the impact on public health systems.

Other individuals highlighted the potential of the entire EMS community, in addition to the previously mentioned “community paramedics,” as health professionals who could augment a community response in emergencies. Especially in the initial and mitigation phases of public health surge responses, EMS providers at all levels could add to needed staffing demands. Including non-traditional partners in coalitions who

⁴Examples of these task forces can be found in an ACF document on guidelines for development. See http://www.acf.hhs.gov/sites/default/files/ohsepr/childrens_task_force_development_web.pdf (accessed March 19, 2015).

are already patched into the regions can help to reduce clinical surge demands as well as foster a more holistic response and recovery.

Social Capital and Cohesion

Daniel Aldrich, an associate professor of political science at Purdue University, delivered an overview of social capital and cohesion, a concept that refers to knowing one's neighbors, volunteering in the community, and having ties to one's locality or region through participation in civic groups, parent/school groups, houses of worship, and other neighborhood organizations. Previous experiences have shown that communities that have high levels of social connectedness (often referred to as social capital or social cohesion) display resilience that serves them well in post-disaster recovery (Aldrich and Sawada, 2015).

Aldrich introduced himself as a victim of Hurricane Katrina who lost his home, his possessions, and his job. About 6 months after Katrina, he and a colleague conducted a house-to-house survey of 1,000 New Orleans residents to determine factors associated with rebuilding. To their surprise, rebuilding was not correlated with less water depth (2 feet versus 15 feet), more resources (insurance and savings), lower population density (offers more routes of evacuation), and fewer deaths. Instead, he found that rebuilding occurred in clusters, and it was correlated with residents having social ties to the community (see Figure 3-3). One example of is from one small New Orleans community, the village of L'est. When residents returned to their homes they found there was no electricity and no gas. They alerted the local power company to turn on the gas, fix the transformers, and restore utility lines. Officials told them that to consider such an expensive undertaking, they needed proof that enough people would benefit. Within 3 days the community collected hundreds of signatures on a petition. Residents had succeeded in maintaining contact during the evacuation process through e-mail, websites, phones, and face-to-face contact.

Social Capital Research

Based on subsequent research of four disasters (1923 Tokyo earthquake, 1995 Kobe earthquake, 2004 Indian Ocean tsunami, and 2005 Hurricane Katrina), Aldrich found that three types of social connections were associated with recovery and resilience: bonding social capital (cohesion within social networks, e.g., ethnicities and religions); bridging

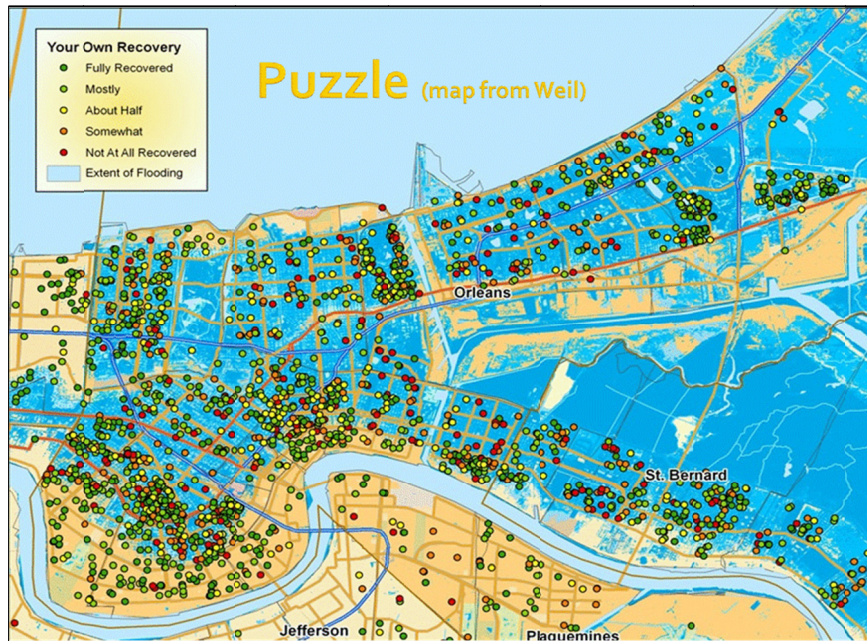


FIGURE 3-3 Perceived recovery after Hurricane Katrina (yellow and white areas are between 1 and 2 feet; darker blue areas are up to 13 feet of water).
SOURCE: Aldrich presentation, March 26, 2014.

social capital (linkages across different social networks through institutions, schools, and sports clubs, among other venues); and linking social capital (connections between citizens and government and elected officials who hold positions of authority and power) (see Figure 3-4).

Aldrich also reported the types of costs associated with rebuilding: psychological, financial, and opportunity costs. If people are strongly connected to their community in terms of sense of place and engagement, they want to rebuild regardless of costs. For example, he and his colleagues found that in Japan people who lived within 1 kilometer of the shore in Sendai wanted to rebuild. Aldrich suggested that policy makers encourage four activities to build trust and community ties:

1. Encourage people to get to know their neighbors;
2. Hold social events to begin strengthening ties across neighborhoods;
3. Have people meet on a regular basis on any topic; and
4. Incentivize volunteering by paying them in local currency that can be used only in locally owned stores.

In Aldrich's view, social connections across affected communities are what drive the process of recovery. The physical infrastructure itself will never be completely secure. There is no way of guaranteeing any bridge or any levy will hold, but social cohesion, in contrast from experience and data, is what drives resilience. Promoting social cohesion, said Aldrich, should be part of the job description of city officials and emergency managers. Ideally such efforts should be undertaken before a disaster—as a component of resilience-building initiatives, and can be either top-down or bottom-up approaches. Some cities have already started programs with this goal in mind, such as the Neighborhood Empowerment Network (NEN) in San Francisco.⁵ Although NEN is a

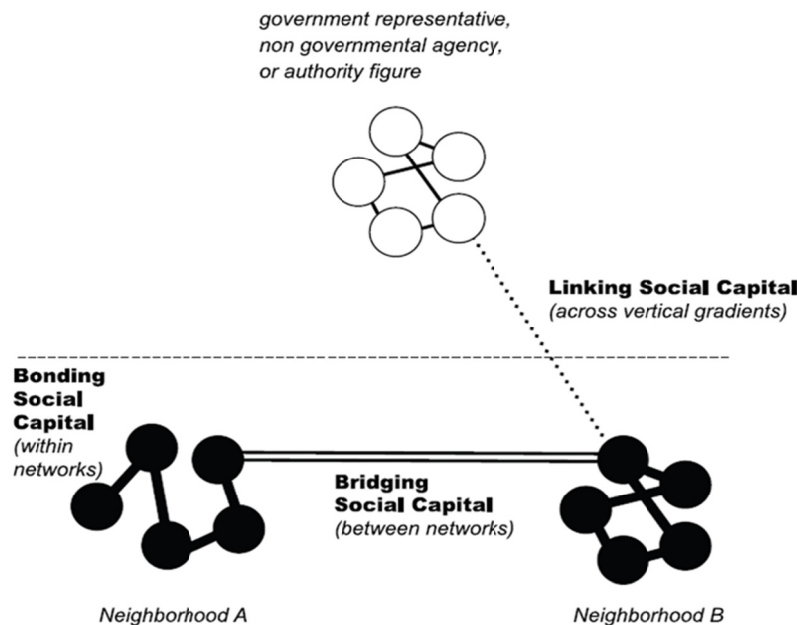


FIGURE 3-4 Theoretical approach to social capital and cohesion.
SOURCE: Aldrich presentation, March 26, 2014.

⁵For more on the Neighborhood Empowerment Network, see <http://empowersf.org> (accessed January 29, 2015).

collaborative of several organizations to advance resilience at the community level, it is sponsored by the San Francisco Department of Emergency Management. Having this type of grassroots encouragement and support from the local government can help communities band together to build more resilience into their social bonds and physical infrastructure to better prepare for disasters.

HIGHLIGHTED OPPORTUNITIES FOR OPERATIONAL CHANGES

During various discussions on these issues throughout the meetings, individual participants voiced suggestions for potential changes ranging from the local level up to the national level, in order to better accommodate some of the needs highlighted:

- Ken Schor, director of the National Center for Disaster Medicine and Public Health, remarked on the need to create an evidence base about social cohesion's effects to mitigate disasters and build resilience. He said community members need to have access to the evidence to inform academia, policy makers, and community organizers and gain their support for the methods. By mapping the methodology used in various cities, neighborhood leaders can leverage successes of individual communities and build linkages across jurisdictions.
- Several speakers voiced the need to build ownership of resilience from within the neighborhood or community to strengthen capacity at the community level. Aldrich argued that communities should be flexibly engaged in developing shared goals and plans for disaster recovery, which also creates a sense of empowerment at the community level, and strengthens ties within and outside the community.
- Facilitation of regional information sharing regarding at-risk individuals could be accomplished by enhancing mechanisms across entities in the same region, said Suzet McKinney, deputy commissioner of the Chicago Department of Public Health. Identification of at-risk populations is often challenging, and shared information from the health care system across state or county lines could help better prepare the distribution of regional assets and capabilities. This could be facilitated by CDC's Division of

State and Local Readiness within the Office of Public Health Preparedness and Response, assisted by the Division for At-Risk Individuals, Behavioral Health, and Community Resilience in ASPR.

- To reduce reliance on emergency departments, several speakers, including Meier, noted that human services and public health could be better integrated in a response, for example, by linking ESF-6 (mass care, emergency assistance, housing and human services) and ESF-8 (public health and medical) at all levels to leverage resources, avoid duplication, and increase situational awareness across communities.
- Several speakers suggested that because disaster funding is currently siloed from the federal level, better integration at the local level could be promoted through funding being contingent on cross-sector engagement. Bruce Clements, preparedness director for the Texas Department of State Health Services, saw a need for a broader, crosscutting risk assessment instead of making risk assessment requirements for multiple communities and sectors based on specific funding. Shah suggested possibly tying ASPR and CDC funding incentives to regional and cross-sector engagement in the agreements to better integrate various sectors at the local level.

Coordination of a Community Response

Highlights and Main Points Made by Individual Speakers and Participants¹

- There is a need to define what is meant by a “true collaboration” across sectors. Collaboration depends first on understanding an organization’s partners, then making commitments, communicating, cooperating, and coordinating. (Jones)
- Creating an all-volunteer registry for managing volunteer inflow during a disaster event can allow for better accessibility across jurisdictions and states. (Hick)
- Developing a system that allows nongovernmental organizations to target their services and resources to local communities through a type of “resource catalog” can simplify the procurement process for state and local health departments during a disaster. (Hick, Prats)
- Loss of Hospital Preparedness Program funding has threatened the regional partnerships and coordinating entities built over the previous decade. (Prats, Upton)
- Elements of successful coordination following the 2014 chemical spill in West Virginia include promoting interagency communication, building trust and relationships, holding mutual interests and objectives, and developing local decision-making capacity. (Gupta)

As disasters have continued to occur throughout the United States and the greater global community, an increasing number of organizations have realized a role during disaster response and recovery to promote healthier outcomes in communities and regions. Successful response to a large-scale disaster includes coordination horizontally and vertically

¹This list is the rapporteurs’ summary of the main points made by individual speakers and participants, and does not reflect any consensus among workshop participants.

within and across the public sector. Additionally, partnerships between the public and private sector (cross-sector collaborations) have become more common and help to serve a greater portion of the population across cultures, geographic locations, age, and other demographics. This chapter discusses the importance of promoting cross-sector collaborations to enhance information management and communication, effectively use volunteers, build sustainable coalitions, and coordinate streamlined health messages to the public.

