

## Children With Disabilities in the Context of Disaster: A Social Vulnerability Perspective

Lori Peek

*Colorado State University*

Laura M. Stough

*Texas A&M University*

An estimated 200 million children worldwide experience various forms of disability. This critical review extrapolates from existing literature in 2 distinct areas of scholarship: one on individuals with disabilities in disaster, and the other on children in disaster. The extant literature suggests that various factors may contribute to the physical, psychological, and educational vulnerability of children with disabilities in disaster, including higher poverty rates, elevated risk exposure, greater vulnerability to traumatic loss or separation from caregivers, more strain on parents, and poor postdisaster outcomes, unless medical, familial, social, and educational protections are in place and vital social networks are quickly reestablished. Future research needs are outlined in the conclusion.

Research on children and disaster has increasingly examined how certain characteristics, such as age and developmental levels, gender, and ethnicity, intersect and affect children's experiences in disaster (La Greca, Silverman, Vernberg, & Roberts, 2002; Peek, 2008). However, researchers have rarely considered how disability may contribute to the short- and long-term impacts of disaster on children. This represents a significant gap in knowledge, given that in the United States almost 9.2% of the school-aged population receives special education services (U.S. Department of Education, 2009), and an even higher percentage of children with disabilities are estimated to live in developing countries (World Health Organization [WHO], 2005).

In this review of the existing literature, we examine the special situation of children with disabilities in the context of disaster, highlighting research on the potential vulnerabilities, risks, and resiliency factors of this population with the goal of building a better knowledge base for future research in this area. We begin with an overview of the social vulnerability perspective and then

summarize definitions of disability that are often used by scholars and practitioners working on disability issues in disaster. The subsequent sections of the article draw on empirical studies from disaster researchers and focus on the adverse physical, psychological, and educational vulnerabilities that children with disabilities may experience in the context of disaster. We conclude with a discussion of the theory of resilience as it pertains to children with disabilities in disaster and outline additional research needs.

### Social Vulnerability and Disaster

Historically, disasters have been viewed as random events that cause indiscriminate losses and suffering among affected populations. However, in the mid-1970s, social scientists who pioneered the social vulnerability perspective began to question the "naturalness" of "natural disasters" (O'Keefe, Westgate, & Wisner, 1976). Proponents of the social vulnerability school assert that disasters are in fact a complex mix of natural hazards and human action (Cutter, Boruff, & Shirley, 2003; Wisner, Blaikie, Cannon, & Davis, 2004). Disasters are thus conceptualized as the product of the convergence of social, political, and economic factors that shape people's exposure to risk and ability to prepare for,

---

The authors are listed alphabetically to denote equal contributions.

This work was supported by the National Institute of Mental Health Research Education in Disaster Mental Health (REDMH) mentoring program, Grant 5R25MH068298-04. The authors would like to thank Fran Norris, Carol North, and Larry Palinkas for their guidance.

Correspondence concerning this article should be addressed to Lori Peek, Department of Sociology, Colorado State University, B-237 Clark Building, Fort Collins, CO 80523-1784. Electronic mail may be sent to lori.peek@colostate.edu.

© 2010, Copyright the Author(s)  
Journal Compilation © 2010, Society for Research in Child Development, Inc.  
All rights reserved. 0009-3920/2010/8104-0016

respond to, and recover from extreme events (Wisner et al., 2004, p. 4). This theoretical frame posits that we as a human society, rather than nature alone, decide who is more likely to live near or in the path of dangerous agents and to have weakened or no defenses against them (Hewitt, 1997, p. 141).

Disaster risk is socially distributed in ways that reflect preexisting inequalities, in that some groups are more prone to death, injury, economic loss, and psychological impairment in the wake of differing hazards (Wisner et al., 2004). Specifically, children, the elderly, women, racial minorities, the poor, persons with physical or mental disabilities, and immigrants have been identified by both disaster researchers and policy makers as especially vulnerable to the harmful impacts of disaster (Cutter et al., 2003). Although these groups differ in many ways, when viewed through a social vulnerability perspective they all can be seen as lacking access to vital economic and social resources, possessing limited autonomy and power, and having low levels of social capital (Morrow, 1999). They also, for socio-historical and economic reasons, tend to live in the most hazardous regions and in the lowest quality housing, further exposing them to risks associated with natural hazards (Cutter et al., 2003; Wisner et al., 2004). Due to the disproportionate losses members of these marginalized groups suffer in disaster, they consequently have the hardest time recovering, creating vicious cycles of loss and vulnerability (United Nations Human Settlements Programme, 2007).

