

Community Engagement and Pediatric Disaster Readiness in a Large Urban Disaster Resource Hospital Network: The Case of “The Great California ShakeOut”

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ABSTRACT

We examined the response of 11 Los Angeles County (LAC) hospitals designated as Disaster Resource Centers (DRCs) to a statewide, earthquake preparedness drill, LAC’s most comprehensive earthquake disaster drill to date. Semistructured interviews were conducted with the coordinators of 11 of the 14 LAC DRCs within 3 weeks of the drill. Interviews were transcribed and thematic analysis was supported by analytical software (Atlas.ti). Except for one pediatric specialty DRC, most DRCs did little to fully test their institutions’ capacity to manage pediatric patients. Few DRCs included children as mock victims. Little or no attention was focused on pediatric triage and other pediatric clinical, psychosocial, and resource issues. Respondents maintained that community readiness is hampered by compartmentalizing the preparedness planning, training, and drilling. Without a mandate to coordinate with other agencies, few DRCs reported coordination with other community entities. Those that did were in smaller submunicipalities within LAC. Community coordination is critical to effective response to disasters, yet disaster preparedness planning and drills are most often uncoordinated and compartmentalized. Drills and training need to be transdisciplinary and coordinated with other community entities likely to play a role in pediatric disaster management.

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Key Words: disaster preparedness, pediatrics, earthquake drill

Natural and humanmade disasters will force public and private entities within a community to respond collectively to the disaster. Effective response can be hampered by cross-sector differences in jurisdiction, governance, communication, and organizational culture. Interagency coordination is key to any successful community disaster response.¹⁻⁴ The coordination needed during and after a disaster cannot be achieved without pre-disaster consensus-building and planning. Coordination and planning are especially critical as they relate to the needs of children. Pediatric disaster studies demonstrate that children are highly vulnerable during and after a disaster and have different physical and emotional needs.⁵⁻⁷ Planning to meet the needs of children includes specialized equipment and training.

This report focuses on pediatric disaster preparedness in Los Angeles County (LAC), a vast metropolitan area with a pediatric population of 2.5 million.⁸ LAC comprises the City of Los Angeles and 87 other incorporated cities,⁹ each with its own city government, services, school districts, and emergency operations centers (EOCs).¹⁰ As part of its disaster preparedness efforts, the county is host to 14 disaster resource centers (DRC), designated medical institu-

tions charged to be the hub disaster response for their respective catchment area. DRC institutions provide resources to smaller “umbrella” hospitals in the same geographic area. DRCs are health care centers under contract with the Los Angeles Emergency Medical Services Agency.

In 2008, a consortium of state and federal agencies sponsored a volunteer statewide earthquake drill entitled *The Great California ShakeOut*,* a simulated 7.8 magnitude earthquake occurring at 10 AM on November 13, 2008. The simulation triggered 1800 deaths, 50 000 injuries and \$200 billion in damages.¹¹ The exercise provided an opportunity to examine whether DRC hospitals took advantage of the ShakeOut drill to expand their disaster readiness capacity. Of particular interest were the extent to which DRCs integrated pediatric victims or issues into their drills, and the level of coordination between hospitals and communities. We use the term “community” to refer to any organization outside of the hospital.

*The Great California ShakeOut sponsors included the California Emergency Management Agency, US Geological Society, American Red Cross, Southern California Earthquake Center, California Earthquake Authority, and State Farm Insurance Company.

METHODS

Study Sample and Recruitment

Institutional review board approval was obtained to conduct qualitative research using key informant (KI) interviews. We invited the disaster preparedness coordinators of the DRC network in LAC to participate in the study. The DRC network comprises 13 hospitals and 1 community clinic association representing a membership of 43 clinics located throughout the county.

Interviews were scheduled with individuals identified as responsible for their institutions' disaster response planning. Electronic mail and telephone correspondence were used to communicate with disaster preparedness coordinators.

We conducted audiotaped telephone interviews lasting approximately 20 minutes to obtain information specific to the ShakeOut. To reduce recall bias, all interviews were conducted within three weeks after the drill. Written, signed consents were obtained from participants before the drill (as part of an ongoing study), and verbal consent was received over the phone on the day of the interview.