PROMOTING CROSS-SECTOR COLLABORATION

Michael “Mac” McClendon, the director of the Office of Public Health Preparedness of the Harris County Public Health and Environmental Health Services in Texas, spoke of the need to involve leadership of health care organizations to promote cross-sector collaboration. He noted that many “C-suite” level executives may not be concerned about resources and planning for disaster until it occurs to their facility or within their region. Receiving support from the top level of leadership at hospitals can be influential, he commented, in promoting the importance of preparedness activities within an institution, including the allocation of funding, staffing, and support. To assist in overcoming this challenge, participants suggested using business-oriented channels such as chambers of commerce or trade groups to relay the importance of preparedness resources. Osborn noted that this approach is currently active in Minnesota through partnerships with the Minnesota Hospital Association.

Defining and Understanding the Meaning of “Collaboration”

The key to cross-sector collaboration is ensuring that partnerships are sustainable before, during, and after disasters. Ana-Marie Jones gave an overview of cross-sector collaboration from her experience as executive director of Collaborating Agencies Responding to Disasters (CARD). CARD is a nonprofit agency, based in Oakland, California, that was created in the wake of the 1989 Loma Prieta earthquake by local nonprofit agencies to address the preparedness and response needs of service providers. The Loma Prieta earthquake demonstrated that despite great effort and billions of dollars invested, traditional disaster response agencies simply could not address all of the emergency preparedness,

planning, and response needs of an increasingly diverse society, Jones said. CARD complements traditional disaster response agencies by providing safe, accessible, emergency services tools and programs designed for nonprofits, faith agencies, related service providers, and the communities they serve.

Jones pointed out that the concept of “collaboration” across sectors has long been assumed, expected, advocated, romanticized, and even scapegoated in the face of failure. True collaboration, she claimed, remains largely misunderstood. Jones asserted that most of the struggles and failures around collaboration stem from unrealistic expectations and a lack of understanding of the component pieces involved. Collaboration is made all the more insurmountable because of silos created by nonprofits, academia, utilities, health, government, and business. The “people” involved make or break collaboration, with personal and institutional relationships being essential. Collaboration depends first on understanding an organization’s partners, then making commitments, communicating, cooperating, and coordinating.

In terms of lessons learned, forming true collaborations requires at least eight elements, observed Jones:

- **Choose to collaborate:** enter a collaboration with eyes wide open by making the collaboration an intentional act, alert to its pitfalls, costs, and multiple steps in a pathway.
- **Be honest:** be brutally honest because without honesty there is no trust between partners; acknowledge the weaknesses of each collaborating partner.
- **Celebrate/leverage differences:** understand and honor each collaborating organization’s diversity as a genuine competitive advantage.
- **Stay focused on common goals, values, and needs:** do not deviate from these shared purposes. Avoid veering off into goals that only the strongest voice wants.
- **Protect your collaborators from idiosyncrasies of one’s own bureaucracy:** when entering a collaboration, it is essential to know each collaborating organization’s pitfalls, and then actively protect collaborative partners from experiencing them.
- **Create micro-successes:** most organizations cannot sustain a long process to reach a goal; each collaborating organization has to break down the long process into tiny steps along the way for which they can achieve success.

- **Embrace technology:** use technology to create an electronic “place” (e.g., Google Docs, Dropbox, or “the Cloud”) that every collaborating partner can access.
- **Seek clarity:** spell out the path for all collaborating partners and agree on the level and depth of each organization’s responsibilities, procedures, and communication standards.

Especially in a regional response or planning effort, Jones said it is important to balance the needs of each community, and include diverse perspectives within and among urban, rural, and frontier settings. This is essential for successful day-to-day partnerships and the operation of the incident management structure with multiple jurisdictions involved. Finally, with a hint of disaster risk reduction concepts, Jones urged participants to “plan beyond resilience.” She said the emergency management and health preparedness field should look beyond just helping communities “bounce back” after disasters and spend more time thinking about how to reduce exposure to the disaster and work across communities to make them less susceptible to the effects (see Figure 4-1).

Private-Sector Engagement

Kellie Bentz, the team lead of global crisis management at Target Corporation, explained that great strides have been made in forging public–private partnerships to coordinate activities during a disaster. Public–private partnerships were given a boost when the national emergency operations center (EOC) created a seat at the table for Volunteers Active in Disaster (VOAD). They were also given additional support through Federal Emergency Management Agency’s (FEMA’s) creation of a National Business Emergency Operations Center (NBEOC),² a virtual organization that serves two-way information sharing between public- and private-sector stakeholders in preparing for, responding to, and recovering from disasters.

Bentz also spoke about her corporation’s robust system of global crisis management. Target created a centralized corporate command center supporting a crisis management team that coordinates internally (nearly 1,800 stores and 37 U.S. distribution centers nationwide) and coordinates with public-sector partners through public–private

²NBEOC was first activated in 2012 during Superstorm Sandy. For more on NBEOC, see http://www.fema.gov/media-library-data/20130726-1852-25045-2704/fema_factsheet_nbeoc_final_508.pdf (accessed October 13, 2014).

partnerships. If the crisis involves a disease epidemic, the command center turns for guidance to its medical director or medical team; if the crisis is a hostage situation, the command center turns for guidance to its corporate security team. The command center maintains weather tracking through real-time weather alerts and 24/7 access to a consulting meteorologist. The command center also conducts tracking of its 1,500 employees who are traveling domestically on any given day and 600 employees who are traveling globally, some of whom are using corporate aircraft. Target also has at its disposal more than 100,000 surveillance



FIGURE 4-1 Planning beyond “resilience” frameworks for cross-sector collaboration.
SOURCE: Jones presentation, March 26, 2014.

cameras, with live and archived video. When asked, Target gives public-sector partners access to these cameras. As a real-life example of public-sector partners needing surveillance cameras, Gary Schenkel, executive director of the Chicago Office of Emergency Management and Communication (OEMC), described their cross-sector coordination during the Chicago Marathon each year. OEMC maintains a public-private partnership using the Facility Information Management System

(FIMS), which houses building plans, emergency points of contact, and emergency operations plans for buildings throughout the city. They are made accessible to OEMC and the police and fire departments during emergencies. The city also tapped into FIMS to cover the Chicago Marathon. Because the city's existing camera system did not cover all 26.2 miles of the race, FIMS coordinated with the private sector to take over private cameras so that the entire route could be surveyed by emergency managers. Bentz reiterated Schenkel's message, saying Target's command center is run by a crisis management team that works with the private sector, public sector, and its internal staff to create a common operating picture. The command center establishes all emergency-related communications to Target's employees. The crisis management team seeks to build relationships with public-sector partners before disaster strikes.

During preparations for Superstorm Sandy in 2012, 265 Target stores were in the path of the storm, Bentz said. A challenge for a company spread across a region like this is trying to plug in to all of the local operating EOCs and understanding priorities. However, Bentz mentioned that FEMA's recently developed NBEOC was activated during the Superstorm Sandy response and was able to consolidate all incoming information from across the country into an extremely useful report. Because of this, along with other data provided through NBEOC such as a regional map of active utility power, they were able to quickly prioritize generators and other resources to the stores and communities that needed them.

MANAGING VOLUNTEERS ACROSS A REGION

Cross-sector collaborations nearly always involve the activities of volunteers. Captain Robert Tosatto, director of the Medical Reserve Corps (MRC) program now housed within Office of the Assistant Secretary for Preparedness and Response (ASPR), delivered an overview of volunteerism. He pointed out that in 2012, 64.5 million Americans (26.5 percent of the U.S. population) volunteered, generating 7.9 billion hours, worth \$175 billion. The largest share of volunteers served in the religious sector (34.2 percent), followed by the educational sector (26.5 percent), social services (14.4 percent), and health (8.0 percent). Tosatto said whether or not a volunteer has a positive experience depends on the quality of volunteer management practices, that is, whether volunteers

are organized, used appropriately, comfortable, and engaged in the roles in which they are placed.

There are at least three common misperceptions about volunteers. The first misperception, said Tosatto, is that they cannot be counted on to do the work. The more that is done to engage volunteers, he noted, the higher the likelihood is of them responding when needed. The second misperception is that volunteers are amateurs—unskilled, undisciplined, and unprofessional. In fact, many bring expertise that might otherwise be inaccessible, such as veterinary training, pharmacy management, or mortuary expertise. Additionally, volunteers' enthusiasm often carries the dividend of motivating paid staff. Volunteers are committed to recovery of the community because it is often the community where they live. The third misconception is that volunteers are free. This is not the case, as there are certainly costs associated with their training, supplies, equipment, and management, said Tosatto.

There are three general types of volunteers. The first is “generic” versus skill-based volunteers. The second is planned versus spontaneous, and the third is affiliated (e.g., American Red Cross, MRC) versus unaffiliated. Spontaneous unaffiliated volunteers—people who just show up to volunteer during an emergency without any pre-registration or notification—are the most problematic. Emergency managers must prepare for them with just-in-time training, rapid screening, rapid background checks, and rapid verification of credentials, especially for health care professionals. While adding these processes during a stressful response phase seems cumbersome, even spontaneous volunteers could be a critical support piece of the response and should not be overlooked. It is incumbent upon emergency managers to have a system in place for volunteer management, according to Capability #15 of the PHP (Public Health Preparedness) Capabilities, published in March 2011.³ This Capability specifies four functions: coordinate; notify; organize, assemble, and dispatch; and demobilize volunteers.

The Medical Reserve Corps

Tosatto then turned to the MRC, a national network of medical and public health volunteers sponsored by ASPR in support of strengthening public health, improving emergency response, and building community resilience. There are some 200,000 MRC members in nearly 1,000 units

³See http://www.cdc.gov/phpr/capabilities/DSLR_capabilities_July.pdf (accessed April 10, 2014).

nationwide. About 90 percent of the U.S. population lives in jurisdictions served by an MRC unit, Tosatto added. Generally, each unit has a distinct composition that is based on local needs for integrating medical volunteers within existing programs and resources. All MRC units have a particular organizational structure, pre-identified members, verified professional licensure/certification, and trained/prepared volunteers. (However, as discussed later in this chapter, their skill sets are not standardized across units.)

When a disaster strikes, state medical and public health volunteers come into play through the Emergency System for Advance Registration of Volunteer Health Professionals (ESAR-VHP) system. ESAR-VHP is a national network of state-managed registries that allows health professionals the chance to get their licenses and credentials verified before a disaster. The program is also administered under ASPR. Thus, in regional disasters, emergency managers usually have two sources of medical volunteers at their disposal, MRC and those in ESAR-VHP.

Including Nongovernmental Organizations (NGOs)

Volunteers from NGOs are also key to emergency response, noted Bruce Clements, preparedness director for Texas State Health Services. The Salvation Army is usually counted on to set up meals, while the American Red Cross is usually relied on to open and staff shelters. Clements said that in Austin, most of the faith-based NGO coordinating is done under one entity called the Austin Disaster Relief Network, which combines volunteers from hundreds of churches statewide, allowing coordinators to allocate volunteers to needed areas that may have been without help. He added that Texas has an NGO representative at the state EOC who acts as a liaison for local and regional NGOs, providing transparent coordination among state agencies leading Emergency Support Function (ESF)-6 and ESF-8 functions. This can also be used as an entry point for NGOs coming into the system.

