Pediatric Disaster Preparedness Education

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Abstract
Disaster preparedness is costly; however, the cost involved in the lack of preparedness is incalculable [1]. Pediatric disaster preparedness education is crucial as there are many nuances that exist around children and disasters, such as supplies, equipment and dosing, as well as physiological and mental factors that make the acute response dramatically different from adults. As a result, it is important that families, schools, and hospital employees are familiar with pediatric disaster preparedness. In this article, we will discuss the challenges related to pediatric disaster preparedness education.

Keywords: Disaster; Education; Pediatric; Preparedness

Introduction
Disaster preparedness involves devoting substantial financial and organizational resources for something that might not happen. Conversely, being prepared is the best maneuver for surviving a disaster once it happens. Disaster preparedness consists of a hazard vulnerability analysis and needs assessment of an institution or region, ensuring that the proper supplies and resources are available, planning the appropriate steps involved in a response, and educating the various levels of providers. Proper education improves the likelihood that supplies and plans will be correctly used and implemented.

Pediatric disaster preparedness is a complex area, due to the specific needs of the pediatric population: [2] pediatric medication dosing and contra-indications, size-appropriate equipment and unique psychosocial needs, [3] age-appropriate mental health support and provision for family reunification, and [4] limited research in pediatric disaster response and education.

One of the first steps in pediatric disaster preparedness education is deciding on the appropriate populations to educate. In June 2001, the National Center for Disaster Medicine and Public Health conducted a conference on Pediatric Disaster Preparedness Curriculum Development. The conference identified three healthcare provider categories: emergency medical services (EMS)/first responders, emergency department (ED)/hospital staff, and ambulatory staff. Further, the conference workforce identified those in each healthcare provider category who should have pediatric disaster preparedness training and whose training would have the greatest impact regarding the reduction of morbidity and mortality of children [5].

Similarly, through this review, we have identified three levels in which education for pediatric disaster should be targeted. First is educating families, teachers and administrators in the school system. Second is educating the hospital administrators and planners. Third is educating the hospital employees. The data on EMS and ambulatory education is lacking and is therefore beyond the scope of this review.

Methods
In this review, we examined the current available written and web-based literature on the existing education methods for pediatric disaster preparedness. We used PubMed as a search engine with the following key words: pediatric, children, disaster, preparedness, education, cost, hospitals, school, public. We found 23 articles which addressed these elements and are included in our review.

Educating the public and the school system
Families and schools are often the very first responders for the school-age pediatric population in the event of a disaster [6]. Depending on the time and day, either the family or school may be responsible for providing first aid and evacuation arrangements to the nearest evacuation facility or hospital. Currently, specific education for families is scarce and consists mainly of a few online courses provided by the American Academy of Pediatrics and private providers [7]. More comprehensive self-paced courses are available online through the Federal Emergency Management Agency (FEMA), as part of the National Incident Management System [8]. These courses are designed for individuals who have emergency-management responsibilities as well as the general population [8]. Parents should also be educated in advance about their school’s emergency plans, including the differences between lockdown, shelter-in-place, evacuation, and relocation. Parents and administrators should recognize that well-meaning attempts to approach a school in crisis by parents or other caregivers could direct resources away from children, undermine emergency efforts, and increase risk to students [6].

School nurses are an important subgroup of providers within the school system who are a key constituency for pediatric disaster preparedness instruction. In one study, online courses for nurses were shown to improve nurse emergency preparedness knowledge and skills but did not affect participants’ confidence [9]. The authors of this study found that boosting confidence required actual hands-on drills. Loyoacan found that practice through drills and community-wide exercises also ensures that gaps will be identified and weaknesses will be addressed [10]. In summary, efforts to measure the impact of educating families and school workers is limited but there appears to be a true benefit in improving the readiness of these important responder groups. The next section will review the literature for the next level of
pediatric disaster preparedness education, which is hospital planners and hospital workers who will receive casualties after a catastrophic event.

**Educating hospital planners and providers**

Most accredited hospitals test their emergency preparedness plans based on The Joint Commission’s requirements that healthcare facilities conduct disaster drills twice a year [11]. Recent data suggest that most hospitals do not drill with pediatric disaster victims [12]. Facilities often overlook simulating disaster scenarios with children, thus, missing a crucial opportunity to assess their own shortcomings. As a consequence, a disaster with a large proportion of children will lead to poor coordination, inadequate resource management, and adverse health outcomes [13].

