

Southeastern Regional Pediatric Disaster Surge Network: A Public Health Partnership

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SYNOPSIS

In the event of a natural or man-made disaster involving large numbers of children, resources in the Southeastern U.S. are extremely limited. This article chronicles the efforts of the Alabama Department of Public Health, the Mississippi State Department of Health, and the South Central Center for Public Health Preparedness in conjunction with more than 40 organizations to develop a voluntary network of health-care providers, public health departments, volunteers, and emergency responders from Alabama, Florida, Louisiana, Mississippi, and Tennessee. The purpose of the Southeastern Regional Pediatric Disaster Surge Network (the Network) is to improve the pediatric preparedness response strategies of public health, emergency response, and pediatric providers in the event of large-scale emergencies or disasters that overwhelm local or state pediatric resources.

The planning and development of the Network is proceeding through three general phases—information sharing, mutual goal setting and collective action, and long-term formal linkages. In Phase 1, critical planning tasks to be undertaken in the development of the Network were identified. In Phase 2, the agencies developed a draft operational handbook that served as the basis for a formal memorandum of understanding. In Phase 3, participants will engage in exercises and evaluations that will further identify and work out logistical and operational details.

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During the past five years, the South Central Center for Public Health Preparedness (SCCPHP) has worked in conjunction with the Alabama Department of Public Health (ADPH), the Mississippi State Department of Health (MSDH), and more than 40 agencies and institutions to improve the pediatric preparedness response strategies of public health, emergency responders, and pediatric providers in the Southeastern United States. Disasters such as Hurricane Katrina, the earthquakes in Haiti and Chile, and other emergencies have illustrated the need for a coordinated and collective response to the needs of children, as children are among the most vulnerable to injury, disease, and exploitation in any emergency.¹ Immediate response is needed not only to ensure child survival and protection, but also to restore some sense of normalcy to the lives of children.

The Southeastern U.S. lacks pediatric surge capacity because of the relatively small number of pediatric facilities, limited public health resources, high rates of poverty, and other adverse factors specifically related to children. As a result, the ability to respond effectively to large-scale pediatric emergencies and disasters is often beyond the capacity and capability of a single organization, institution, or health department. The challenge of accommodating pediatric surge becomes more daunting given the increased number and consequences of large-scale disasters, and the number of agencies and organizations that must be organized, coordinated, and managed during a disaster response.^{2,3}

Through their emergency and disaster experiences, ADPH, MSDH, and pediatric providers learned that traditional approaches and local health systems, by themselves, were not always effective in addressing the complex, multi-institutional, and multijurisdictional nature of regional pediatric surge.⁴⁻⁸ Further, they realized that the continuing challenges of limited pediatric resources and the unique physiological, mental, and social issues of children would require a focus on leading, organizing, and managing numerous government and private sector organizations to eliminate multiple chains of command, reduce duplicative efforts, and prevent agencies from working at cross purposes. Effective pediatric emergency and disaster response in the Southeast would require a collaborative network of agencies and organizations—a new type of organization called a high-reliability network (HRN).⁹

This article chronicles the efforts of more than 40 organizations to develop an HRN, specifically the Southeastern Regional Pediatric Disaster Surge Network (the Network), a voluntary network of health-care providers, public health departments, volunteers, and emergency responders from Alabama, Florida, Louisi-

siana, Mississippi, and Tennessee. The purpose of the Network is to provide pediatric care and mutual aid at the time of an emergency or disaster.

Previous efforts by national and regional groups have illustrated methods for addressing surge capacity through general mutual aid agreements and limited emergency-response resources related to children.¹⁰ These efforts, however, are generally clinically focused, intrastate, and not specific to the Southeastern U.S. In contrast, Network organizers envisioned the solution to limited pediatric surge capacity as regional in nature and as a managerial and organizational issue rather than strictly clinical. Therefore, drawing upon the high-reliability organization (HRO) literature, Network partners attempted to create, maintain, and operate a collaborative, pediatric-surge HRN. The aim was to create a network that would (1) be highly reliable and (2) exhibit an extremely high degree of inter-organizational/agency collaboration. Additionally, this first-of-its-kind regional network would have to operate in cooperation with existing response systems as described in the National Response Framework.¹¹

METHODS

Theoretical framework

Organizations that operate successfully in uncertain settings where the potential for disasters is ever present but fewer disasters occur than are expected are termed HROs. Examples of HROs include power-grid dispatching centers, aircraft-carrier operations, air-traffic control systems, nuclear power generation, wildfire management, U.S. Army combat maneuver groups, high-density theme parks, prison inmate transport operations, and emergency medical treatment. The best of these organizations rarely fail, even though they encounter numerous unexpected events.