BUILDING SUSTAINABLE COALITIONS AND COLLABORATIONS

The most significant challenge to cross-sector collaborations is to sustain collaborations during “peace time,” that is, the period between disasters. Rosanne Prats, the executive director of emergency

preparedness at Louisiana Department of Health and Hospitals, warned of loss of collaborations with ongoing cuts to federal disaster response programs. Many public disaster agencies have lost key staff, she said, and are scrambling with fewer staff to maintain public-private partnerships. She added that the entire edifice of a regional response, which has been built over the past decade through dedicated funding and programs, is under threat unless new approaches are devised to sustain these regional cross-sector collaborations. For example, funding for the Hospital Preparedness Program (HPP), which is administered by ASPR, has been dramatically reduced in recent years and continues to be under threat of further reduction. The cooperation of hospitals and health care coalitions is needed in terms of sending staff to participate in the regional planning process, supporting full-scale and tabletop exercises, and encouraging training. Loss of federal funding translates to losing leverage to show hospital leadership there is commitment to regional preparedness at the federal level and makes it difficult to ensure that hospitals contribute to important disaster planning elements.

Prats added that collaborations are sustainable as long as they operate through institutional relationships that are independent of individuals. John Hick of Hennepin County Medical Center noted that the role of large NGOs being engaged in preparedness activities, including full-scale and tabletop exercises, is one way for cross-section collaborations to remain intact. Engagement in one preparedness activity generally motivates engagement in other disaster-related activities. Preparing for one threat, in short, helps to prepare for others. Using pre-existing relationships as a way to connect with new agencies was highlighted by Aubrey Miller, senior advisor at the National Institute of Environmental Health Sciences (NIEHS). He said NIEHS relationships with academic centers and other grantees across the country opened up a network of opportunities to build relationships with NGOs that want to contribute to the cause, whatever that might be at the time. Miller said building those relationships ahead of time, and having the ability to tap into those resources at a moment's notice, will help accelerate response time. Adding to this, Jim Craig of the Mississippi Department of Health called for a long-term, sustainable process for developing models for NGO relationship building. So often in the past, he said, short-term capabilities have been the focus, and the models and relationships disintegrate time and time again.

Coordinating Messages to the Public

The chemical spill in West Virginia in 2014 was examined to identify some of the challenges in disseminating important health and safety information across a large region during a real event with uncertain health consequences. Rahul Gupta, executive director, Kanawha-Charleston Health Department, spoke about the accidental release in January 2014 of 10,000 gallons of the chemical methylcyclohexanemethanol (MCHM) and eight other chemicals into the Elk River. The contaminants were released upstream of the drinking water intake, treatment, and distribution center. Within hours of the spill's detection, members of the public complained of a black licorice-like odor emanating from the water. At that point in time, little was known about the chemicals or their human health effects. The main toxin, MCHM, is a chemical used to wash coal and remove its impurities that contribute to pollution during combustion. Although no human data were available about MCHM, it is considered hazardous by the U.S. Occupational Safety and Health Administration, and the Centers for Disease Control and Prevention (CDC) indicates that no MCHM should be detectable in drinking water. Simply finding information alone was a challenge, said Gupta, because there was so much unknown about the chemical and its health effects. There was not enough information available to know the full scope of the problem, nor ease the ensuing panic of the public.

Within hours of the spill, Gupta said the health department decided to launch an unprecedented "Do Not Use" (DNU) tap water order. This meant launching an exceptional health response to inform local residents and enforce closure orders for schools and businesses. The DNU order affected all 300,000 people served by the water utility across nine counties surrounding the river and the state capitol, Charleston. Two days after the DNU order was lifted and the water was deemed safe to drink, CDC advised pregnant women not to drink the water. The West Virginia Department of Environmental Protection also alerted the public that more chemical was released than was originally reported. At the same time, a second wave of illnesses occurred because the chemicals in the hot water storage tanks began to vaporize. The vapors condensed on the skin, leading to primary complaints of skin and mucosal irritation. Some people also reported migraines, nausea, vomiting, and respiratory tract symptoms. The water still smelled foul. These conditions created mistrust between the public health agencies and citizens, and propelled

many to avoid using the water that was deemed safe. Some participants commented that when multiple stakeholders are involved, common challenges in information sharing and dissemination include issues of message coordination and information access, resources and staffing, and message adaptability and customization for the target audience. Gupta explained that this large operation was organized by an interagency task force that included representatives from multiple levels: CDC, the Environmental Protection Agency, FEMA, the National Institutes of Health, the National Guard, the West Virginia Department of Environmental Protection, West Virginia (WV) governor's office, the WV-American Water Company, city and county governments, local boards of education, hospital systems, law enforcement, and local health departments. What became apparent through the response, he noted, was the importance of effective negotiation skills, and using those and credible science to inform decision-making capacity and mutual objectives among that many stakeholders.

Identified Challenges and Lessons

Gupta cited several other challenges following the incident, particularly issues with conflicting public messaging. "This resulted in issues of trust, communication, and negative perception of water safety within the community," he said, while also noting the evolving role of social media in disaster management and how it can be leveraged as a means of digital surveillance. He suggested that it should absolutely be used when possible to see what is and is not working, and actions should be immediately changed, if needed, instead of simply waiting for an After Action Report to be released. He added that some of the other elements of successful coordination they found were promoting interagency communication, building trust and relationships, holding mutual interests and objectives, and developing local decision-making capacity.

To help ensure that public health information is up-to-date and included in broader communications, Gupta also suggested having a public health information officer provide daily talking points to municipal leadership, even if not requested. He also noted that legal and competing interests can create additional challenges that hamper decision-making following an incident, as may occur when economic decisions start to outweigh public health priorities. Several participants suggested that circulating a structured, short report periodically after

disasters, among all entities within the ESF-spectrum can improve awareness, inform about work being done, and provide an opportunity for dialogue.

Scientific Response Units

Captain Deborah Levy, chief of healthcare preparedness activity in the Division of Healthcare Quality Promotion at CDC, described CDC's use of Scientific Response Units, which bring together technical experts in various fields to offer their expertise or develop guidance as an event unfolds. These units create a structured approach for incident management. Daily updates are released in a scheduled, consistent fashion to partners and media outlets so that data and information are disseminated at set times every day. Some participants noted that having a common structure to bring together silos of technical experts offers an opportunity to strengthen interagency partnerships and craft more consistent messages to the public.⁴ In addition, the National Association of County and City Health Officials (NACCHO) has developed risk communication tools⁵ to plan for an emergency, create effective messages, and interact with the community and the media during a disaster (NACCHO, 2014).

HIGHLIGHTED OPPORTUNITIES FOR OPERATIONAL CHANGES

Successful coordination of a regional emergency response continues to be a dynamic goal as more sectors and entities find themselves with a role to help prepare, respond, or assist in recovery of their communities. Nonetheless, several participants and speakers had additional ideas for improving the management of volunteers, easing the manner in which NGOs are brought into responses, and enhancing partnership structures to enable a more resilient region:

⁴CDC's Healthcare Preparedness Activity hosts stakeholder meetings with a "whole of community" approach and builds in partnership activities. For more resources on communication, outreach, and building partnerships, see <http://www.cdc.gov/phpr/healthcare/tools-resources.htm> (all websites listed were last accessed October 13, 2014).

⁵For risk communication tools, visit some of NACCHO's Advanced Practice Center products: <http://tinyurl.com/qf2dvt6>, <http://tinyurl.com/nbgaaum>, <http://tinyurl.com/nbko7ar>, and <http://tinyurl.com/p65wtfa> (accessed October 13, 2014).

- Several participants commented that developing a structure for management of spontaneous unaffiliated volunteers could improve use of volunteers during an event and asked whether federal stakeholders could assist in development of a toolkit. Currently, there is no standardized method for managing spontaneous volunteers across organizations. Individual participants noted that by setting up a standard process of registering volunteers across organizations and allowing physical and virtual means of registration, prospective volunteers could be solicited across counties and integrated into existing volunteer databases. From here, their documented skill sets could be matched to the situational needs in different areas (Fernandez et al., 2006).
- Hick pointed to the need to develop a method for NGOs to identify services and resources they have available to communities, so when needed, regional and local leaders can reach out to them for those particular services, and multiple jurisdictions will not be counting on the same limited number of assets.
- Resource “typing,”—that is, categorizing what assets and specific types of personnel organizations can provide, and setting a basic minimum standard, can also help to manage expectations of what types of resources are immediately available. Prats saw a need for a better statewide “resource catalog” that describes the volunteer groups and associated skills, capabilities, and resources available before, during, and after a disaster. A standardized assessment for state and local authorities to use would be additionally valuable. Seeing the larger picture up front and knowing what is available can help state and regional authorities plan and coordinate the response better.
- Create a standardized capabilities framework for medical and public health volunteer response agencies, voiced Hick. Given that there are no recognized definitions for voluntary organization capabilities in a public health and medical response, sharing volunteers across jurisdictions can be challenging. Hick added that there are important variations within groups sometimes that should be known in advance. For example, one MRC unit in a state may have 100 volunteers and be able to give vaccinations, but another MRC in the same region may only have 20 volunteers and not have that immunization expertise.

Several participants suggested defining a research agenda on capabilities and expectations and developing a pilot categorization tool to optimize use and sharing of volunteers across organizations. This could be done in partnerships among groups such as the American Red Cross, MRC, and the National VOAD.

- Hick also emphasized creating better, more reliable systems monitoring that can be used consistently between partners when an incident happens. Some participants agreed that shared systems monitoring offered an easy information-sharing opportunity for broadening networks and accessing new data streams that could have significant importance during an event. Active information mining and sharing on a routine basis is valuable to identify the pertinent stakeholders and allow them to provide expertise during an emergency.

5

Final Remarks

Despite the progress in regional coalitions and cross-sector collaborations, much of the progress from coordinating regional partnerships developed over the past decade is in jeopardy because, as Lori Upton of the Southeast Texas Regional Advisory Council and Rosanne Prats of the Louisiana Department of Health and Hospitals pointed out, the Hospital Preparedness Program (HPP) continues to be cut. At risk is the capacity and capability to effectively evacuate patients, sustain operations in the throes of an emergency, balance the surge from increased volume of patients throughout a community, and establish systems to reunite families following an emergency. As funding for regional coalitions and HPP continues to be uncertain, coming up with innovative approaches to address surge capability across regions, casting a wide net when building pre-disaster relationships, and working to better integrate systems and decrease redundancies will be on the forefront for communities across the nation. As a country, Jennifer Ward of the Trauma Center Association of America said we should be building on the day-to-day trauma and health care systems, but in addition, health care delivery systems and public health departments can also continue to integrate elements of disaster planning into everyday routines. In addition, there is an opportunity to “socialize” the concept of preparedness wherever possible to increase our national capacity for surge management, information sharing, and community engagement.

Many of the speakers and participants underscored the importance of strong information sharing across multiple case studies. These elements can include

- Strong public–private partnerships;
- Effective rumor control/media monitoring;
- Effective public health message coordination;
- Institution of surveillance to improve situational awareness; and
- Effective communication among and between cities, counties, and states.

Some incidents may demand more of one than another, but taking the time to consider each element during a response could allow for more robust regional coordination and healthier outcomes. In any chaotic situation or disaster, accurate communication among so many stakeholders will be a challenge. However, as discussed throughout, and as Rahul Gupta, West Virginia Health Department, Dan Hanfling, UPMC Center for Health Security, and John Osborn, Mayo Clinic College of Medicine, noted, exchanging information and bringing partners together often throughout the response, identifying the right data to collect to improve situational awareness, and encouraging inclusive regional health care coalitions are a few ways this challenge can begin to be alleviated.

Many overlapping successful elements emerged regarding successful coordination. These included promoting interagency communication, building trust and relationships, holding mutual interests and objectives, developing local decision-making capacity, possessing effective negotiation skills, and using credible science to inform decision making.