The social vulnerability paradigm, and the ensuing identification of vulnerable groups, has helped focus attention on those most at risk during and in the aftermath of disaster. Yet, social science research on vulnerable populations in disaster has tended to concentrate on single demographic factors—such as age, race, gender, or socioeconomic status—instead of examining the complex intersections between these categories (Phillips & Morrow, 2007). For example, it is clear that not all children are equally vulnerable to the impacts of disaster. Instead, the age of the child intersects with other personal and social characteristics, such as his or her geographic location, family structure, socioeconomic status, physical and mental ability, stage of development, and nationality, to determine the likelihood of harm in a particular disaster event. Given that these vulnerability factors tend to “cluster,” certain segments of the population, such as children with disabilities, may experience amplified risk in disaster.

### Defining Disability

*Disability* is a broad term that is not consistently defined. Its use varies according to societal norms and by the organizations, medical entities, and governmental agencies that address disability issues. The limited extant research on the effects of disaster on individuals with disabilities similarly has defined disability in a variety of ways. Mental health researchers typically use criteria from the American Psychiatric Association's (2000) *Diagnostic and Statistical Manual* to define samples with cognitive and psychological disabilities. Disaster researchers who study individuals with mobility impairments tend to use the Americans With Disabilities Act (1990) definition of disability as being “a physical or mental impairment that substantially limits one or more of the major life activities of such individual” (PL 101-336, 104 Stat. 327). Given their focus on disaster population statistics, epidemiologists often rely on the U.S. Census Bureau definition of disabilities, which allows for the analysis of data on persons with sensory, physical, mental, self-care, mobility, and employment-related disabilities. The emergency management field categorizes people who use wheelchairs, non-English speakers, and the elderly together as “special needs” populations.

Considering these varying taxonomies, definitions of disability in disaster research are best subsumed under the WHO's International Classification of Functioning, Disability, and Health (WHO, 2001). The ICF conceptualizes disability as resulting from the interaction between the health condition of an individual and that individual's personal and environmental setting. Thus defined, disability refers to an impairment in body functions or structures, a limitation in a specific activity, or a restriction in social participation. To date, research on the effects of disaster on people with disabilities has almost exclusively focused on how physical or cognitive impairments intersect with disaster experiences rather than on the interplay of disability with social and environmental factors. Kailes and Enders (2007) have proposed a functional-needs approach to defining disability in disaster, which highlights the supports individuals may need in the areas of communication, medical health, functional independence, supervision, and transportation. This functional-needs approach to disability was adopted by the U.S. Federal Emergency Management Agency and Department of Homeland Security Office for Civil Rights and Civil Liberties (2008) as part of its Comprehensive Preparedness

Guide 301 (CPG-301), which is designed to aid tribal, territorial, state, and local governments in planning for individuals with special needs during an emergency. The functional-needs approach has not yet been used, however, as a theoretical approach in disaster research on individuals with disabilities.

Identifying the precise number of individuals with disabilities within a particular sociocultural context also depends on the definition chosen. According to the WHO (2005), roughly 600 million people—10% of the global population—have some type of disability. Disability is highly correlated with poverty, and as many as 80% of all individuals with disabilities live in developing countries. The U.S. Census Bureau estimates the prevalence of disability in children between the ages of 6 and 15 to be nearly 13% (U.S. Census Bureau, 2005). The proportion of children with disabilities in developing countries is likely significantly higher, and it is estimated that over 200 million children worldwide have some type of disability (United Nations International Children's Emergency Fund, 2007).

### Children, Disability, and Disaster

By the end of the 20th century, disasters affected an estimated 67 million children around the world each year (Penrose & Takaki, 2006). This number is projected to more than triple over coming decades, mostly due to population growth, especially in hazardous regions such as low-lying coastal zones, and the growing prevalence and severity of climate change-related disasters (Bartlett, 2008). Conservative estimates suggest that over 7 million of these disaster-affected children experience various forms of disability (United Nations International Children's Emergency Fund, 2007), and millions more may acquire disabilities as a result of increasingly frequent and intense disaster activity, wars, and landmine explosions (World Health Organization, 2005).