During the past 20 years, there has been considerable research on HROs and the strategies they pursue in addressing complex, large-scale logistical problems and in avoiding accidents and cascading events that would otherwise result in significant losses.¹²⁻¹⁹ Although various authors have listed an array of characteristics of HROs, three primary characteristics are most often cited:

1. HROs aggressively seek to know what they do not know. To this end, they devote care and attention to systems design and to extensive training and exercises. In addition, operational personnel participate in system design and process development.
2. HROs emphasize high reliability and, as new

insights emerge, redesign and improve all aspects of prevention, detection, response, and recovery.

3. HROs consistently communicate the big picture to everyone. HROs focus on ensuring that all members understand the overarching goals and mission of the organization and that organizational goals are the same as public goals.^{13,20}

HROs have been studied extensively; however, the lessons learned in managing HROs have not been systematically applied to the management and operation of multiple government and private sector organization networks required to respond to large-scale disasters. These lessons focus on the network organization, management, and leadership.

The Network organizers understood that a network could not be expected to adopt HRO attributes overnight. Rather, the Network would have to incorporate HRO characteristics as interagency collaboration and the Network itself developed. Figure 1 shows the three phases of the collaborative network developmental process.²¹ Phase 1 is termed “exchange network” because it is the period during which the members of the network exchange information, usually through interpersonal interactions among members. In Phase 2, members form “action networks” in which agencies collaborate to establish mutual goals and take collective action. In short, action network members engage in projects and network development, and establish goals to be achieved by a set of undertakings that involve assignment of tasks and accompanying accountability. Phase 3, “systemic network,” sees the formulation and exchange of formal documents creating formal agreements among network members.

Development of the Network

In an effort to create an effective HRN to address a specialized emergency and preparedness need within the region, ADPH and MSDH partnered with SCCPHP to sponsor the creation of the Network. This

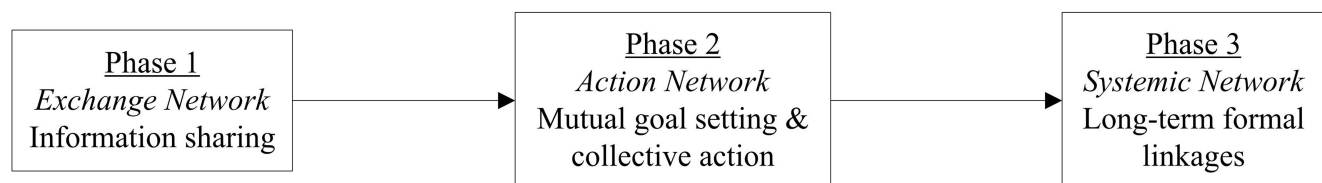
voluntary Network representing health-care providers, public health departments, volunteers, and emergency responders from five states will serve as a source for pediatric resources in the event of an emergency or disaster in any one or all of the five states. When there is no emergency or disaster, SCCPHP maintains the Network and coordinates its activities.

For the purposes of the Network, a pediatric emergency or disaster is defined as an overwhelming incident that exceeds the effective response capability or resources of impacted pediatric health-care facilities. An incident of this magnitude will almost always involve a broad range of health-care providers and emergency responders from a variety of jurisdictions. Only a broad systems solution such as an HRN can deal with patient surge issues of such magnitude.

During a response to an emergency, the Network will operate within the prescriptions of the National Response Framework¹¹ as a resource for operational support through an Emergency Operations Center (EOC) appropriate for the incident.²² In essence, the local incident command will request support from a state EOC and, if appropriate, from one state EOC to another state EOC. The visibility of Network resources will be through the Essential Support Function 8 (Public Health and Medical Services [ESF 8])²² representative at the state-level EOC. During a response that involves a gubernatorial or Presidential declaration of emergency, the sharing of resources across state boundaries will be governed by the Emergency Management Assistance Compact (EMAC) enacted by Congress and approved by all states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands.²³ For emergencies that are not of sufficient scale to achieve a declaration of emergency, resource sharing will be achieved through mutual aid understandings separate from EMAC.²⁴ The Network will function with a memorandum of understanding (MOU) signed by all Network participants and additional mutual aid agreements that exist among many of the Network participants.