Effective community engagement in the planning stages, and information sharing and management in the response stages, can each help to reduce the clinical surge during a large regional disaster. Several speakers described policies their region has instituted to reduce the flow of nonemergency patients to emergency departments during a disaster. This concept—using community outreach in planning phases and transparent information sharing during response phases—was reiterated throughout the regional meetings, as was the importance of coalition building and sustainability. Looking forward in the face of health impacts from climate change and unknown emerging threats across the globe, regions could broaden their focus on coalitions to include and sustain non-traditional partners, think proactively and integrate health information technologies, and use all available services in a community to effectively ensure successful health outcomes.

A

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B

Acronyms

ACA	Affordable Care Act
ACF	Administration for Children and Families
ASPR	Office of the Assistant Secretary for Preparedness and Response
ASTHO	Association of State and Territorial Health Officials
BRIC	Boston Regional Intelligence Center
CARD	Collaborating Agencies Responding to Disasters
CDC	Centers for Disease Control and Prevention
CMOC	Catastrophic Medical Operations Center
DNU	“Do Not Use”
EHR	electronic health record
EMS	emergency medical services
EOC	emergency operations center
ESAR- VHP	Emergency System for Advance Registration of Volunteer Health Professionals
ESF	Emergency Support Function
FEMA	Federal Emergency Management Agency
FIMS	Facility Information Management System
HHS	U.S. Department of Health and Human Services
HIT	health information technology
HPP	Hospital Preparedness Program

IOM	Institute of Medicine
JPATS	Joint Patient Assessment & Tracking System
MCHM	Methylcyclohexanemethanol
MDH	Minnesota Department of Health
MIC	Medical Intelligence Center
MRC	Medical Reserve Corps
NACCHO	National Association of County and City Health Officials
NBEOC	National Business Emergency Operations Center
NEN	Neighborhood Empowerment Network
NGO	nongovernmental organization
NHSPI	National Health Security Preparedness Index
NIEHS	National Institute of Environmental Health Sciences
NTL	nurse triage line
OEMC	Office of Emergency Management and Communication
ONC	Office of the National Coordinator (HHS)
PHEP	Public Health Emergency Preparedness
SETRAC	SouthEast Texas Regional Advisory Council
UASI	Urban Area Security Initiative
VOAD	Volunteers Active in Disaster

C

Statement of Task

An ad hoc committee will organize and conduct a series of three regional, public workshops that will explore opportunities to strengthen regional coordination required to ensure effective medical and public health response to a large-scale multi-jurisdictional disaster. Each regional workshop will include discussion of mechanisms to strengthen coordination between multiple jurisdictions in individual regions to ensure fair and equitable treatment of communities from all impacted jurisdictions. In particular, the workshop discussions will explore:

- Lessons learned and best practices from past large-scale disasters, including the creation of local partnerships and agreements.
- Planning strategies that local, state, and national officials use to strengthen regional disaster preparedness for large-scale medical and public health disasters, including
 - Potential challenges associated with mass patient care required in multiple jurisdictions in a single region, including the impact on patient transportation systems;
 - The use of emergency shelters, and specifically the value of medical needs shelters, in ensuring health outcomes; and
 - Ways to ensure consistent standards of care are used throughout a region.
- Planning, guidance, and tools needed at the federal, state, regional, and local levels to support local efforts to establish fair and equitable disaster plans.

The committee will develop the agenda for the workshop sessions, select and invite speakers and discussants, and moderate the discussions. Following each workshop, a brief individually authored workshop summary will be prepared by a designated rapporteur based on the presentations and discussions held during that specific workshop session. In addition, a single individually authored full-length summary of the presentations and discussions at the workshops will be prepared by a designated rapporteur and issued in accordance with institutional policies and procedures.

D

Agendas

<p>Regional Disaster Response Coordination to Support Health Outcomes: A Workshop Series</p>

March 26, 2014
Huntington Room
The Beckman Center
Irvine, CA

8:30 a.m. Welcoming Remarks, Challenges to
Ensuring Health in Regional Disaster
Preparedness: *Community Planning and
Engagement, Information Management and
Coordination, and Surge Management*

W. CRAIG VANDERWAGEN, *Planning Committee
Chair*
Senior Partner
Martin, Blanck & Associates

Session I: Community Planning and Engagement

8:50 a.m. Panel Presentation: Community Planning Across a
Region: Previous Work, Examples of Success and
Continuing Needs to Address Regional Disasters
Versus Local Disasters

Cross-Sector Collaboration:

ANA-MARIE JONES
Executive Director
Collaborating Agencies Responding to Disasters
(CARD)

At-Risk Populations:

TERESA EHNERT
Bureau Chief, Public Health Emergency Preparedness
Arizona Department of Health Services

Engagement of Volunteers in Emergencies:

CAPT. ROBERT TOSATTO
Director
Division of Civilian Volunteer Medical Reserve Corps

Social Capital and Cohesion:

DANIEL ALDRICH
Associate Professor of Political Science
Purdue University

9:50 a.m. Discussion with Panelists and Attendees

10:20 a.m. BREAK

Session II: Breakout Discussions

10:40 a.m. Breakout Discussion by Focus Area

Cross-Sector Collaboration:

Having multiple businesses, government authorities, non-profit governmental organizations (NGOs), and faith-based groups in a community can greatly augment disaster response, but challenges remain in building integrated, coordinated responses across a community, especially when standard memoranda of understanding (MOUs) might not be sufficient, including (1) supply chain interruptions affecting multiple jurisdictions/communities; (2) conveying the need for preparedness by all to engage diverse, cross-sector involvement; and

(3) promoting health security collaborations within and across communities so authorities can “operationalize” a next level of response at the regional level.

Facilitators

ANA-MARIE JONES
Executive Director
Collaborating Agencies Responding to Disasters
(CARD)

LYNNE KIDDER, *Preparedness Forum Co-Chair*
Former President & CEO
The Bipartisan WMD Terrorism Research Center

At-Risk Populations:

Engaging vulnerable and at-risk populations is often a challenge in cities nationwide, but coordinating this engagement across jurisdictions becomes even more difficult: (1) knowledge of medically vulnerable, electricity-dependent citizens is limited and haphazard, and sharing this knowledge is not always possible; (2) citizens receiving social services are often vulnerable in disasters but not included in pre-planning efforts (i.e., child care facilities, foster care programs, homeless youth, refugee populations, low-income families, and seniors) and might not be aware of their need to coordinate across a region; and (3) integrating community health clinic expansion with social service outreach is difficult across community borders/ jurisdictional lines.

Facilitators

TERESA EHNERT
Bureau Chief, Public Health Emergency Preparedness, Arizona Department of Health Services

SUZET MCKINNEY, *Planning Committee*
Deputy Commissioner, Chicago Department of Public Health

Management of Volunteers During Emergencies:

Volunteer networks are essential in disasters and multiple volunteer organizations have built strong response frameworks. However, coordination of these organizations often remains a challenge, especially during responses that span multiple jurisdictions. Some key volunteer management issues include (1) promising practices in the management of volunteers across a region, including credentialing, background checks, initial and ongoing training, and core competencies; (2) coordination for the deployment of volunteers across organizations (e.g., MRC, American Red Cross, VOAD, etc.) and jurisdictions; (3) liability or other risks and barriers that could create difficulties for the use of volunteers for certain missions or regional deployments; and (4) management of spontaneous volunteers during a regional response.

Facilitators

CAPT. ROBERT TOSATTO
Director, Division of Civilian Volunteer Medical
Reserve Corps

JOHN HICK, *Planning Committee*
Medical Director, Office of Emergency Preparedness,
Minnesota Department of Health

Social Capital and Cohesion:

More research and evidence has been emerging to support the need for stronger social cohesion in communities to increase resilience to disasters, but existing challenges are (1) latent social conflicts existing in a region that can hinder network building; (2) difficulty in engaging individual citizens in preparedness activities and the importance of having “citizen responders”; and (3) unique considerations of connecting social capital networks across multiple communities if a disaster occurs affecting an entire region.

Facilitators

DANIEL ALDRICH
Associate Professor of Political Science
Purdue University

KENNETH SCHOR, *Preparedness Forum member*
Acting Director
National Center for Disaster Medicine & Public
Health

12:15 p.m. LUNCH

Session III: Breakouts Continued

1:15 p.m. **Breakout Discussion by Focus Area**

Cross-Sector Collaboration:

Having multiple businesses, government authorities, and NGOs and faith-based groups in a community can greatly augment disaster response, but challenges remain in building integrated, coordinated responses across a community, especially when standard MOUs might not be sufficient, including (1) supply chain interruptions affecting multiple jurisdictions/communities; (2) conveying the need for preparedness by all to engage diverse, cross-sector involvement; and (3) promoting health security collaborations within and across communities so authorities can “operationalize” a next level of response at the regional level.

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Facilitators

DANIEL ALDRICH
 Associate Professor of Political Science
 Purdue University

KENNETH SCHOR, *Preparedness Forum member*
 Acting Director
 National Center for Disaster Medicine & Public
 Health

2:30 p.m.

Group Rotation: Opportunity to give feedback
 to another topic area

- (1) What is missing?
- (2) Added perspective from your
 organization/discipline

Rotations:

Board Room → Huntington Room
Huntington Room → Board Room
Newport Room → Balboa Room
Balboa Room → Newport Room

3:00 p.m. BREAK

Session IV: Wrap Up

3:30 p.m. Final Plenary and Report-Out by Facilitators
Huntington Room

- Cross-Sector Collaboration
- At-Risk Populations
- Management of Volunteers
- Social Capital and Cohesion

4:30 p.m. Wrap-Up Discussion and Next Steps

- What central themes emerged across topics?
 - Top identified challenges?
 - Top identified opportunities?

W. CRAIG VANDERWAGEN, *Planning Committee
Chair*

Senior Partner
Martin, Blanck & Associates

5:00 p.m. ADJOURN

**Regional Disaster Response Coordination
to Support Health Outcomes:
A Workshop Series**

July 24, 2014
Malcolm Moos Health Sciences Tower
University of Minnesota
515 Delaware Street, SE
Minneapolis, MN

8:30 a.m. Welcoming Remarks, Challenges to Ensuring Health
in Regional Disaster Preparedness: *Community Plan-
ning and Engagement, Information Management and
Coordination, and Surge Management*

W. CRAIG VANDERWAGEN, *Planning Committee
Chair*
Senior Partner
Martin, Blanck & Associates

8:40 a.m. Overview: Information and Incident Management

GARY SCHENKEL
Executive Director
Chicago Office of Emergency Management and
Communication

Session I: Case Study Scenarios

Session Objectives:

- Explore pieces of information management during disasters
through various recent case studies
 - Identify gaps that still exist for specific disasters (i.e.,
slow moving, no-notice, natural disaster, etc.)

9:00 a.m. Panel Presentation: Information Sharing and Coordi-
nation Lessons Learned from Past Experiences and
Continuing Needs to Address Regional Disasters
Versus Local Disasters

Hurricane Sandy:

KELLIE BENTZ

Team Lead, Global Crisis Management

Target Corporation

Hurricane Evacuation Response (Katrina, Rita, Ike, Gustav):

MICHAEL MCCLENDON

Director

Office of Public Health Preparedness Emergency

Management Coordinator

Harris County Public Health and Environmental
Health Services

9:45 a.m. Discussion with Attendees

10:00 a.m. BREAK

10:15 a.m. (Panel Continued)

West Virginia Chemical Spill:

RAHUL GUPTA

Executive Director/Health Officer

Kanawha-Charleston Health Department

2009 H1N1 Outbreak (MN):

AARON DEVRIES

Epidemiologist and Medical Director

Infectious Disease Division

Minnesota Department of Health

*Boston Marathon Bombings:*RICHARD SERINO, *Preparedness Forum Member*

Former Deputy Administrator and

Chief Operating Officer

Federal Emergency Management Agency

11:15 a.m. Discussion with Panelists and Attendees

11:45 a.m. LUNCH

Session II: Breakout Discussions

12:45 p.m. Breakout Discussions by Focus Area—Within focus areas discuss and identify 2 to 3 top constraints and opportunities related to each topic area. Discuss potential partnerships to help address challenges.