Scholarship on social vulnerability and disaster often lists both children and individuals with disabilities as populations at particular risk when disaster strikes. Consequently, two parallel tracks of research—one on children, the other on people with disabilities—have emerged within the disaster literature. Although an increasing amount of scholarly and applied attention has focused on the implications of disaster for children and youth, little empirical work has examined the effects of disaster on individuals with disabilities. The research that is

available has focused on adult populations (Stough, 2009) and seldom mentions the needs of children with disabilities.

Given the dearth of research that reports on children with disabilities in disaster, we extrapolate from work in both areas to examine the potential implications of disasters for children with disabilities. To frame our discussion of the vulnerability and risk factors for children with disabilities, we draw on Peek's (2008) model that has previously been used to review research on children in disasters in terms of their physical, psychological, and educational vulnerabilities.

### *Physical Vulnerability*

When disaster strikes, children are among those most vulnerable to death and injury, especially in developing countries (Neumayer & Plümper, 2007). Similarly, adults with disabilities or mobility impairments are at increased risk for mortality (Aldrich & Benson, 2008). Children and individuals with disabilities share a number of common risk factors that increase the probability that they will experience negative physical impacts during and following disaster.

First, children and people with disabilities are more likely to live in poverty both in developed and developing nations. In the United States, a higher percentage of children (18.3%) and individuals with severe disabilities (26%) live in poverty than the population as a whole (13.3%; U.S. Census Bureau, 2006). In most high-income countries, people under 18 years of age make up about 20% of the population; in low-income countries, where children are more likely to experience disability, children represent closer to half of the total population (e.g., 42% in Bangladesh, 51% in Nigeria, 57% in Uganda; Bartlett, 2008, p. 75). Poor people around the world are more physically vulnerable to natural disasters because they cannot afford to engage in prescribed preparedness actions, often do not receive or understand warning messages, are less likely to have the resources to evacuate a threatened area, and typically live in low-cost, lower-quality housing that is more prone to damage or collapse (Fothergill & Peek, 2004; Wisner et al., 2004). Children with disabilities in high-poverty areas are thus among those most exposed and most vulnerable to extreme events.

Second, in the case of sudden onset disasters that allow little warning time, such as tornados or earthquakes, children with disabilities may have a more difficult time taking recommended protective

actions, escaping, or withstanding the force of the disaster. For instance, children with mobility limitations may be incapable of crouching under their desks in an earthquake, hiking up a hillside in a flash flood, or running to an evacuation point on higher ground in the event of a tsunami. All of these are recommended protective actions developed for people without mobility limitations. Children with cognitive impairments may not recognize signs of environmental danger or understand impending threats (Kailes & Enders, 2007) or may become anxious and confused in response to emergency signals (Scotti et al., 2007).

Third, even when evacuation is possible due to longer warning periods, such as with hurricanes, children with disabilities may be less likely to leave the threatened area thus putting them at increased risk for death or injury. Although much prior disaster research has shown that adults with children are *more likely* to respond to disaster warnings and evacuation orders than people without children, research on adults with disabilities has revealed that they are among those *least likely* to evacuate (see Dash & Gladwin, 2007). For example, studies on adults with sensory disabilities such as blindness or deafness suggest that these individuals often do not receive timely warning messages (Phillips & Morrow, 2007) and that they encounter significant barriers during evacuation (White, 2006). Van Willigen, Edwards, Edwards, and Hesse (2002) contrasted the experiences of households that had a family member with a disability with other households in North Carolina in the aftermath of Hurricanes Bonnie, Dennis, and Floyd. They found that evacuation rates were anywhere from 9% to 25% lower among those households that had a member of the family with a disability. These households were more likely to report that transportation issues and the lack of accessible shelters contributed to their decision not to evacuate. Research has also revealed that people with disabilities are less apt to have evacuation plans than those without disabilities (Spence, Lachlan, Burke, & Seeger, 2007).

