Regional Disaster Response Coordination to Support Health Outcomes: Surge Management: Workshop in Brief

DETAILS

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When a disaster strikes, it rarely impacts just one jurisdiction. It is important for jurisdictions to consider how they will respond to a scenario in which the entire region is impacted. To explore these considerations, the Institute of Medicine's Forum on Medical and Public Health Preparedness for Catastrophic Events organized 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 multijurisdictional disaster. Each of the three workshops covers different topics that may strengthen regional disaster response. The first workshop, held in Irvine, California, explored issues of community planning and engagement.[1] The forum convened a second regional workshop in Minneapolis, bringing together key stakeholders to examine how information and incident management can augment response efforts in a complex, regional emergency.[2] The third and final workshop in this series, which this document summarizes, was held in New Orleans and considered how community engagement and information sharing can impact issues of surge management across the public health and health care spectrum.[3] Workshop chair Craig Vanderwagen, former Assistant Secretary for Preparedness and Response (ASPR), asked, for example, "How can assets across a region be better managed?" Whether it is federal regions talking across states or intra-state regions, Vanderwagen said there are cities and states that have lived through experiences demanding regional considerations, and lessons they have learned should be applied to those jurisdictions that have not. Issues such as massive patient tracking and evacuation, hospital surge with those not acutely ill, and coordination of the expansion of focused task forces, organizations, and coalitions involved in disaster response will continue to arise and present challenges in a large disaster unless lessons learned and needs identified can be heard and addressed at all levels.

Patient Tracking and Evacuation

Building off of conversations about information and incident management in the second regional series meeting, a portion of the third meeting focused on the concerns of "pre-hospital surge" and ways that surge can be alleviated at a regional level through strong patient tracking and evacuation procedures and coordination. Though accountability falls to the state level, a few participants mentioned the need for a systematic review of patient tracking systems. Many different systems are available, but at an aggregate level the strengths and weaknesses of each, as well as key technology standards, have not been measured. Systems should also be able to "talk" to each other across regions, said Dan Hanfling, contributing scholar at the Center for Biosecurity at UPMC. Many proprietary challenges are associated with sharing data across systems, but Jolene Whitney, specialty care program manager at the Bureau of

[1] The first workshop in brief can be accessed at http://www.iom.edu/Activities/PublicHealth/MedPrep/~/media/Files/Activity%20Files/PublicHealth/MedPrep/2014-MAR-26/WIB-Regional-Disaster.pdf (accessed December 13, 2014).
[2] The second workshop in brief can be accessed at http://www.iom.edu/~/media/Files/Resources/WIBs/WIBregionaldisaster2.pdf (accessed December 13, 2014).
[3] This summary represents the viewpoints of the speakers. It does not represent consensus recommendations or conclusions of the workshop, but rather provides a summary of presentations and discussions and offers a snapshot of the current state of surge management for regional preparedness initiatives and potential paths forward.

Emergency Medical Services (EMS) and Preparedness at the Utah State Health Department, said trauma systems should share lessons learned about key data points to include in a regional disaster registry, to guide a pre-hospital tracking system. 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 electronic health records (EHRs) can also improve the care of the patient, said Jennifer Ward, president of the Trauma Center Association of America. Following these highlighted points, several participants 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. 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 patient release. She also commented that information technology partners and all affected stakeholders should be included at the initial stages.

Reiterating the concept of building on day-to-day systems supported by the ASPR (Lurie et al., 2013), patient movement in a disaster should rely on patient catchment systems used in everyday care, said Ward. Creating a new system and identifying new players could bring more challenges than simply leveraging the existing daily systems and memorandums of understanding (MOUs) 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 that support trauma system planning, regionalization of emergency care, trauma care centers, and trauma service availability, but funding has not yet been appropriated, and some will need to be reauthorized before the programs can begin.[4] Effective regional health care systems could assist in a stronger response to infectious diseases like Ebola and other public health emergencies.

In the cases of geographically remote regions, where the nearest specialty care center may be 500 miles away, a participant noted the importance of forming multistate consortiums to collaborate on assessing needs and priorities for evacuation with such distance in mind. John Hick, medical director for emergency preparedness at Hennepin County Medical Center, Minnesota, added that working within a region to emphasize transfer of any non-specialty patients (e.g., those with smaller truncal burns or pediatric patients over 5 years old with noncomplex conditions) can also help to alleviate the surge on a specialty center and reduce the number of evacuations needed in a resource-poor environment. The highlights of this entire discussion were presented by Whitney in the bullets below.