In planning and developing the Network, we had an

Figure 1. Phases of network formation and influencing constructs of interagency collaboration^a used in planning and developing the Southeastern Regional Pediatric Disaster Surge Network



^aAdapted from: Alter C, Hage J. Organizations working together. Newbury Park (CA): Sage Publications; 1993.

advantage compared with efforts to develop other types of networks. This advantage concerned the nature of the participants and the agreement to aggressively seek what “we did not know.” Because the Network comprised health-care institutions, the individuals involved possessed a similar type of training and experience (e.g., physicians, nurses, and health administrators). As the management scholar Henry Mintzberg observed, such participants can be more easily coordinated because they possess a “standardization of skills,” which they acquired through comparatively similar training.²⁵ In addition, the participants understood the ultimate goals of effectiveness and reliability (doing the right things) as well as the reality of efficiency (doing things right) as they applied to the Network. Therefore, they understood the big picture and were insistent on developing the Network with people who understood the nature of emergency response. In addition, participants insisted on maintaining the individual autonomy of each participating organization, but willingly committed to yielding to the common goal of Network effectiveness and reliability.

RESULTS

The planning and development of the Network is proceeding through three general phases—information sharing, mutual goal setting and collective action, and long-term formal linkages, as introduced in Figure 1. This model, drawn from the interagency collaboration literature, was adopted by SCCPHP to provide developmental guidance and to serve as a format for documentation of Network activities. Figure 2 shows the three phases of Network development, the actual and proposed associated activities of the Network, and HRO characteristics that will aid in moving the Network to an HRN. Figure 2 can serve as a starting point or model for those wanting to develop a broad collaborative network.

Phase 1—exchange network: information sharing

In early 2005, a conference hosted by the Children’s Hospital of Alabama and convened by SCCPHP was held for regional pediatric providers, public health representatives, and other responders to address the lack of pediatric surge capacity. As shown in Figure 2, in the meeting, critical pre-event planning tasks were identified that would have to be undertaken in the development of a regional pediatric medical surge network, including network organization planning, financial agreement planning, and operational/medical staff protocol planning.⁸ The critical planning

tasks identified by the working group are shown in Figure 3.

Phase 2—action network:

mutual goal setting and collective action

In October 2008, ADPH contacted SCCPHP regarding a U.S. Department of Homeland Security grant to improve emergency preparedness in Alabama, specifically to advance the planning of the pediatric surge network and create a functioning HRN. The centerpiece of the project was a series of participatory meetings of pediatric-preparedness stakeholders to formalize a regional pediatric disaster surge network using a modified Delphi methodology.^{26,27}

The project plan consisted of five Phase 2 stages (Figure 2):

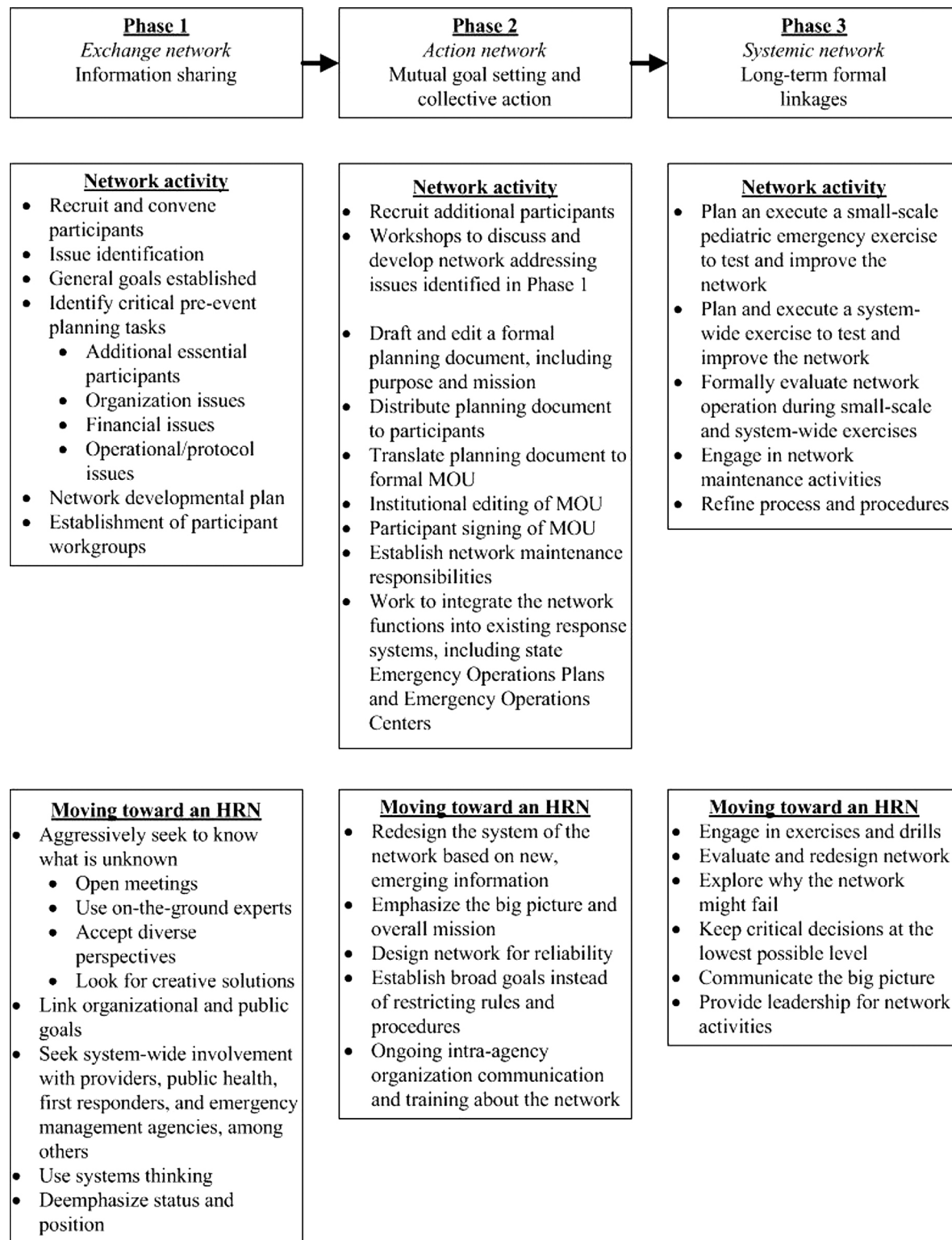
- Stage 1—Further recruit participants for the planning process.
- Stage 2—Conduct seven face-to-face planning workshops to formalize a plan for network coordination, network finances, credentialing, operations (roles and responsibilities of network participants), logistics, and public information.
- Stage 3—Draft and edit a formal plan (including goals) for the Network (evolved into the Network Handbook and, ultimately, the formal MOU).
- Stage 4—Conduct a face-to-face workshop to finalize the formal plan, Network Handbook, and MOU.
- Stage 5—Distribute these materials to the stakeholders for acceptance and commitment.