Fourth, both children and people with disabilities are often excluded from emergency preparedness planning at all levels of government, leaving children with disabilities especially unprepared for emergencies. Disaster response professionals commonly assume that parents will inform, warn, and protect children in the event of disaster, even though children are frequently apart from their parents when in school, daycare, or with their friends (Mitchell, Haynes, Hall, Choong, & Oven, 2008;

Phillips & Morrow, 2007). Likewise, emergency management agencies regularly do not include the needs of individuals with disabilities in their emergency preparedness policies, citing factors such as inadequate personnel or their own limited knowledge of disability (Fox, White, Rooney, & Rowland, 2007; Rowland, White, Fox, & Rooney, 2007). This lack of attention to disability-related needs in emergency management could result in children with disabilities being left behind in an evacuation or forced to evacuate without vital supports (e.g., mobility devices, respirators, medications, companion animals, etc.; Osofsky, Osofsky, & Harris, 2007; Rooney & White, 2007). As a case in point, approximately 100,000 children and their families evacuated from the city of New Orleans as a result of Hurricane Katrina (Casserly, 2006). Over one third of the children who remained displaced months after the storm had at least one diagnosed chronic medical condition, and their access to health insurance, continuous medical care, prescription medication, and specialized medical equipment was significantly compromised (Abramson & Garfield, 2006; Abramson, Redlener, Stehling-Ariza, & Fuller, 2007).

Fifth, children with disabilities may be in danger of suffering life-threatening consequences in the aftermath of disaster due to separation from parents and other caregivers. Children who are separated from their parents after disaster are more prone to illness and disease, malnutrition, and abuse, and may have difficulty in situations with prolonged deprivation associated with more chronic events such as droughts (Babugura, 2008; Bartlett, 2008). Individuals with physical disabilities, which include those with paralysis or who are medically fragile, are similarly susceptible to secondary illnesses in conditions in which their ongoing health needs are not appropriately addressed (Kinne, Patrick, & Doyle, 2004).

Sixth, the stigma, social distancing, and institutional exclusion often experienced by individuals with disabilities can further threaten the physical health and well-being of children with disabilities in the aftermath of disaster (Hemingway & Priestly, 2006; Tierney, Petak, & Hahn, 1988). For example, children with disabilities may acquire additional impairments and experience health issues as a result of inadequately staffed shelters that are not prepared to meet their medical needs. Indeed, the National Organization on Disability (2005) reports that shelters often do not offer equitable access to services for people with disabilities, which may also mean this group is overlooked in the

distribution of basic relief and excluded from full participation in response and recovery activities (Hemingway & Priestly, 2006). In some developing countries, individuals with disabilities are socially stigmatized and face considerable social discrimination (Institute of Medicine, 2001), and anecdotal accounts suggest that some individuals with disabilities may even be purposely abandoned during disaster. For instance, news media reported that people with physical and cognitive disabilities were left behind during evacuation in the 2000 floods in Mozambique and Zimbabwe (United Nations Human Settlements Programme, 2007).

### *Psychological Vulnerability*

Most of the research that has been conducted on children and disasters has explored their psychological vulnerability in the short-term aftermath of disaster (La Greca et al., 2002; Weissbecker, Sephton, Martin, & Simpson, 2008). This body of work collectively indicates that school-aged children are often more psychologically affected by disaster than adults and that children of different ages express trauma differently. Following direct exposure to disaster, young children may exhibit increases in aggressive and oppositional behaviors, separation anxiety, diminished activity levels, somatic complaints, and changes in sleeping behaviors, whereas adolescents tend to have elevated anxiety levels, diminished academic performance, and may engage in delinquent behaviors (Norris et al., 2002). It should be noted, however, that most children, even when directly impacted by disaster, do *not* develop new psychopathologies. Children can and do effectively adapt to disruptive shocks caused by disaster, especially when they receive appropriate support from a parent or other close adult and live in a safe and nurturing environment (Dubow & Tisak, 1989; La Greca et al., 2002; Masten, 2001).