Information Sharing and Dissemination to Stakeholders:

- Potential for integration of health PIOs into Joint Information Centers
- How does information get to the PIO in each jurisdiction? How is information pushed to stakeholders such as NGOs, FBOs, and health care coalitions assisting in response efforts?
- Private-sector communication spanning jurisdictions (i.e., multiple Targets throughout a region, COCA guidance from CDC)

Facilitators

RAHUL GUPTA
Executive Director/Health Officer
Kanawha-Charleston Health Department

JOHN HICK, *Preparedness Forum Member*
Medical Director for Emergency Preparedness
Hennepin County Medical Center

Using Data to Augment Situational Awareness and Incident Management:

- How can surveillance and information be mined for intelligence to assist in response? How can libraries and information specialists assist in this effort?
- Can informatics support clinical management and “community triage” to lessen surge demands on area hospitals?

- How can non-traditional partners (e.g., sentinel laboratories, librarians, Information Sharing Advisory Councils, and others) be included in data collection and information coordination with public health and emergency management officials?
- How can data and information gathered from shelters be shared and used to inform response?

Facilitators

DAN HANFLING, *Preparedness Forum Member*
Special Advisor, Emergency Preparedness and Response
Inova Health System

RICHARD SERINO, *Preparedness Forum Member*
Former Deputy Administrator and
Chief Operating Officer
Federal Emergency Management Agency

Coordination Within and Across Sectors:

- What are the preferred methods for private sector receiving messages?
- How are 2-1-1 systems, distress hotlines, and librarians coordinated throughout a region?
- How is vertical and horizontal flow of information managed?
 - Two-way communication with and integration of health care systems?
- Facilitation of “net-centric” health care coalition information sharing across regions to inform larger disaster picture and needs
- How to support decision making of policy makers: using information specialists to identify and organize information and multi-agency coordination to synthesize best picture

Facilitators

JOHN OSBORN, *Preparedness Forum Member*
Operations Administrator
Mayo Clinic

MICHAEL MCCLENDON
Director
Office of Public Health Preparedness Emergency
Management Coordinator
Harris County Public Health and Environmental
Health Services

3:00 p.m. BREAK

Session III: Wrap Up

3:15 p.m. Final Plenary and Report Out by Facilitators

4:15 p.m. Wrap-Up Discussion and Next Steps

- What central themes emerged across topics?
 - Top identified challenges?
 - Top identified opportunities?

W. CRAIG VANDERWAGEN, *Planning Committee*
Chair
Senior Partner
Martin, Blanck & Associates

4:45 p.m. ADJOURN

**Regional Disaster Response Coordination
to Support Health Outcomes:
A Workshop Series**

November 15, 2014
Grand Salon 12
Hilton New Orleans Riverside
2 Poydras Street, New Orleans, LA

8:30 a.m. Welcoming Remarks, Challenges to Ensuring Health in
Regional Disaster Preparedness: *Community Planning
and Engagement, Information Management and Coordination, and Surge Management*

W. CRAIG VANDERWAGEN, *Planning Committee
Chair*
Senior Partner
Martin, Blanck & Associates

8:40 a.m. Overview

Session I: Case Study Scenarios

Session Objectives:

- Explore pieces of information management during disasters through various recent case studies
 - Identify gaps that still exist for specific disasters (i.e., slow moving, no-notice, natural disaster, etc.)

9:00 a.m. Panel Presentation: Surge Management Coordination
Lessons Learned from Past Experiences

Evacuation/Tracking of Patients:
LORI UPTON
Regional Director of Emergency Management
Operations
SouthEast Texas Regional Advisory Council

*Surge Capacity of Public Health and
Human Services:*

MONIQUE DAVIS
Hudson Regional Health Commission
New Jersey

*Lessons Learned in Coordination of Community
Response:*

ROSANNE PRATS
Executive Director, Emergency Preparedness
Louisiana Department of Health and Hospitals

- 11:15 a.m. Discussion with Panelists and Attendees
- 11:45 a.m. Tabletop Scenario Overview
- 12:00 p.m. LUNCH

Session II: Breakout Discussions

- 12:45 p.m. Breakout Discussions by Focus Area

Patient Evacuation and Tracking

- How is this coordinated across state/regional EMS/pre-hospital providers?
 - For patients' evacuated pre-storm, how are they tracked to their new destination?
- Are certain hospitals in a region pre-identified for certain types of patients (i.e., infectious disease, burn, trauma, pediatric)?
 - How are "specialty care" transfers managed?
- How are pre-hospital patient information systems able to communicate?
 - How are pre-hospital patient systems able to integrate into standard EHRs in a region?

Facilitators

JOLENE WHITNEY
Specialty Care Program Manager
Bureau of EMS and Preparedness
Utah State Health Department

LORI UPTON
Director of Preparedness
SouthEast Texas Regional Advisory Council

Surge Capacity and Community Resilience

- How is the “surge of public health and human services” managed?
 - Can public health surge (i.e., mental health/social services, medical sheltering, mortuary services, environmental surveillance, health transportation) help to alleviate clinical surge issues?
- How can you “surge” to strengthen community resilience?
 - What processes are built into communities?
 - What regional services can be anticipated and addressed to keep people out of the hospitals?
- Are there possibilities for increasing surge capacity in the region through new models of integrated/team-based care and home health support?

Facilitators

UMAIR SHAH
Director
Harris County Public Health and Environmental Services

ANDREW STEVERMER
Regional Emergency Coordinator
Office of the Assistant Secretary for Preparedness and Response
U.S. Department of Health and Human Services

Coordination of All Community Groups Engaged in Emergency Planning (coalitions, schools, NGOs, etc.)

- How are these entities coordinated at state and regional levels?
 - Who is overseeing coordination of grass-roots/community groups?
 - What challenges arise for regions that cross state lines?
- Who is the lead during a medical or public health surge response?
 - Where do these community groups fit into a unified command system?
- What lessons have been learned in regional disasters (e.g., Sandy, the Gulf)?
 - How are new “players” integrated into structure (e.g., child task forces in MO, NJ, and NY)?

Facilitators

JOHN HICK, *Preparedness Forum Member*
 Medical Director for Emergency Preparedness
 Hennepin County Medical
 Center, Minnesota

ROSANNE PRATS
 Executive Director
 Emergency Preparedness
 Louisiana Department of Health and Hospitals

3:00 p.m. BREAK

Session III: Wrap-Up

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W. CRAIG VANDERWAGEN, *Planning Committee*
Chair
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Martin, Blanck & Associates

4:45 p.m. ADJOURN

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Biographical Sketches of Invited Speakers and Panelists

W. Craig Vanderwagen, M.D., RADM, USPHS (*Workshop Chair*) is a Senior Partner with Martin, Blanck & Associates and joined the firm in November 2009. From August 2006 until July 2009, he was the founding Assistant Secretary for Preparedness and Response (ASPR), U.S. Department of Health and Human Services (HHS). In this role, Dr. Vanderwagen was responsible for the leadership and development of a new organization whose mission was to prepare the nation for response and recovery from public health and other health disasters, whether natural or manmade. The organization was initiated after Hurricane Katrina and formalized after the passage of the Pandemic and All Hazards Preparedness Act. Dr. Vanderwagen had a distinguished 28-year career in public service as a commissioned officer in the U.S. Public Health Service (USPHS). Before becoming Assistant Secretary, he deployed multiple times to disaster environments, including serving in Louisiana after Hurricane Katrina in 2005. He also served as lead public health official and senior officer aboard the USNS Mercy in Indonesia after the tsunami in 2005; Director of Primary Care and Public Health for the Ministry of Health in Iraq from September 2003 to March 2004; consultant to the Pan American Health Organization in Honduras after Hurricane Mitch in 1999; and Medical Director for Project Provide Refuge (joint Department of Defense and HHS Kosovar refugee assistance) in 1999. Dr. Vanderwagen's deployments were in addition to his duties in the USPHS, where he retired as the agency's Chief Medical Officer after 25 years of service. During his career with the Indian Health Service, he provided leadership in the uses of electronic health records, and implementation of the use of best practices to combat chronic diseases. He was an early supporter of and the agency's lead negotiator

for a majority of the early Self Governance Compacts. Dr. Vanderwagen serves on multiple boards of directors covering infectious diseases, disaster medicine, and public health preparedness. He is also an advisor to the International Federation of Biosafety Associations. He received a B.S. from Calvin College and an M.D. from Michigan State University College of Human Medicine.

Daniel P. Aldrich, M.A., Ph.D., is Associate Professor and University Scholar at Purdue University, which he joined in 2008. Dr. Aldrich received his M.A. and Ph.D. in Political Science from Harvard University, an M.A. from the University of California, Berkeley, and his B.A. from the University of North Carolina at Chapel Hill. Dr. Aldrich has authored and/or edited three books (*Site Fights* from Cornell University Press, *Building Resilience* from the University of Chicago Press, and *Resilience and Recovery* from Springer Press) along with more than 60 peer-reviewed articles, reviews, and OpEds in media outlets such as *The New York Times*, CNN, and the *Asahi Shinbun*. He has been a visiting scholar at the Japanese Ministry of Finance, the Institute for Social Science at Tokyo University, Harvard University, the Tata Institute for Social Science in Mumbai, the Institut d'études politiques de Paris (Sciences Po), and the East West Center in Honolulu, Hawaii. He has spent more than 4 years conducting fieldwork in Japan, India, and France.

Kellie Bentz currently leads a team of specialists within the Global Crisis Management program at Target that develops and manages the crisis response plans, exercise plans, and special event monitoring enterprise-wide. Prior to accepting this role in July 2013, Ms. Benz was the Senior Director of Disaster Services at Points of Light. In this role, she led the strategy and execution for Points of Light's global disaster services portfolio across the organization in preparedness, response, and recovery. She responded to disasters ranging from the 2011 Japan tsunami and earthquake to Superstorm Sandy to the Moore, Oklahoma tornadoes. Ms. Benz was chair of the Volunteer Management Committee for the National Organizations Active in Disaster. She started her career in crisis management with HandsOn Network in New Orleans following Hurricane Katrina. As the project matured into a local organization, Ms. Benz became the founding Executive Director of what is now HandsOn New Orleans. In addition, while in New Orleans, she served on multiple advisory boards, including the Greater New Orleans Kids Partnership,

Social Entrepreneurs of New Orleans, and as Vice President of Louisiana Volunteer Organizations Active in Disaster during Hurricanes Gustav and Ike. Her most recent academic achievement was graduating from the Harvard National Preparedness Leadership Initiative Certificate Program in 2012. She graduated from the College of Charleston and in 2011 received the Alumni of the Year award for her contributions in the disaster philanthropy space.