The Planning Steering Committee comprised 11 members (two from MSDH, one from the University of Mississippi School of Medicine, four from ADPH, and four from SCCPHP). The Planning Steering Committee met three times via teleconference to review progress in the recruitment of participants for the face-to-face workshops and to establish a schedule and agenda for the workshops.

The first workshop, in March 2009, is best described as a “proof of concept” exercise. SCCPHP investigators outlined the project, reviewed the project plan, and facilitated the first information-gathering exercise in the subject areas of (1) network coordination, (2) finance, (3) medical staff/personnel, (4) operations, (5) planning, (6) logistics, and (7) public information. The information collected during the workshop became the input for the first draft of the Network Handbook, developed by SCCPHP.

Prior to the second workshop, SCCPHP distributed the draft Network Handbook to attendees of the first workshop and those who had registered for the second

Figure 2. Phases of network formation, network activity, and high-reliability network building blocks used in planning and developing the Southeastern Regional Pediatric Disaster Surge Network



MOU = memorandum of understanding

HRN = high reliability network

Figure 3. Critical issues identified in the planning and development of the Southeastern Regional Pediatric Disaster Surge Network^a

<i>Disaster network creation issues^b</i>	<i>Pre-event planning requirements</i>
Network organization planning	
Determine the appropriate region	Geography, topology, population density, and potential disaster threats will be a major input to the appropriate region size. Also, established institutional relationships and partnerships will provide basis for initial discussions.
Identify principal institutions	Major children's hospitals in geographic area, health departments, and large pediatric clinics.
Identify stakeholders	FBI, state and local law enforcement, private MDs, Homeland Security, FEMA, schools, Governor's Office, EMA, and public health agencies.
Determine disaster trigger points	Network institutions must determine criteria for a disaster and who initiates network disaster plans.
Use common terminology— standardized code language	Stakeholders and network institutions must reach consensus on terminology and code language to be implemented in all network hospitals.
Profession licensing/credentialing across state lines	Licensing agencies in a region should establish protocols that allow licensing and credentialing to cross state boundaries, given an event that initiates network disaster plans.
Hazard vulnerability analysis	All hazards do not have an equal probability within a region, depending upon geography, types of high-risk technologies, materials handled within the region, and terrorist threat. Therefore, risk analysis by hazard category must be undertaken.
Communication plans/alternatives	Multiple methods for communication must be developed and contact information between parties should be exchanged prior to an event and updated as needed. This information would include cell phone numbers, e-mail addresses, ham radio, and other means of contact.
MIS data—archived and recent information	The availability of relevant care information would be dictated by the decision to send acute patients (those affected by the disaster) or long-term care patients to other facilities. For disaster victims, only the relevant information would have to be sent and could be done in paper form. For long-term care patients, information related to chemotherapy regimens, dialysis, or other procedures would have to be included.
Special-needs patients	Adequate planning and resources for special-needs populations (e.g., children on dialysis) must be included in the planning.
Adult hospital overflow	Adult hospitals in close proximity to pediatric hospitals may be called upon to meet pediatric needs.
Staff/victim transportation	Network institutions must decide when staff or victims need to be moved. Institutions should have set means to transfer noncritical victims.
Supplies inventory availability	Institutions should have up-to-date inventories of supplies that are easily accessible and can be communicated quickly to network partners.
Incident command	Plans developed should outline incident command for the organization and the network.
Drills and exercises	Periodic drills on high-probability hazards should be planned and conducted.
Financial agreement planning	
Reimbursement—member, physician, hospital	Network institutions should communicate with Medicaid, HMOs, and PPOs on issues related to reimbursement when crossing state boundaries.