Challenges

- The state is ultimately accountable for recording patient reception and tracking
  - This accountability is required because it is part of the responsibility of ensuring continuity of the appropriate level of care
- Federal bills need to be reauthorized that have been critical to the establishment of having a robust trauma care system to support a basic infrastructure
- Pre-hospital data systems typically do not integrate into hospital EHRs
  - Lack of integration of systems impacts patient care

Opportunities

- Establish a next-generation integrated patient, victim, materiel, and fatality tracking system based on a review of previous events (Katrina, Gustav, Sandy, etc.)
  - Develop technology standards and assess if systems meet these standards
    - Develop guidance if gaps exist
  - Reduce redundancy of the different tracking systems (Federal Emergency Management Agency, hospital, Food and Drug Administration/Medical Countermeasure)

[4] http://www.appropriations.senate.gov/sites/default/files/hearings/Trauma%20Center%20Association%20of%20America.pdf (accessed February 10, 2015).

  - System needs to be scalable and track every step of the entire disaster spectrum (pre-hospital, shelter, hospital, rehab, etc.), through patient discharge
  - Ensure interoperability of patient tracking systems
  - Provide recommendations to federal, state, and local governments; health care providers; information technology; and vendors
    - Convene stakeholders to understand their needs
- For patient transfers, existing patient catchment systems could be used (e.g., model around existing trauma systems)
  - There is no need to create new, pre-identified systems, but regions can leverage the existing daily systems and MOUs.

Case Study: Southeast Texas Regional Advisory Council

The first medical challenge that brought the need for regional planning to the forefront in Texas was Hurricane Allison in 2001, said Lori Upton, director of preparedness for the Southeast Texas Regional Advisory Council (SETRAC). There was no coordinating entity, and the flooding throughout hospitals was massive and widespread. Only one trauma center was able to remain open. She said the providers on the ground quickly understood a coordinated infrastructure needed to be in place, regardless of whether it was private or state run, because everyone needs to join forces when a disaster happens. Following Allison, hurricanes Katrina and Rita in 2005 were the first time the new 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 the medical community. With just a rudimentary patient tracking system listing each patient's name, chief complaint, and location, they were able to move more than 3,400 patients to other health care facilities with an error rate of only .08 percent. Listing the chief complaint also provided 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. Upton listed other important lessons they learned from both storms:

- 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, surge, and support facilities
- Do not evacuate to another coastal community
- Prioritize evacuations by focusing first on homebound individuals, 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
- Coordinate all ambulances (see Figure 1) coming from different places to streamline calls, and provide shelter and food for the drivers and paramedics while keeping them from reaching exhaustion; this was done in Texas for the first time in 2005
- Repeatedly update the manifest to ensure that if patients are listed as being present during transport, they have actually arrived and are physically at the hospital

Upton also explained the context in which these transports and evacuations were performed. The SETRAC board has a standing committee called the Regional Health Care Preparedness Coalition (RHPC). The operational arm of the RHPC is the previously mentioned CMOC. The CMOC covers a region with 500 nursing homes, 167 hospitals, and more 7 million persons, and is activated by a local or state authority to assist mainly with logistical and operational response needs. Unintegrated technology and systems was a challenge when hurricane Ike hit in 2008, Upton commented. Because of this, the state did not have the awareness of the information and transports that were seen at the regional level, which led to a disconnect and gaps in situational awareness. She said now CMOC's Web Emergency Operations Center (EOC) is connected to the state server and their patient tracking system is integrated with the state as well, giving much more transparency to actions during a response at all levels compared to pre-integration responses.

FIGURE 1 Staging of ambulances during Hurricane Ike in 2008.
SOURCE: Lori Upton presentation, November 15, 2014.

Public Health Surge Capacity and Community Resilience

The discussion on public health surge capacity and community resilience also built off an earlier series meeting—on community engagement—as 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, Texas Public Health and Environmental Services, and Andrew Stevermer, regional emergency coordinator for ASPR, focused on long-term goals of making communities more resilient by addressing social determinants of health.[5] If public health can address those determinants such as housing, transportation, education, access to health care and nutrition, and others prior to a disaster, then communities could become more resilient in disasters and there will be less of a clinical surge burden on regional hospitals.