Monique Davis, M.P.H., MCHES, CCPH, is a Health Educator/Risk Communicator/Planner for the Hudson LINCS Public Health Emergency Preparedness Team since 2003. In this role, Ms. Davis contributes to the overall planning for public health emergencies with partner agencies for the preparation for, mitigation of, response to, and recovery from such emergencies, naturally occurring disease outbreaks, and other disasters, including weather-related events. Ms. Davis also develops and conducts trainings related to public health emergency preparedness for various populations including community members, businesses, health care professionals and the academic community. She is the designated Risk Communicator at Hudson Regional Health Commission, and in that role she works closely with the state and county Public Information Officers to craft and disseminate timely and accurate health messages. Ms. Davis chairs Hudson County's Medical Needs Shelter Steering Committee, and is an active member of the Northeast (New Jersey) Healthcare Coalition, the Northern Urban Area Security Initiative (UASI) Public Health Subcommittee, and the Northeast Region Public Health Emergency Preparedness Workgroup. Additionally, Ms. Davis is a member of the Executive Board of the National Public Health Information Coalition since 2010 (member since 2006), and a member of the New Jersey Society of Public Health Educators since 1984. She is also a member of the Communications Workgroup for the Public Health Accreditation Board. Prior to her role at Hudson Regional Health Commission, Ms. Davis worked as a health educator at a mid-sized community-based hospital, and as a consultant to local health departments for 10 years. She holds a Health Officer's License in the state of New Jersey, is a Master Certified Health Education Specialist, and a Certified Communicator in Public Health. Ms. Davis graduated from Rutgers University with a B.S., and holds a Master's in Public Health from Rutgers University Graduate Program in Public Health/Robert Wood Johnson Medical School/UMDNJ.

Aaron DeVries M.D., M.P.H., FIDSA, is the Medical Director of the Infectious Disease Epidemiology, Prevention, and Control Division at the Minnesota Department of Health (MDH). In this role he provides leadership in infectious disease investigations, policy development, and public health preparedness activities, and consults on infectious disease issues throughout MDH. Among his many past activities, Dr. DeVries led the development and implementation of a statewide nurse triage line servicing all Minnesotans during the 2009 H1N1 pandemic. He is an Adjunct Assistant Professor at the University of Minnesota in the Department of Medicine and the School of Public Health. He provides clinical care to patients with HIV and persons who have been sexually assaulted in his position at Health Partners Specialty Center in St. Paul, MN. After receiving a B.S. from Calvin College and an M.D. from Vanderbilt University, Dr. DeVries completed a combined Internal Medicine/Pediatrics Residency, Infectious Disease Fellowship, and an M.P.H. at the University of Minnesota. Dr. DeVries was deployed to Louisiana in 2005 after Hurricane Katrina and during Hurricane Rita as part of a Medical Reserve Corps unit.

Teresa Ehnert joined the Arizona Department of Health Services in 2005. Her primary responsibility as Bureau Chief of Public Health Emergency Preparedness is to direct the overall planning, development, implementation, coordination, and evaluation of the programs for Public Health Emergency Preparedness. She also serves as the Department's Continuity of Operations Coordinator. Ms. Ehnert is responsible for coordinating state and regional planning committees on preparedness activities with Local Health Officers, Indian Health Services, Tribes, County Health, Hospitals, Community Health Centers, Poison Control, and many emergency response partners. She facilitates programs designed to enhance planning and response to public health emergencies. Ms. Ehnert also provides oversight and leadership for implementation and monitoring of work plans, budgets, and deliverables for two public health preparedness grants exceeding \$20 million. Prior to her role at the Department of Health Services, she was a Chief Master Sergeant in the Air Force completing a career of nearly 27 years. Ms. Ehnert has a Master's in Management from the University of Mary in Fargo, North Dakota.

Rahul Gupta, M.D., M.P.H., FACP, serves as the Health Officer and Executive Director at Kanawha-Charleston and Putnam County Health Departments in West Virginia. He is a clinical Assistant Professor of

Medicine at West Virginia University School of Medicine and adjunct Associate Professor at University of Charleston's School of Pharmacy. Additionally, he serves on the medical consulting staff at Charleston Area Medical Center and Health Right clinic. Dr. Gupta works with various health care and public health organizations at state, national, and international levels to develop, integrate, and measure adherence to various public health initiatives, including those for the underserved and indigent population. Such initiatives are wide ranging from immunization initiatives and reduction of heart disease, stroke, and pneumonia related morbidity and mortality. He serves on the expert panel at the Institute for Health Metrics and Evaluation to measure the Global Burden of Disease. During his career, Dr. Gupta's work has ranged from helping to initiate the first Pulse Polio campaign in Delhi in 1994, which led to the eventual eradication of the disease in India, to providing expertise and assistance in helping West Virginia University to obtain funding and establish its first School of Public Health. In 2012, he provided compiled reports and other support to the West Virginia legislature to enable the passage of legislation creating the Herbert Henderson Office of Minority Affairs, the first office of its kind in the history of the state. In 2013, he assisted in leading a statewide grassroots effort to persuade the Governor to announce support for Medicaid expansion in West Virginia. Dr. Gupta earned an M.D. and subspecialty diploma in pulmonary medicine from University of Delhi. He completed his internship and residency training at St. Joseph Hospital/Northwestern University. Additionally, he earned an M.P.H. in health care organization and policy from the University of Alabama, Birmingham and is a recipient of a fellowship from the American College of Physicians. Dr. Gupta is board certified by the American Board of Internal Medicine. He currently serves on the Board of Directors and the Executive Committee of the National Association of County and City Health Officials (NACCHO). Additionally, he serves on several editorial boards and as a peer reviewer for medicine and public health journals, having authored more than 100 scientific publications. He has been a principal investigator for numerous well-known clinical trials. As a faculty member, he has received numerous teaching and other awards and is a member of the Alpha Omega Alpha Medical Honor Society. Dr. Gupta is the 2013 Marie Fallon award recipient for public health leadership from the National Association for Local Boards of Health. During the 2014

legislative session, the West Virginia Senate unanimously passed Senate Resolution 54 recognizing Dr. Gupta's various contributions to public health.

Dan Hanfling, M.D., is special advisor to the Inova Health System in Falls Church, Virginia, on matters related to emergency preparedness and disaster response. He is a board certified emergency physician practicing at Inova Fairfax Hospital, Northern Virginia's Level I trauma center. He serves as an Operational Medical Director for PHI Air Medical, a helicopter emergency medical services (EMS) transport agency, and has responsibilities as a Medical Team Manager for Virginia Task Force One, a Federal Emergency Management Agency (FEMA) and U.S. Agency for International Development (USAID) sanctioned international urban search and rescue team. He has been involved in the response to numerous international and domestic disaster events. He was also integrally involved in the management of the response to the anthrax bioterror mailings, when two cases of inhalational anthrax were successfully diagnosed at Inova Fairfax. Dr. Hanfling recently served as Vice Chair of the Institute of Medicine (IOM) Committee on Establishing Guidelines for Standards of Care During Disasters, and has authored and co-authored many articles on subjects related to hospital preparedness and response, surge capacity development, and crisis standards of care. Dr. Hanfling received an A.B. in political science from Duke University and was awarded his M.D. from Brown University. He completed an internship in Internal Medicine at the Miriam Hospital in Providence, Rhode Island, and an Emergency Medicine Residency at George Washington/Georgetown University Hospitals. He is Clinical Professor of Emergency Medicine at George Washington University, Contributing Scholar at the UPMC Center for Health Security and adjunct faculty of the George Mason University School of Public Policy, Office of International Medical Policy.

John Hick, M.D., is a faculty emergency physician at Hennepin County Medical Center (HCMC) and an associate professor of emergency medicine at the University of Minnesota. He serves as the associate medical director for Hennepin County emergency medical services and medical director for emergency preparedness at HCMC. He is medical advisor to the Minneapolis/St. Paul Metropolitan Medical Response System. He also serves the Minnesota Department of Health as the medical director for the Office of Emergency Preparedness and medical

director for Hospital Bioterrorism Preparedness. He is the founder and past chair of the Minneapolis/St. Paul Metropolitan Hospital Compact, a 29-hospital mutual aid and planning group active since 2002. He is involved at many levels of planning for surge capacity and adjusted standards of care and traveled to Greece to assist in health care system preparations for the 2004 Summer Olympics as part of a 15-member team from the Centers for Disease Control and Prevention (CDC) and HHS. He is a national speaker on hospital preparedness issues and has published numerous papers dealing with hospital preparedness for contaminated casualties, personal protective equipment, and surge capacity.

Ana-Marie Jones is the Executive Director of CARD (Collaborating Agencies Responding to Disasters), a nonprofit created by local community agencies after the 1989 Loma Prieta earthquake. Under her leadership, CARD has developed an alternative approach to emergency preparedness, disaster response, and continuity planning activities. Incorporating research from diverse fields, including adult learning, brain function, advertising and marketing, past disasters, and social change, CARD's curriculum successfully de-emphasizes "disasters" and "emergencies" as the impetus for action. Before joining CARD in 2000, Ms. Jones worked for the California Governor's Office of Emergency Services, managing projects supporting nonprofits and access and functional needs issues. She was also the acting Executive Director of the Northern California Disaster Preparedness Network, a 5-year funding initiative designed to address emergency preparedness and disaster response for agencies serving multi-ethnic, at-risk, and other diverse communities. The Japanese Central Government has twice brought Ms. Jones to Japan to share her approach with government, emergency management, university, and nonprofit leaders. In 2005 she joined the faculty at University of California, Berkeley, as a guest lecturer, and her written works have been published in the United Kingdom and in the United States. Over the past several years she has won three cable television Telly Awards. She is one of seven people recognized for innovations in emergency management in FEMA's 2013 Strategic Foresight Initiative, under "Big Issues. Strong Leaders. Bold Action." In 2013 she was also inducted into the International Women in Homeland Security and Emergency Management Hall of Fame. She is a graduate of EuroCentro-Firenze, in Florence, Italy, and she was the elected Team

Leader of the San Francisco Team Management and Leadership Program (a graduate program of Landmark Education LLC) during 9/11.

Lynne Kidder, M.A. (*Preparedness Forum Co-Chair*), is a Boulder, Colorado-based consultant and the former President and CEO of the Bipartisan WMD Terrorism Research Center (the WMD Center). The WMD Center is a not-for-profit research and educational organization founded by former Senators Bob Graham and Jim Talent at the conclusion of the Congressional Commission on the Prevention of Weapons of Mass Destruction, Proliferation, and Terrorism. She remains a member of its Board of Directors. Ms. Kidder was the principal investigator for the WMD Center's 2011 Bio-Response Report Card, designed to promote a wider understanding of the unique threats and challenges of bioterrorism and the actions required for effective response to either deliberate or naturally occurring biological disasters. Ms. Kidder has served as a Senior Advisor to the Center for Excellence in Disaster Management and Humanitarian Assistance, a Department of Defense organization based at U.S. Pacific Command that provides training to enhance civil military, inter-agency, and nongovernmental organization coordination during international disaster response. From 2005 to 2010, she was Senior Vice President at Business Executives for National Security, where she led the development and nationwide implementation of programs to facilitate resilience-focused public private collaboration. Ms. Kidder's other professional experience includes executive-level management in state government, corporate government affairs, and 8 years as professional staff in the U.S. Senate. She also served for 5 years as executive director of the nonprofit North Bay Leadership Council, in Northern California, and was credited with leading numerous regional initiatives among private employers, public officials, and other civic leaders. She holds a B.A. from Indiana University, an M.A. from the University of Texas at Austin, and did postgraduate study in public administration at George Mason University.