Medical malpractice issues—liability and insurance	Liability and insurance issues would be dictated by patient and/or personnel movement across state boundaries. These issues would need to be resolved during the development process.
Memorandum of understanding—staff, equipment, and facilities	Network institutions should develop standards of practice and use for staff, equipment, and facilities.
Operational/medical staff protocol planning	
Institutional standardized matrix	Each participating hospital or agency should have an incident command system in place. As part of the development of the network, a standardized matrix identifying responsible personnel for certain areas and activities should be created and shared between partners.
Identification of volunteers and deployment team	Staff and volunteers who would be able to travel or provide care to children outside of their institution or state should be identified and given instructions on how to respond given an event.

continued on p. 123

Figure 3 (continued). Critical issues identified in the planning and development of the Southeastern Regional Pediatric Disaster Surge Network^a

<i>Disaster network creation issues^b</i>	<i>Pre-event planning requirements</i>
Facility leaders	Each institution should identify a leader and assure that network partners are familiar with this person.
Triage standardized	Network institutions should reach consensus on a standard triage system and ensure that all employees are aware of the standard.
Joint institution training	Staff who will be working at other network institutions should have some introduction to their counterparts at other institutions. Training these individuals together may be necessary.
Adoption of best practices	While it is difficult to plan for every disaster situation, incorporating the pediatric network into drills (national, regional, statewide, and local) will assist partners in developing best practices.

^aAdapted from: Ginter PM, Wingate MS, Rucks AC, Vascenez RD, McCormick L, Baldwin S, et al. Creating a regional pediatric medical disaster preparedness network: imperatives and issues. *Matern Child Health J* 2006;10:391-6.

^bIssues were identified at the Pediatric Disaster Preparedness meeting, February 15, 2005. Organizations with representatives in attendance included the American Academy of Pediatrics; Alabama Department of Health Center for Emergency Preparedness; Children's Hospital of Atlanta; Children's Hospital of Alabama; Le Bonheur Children's Hospital; Tulane University Medical Center; University of Alabama at Birmingham, School of Public Health, South Central Center for Public Health Preparedness; University of South Alabama Medical School; and Vanderbilt Children's Hospital.

FBI = Federal Bureau of Investigation

MD = doctor of medicine

FEMA = Federal Emergency Management Agency

EMA = emergency management agency

MIS = management information system

HMO = health maintenance organization

PPO = preferred provider organization

workshop. The draft had six sections: (1) introduction, (2) purpose, (3) network activation, (4) operations and logistics, (5) medical staff and personnel development, and (6) finance. In preparation for the second workshop, SCCPHP investigators developed a list of topics and worksheets to gather data about the topics. The 38 participants were organized into six workgroups to collect data on the first 12 topics shown in Figure 4. The workgroups presented their findings in a plenary session, with the SCCPHP investigators serving as facilitators. Before the second workshop concluded, data were collected on each of the 12 topics.

Using the data, SCCPHP investigators expanded the draft of the Network Handbook and distributed it to all previous workshop attendees and third workshop registrants. The third workshop was designed similarly to the second workshop and, in addition, there was a plenary session to review and edit the draft of the Network Handbook. The workgroups were assigned topics 13 through 19 from Figure 4, with topics 17 through 19 combined into one topic dealing with network financing.

In the workshop, the issue was raised as to whether Network efforts were duplicating plans previously developed by the state emergency management agencies. A consensus was reached that pediatric-focused resources

were neither well-defined nor well-represented in the response processes coordinated by the emergency agencies. Therefore, it was also established that the Network would be represented in the participating states' EOCs by state public health agencies that fill the ESF 8 "seat" in the EOC during disaster response activations.