Developing effective strategies for sustainable regional coalition development was a challenge that a few participants identified, with siloed funding from the national level suggested as a barrier as well by Bruce Clements, preparedness director for the Texas Department of State Health Services. He 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 funding incentives to regional and cross-sector engagement in the agreements to better integrate various sectors at the local level. The funding is currently separated at the federal level, he said, so it is difficult to group funding streams across or even within regions.

One of the opportunities discussed included widening the net for coalition inclusion. Alex Adams of the National Association of Chain Drug Stores said there are 120 pharmacy organizations across the country, and thousands of actual pharmacies. Because of their complexities, he said planning at the local level is very challenging, and regional planning would be far more advantageous. He also noted that with the explosion of pharmacies as walk-in clinics, they have capabilities to administer 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 the Affordable Care Act continues, Adams said pharmacies could be a public health asset in mitigating surge issues in the community, reducing the burden on hospitals. Carolyn Meier, deputy regional administrator for the Administration for Children and Families (ACF), noted that human services and public health could be better integrated in a response. For example, linking ESF-6 (mass care) and ESF-8 (public health and medical) at all levels could leverage resources, avoid duplication, and increase situational awareness across communities. She highlighted ACF's regional emergency management specialists, who can assist at regional shelters and provide many services that residents might otherwise seek in a hospital or health care

[5] The 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).

setting (e.g., crisis counseling, mental health services, help in securing or renewing prescription medications, or special needs support). Linking ESF-6 and ESF-8 during the planning phases, and widening health care coalitions to include many in social and pediatric services, can then lead to better coordination and situational awareness during a large response. If social services and those charged with mass care are already plugged into the health care response, they can more rapidly assist and reduce the burden on the health care system. Other challenges, opportunities, and partnerships that were discussed were presented by Shah and Stevermer below.

Challenges

- Framing the mission as population-based health and communicating an understanding of this to partners
  - Addressing social determinants of health early to keep people out of the health care system
- Understanding and developing effective strategies for sustainable coalition development
  - Because funding is currently siloed from the top level, tying funding to cross-sector engagement could promote better integration at the local level
- Technology is not being integrated at regional, state, and national levels
- There is a lack of uniformity in measuring successes across communities

Opportunities

- Link human services and health care/public health coalitions: coordinate ESF-6 and ESF-8 functions at the federal and regional levels
- Include nontraditional partners; share lessons across communities so those that have not been affected can learn from others' experiences
- Better leverage and incentivize activities
  - Use accreditation groups: Public Health Accreditation Board and The Joint Commission
  - Hold more exercises and training, and include the media in the experience (see Figure 2)

Potential Partnerships

- External partners: outside of public health/health care (e.g., human services task forces, pharmacies, mortuary, community planners, call centers, media, public, emergency management, etc.) at both state and regional levels
- Internal partners: within public health (e.g., chronic diseases, environmental health, etc.)

Case Study: Hudson Regional Health Commission, New Jersey

Hurricane Sandy's destruction on the New Jersey coastline led to hospital surges that overwhelmed emergency departments, emphasizing the need for public health to become integrated and to assist in managing the surge burden. Monique Davis, health educator and risk communicator for the Hudson Regional Health Commission, described three approaches for increasing surge capacity through public health: the activation of medical needs shelters, mobilization of alternative care sites and extended treatment areas, and development of regional public health emergency preparedness workplans prior to disaster. She stressed that the goal of these approaches is to decompress emergency departments and health care facility bed surges throughout the region by having a place for those not in critical condition to receive treatment. She highlighted the need for medical needs shelters during Hurricane Sandy as a gap in available services to be provided. Many patients were stable and simply needed oxygen support or power for medical devices, but because that was unavailable in general shelters, patients were sent to hospitals instead, overwhelming emergency departments.

Prior to Hurricane Sandy, in 2010, the New Jersey Department of Health formed a workgroup to develop a planning template for alternative care sites and extended treatment areas. Their scalable template was completed in 2013[6] and encouraged standardization throughout the state in areas of floor plans, Incident Command System (ICS) structure, just-in-time training, and job action sheets. As large-scale disasters that overwhelm health systems will demand high numbers of staff and volunteers, this standardization can facilitate a smoother process for volunteer staff coming in from different areas across New Jersey. Medical needs shelters and alternative care sites are concrete ways that public health and community partners can assist in reducing the clinical surge burden on

[6] The New Jersey Department of Health Alternative Care Site/Expanded Treatment Area Planning Template can be found at http://www.nj.gov/health/er/acs_planning.shtml.