Michael "Mac" McClendon joined the Harris County Public Health and Environmental Services (HCPHES) in Texas in 2005 as Emergency Management Coordinator. In 2006 he was named Chief of the Office of Public Health Preparedness and in March 2007 was named Director. Mr. McClendon is responsible for all hazard planning and response to public health emergencies. He is also experienced in developing and implementing emergency preparedness plans within the all-hazards framework

and represents public health on many local, state, and federal planning committees. He was formerly the Emergency Response Chief for a major chemical manufacturer and has more than 26 years of experience in emergency response and management, including fire, heavy rescue, hazardous materials and EMS. Mr. McClendon currently chairs the NACCHO Preparedness Policy Advisory Group and serves on the NACCHO Incident Management working group. He also serves on the Association of State and Territorial Health Officials/NACCHO national Health Security Preparedness Index steering committee. He is a member of the Texas Task Force One Urban Search and Rescue Team, for which he serves as a Task Force Safety Officer and is also a member of the State of Texas Region 2 Type 3 Incident Management Team. He also served on the State of Texas Incident Management Team (IMT) Steering Committee representing Emergency Support Function 8. He is also an adjunct instructor for the Texas A&M Texas Engineering Extension Service Urban Search and Rescue (US&R) Preparedness & Response Division. He has also responded to many local, state, and federal disasters, including the Texas US&R Texas A&M bonfire collapse, multiple Texas flooding incidents, Hurricane Dennis, 9/11 at the World Trade Center, Texas US&R World Series State deployment Houston, Hurricane Katrina Mega Shelter Operation Reliant Park unified command, HCPHES hepatitis A mass vaccination response in Houston/Harris County, HCPHES/CDC joint salmonella investigation and response Houston/Harris County, HCPHES Hurricane Ike response, recovery, and the Novel H1N1 influenza response.

Suzet M. McKinney, Dr.P.H., M.P.H., currently serves as Deputy Commissioner of the Bureau of Public Health Preparedness and Emergency Response at the Chicago Department of Public Health (CDPH), where she oversees the emergency preparedness efforts for the Department, coordinating those efforts within the larger spectrum of the City of Chicago's Public Safety activities. Dr. McKinney also oversees the CDPH Division of Women & Children's Health and is the former senior advisor for Public Health and Preparedness at the Tauri Group, where she provided strategic and analytical consulting services to the U.S. Department of Homeland Security (DHS), BioWatch Program, including creative, responsive, and operationally-based problem-solving for public health, emergency preparedness, and homeland security issues, specifically chemical and biological early detection systems and the implementation of those systems at the state and local levels. She serves

as Incident Commander for CDPH and is a member of Chicago's Incident Management Team. In academia, Dr. McKinney serves as Adjunct Assistant Professor of Community Health Sciences at the University of Illinois at Chicago School of Public Health and as the Coordinator of the School's Online Emergency Preparedness Certificate Program. She also serves as a mentor for the Biomedical Sciences Careers Project at Harvard University, as well as the National Preparedness Leadership Initiative Executive Education Program at Harvard University. Dr. McKinney holds her Doctorate from the University of Illinois at Chicago School of Public Health, a Master of Public Health degree from Benedictine University in Lisle, Illinois, and a B.A. in Biology from Brandeis University (Waltham, Massachusetts).

John Osborn, M.Sc., is operations administrator in the Department of Practice Administration at Mayo Clinic in Rochester, Minnesota, supporting the Mayo Clinic Care Network and affiliated practices. He is responsible for practice and business development nationwide, and provides strategic leadership for e-health products and services. Prior to this assignment, he was operations manager for general and trauma surgery in the Department of Surgery, and administrator of the Mayo Clinic Level 1 Trauma and Level 1 Pediatric Trauma Centers. He has been with Mayo Clinic since 2004. Mr. Osborn also serves as the lead administrator for mass casualty incident planning and response for Mayo Clinic, and is the administrator for business continuity within the affiliated practices. He is currently assistant professor of health care systems engineering in the Mayo Clinic College of Medicine. He is an active member of several national organizations, serving on the boards of directors of the Trauma Center Association of America and the Association of Academic Surgical Administrators. He is also a member of the Sector Coordinating Council for health care and public health within the Critical Infrastructure Protection Advisory Committee system, and the Editorial Board of the *American Journal of Disaster Medicine*. Mr. Osborn received a B.A. in Political Science from the University of Notre Dame and an M.Sc. in Decision Sciences from the London School of Economics and Political Science.

Rosanne Prats, Sc.D., M.H.A., works for the Department of Health & Hospitals (DHH) as the executive director of emergency preparedness. She received her doctorate at Tulane University. She came to DHH with health care work experience in the federal, state, and private sectors. Dr.

Prats's work experience includes several years of working for the federal government in Information Technology Services as a program manager and computer specialist. While pursuing her M.H.A. at Tulane University, she held a residency position at DHH's Office of Public Health. She was a key player in developing the Louisiana Public Health Institute, a nonprofit entrepreneurial vehicle through which the promotion of public health activities could be furthered. In 1997, she was recruited to work in the private sector for the largest private hospital system, Columbia/HCA. As one of four consultants, she developed, interpreted, and evaluated market demographics and competitor analyses to determine strategic placement of clinics primarily in the Arkansas, Florida, and Louisiana markets. In 1997, Dr. Prats was recruited to work with Columbia/HCA's Legal Department to develop the Compliance Department for the company. In 1999, Dr. Prats returned to Louisiana to assist the State Health Officer in developing and implementing DHH's Emergency Preparedness Disaster Plan. This current position involves coordinating among local, state, and federal agencies.

Gary W. Schenkel, M.P.A., is executive director of the Chicago Office of Emergency Management and Communications (OEMC). He has led at the most senior level in the U.S. Department of Defense, a major metropolitan police department, and in federal law enforcement. Prior to becoming director of OEMC, he served as Acting Assistant Secretary for DHS, Office of State and Local Law Enforcement. He was assigned to that post after having served as director of the Federal Protective Service (FPS), the national law enforcement agency responsible for the security of federal facilities throughout the United States from 2007 through 2010. A retired Marine Corps Lieutenant Colonel, Mr. Schenkel has significant leadership experience in a wide range of areas, including law enforcement, organizational structuring and transformation efforts, security planning for public and private facilities, logistical planning and execution, and business administration. Throughout his career, he has established excellent relationships with stakeholders, partners, and clients and has a clear understanding of the place security holds in the flow of commerce. Prior to leading FPS, Mr. Schenkel served as assistant federal security director for the Transportation Security Administration (TSA) at Chicago Midway Airport. Before joining TSA, Mr. Schenkel served as acting deputy superintendent and assistant deputy superintendent of the Chicago Police Department, the nation's second largest police force, where he was one of only two civilians in the

department's history to be given operational command over uniformed officers. He headed the department's antiterrorism efforts following the 9/11 attacks. Mr. Schenkel is a 29-year veteran of the U.S. Marine Corps, serving in both enlisted and officer grades, retiring as a Lieutenant Colonel in 2000. In his three decades of service, he garnered significant leadership experience, including command of a 1,200-man company during combat operations in Desert Storm in 1991. In addition, he developed nuclear response plans and executed various logistical projects, including what was then the largest single movement of nuclear weapons in U.S. history. Prior to retiring from the Marine Corps, Mr. Schenkel served as Operations Officer at the Marine Corps Warfighting Lab in Quantico, Virginia, where he focused on long-range planning related to urban combat and the Marine mission in the 21st century. Mr. Schenkel is a graduate of Lindenwood College in St. Charles, Missouri, and California State University in Hayward, California.

Kenneth W. Schor, D.O., M.P.H., M.S., is a federal civilian faculty member of the Uniformed Services University of the Health Sciences (USU), serving as the acting director of the National Center for Disaster Medicine and Public Health. He retired as a Captain (O-6 rank) in the U.S. Navy Medical Corps in 2009 after nearly 27 years of active duty service. He holds a faculty appointment as assistant professor, Department of Preventive Medicine and Biometrics. Academic credentials include a B.A., cum laude, Allegheny College; a D.O., Philadelphia College of Osteopathic Medicine; an M.S. (National Resources Strategy), Distinguished Graduate, National Defense University Industrial College of the Armed Forces; and an M.P.H., USU. Graduate medical education includes Non-categorical Medicine Internship, Naval Medical Center, San Diego; Family Practice Residency, Naval Hospital, Jacksonville; and General Preventive Medicine Residency, USU. He is a Diplomate of the American Board of Preventive Medicine and remains Board Eligible in Family Medicine. Dr. Schor's final four duty stations include USU as associate program director of general preventive medicine residency; medical director for humanitarian assistance, disaster response, and international health policy for the Deputy Assistant Secretary of Defense for Stability Operations, Pentagon; preventive medicine officer for Headquarters, U.S. Marine Corps; and amphibious task force surgeon and officer-in-charge of Fleet Surgical Team 6. His personal military awards include the Defense Superior Services Medal, the Legion of Merit, the Defense

Meritorious Service Medal, the Navy and Marine Corps Meritorious Service Medal, the Joint Service Commendation Medal, the Navy and Marine Corps Commendation Medal, and two awards of the Navy and Marine Corps Achievement Medal.

Richard Serino was recently named a Distinguished Visiting Fellow at Harvard School of Public Health, National Preparedness Leadership Initiative. Mr. Serino was appointed by President Obama and confirmed by the Senate as FEMA's Eighth Deputy Administrator in 2009 and served until 2014. Previously, he was as chief of Boston EMS and assistant director of the Boston Public Health Commission. During his time at FEMA, Mr. Serino traveled to more than 60 disasters nationwide to hear directly from survivors and build relationships with whole community partners. He saw flooding throughout the Midwest, fires in Colorado and Texas, tornadoes that devastated Joplin, Missouri, tsunami destruction in American Samoa, and hurricane-stricken areas in the south and along the east coast, including Hurricanes Irene, Isaac, and Sandy. During Mr. Serino's time at FEMA he led the Whole Community and Survivor-centric themes at FEMA and throughout emergency management. The improvements he championed were focused on emphasizing financial accountability, improving the use of analytics to drive decisions, advancing the workforce, and fostering a culture of innovation. Under Mr. Serino's leadership, FEMA has started initiatives such as FEMA Corps, FEMA Stat, the FEMA Think Tank, a detailed budgetary process, and a Disaster Workforce and Workplace Transformation. While serving as Chief, Mr. Serino served as Incident Commander for more than 35 mass casualty incidents and for all of Boston's major planned events, including the Boston Marathon, Boston's Fourth of July celebration, First Night, and the 2004 Democratic National Convention. Mr. Serino attended Harvard University's Kennedy School of Government Senior Executives in State and Local Government program in 2000, completed the Kennedy School's National Preparedness Leadership Initiative in 2005, and graduated from the Executive Leadership Program, Center for Homeland Defense and Security at the Naval Postgraduate School. Mr. Serino has received numerous local, national, and international awards for heroism, leadership, and innovation.

Umair A. Shah, M.D., M.P.H., was appointed in 2013 as the Harris County Public Health and Environmental Services executive director and

the local health authority for Harris County, Texas, the third most populous county in the United States. Previously, Dr. Shah had served as HCPHES deputy director and its director of disease control and clinical prevention since 2004. Prior to joining HCPHES, he was chief medical officer at Galveston County Health District and since 1999 an emergency department physician at Houston's Michael E. DeBakey VA Medical Center. He earned his B.A. in Philosophy from Vanderbilt University; his M.D. from the University of Toledo Health Science Center; and his Internal Medicine residency, a Primary Care/General Medicine Fellowship, and his M.P.H. from the University of Texas Health Science Center. In addition to completing an international health policy internship at the World Health Organization in Geneva, Switzerland, he has provided leadership through the American Public Health Association, CDC, the IOM, and NACCHO. Dr. Shah currently serves on NACCHO's board of directors. His numerous large-scale emergency response roles have involved Tropical Storm Allison; Hurricanes Katrina, Rita, and Ike; novel H1N1; and earthquakes in Kashmir and Haiti. His focus areas include population health, wellness, and prevention; health "innovation" technology; health care management; global/refugee health; health equity; and community/stakeholder engagement. He remains engaged in clinical patient care and academic teaching, and is actively involved in the local community.