A Handbook Editing Committee was formed from participants in the third workshop plus others from the previous workshops nominated by the project's sponsors. The formation of the Handbook Editing Committee was a major breakthrough in the fourth workshop meeting, not only in the contents of the Network Handbook, but also, and more importantly, in the ownership of the process. To this point, the Network Handbook and the organizational direction of the project had been largely "owned" by the SCCPHP investigators, who argued that as long as the project was not led by the representatives of the Network partners, it would be more difficult, and likely impossible, to bring it to fruition. During the meeting of the Handbook Editing Committee, ownership was transferred from the SCCPHP investigators to the Network participants. In addition, it was concluded that participating institutions, at best, would only commit to broad participation and to provide pediatric resources to the "best of their

ability” in a formal Network agreement. Detailed and specific procedures for credentialing, patient transfer, and financing could not always be anticipated, and regulations varied considerably from state to state. Network participants would not commit to an agreement that could jeopardize their own operation or potentially incur crippling financial costs.

Participants attending the fourth workshop identified the need for and created two task forces. The Common Systems and Acronyms Task Force met via teleconference and focused on identifying systems that exist in each state to monitor the hospital resources and to define the variations of common acronyms used in the various partner states. The Resource Typing Task Force focused on defining pediatric-focused resources that can be added to the Federal Emergency Management Agency’s Public Health and Medical Services resource definitions.^{28,29} The pediatric resources defined by the Resource Typing Task Force included physicians (e.g., general pediatrician, pediatric critical care, and anesthesiologist), registered nurses, respiratory therapists, mental health professionals, social workers, pharmacists, and paramedics, among others.

Workshops 5 through 7 featured reports from the Common Systems and Acronyms Task Force and the Resource Typing Task Force. Additionally, Network development had reached a point at which further development and movement to Phase 3 (Figure 2) would not be possible without executive-level com-

mitment by the participating institutions. Therefore, drawing upon the Network Handbook, an MOU was drafted, edited, and submitted to key Network participants for vetting, final revisions, and signatures.

In addition, during workshop 7 it was recognized that the activities associated with day-to-day maintenance of the Network (e.g., maintaining Network participant points-of-contact information, convening Network participants, and planning and conducting exercises and drills) would have to be the responsibility of one organization that could keep it as a high priority. SCCPHP accepted this responsibility as it fit with the Center’s fundamental mission and goals. Successful completion and signing of the MOU by Network participants and the establishment of the SCCPHP to facilitate Network maintenance would signify the end of Phase 2 and the beginning of Phase 3 of Network development.

Phase 3—systemic network: long-term formal linkages

As of this writing, the Network has entered Phase 3 of Network development (Figure 2). The final phase of Network development will engage participants in exercises and evaluations of the Network. Through these activities, additional logistical details will be identified and integrated into the Network Handbook. An important challenge confronting Network participants is to test the effectiveness of the conversion from a virtual to an actual operating Network. To date, all efforts have centered on organizing and developing the guidelines for implementing the Network, but the effectiveness of the effort has not been evaluated.

An important element of Network maintenance is the design, delivery, and evaluation of drills and exercises. Drills are scheduled quarterly for the purpose of verifying the Network Participant Primary-Point-of-Contact (Primary POC) list. The drill will involve the SCCPHP placing a telephone call and sending an e-mail message to every Primary POC and recording whether the contact is successful. A log of these drills will be maintained and reported regularly at each Network conference. On an annual basis, the Network will conduct at least two Homeland Security Exercise and Evaluation Program (HSEEP) compliant exercises.³⁰ Both discussion-based and field exercises will be conducted. The exercises may be broad in scope to evaluate the integration and coordination of many aspects of the Network, or they may be functional to evaluate a particular function—e.g., an interstate request for support during a non-declared emergency.

The exercises will be robust in nature and incorporate the three suggestions of Bullard and colleagues:³¹

Figure 4. Topics for workgroup discussion and data generation during the planning and development of the Southeastern Regional Pediatric Disaster Surge Network

1. Activation and deactivation
2. Maintenance of situational awareness
3. Network incident command
4. Unified command
5. Role of adult hospitals
6. Role of volunteers
7. Institutional communication outside of an event
8. Procurement procedure and authority
9. Assessment of resource availability
10. Determination of need for nongovernmental agency assistance
11. Assessment of need for support functions
12. Identification of agency planning partners
13. Support and medical staff
14. Licensing and credentialing
15. Common language and coding
16. Release of personnel
17. Funding
18. Monitoring multiple sources of funds
19. Financial controls

(a) ensure that legal issues are considered in the development and conduct of state and local legal preparedness exercises; (b) identify and promote awareness of key legal and operational issues and challenges faced by healthcare providers and facilities in an emergency; and (c) test healthcare provider and facility emergency response plans to ensure effectiveness and integration with other local emergency preparedness efforts.³¹

An important part of the HSEEP process is the detailed documentation of exercises in the form of planning documents and the writing of after-action reports and improvement plans (AAR/IPs). The AAR/IPs will be used to improve Network performance and to identify training and educational needs.