Instrument, Data Collection, and Analysis

The investigators created a guide for the interviews (Table 1). The guide was influenced by findings from prior studies conducted with the same group of hospitals and was specifically constructed to measure the level of pediatric and community involvement by hospitals participating in the ShakeOut.

The audiotaped interviews were transcribed into text files. Qualitative analysis was based on thematic analysis approach using Atlas.ti qualitative analytical software, which classifies themes and patterns revealed in responses to each of the interview topics described here. We reviewed various thematic patterns described in participants' responses and subsequently created codes that reflected corresponding themes. New codes were created as novel patterns emerged. Themes were catalogued and collectively became the information base for a meaningful conceptual framework and analysis.

RESULTS

Hospital Characteristics

Nearly all (86%) of DRC coordinators were interviewed, including 11 DRC hospital coordinators and the DRC coordinator of the community clinic. Of the participating hospitals, two had both pediatric and adult hospital characteristics. Nine were general hospitals focusing on adult populations, and one was a free-standing children's hospital. Of the participating general hospitals, one was designated as a pediatric trauma center. All of the general hospitals included a neonatal intensive care unit (NICU) and/or a pediatric intensive care unit (PICU).

Due to the structural and clinical differences between the clinic association and hospitals, the clinic association data were excluded from analysis. The two hospitals that did not partici-

pate in the study were general hospitals that included a NICU and/or a PICU. DRC representatives from these hospitals were unreachable within one month after the ShakeOut.

All KIs were individuals who were directly involved in the planning and coordination of disaster preparedness and response activities in their respective hospitals. All but one respondent, who was the pediatric disaster specialist, was the designated coordinator of their institution's DRC.

Drill Scenarios and Objectives

KI interviews demonstrated that the ShakeOut provided an opportunity for hospitals in the disaster network to simulate prescribed scenarios that may occur in the aftermath of a 7.8-magnitude earthquake. Each hospital selected a drill scenario based on training needs, feasibility, or available resources (Table 2). Five of the 11 hospitals reported having conducted a full-scale drill. One facility reported having set up an external care center but conducted a tabletop exercise on lateral evacuation of patients within the hospital. Four of the remaining facilities focused on testing only their emergency communications tools or initiating the incident command center. One hospital used the opportunity to host an educational forum for all of its employees.

Consideration of Pediatric Victims

Inclusion of Children: The number of children included in the drill ranged from 0 to 31. Eight of the 11 hospitals reported including pediatric victims or issues in their response to the ShakeOut. Four of these hospitals reported having used live mock victims in their drills, while three reported using "paper victims," mannequins, or dolls. The hospital that reported having an educational forum for its employees included a "pediatric hand-out" as part of their educational packet. Of the three hospitals that did not drill with a pediatric scenario, two were general hospitals and one was a blended facility. The primary reasons reported for not including children in their drills were children were not the focus of the drill and "victims are categorized as patients, and subgroups of patients are generally not considered for disaster drills."

Special Preparations and Training: When asked if they needed special training for including pediatric victims in their drills, KIs from a pediatric and general hospital suggested that they did not, stating that their institution has the capacity to treat children routinely.

A DRC coordinator whose general hospital included pediatric victims noted that few trainings or tools were available to support specific pediatric disaster response practices, such as evacuating a NICU. "We'd never done it before," reported a respondent, "and when we asked around, nobody else had done it either. We didn't have anybody as a resource to turn to." This respondent reported that the hospital let a neonatal specialist guide their drill and used this opportunity to learn by trial and error.

Community–Hospital Collaborations

Knowledge: Seven of 11 hospitals were able to describe the ShakeOut activities conducted by at least one nonmedical agency in the community. Three of the 11 hospitals were unaware of disaster response activities in other community orga-

nizations, saying only that they were aware that schools and businesses “everywhere” were taking part in ShakeOut drills.

TABLE 1

Key Informant Interview Guide, Pediatric and Community Involvement in Statewide ShakeOut Drill, November 13, 2008

Hospital Focus

First, we are going to focus on your hospital’s work during the ShakeOut drill on November 13th.