Andrew Stevermer, M.S.N., is a regional emergency coordinator with ASPR. He has promoted regional emergency preparedness since 2000 through work with the Office of Emergency Preparedness, FEMA, CDC, and ASPR. He had a 31-year career as a commissioned officer in the USPHS, working in a variety of health programs as a nurse practitioner, program manager, and consultant to many Indian Health Service and Health Resources and Services Administration (HRSA) programs. From 2009 to 2011, he served as a liaison officer between ASPR and the Public Health Agency of Canada to promote collaboration between the United States and Canada on emergency preparedness and response activities. He has participated in leadership roles in many domestic and international disaster responses. He received a B.S.N. from the University of Minnesota, and an M.S. in Nursing with specialization as a Family Nurse Practitioner from the University of Washington.

Captain Rob Tosatto, M.P.H., M.B.A., serves as director of the Division of the Civilian Volunteer Medical Reserve Corps at HHS. He is

the principal advisor to the U.S. Surgeon General, the Assistant Secretary for Health, and the Assistant Secretary for Preparedness and Response on issues of civilian volunteers and their participation in public health initiatives and emergency preparedness/response activities. He is a strong advocate for reducing disaster risk, building community resilience, and engaging young members of our society in these efforts. He is directly responsible for overseeing the establishment, implementation, and coordination of Medical Reserve Corps units in communities nationwide. Captain Tosatto has been a USPHS officer since 1988, and has completed tours of duty with the Office of Global Health Affairs, the Substance Abuse and Mental Health Services Administration, and the Indian Health Service, including assignments on the Navajo, Fort Hall, and Pine Ridge reservations. He has been deployed on numerous occasions, including response missions following the anthrax mailings in 2001, Hurricane Katrina, and several humanitarian and national special security events. He holds an R.Ph. (bachelor's degree) from the University of Pittsburgh School of Pharmacy and master's degrees in both Public Health and Business Administration from the University of Alabama, Birmingham.

Lori Upton, M.S., CEM, is the director of regional preparedness for SouthEast Texas Regional Advisory Council. Ms. Upton has extensive clinical experience in emergency and trauma nursing. She authored several peer-reviewed articles on medical components of disaster response and planning, and she authored the Disaster Chapter of *Emergency Nurses Pediatric Course*, 4th edition. She speaks nationally and internationally on coalition building, and developing and integrating medical disaster planning and response. Her expertise has been deployed on federal and state incidents, including Hurricane Andrew and 9/11, and she served as medical operations chief for Hurricanes Katrina, Rita, Gustav, and Ike. Ms. Upton has served on local, state, and national committees including the IOM, the Governor's Emergency and Trauma Advisory Council, Department of State Health Services Preparedness Coordinating Council, and the UASI Health and Medical Committee. She has B.S.N. and M.S. degrees and she is a Certified Emergency Manager.

Jolene R. Whitney, M.P.A., is deputy director for the Bureau of EMS and Preparedness, Utah Department of Health. She supervises 24 staff performing various functions related to EMS and trauma system

development (including stroke and STEMI), chemical stockpile emergency preparedness, surge capacity and MCI Planning, ED, trauma and prehospital patient care databases, EMS licensing and operations, EMS certification and testing, critical incident stress management, national disaster medical system, EMS medical disaster resources, EMS grants program, and the EMS for Children program. Ms. Whitney has worked with the Bureau for more than 33 years. She co-chaired a task force that developed one of the first set of air ambulance regulations in the country. Ms. Whitney earned her M.P.A. from Brigham Young University and a B.S. in Health Sciences, with an emphasis in Community Health Education, from the University of Utah. She was certified as an EMT-Basic in 1979 and obtained certification as an EMT instructor and EMT III (Intermediate) in 1983. She is co-author of six publications pertaining to domestic violence, preventable trauma mortality, Western state rural care challenges, and state and hospital surge capacity planning. Ms. Whitney has served on national assessment teams, which include state EMS system assessments for National Highway Traffic Safety Administration (NHTSA), and American College of Surgeons trauma system assessments. She served as a HRSA rural trauma grant reviewer and contributor to the development of the HRSA model trauma system plan, the National Association of State EMS Officials (NASEMSO) trauma system planning guide, National Trauma Data Standards, and the NHTSA curriculum for the EMT refresher course. She served as chair and vice chair for the National Council of State Trauma System Managers/NASEMSO for 5 years. She also served on the NASEMSO Highway Information and Transportation Committee and assisted in the development of the Emergency Response Readiness Assessment and the corresponding data model. She is a member of the American Trauma Society and Utah Emergency Managers Association. Ms. Whitney spent 250 hours in the Olympic Command Center, serving as a hospital liaison for the Utah Department of Health during the 2002 Winter Olympics in Salt Lake City. She recently served on the IOM Crisis Standards of Care Committee and helped to craft the EMS section of *A Systems Framework for Catastrophic Disaster Response*. She chaired the planning committee for the IOM Preparedness and Response to a Rural Mass Casualty Incident Workshop. In 2013, she served once again on the IOM Crisis Standards of Care Committee and helped craft the *Crisis Standards of Care: A Toolkit for Indicators and Triggers*.

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Speakers and Registered Attendees

Workshop #1: Community Planning and Engagement Irvine, CA

Daniel Aldrich
Purdue University

Faisal Almazroua
University of California, Irvine

Bruce Altevogt
Institute of Medicine

Lisa Austin
United Way World

Dee Ann Bagwell
Los Angeles County,
Department of Public Health,
Emergency Preparedness

Paul Barach
University Cork College,
Ireland

Laura Billon
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Berninia Bradley
Center for Disaster Medical
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Steve Chambers
Visalia Medical Reserve Corps

Michele Cheung
Orange County Health Care
Agency

Mark Chew
Orange County Health Care
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Mississippi State Department of
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Brandon Dean
Los Angeles County
Department of Public Health

Muriel DeLaVergne-Brown
Crook County Health
Department

Claudia Der-Martirosian
Veterans Emergency
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Office of the Assistant Secretary
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Health and Human Services

Patricia Draper
Kent County Health Department

Teresa Ehnert
Arizona Department of Health
Services

Pat Frost
Contra Costa Health Services

Kate Garay
Marin Medical Reserve Corps
Foundation

Bob Garcia
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Families, U.S. Department of
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Eleanor Guzik
American Red Cross

Fred Hagigi
Veterans Emergency
Management Evaluation
Center

Jack Herrmann
National Association of County
and City Health Officials

Mary Hilfiker
Rady Children's Hospital, San
Diego

James James
Society for Disaster Medicine
and Public Health

Ana-Marie Jones
Collaborating Agencies
Responding to Disasters

Lynne Kidder
The Bipartisan WMD Terrorism
Research Center

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Fergus Laughridge
Humboldt General Hospital
EMS Rescue

Sukhi Lee
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California Emergency Medical
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Linda MacIntyre
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Headquarters

Aizita Magana
Los Angeles County
Department of Public Health

Shelia Martin
EMS Authority

Kevin McCulley
Utah Department of Health

Suzet McKinney
Chicago Department of Public
Health

Ken Miller
Orange County Fire Authority

Erin Mullen
Rx Response

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County of Orange Health Care
Agency

Michael Noone
EMS

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South Beach County Public
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Megan Reeve
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Alex Repace
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Oregon Health Authority

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Uniformed Services University
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Carl Schultz
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Harris County Public Health
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Nadine Simons
U.S. Department of Health and
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Mike Steinkraus
Orange County EMS

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Craig Vanderwagen
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Stephanie Walker
Northeast Texas Public Health
District

Daniel Wall
Ventura County EMS

Allegra Weinstein
Orange County Health Care
Agency

Anita Yuan
Veterans Emergency
Management Evaluation
Center

**Workshop #2:
Information Management and Coordination
Minneapolis, MN**

Bruce Altevogt
Institute of Medicine

Stacey Arnesen
National Library of Medicine

Gerrit Bakker
Association of State and
Territorial Health Officials

Bill Belknap
Hennepin County Public Health

Kellie Bentz
Target Corporation

Carrie Bergquist
Altru

Annette Bertelson
Trauma Center Association of
America

Paul Biedrzycki
Milwaukee Health Department

Pam Blixt
City of Minneapolis Health
Department

Machelle Bulman
Veterans Memorial Hospital

Jeanne Carls
Minnesota Department of
Health

Susan Cooper
Regional Medical Center,
Memphis

Brooke Courtney
U.S. Food and Drug
Administration

Sheryl Darling-Mooney
Veterans Memorial Hospital
Community & Home Care

Patrick Devlin
Fairview Health Services

Aaron DeVries
Minnesota Department of
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Tyler Esh
Southwest Region Emergency
Preparedness Team
(Minnesota)

Marc Fisher

Richard Gibbons

David Golden
Boynton Health Service/
University of Minnesota

Samuel L. Groseclose
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Centers for Disease Control
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Rahul Gupta
West Virginia Health
Department

Dan Hanfling
UPMC Center for Health
Security

Chuck Hartsfield
CentraCare Health

Mary Ellen Hennessy
Healthcare Association of New
York State

Jack Herrmann
National Association of County
and City Health Officials

John L. Hick
Hennepin County Medical
Center

James James
Society for Disaster Medicine
and Public Health

Dan Johnson-Powers
University of Minnesota
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The MESH Coalition

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Emily Lord
Rx Response

Judy Marchetti
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Michael “Mac” McClendon
Harris County Public Health &
Environmental Services

Suzet McKinney
Chicago Department of Public
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Megan Mott
Institute of Medicine

John Osborn
Mayo Clinic College of
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Julie Pierson

Christine Porter
GAP Solutions, Inc.

Steven Ramsey
Social and Scientific Systems,
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Alex Repace
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National Center for Disaster
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Carol Sele
Sanford Bemidji Medical Center

Richard Serino
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Adam Shadiow
Arrowhead EMS Association

Umair Shah
Harris County Public Health
and Environmental Services

Nick Simpson
Hennepin County Medical
Center

Elaine Stevens
HealthEast Care System

Jo Thompson
Arrowhead EMS

Liz Ticer
City of Grapevine, Texas

Craig Vanderwagen
Martin, Blanck & Associates

Jacy Walters
Minnesota Department of
Health

Jamie Weness
Western Wisconsin Public
Health Readiness Consortium

Douglas Zimmermann
Manifest Inc.

**Workshop # 3:
Surge Management
New Orleans, LA**

Alex Adams
National Association of Chain
Drug Stores

Bruce Altevogt
Institute of Medicine

Michelle Askenazi
Tri-County Health Department,
Colorado

Sarah Babcock
New Orleans Health
Department

James Blumenstock
Association of State and
Territorial Health Officials

Sherilyn Clark
Manatee County Emergency
Management

Bruce Clements
Texas Department of State
Health Services

Jim Craig
Mississippi State Department of
Health

Cynthia Davidson
Department of Health and
Hospitals, Louisiana

Monique Davis
Hudson Regional Health
Commission

Carina Elsenboss
King County Public Health
Department

Joanna Galaris
Emory University

Gladys Gichomo

Amy Grissom

Dan Hanfling
UPMC Center for Health
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Jack Herrmann
National Association of County
and City Health Officials

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Humane Society International

Annette Matherly
University of Utah Burn Center

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Kathy Sykes

Ritu Tuteja
National Center for Health
Statistics, Centers for Disease
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Lori Upton
SouthEast Texas Regional
Advisory Council

Craig Vanderwagen
Martin, Blanck & Associates

Jennifer Ward
Trauma Center Association of
America

Sundee Warren
Public Health Emergency
Preparedness and Response
Louisiana, Region 1

Elizabeth Whitton
American Planning Association