DISCUSSION

The Network participants engaged in a series of meetings from 2005 throughout 2010 to develop a voluntary pediatric surge network. Details have culminated in the development of a Network Handbook and broad MOU outlining the essential character of the Network. Although testing and evaluating the effectiveness of the Network remains the primary challenge, plans are in place to test the proposed system.

Development of the Network has been an interesting and often challenging process, and we learned some important lessons that will be of benefit for future Network development projects.

1. Keep the time between the developmental phases as short as possible. We let too much time elapse between Phase 1 and Phase 2 and lost some momentum.
2. Developmental participants should be knowledgeable about surge problems and issues, as well as emergency and disaster preparedness operations and response systems. We had knowledgeable participants from a variety of agencies and organizations who could consider practical operational and response issues.
3. In Phase 2, institutional executives must become involved to formally commit their agency or organization to Network membership and participation. Although we were able to develop a plan, it had to be translated into a formal MOU that the institutions could commit to and adopt before we could have a “real” surge mutual aid network that we could engage in an exercise.
4. One organization had to take primary responsibility for moving the developmental process

along—convening, facilitating, and documenting the work of the Network participants. SCCPHP was able to fulfill this role with the support of ADPH and MSDH.

5. Similarly, an organization or individual must have responsibility for the maintenance of the Network on an ongoing basis. Network participants typically are busy with competing priorities, and Network maintenance would likely not receive the attention necessary to keep it viable. Therefore, SCCPHP agreed to perform the maintenance function.
6. Multistate, multijurisdictional mutual aid networks are a practical solution to emergency and disaster response; however, they are much more complicated than intrastate mutual aid pacts. We spent hours discussing financing, credentialing, transporting of patients across state lines, and incident command authority issues, as well as state regulatory differences and other difficulties with multiple state agreements. As a result, our initial MOU is more general than we would have anticipated (or wanted), and we now realize that many of the operational and logistical issues will have to be worked out through interstate exercises.
7. The process of convening providers, public health organizations, and the responder community to discuss issues concerning pediatric emergencies or disasters that would overwhelm local or state response capabilities was a great benefit and instructive in itself. The process alerted everyone to the problem, personally connected people who may ultimately have to work together, opened lines of communication, and provided a foundation for the development of closer relationships.
8. In a process such as this, one must get started before one knows how to do it. We had a good idea of what we wanted to accomplish and a reasonable plan for achieving it. However, as the process unfolded, we had to rethink and change the process itself as we proceeded. For example, the model or “map” shown in Figures 1 and 2 was established well into the process as we tried to understand the interagency collaborative process. The model then provided a way to document our developmental activities and help us think through how to incorporate HRO characteristics.

CONCLUSION

Exercises and subsequent evaluation of the Network will yield new insights into the development and operation of regional mutual aid networks. However, the real test of the Network will come in an actual emergency or disaster. If the initial reality test for the Network comes in the form of a localized emergency that impacts only one or relatively few participants, the Network is expected to function as envisioned. The ultimate test of the Network will be in an actual widespread emergency where all participants will face a difficult choice—should we look out for our own self-interest or participate altruistically as members of the Network? We think the Network will be collaborative and highly reliable and the relationships established through its development will provide vital regional pediatric surge capacity.