1. Can you briefly describe your facility’s drill goals?
 2. How, if any, were children involved in your drill?
- If children were involved:
3. What preparations did you have to make to involve children?
 4. Were there any actions, outside of your ordinary drill procedures, that were taken to involve children in the process?
 5. In your opinion, how successful was the drill involving children?
- If children were NOT involved:
6. What circumstances led you to not involving children?

Community Focus

We will now focus on the surrounding community and their preparations for the ShakeOut drill.

7. Can you describe the kinds of ShakeOut activities that were conducted in your surrounding community?
8. Was there any coordination with the community? Please describe.
9. In what capacity was your hospital involved with these community drills?
10. What resources would be useful to enhance the involvement of your hospital in such community activities in the future?
11. What circumstances led to the hospital not being involved with these community drills?

Children and Community

We will now focus on how children were involved in community-wide ShakeOut activities.

12. Can you describe how children were involved in these community drills?
- If children are involved:
13. How did it play out to have pediatric involvement?
 14. What improvements would you recommend and what resources would be required to make these improvements?
- If children were NOT involved:
15. As far as you know, what circumstances led to not involving children in these community drills?
 16. What resources would be useful to involve children in such community activities in the future?

Type of Agencies and Characteristics of Collaborations: During the drill, DRC coordinators were most likely to connect with county and city disaster authorities, other hospitals in the network, ham radio operators, and local medical clinics. Four DRCs also reported having collaborated with local fire and police departments, schools, Red Cross centers, city public works, and other local nondisaster network hospitals. All respondents reported having communicated with the county EOC on the day of the ShakeOut. Seven respondents tested communications with other local hospitals or medical clinics. More extensive coordination was reported by six of the respondents. Four reported that their hospitals participated in local citywide planning activities that included other local agencies. Three DRCs reported coordinating with surrounding schools even though schools were participating in the ShakeOut. Three hospitals reported that local schools participated in their drills, although coordination was limited to including school children in the hospital drills or providing disaster education at a school district event.

Community Coordination in Small and Large Municipalities:

Of the total participating hospitals, seven were located in small municipalities and four were in the City of Los Angeles. The four hospitals reporting participation in city-wide disaster planning shared several characteristics. All were general hospitals located in smaller municipalities. Further analysis revealed that hospitals located in the smaller municipalities within LAC were more likely to report coordination with outside agencies during the ShakeOut than those in the City of Los Angeles. To represent their interests, six of the seven hospitals located in these smaller cities reported having sent a hospital representative to their local EOC during the drill exercise. In comparison, none of the DRC institutions located in the City of Los Angeles made contact with their EOC. In addition, six of seven disaster coordinators from hospitals located in the smaller cities involved at least one other agency in their hospital’s ShakeOut drill plans. Hospitals that included school districts in their drills were also located in the smaller cities. Five of seven of the hospitals in small cities coordinated with their local school districts.

TABLE 2

Examples of Full-Scale Drill Scenarios Conducted by Hospitals During the ShakeOut Drill

- Evacuation of adult patients to a nearby hospital
- Evacuation of a neonatal intensive care unit (NICU) to a makeshift external care center set up in the parking lot of a hospital
- Response to a surge in both adult and pediatric patients injured by the earthquake while dealing with internal minor structural damage to the hospital.

Coordination with Schools

Only 5 of the 11 participating DRCs reported having any coordination with schools. One of the five offered an event at a school site. One hospital noted that coordination with the local schools was facilitated by a well-established relationship with the local school district. Others reported that coordination plans and activities with schools for the ShakeOut were facilitated by their local EOC. Three DRC coordinators reported having personally played a role in the development of the local school district’s emergency preparedness plans.

All DRCs reported specific challenges to integrating schools into their hospital drills. The primary challenges reported were lack of funding and a historical disconnect between the school and hospital systems. A respondent from the hospital that participated in an educational event at the local high school reported that it was only possible because of funds secured for that purpose by the school district. One hospital coordinator maintained that coordination between the community and local schools was further challenged by turnover of disaster response staff and lack of emphasis for coordination. Table 3 presents respondents' suggestions for improving disaster preparedness coordination with community schools.

Pediatric Resource and Training Needs

Pediatric Equipment: Several hospitals reported needing pediatric equipment. Suggestions included equipment not yet invented such as collapsible cribs that are easily stored.