FIGURE 2 Media cameras covering a disaster exercise in Louisiana.
SOURCE: Rosanne Prats presentation, November 15, 2014.

hospitals and provide care. Teaming up with pharmacists, ACF regional administrators, and others could augment a public health surge response even further and assist the region in a large-scale response.

Coordination of a Community Response

"It's good to review the planning process you have in place multiple times, but the relationships you sustain is really what makes it work during a response."

—Jim Craig, Director of Health Protection, Mississippi State Department of Health

Coordination between governmental agencies and nongovernmental organizations (NGOs) can be confusing and complicated if NGOs are unsure of their role and responsibilities during a disaster. As a few participants noted, having NGOs integrated into the state and local emergency response plan as an identified resource can alleviate some of the confusion when a crisis does occur. Ron Perry, emergency manager for Jefferson Parish, Louisiana, stated that when he and his staff review the parish's All-Hazard Plan, they include Red Cross, United Way, and other local NGOs into their planning process as part of the staff. They make a point to contact those organizations to make sure they are available in their region. He also mentioned that in their plan, they have allotted all volunteer coordination efforts to be organized under United Way, and to have a regional coordinator who works with outside organizations through the Governors Office of Homeland Security and Emergency Preparedness.

Knowing who can provide certain resources is important when coordinating responses for small and large disasters. But how NGOs come to the aid of communities was a large concern to many participants. Hick mentioned that there is a need to develop a way for NGOs to identify the services and resources they have available to specific communities, so when regional and local leaders reach out to the NGOs, the communities will not be counting on the same limited number of assets. Clements said that in Austin, Texas, most of the faith-based NGO coordinating is done under one network called 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. Clements added that Texas has an NGO representative at the state emergency operations center who acts as a liaison for local and regional NGOs, providing transparent coordination among state agencies leading ESF-6 and ESF-8 functions. It can also be used as an entry point for NGOs coming into the system.

In addition to volunteers, the number and type of physical assets available can also be confusing and misleading. Hick commented that resource "typing," that is, categorizing what assets and specific types of personnel organizations can provide, and setting a basic minimum standard can also help manage expectations of what is immediately available. Rosanne Prats, executive director of emergency preparedness at the Louisiana Department

of Health and Hospitals (DHH), saw a need for a better statewide "resource catalog" that describes the volunteer groups and associated skills, capabilities, and resources available after a disaster. Currently, she said they are often just stumbled upon, and Hick added that there are important variations within groups sometimes that should be known in advance. For example, one medical reserve corps (MRC) unit in a state may have 100 volunteers and be able to give vaccinations, but another MRC unit in the same region may only have 20 volunteers and not have that immunization expertise. Seeing the larger picture up front and knowing what is available can help state and regional authorities plan and coordinate the response better.

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, director of health protection at 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. Hick presented expanded discussion points on coordination of the public-/private-sector response, shown below.

Challenges

- NGOs are uncertain where they fit within the response system and where their best entry points should be
- Sustaining NGO commitment between disasters

Opportunities

- Identify the "it" message, meaning the message that will catch the attention and solicit buy-in of potential NGO partners; communicating a reason that has strong meaning to an NGO can better leverage NGO engagement
- Scale up engagement around the "it" by conducting exercises
  - Include businesses in planning for emergency operations centers and points of dispensing
- Resource typing

Potential Partnerships

- Local: corporations and faith-based, cultural, and service organizations
- State: voluntary organizations active in disasters
- National: federal level, national service organizations

Case Study: Louisiana Department of Health and Hospitals

Prats discussed lessons in coordination and surge management learned from Hurricane Katrina in 2005, and progress made since that time. She said the storm brought attention to gaps in evacuation procedures (after the storm) of multiple hospitals, the complex patient and staff evacuation system, and the need to evacuate pre-disaster within a 36-hour window. One of the sheltering problems that arose, she said, included having multiple shelters available to citizens often run by various entities. This made it confusing and created issues with fairness among the evacuees, as the media would report on the air-conditioned shelters with many amenities, so many residents would try to flood those locations instead of the sometimes more austere locations run by other organizations. Another lesson taught by Katrina was to use the ICS as the mechanism to allow multiple entities to interface to successfully perform a complex task. Multiple state and local public health departments, the military, law enforcement, and others were all involved, but did not have coordinated terminology and acronyms, causing much confusion that could have been avoided by standardizing systems and frameworks.