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REFERENCES

1. Becker BM. Children and disaster. In: Ciotto GR, editor. *Disaster medicine*. 3rd ed. Philadelphia: Mosby Elsevier; 2006. p. 51-8.
2. Coleman L. Frequency of man-made disasters in the 20th century. *J Contingencies and Crisis Manag* 2006;14:3-11.
3. Arnold M, Chen R, Diechmann U, Dilley M, Lerner-Lam A, Pullen R, et al., editors. *Natural disaster hotspots case studies*. Washington: The World Bank; 2006.
4. McAndrews L. Children's hospitals meeting the challenge together. *Pediatrics* 2006;117(5 Pt 3):S357-8.
5. Spedale SB. Opening our doors for all newborns: caring for displaced neonates: intrastate. *Pediatrics* 2006;117(5 Pt 3):S389-95.
6. Baldwin S, Robinson A, Barlow P, Fargason CA Jr. Moving hospitalized children all over the southeast: interstate transfer of pediatric patients during Hurricane Katrina. *Pediatrics* 2006;117(5 Pt 3):S416-20.
7. Johnston C, Redlener I. Critical concepts for children in disasters identified by hands-on professionals: summary of issues demanding solutions before the next one. *Pediatrics* 2006;117(5 Pt 3):S458-60.
8. Ginter PM, Wingate MS, Rucks AC, Vasconez RD, McCormick L, Baldwin S, et al. Creating a regional pediatric medical disaster preparedness network: imperatives and issues. *Matern Child Health J* 2006;10:391-6.
9. Ginter PM, Duncan WJ, McCormick LC, Rucks AC, Wingate MS, Abdolrasulnia M. Effective response to large-scale disasters: the need for high-reliability preparedness networks. *Int J Mass Emergencies and Disasters* 2006;24:331-49.
10. Boyer EW, Fitch J, Shannon M. Pediatric hospital surge capacity in public health emergencies. Pub. No. 09-0014. Rockville (MD): Agency for Healthcare Research and Quality (US); 2009.
11. Federal Emergency Management Agency (US). NRF resource center: national response framework [cited 2009 Oct 7]. Available from: URL: <http://www.fema.gov/emergency/nrf>
12. Perrow C. *Normal accidents: living with high risk technologies*. New York: Basic Books; 1984.
13. Roberts KH. Some characteristics of one type of high reliability organization. *Organization Science* 1990;1:160-76.
14. Roberts KH, Stout SK, Halpern JJ. Decision dynamics in two high reliability military organizations. *Management Science* 1994;40:614-24.
15. Roberts KH, Bea R. Must accidents happen? Lessons from high-reliability organizations. *Acad Manag Exec* 2001;15:70-8.
16. La Porte T, Consolini P. Theoretical and operational challenges of "high-reliability organizations": air-traffic control and aircraft carriers. *Int J Public Admin* 1998;21:847-52.
17. Klein RL, Bigley GA, Roberts KH. Organizational culture in high reliability organizations: an extension. *Human Relations* 1995;48:771-93.
18. Bigley GA, Roberts KH. The incident command system: high-reliability organizing for complex and volatile task environments. *Acad Manag J* 2001;44:1281-99.
19. Bierly PE III, Spender JC. Culture and high reliability organizations: the case of the nuclear submarine. *J Manag* 1995;21:639-56.
20. Grabowski M, Roberts KH. Risk mitigation in virtual organizations. *Organization Science* 1999;10:704-21.
21. Alter C, Hage J. *Organizations working together*. Newbury Park (CA): Sage Publications; 1993.
22. Department of Homeland Security (US). National Incident Management System. December 2008 [cited 2009 Oct 7]. Available from: URL: http://www.fema.gov/pdf/emergency/nims/NIMS_core.pdf
23. Public Law 104-321, 110 Stat. 3887.
24. Stier DD, Goodman RA. Mutual aid agreements: essential legal tools for public health preparedness and response. *Am J Public Health* 2007;97(Suppl 1):S62-8.
25. Mintzberg H. *The structuring of organizations*. Englewood Cliffs (NJ): Prentice-Hall; 1979.
26. Ginter PM, Duncan WJ, Abdolrasulnia M. Hospital strategic preparedness planning: the new imperative. *Prehosp Disaster Med* 2007;22:529-36.
27. Rucks AC, Ginter PM, Duncan WJ. fCOOP: an efficient and effective process for continuity of operations planning. Presented at the 4th Annual Public Health Preparedness Summit; 2009 Feb 18–20; San Diego.
28. Federal Emergency Management Agency (US). NIMS resource center: resource typing [cited 2009 Oct 7]. Available from: URL: <http://www.fema.gov/emergency/nims/ResourceMngmnt.shtm#item4>
29. Federal Emergency Management Agency (US). Typed resource definitions: medical and public health resources [cited 2009 Oct 7]. Available from: URL: <http://www.fema.gov/emergency/nims/ResourceMngmnt.shtm#item4>
30. Federal Emergency Management Agency (US). Homeland Security Exercise and Evaluation Program: about HSEEP [cited 2010 Mar 31]. Available from: URL: https://hseep.dhs.gov/pages/1001_About.aspx#HSEEOOverview
31. Bullard CH, Hogan RD, Penn MS, Ferris J, Cleland J, Stier D, et al. Improving cross-sectoral and cross-jurisdictional coordination for public health emergency legal preparedness. *J Law Med Ethics* 2008;36:57-63.