To overcome this gap, the Pediatric Disaster Resource and Training Center (PDRTC) at Children’s Hospital Los Angeles (CHLA) had defined its mission to provide education and enable hospitals to care for children who arrive at their door during and after a catastrophic event. The Center develops policies, plans, procedures, and education focused on children and families. A variety of platforms to deliver guidance are used, including computer-based tools. In collaboration with the Information Sciences Institute at the University of Southern California, the PDRTC also developed the Pediatric Emergency Decision Support System software (PEDSS) to assist hospitals in their pediatric disaster preparedness. The web-based software application is free (http://pedis.isi.edu/pedss). The application helps hospitals determine the pediatric medical and pharmaceutical supplies needed in the event of an earthquake. The application collects contextual information, such as demographics and capabilities, as well as surge capacity per injury type and then determines the required medical supplies based on the estimated number of children and available hospital resources [14].

Even among pediatric specialists, however, education for disaster preparedness is less than optimal. One survey of pediatric surgeons found that most felt they needed additional training, with 74 percent stating that they definitely or probably needed to do more training. Among experiential factors, the authors found that attendance at a national conference was associated with the highest sense of preparedness. The authors determined that subjects with actual disaster experience were about four times more likely to feel prepared than those with no disaster experience (p < 0.001). The authors also demonstrated that individuals with a defined leadership position in a disaster response plan are twice as likely to feel prepared [15].

In a review of the available literature on pediatric disaster preparedness education courses for hospital staff, Ablah and colleagues concluded that although the need for pediatric disaster preparedness is obvious and clear, very few curricula have been developed, delivered and evaluated [5]. The field of pediatric disaster training currently offers no standardized educational goals or objectives [16] or universally accepted guidelines to define preparedness, even for those in emergency department settings [17]. In order to achieve evidence-based pediatric emergency preparedness training, existing training programs must be evaluated, standardized training guidelines need to be developed, and critical components of pediatric disaster response need to be captured in the academic literature [7].

The available education curricula exist via either classroom teaching or online courses. For example, CHLA recently instituted a novel pediatric-focused disaster course for all new and existing clinical and non-clinical staff. Non-clinical staff are required to complete the course because clinical staffing may be limited in the event of a real disaster [13,18]. However, courses alone are not sufficient to educate hospital personnel. Fox and Timm described a pediatric disaster preparedness program presented to pediatric nurses in an urban, Level 1 trauma center. Survey results from the participants prior to the program revealed a lack of awareness of pediatric issues. Although the program resulted in an immediate improvement in awareness, retention fell back to pre-course levels two years later [19]. This study reiterated the inadequacy of courses in educating about pediatric disaster preparedness.

Drills on a regular basis, especially with mock patients, are invaluable in retaining the knowledge and skills acquired during preceding courses and in building the confidence of the team members in their abilities to function appropriately in time of need. Drills also serve as a means to evaluate the ability of the healthcare workers to perform emergency plans and to identify gaps and weaknesses in disaster-related knowledge and skills [12,13,17,20]. A novel approach for designing epidemiology-based mock victims for such drills has been described by Ballow et al. [21] and includes a regional hazard analysis, a historical assessment of previous disasters, and analysis of the regional pediatric population characteristics. All of these should guide the detailed design of the mock patients. More research is warranted in understanding to what degree hands-on exercises improve learning in pediatric emergency preparedness.

**Conclusion**

Education is a crucial component of pediatric disaster preparedness [4]. All levels of providers should be educated in order to be prepared. Public efforts are limited and more can be done to improve their readiness. Schools are a natural site to bolster disaster education but shrinking budgets and competing demands result in difficult tradeoffs. Resources are available from advocacy groups and government agencies (mostly FEMA and American Academy of Pediatrics).

Training for hospital leaders and workers is also scant but required by regulatory agencies. The quality and content of these trainings are lacking nationwide guidance. Hospital employees who are required to respond in an efficient and coordinated way at the time of a disaster involving pediatric patients oftentimes feel unprepared [15]. There are only a few existing curricula for educating hospital providers and there is still no evidence-based assessment or guidance of the curricula provided [7]. Drills are a necessary part of the educational process as they enable retention of acquired knowledge and skills, and provide a means for evaluation and improvement.

As suggested by the conference on Pediatric Disaster Curriculum Development conducted by the National Center for Disaster Medicine and Public Health preparedness education and training program in June 2001, an official nationwide role-specific, competency-based, pediatric disaster preparedness and training program should be developed to provide appropriate preparedness across the nation [4].

**References**