In response to a question about operational resilience on the "front lines" of health care, Prats again emphasized using ICS, especially when responding at a regional level. This allows clarification of interface points among organizations so they can stay in communication and operations remain as they typically would. This helps streamline the process when many people and organizations appear or drop in to assist. Prats commented that ICS in Louisiana for hurricanes is clear and well defined. However, the chain of command up to the federal level and responsibilities for infectious disease epidemics such as Ebola are much less clear. The group also raised issues

regarding the influence of politics on a response effort. Plans and standard operating procedures inculcate neatly written steps to be performed in a disaster, but are often interrupted by differing expectations portrayed by media, elected leaders, and affected individuals. Overall, Prats surmised that a main lesson learned from her large-scale disaster experiences was to use science, plans, and protocols as guidelines, but also to remain flexible to address multiple expectations and differing political pressures in a sometimes-changing threat environment.

Conclusion

Other examples arose during discussions and presentations on innovative ways to reduce clinical surge. Upton from SETRAC mentioned the formation of "oxygen strike teams" during Hurricane Ike in 2008 when many residents did not evacuate, but lost power and were oxygen dependent. SETRAC teamed up with 911 dispatch and a welding company and had teams go throughout different communities where the 911 calls were coming from to have a paramedic check the patient status and exchange an empty oxygen tank for a full one. This kept many residents out of the hospitals so providers could focus on those who needed acute care. Whitney from Utah complemented this with a suggestion for community paramedicine,[7] saying some communities are establishing nursing call centers to refer residents to other locations and facilities for more "human services" previously described instead of EMS simply making a transport to the emergency department. These are both great examples of using community assets and resources to reduce the clinical surge burden on hospitals.

In response to a question about creating sustainable and resilient health systems, Prats, Upton, and Davis all highlighted the continually decreasing Hospital Preparedness Program (HPP) funding as a dangerous barrier to successful regional facilitation. Prats said if the regional coordinators go away, then hospitals may revert back to more of an institutional focus, similar to the system prior to HPP. Davis and Upton also noted that this decrease in funding in recent years makes it difficult to engage hospital leadership, to send staff to regional trainings, and to retain trained volunteers across a region.

As funding for regional coalitions and HPPs continues to be uncertain, it is important for communities to come up with innovative approaches to address surge capability across regions, cast a wide net when building pre-disaster relationships, and work to better integrate systems and decrease redundancies. As a country, as Ward stated previously, we should be building on the day-to-day trauma and health care systems, integrating elements of disaster planning, and socializing the concept of preparedness wherever possible to increase our national capacity for surge management, information sharing, and community engagement.

Reference

Lurie, N., G. Margolis, and K. Rising. 2013. The U.S. emergency care system: Meeting everyday acute care needs while being ready for disasters. *Health Affairs (Millwood)* 32(12):2166-2171.

[7] The Health Resources and Services Administration defines community paramedicine as "an emerging field in health care where EMTs [Emergency Medical Technicians] and Paramedics operate in expanded roles in an effort to connect underutilized resources to underserved populations." See more at http://www.hrsa.gov/ruralhealth/pdf/paramedicevaltool.pdf (accessed December 10, 2014).

DISCLAIMER: This workshop in brief has been prepared by **Megan Reeve, Bruce Altevogt,** and **Ashley Ottewell,** rapporteurs, as a factual summary of what occurred at the meeting. The statements made are those of the authors or individual meeting participants and do not necessarily represent the views of all meeting participants, the planning committee, or the National Academies.

REVIEWERS: To ensure that it meets institutional standards for quality and objectivity, this workshop in brief was reviewed by **Rosanne Prats,** Louisiana Department of Health and Hospitals, **Vicki L. Sakata,** Northwest Healthcare Response Network; and **Lori Upton,** SouthEast Texas Regional Advisory Council. **Chelsea Frakes,** Institute of Medicine, served as review coordinator.

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For additional information regarding the workshop, visit http://iom.edu/Activities/PublicHealth/MedPrep/2014-NOV-15.aspx.