Pediatric-Focused Disaster Training: Specific training needs included NICU evacuations, using the JumpSTART triage system for children, family reunification, and handling a huge population in a high influx type of disaster.

Access to Pediatric Expertise Available During a Disaster: "I'm definitely very interested in having a robot in our ER," reported one respondent, referring to a robot capable of providing two-way audiovisual telecommunication and immediate telepresence for locations lacking pediatric experts.

Bi-directional Communication Between the Pediatric Hospitals and Emergency Medical Services: The DRC coordinator of the pediatric specialty hospital acknowledged that the county's emergency response systems will inevitably seek support, advice, and supplies from pediatric facilities to help manage pediatric patient surges. Given that certainty, she maintained that predisaster planning and drilling would be critical for interagency coordination to be successful in a real disaster.

COMMENT

The ShakeOut drill provided an opportunity for institutions to combine their compartmentalized disaster preparedness efforts into a cohesive community-wide exercise. Past research examining pediatric predisaster planning among LAC's DRC hospitals suggested that disaster drills typically focus only on the institution's readiness and are conducted in isolation of communities.¹² Although there was no mandate to coordinate drill activities between community and health care agencies or to integrate pediatric concerns, the drill presented an opportunity to plan and test the coordination that would be essential for an effective response.

We found that most institutions had considered pediatric concerns in their ShakeOut drills. Previous interviews with DRC coordinators suggested that either none or very few planned for disasters involving children.¹² In the absence of any state or federal guidelines for pediatric disaster planning, this is an encour-

TABLE 3

Respondents' Suggestions for Improving Disaster Preparedness Coordination With Communities and Schools

- Pass mandate at the school district or county/state level emergency planning agencies
- Coordinate disaster drill requirements at the state level
- Establish personal connections between key players in disaster coordination in schools and hospitals
- Create smaller school districts to facilitate collaboration
- Plan disaster drills early enough to be included in local school calendars

aging discovery; however, findings from this study suggest that hospitals continue to lack support and resources for pediatric disaster planning. Many remain concerned about their institutions' capacity to address pediatric disaster needs.

In spite of the opportunities this drill presented, few institutions took advantage to coordinate with their local community. The differences between the smaller LAC municipalities and the larger City of Los Angeles were striking. Predisaster community coordination and planning were more likely to be conducted in smaller communities when compared to the larger City of Los Angeles. This feature may be attributed to smaller cities finding it more feasible to coordinate disaster planning between institutions, as they do not have to navigate Los Angeles City's massive, bureaucracies, agencies, and school district.¹³ The large and centralized structures of the Los Angeles Unified School District, which is the second largest school district in the nation,¹⁴ and police, fire, and emergency medical services create enormous challenges to addressing and developing coordinated and focused community disaster planning.

Respondents from smaller cities were more apt to know personally and communicate regularly with respective institution representatives likely to play a role in the disaster response. These respondents reported sending their own children to the local schools or having personal connections with other community leaders. This finding has significant implications as to approaches to improve emergency planning and training. The approach of the hospitals, charged as first responders during the ShakeOut, raises questions about the utility of fragmented planning and underscores the need to address disaster planning and response inclusively. Community engagement is vital for the coordination that will inevitably be needed in the event of a disaster. The approaches undertaken in the smaller cities challenge us to consider means by which to create the relationships necessary for effective coordination in other regions, particularly larger, centralized municipalities. Creating geographically discrete, multi-institutional units of planning may facilitate the development of integrated planning and response.

This study focuses on 11 of 14 DRCs that belong to a disaster network in a large metropolitan area. The interviews were con-

ducted to gather the cross-sectional perspective of a highly publicized disaster preparedness event. In the event of a real disaster, the conditions and response levels will be different than those in an organized, preplanned drill activity. Although vital information on need and status of disaster preparation for a pediatric disaster can be learned from this study, the results are not generalizable to other hospitals, geographic areas, or disaster events.

CONCLUSIONS

Community coordination is critical to effective response to disasters, yet disaster preparedness planning and drills are most often uncoordinated and compartmentalized. Drills should be coordinated with other community entities likely to play a role in pediatric disaster management. Indeed, further research is needed, especially in the fields of organizational network building and communication, to elucidate ways communities can come together to address the needs of residents of all ages.

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