Very little research has been conducted on the psychological effects of disaster on individuals with disabilities. Some policy accounts suggest that adults with disabilities experience feelings of distress, depression, or anxiety following disaster (Rooney & White, 2007), but most of these reports did not include a formal psychological assessment. However, a few studies on individuals with pre-existing mental illnesses have found that when psychological treatment is continued postdisaster, patients do not acquire new psychopathologies, nor do their symptoms intensify (Bystritsky, Vapnik, Maidment, Pynoos, & Steinberg, 2000; McMillen, North, Mosley, & Smith, 2002).

Most children with disabilities are not only reliant on their parents for the same types of care as their peers who do not have disabilities but also often depend on their parents for additional functional and emotional supports. For instance, children with health care needs often have their parents administer prescriptions or perform medically related functions such as tube feeding or transferring them in and out of a wheelchair. Children with sensory disabilities such as blindness or deafness may rely on their parents for communication needs, and those with intellectual disabilities may need their parents to explain unfamiliar events when they occur. Yet trauma can have a deleterious impact on mothers and fathers and may limit their capacity to parent their children effectively (Appleyard & Osofsky, 2003). When parents suffer from depression, anxiety, posttraumatic stress disorder (PTSD), or other postdisaster disturbances, they are more likely to feel helpless and frustrated as they attempt to meet the support needs of their children (Osofsky, 1995), and severe parental distress can, in turn, contribute to PTSD symptomatology in children (Breton, Valla, & Lambert, 1993; Green et al., 1991). Given the added demands on parents of children with disabilities, it is possible that both these adults and their children could be at an even higher risk for postdisaster psychological impairment.

The separation of a parent and child during a disaster can be especially distressing to both the adult and child. For instance, one post-Katrina study found that trauma symptoms consistent with depression and PTSD were higher among children separated from caregivers during evacuation and displacement than among those children whose families remained intact (Osofsky et al., 2007). Because children with disabilities have social networks that tend to be smaller and more fragile (Smart, 2001), it is understandable that losing a parent or other person in their limited support system due to physical separation or even death could be particularly traumatic.

Research on individuals with disabilities suggests that they and their family members have more stressful evacuation and sheltering experiences and can be at a disadvantage in understanding instructions and procedures in these situations (Barile, Fichten, Ferraro, & Judd, 2006; Peek & Fothergill, 2008; White, 2006). Scotti et al. (2007) found that emergency situations, which typically include startling visual and auditory alerting systems and involve the presence of emergency personnel and other strangers, trigger negative stress reactions in adults with intellectual disabilities. Children with

intellectual disabilities such as autism may become agitated by alert systems and postdisaster sheltering. Children are often excluded in terms of postdisaster communication and decision making (Mitchell et al., 2008), and children with disabilities may be especially prone to exclusion from information and services made available to other children in shelters such as recreation, crisis intervention, or different forms of therapy.

Due to their economic status, individuals with disabilities are more likely to live in areas that are at risk of physical impact during disaster (Hewitt, 2007; Wisner et al., 2004), and therefore it is probable that children with disabilities and their families will experience significant material loss. Proximity to a disaster and direct exposure to destruction, trauma, and loss, in turn, increases the likelihood that a child will develop PTSD (Garfinkel, Kaushal, Teitler, & Garcia, 2005; Norris et al., 2002; Weissbecker et al., 2008). In their posthurricane research, Van Willigen et al. (2002) found that a higher percentage of households that included an individual with a disability experienced damage to their homes, and that members of these households were more likely to report that their lives were still disrupted more than a year after the disaster. Given children's elevated risk for trauma following disaster, children with disabilities who are directly exposed to disaster may be more susceptible to long-term psychological disruptions and they may exhibit negative reactions years following the event (Christ & Christ, 2006). In addition, although research has yet to explore whether children with disabilities are at risk for experiencing recurring disasters, the compounded vulnerability of this population suggests that this may be the case.

Although research shows that most children can and do recover psychologically from disaster, children with disabilities may face additional barriers that may delay their recovery. In their analysis of survey data with New York City residents, Garfinkel et al. (2005) found that adults with work disabilities and children with activity limitations were among those most likely to report persistent mental and physical health problems 6 months after the 9/11 attacks. According to Stough and Sharp (2007), adults with disabilities are more likely to require accessible housing and social services postdisaster to support their disability-related needs as well as a substantially longer period of case management than do adults without disabilities. Following Hurricane Katrina, children with cognitive disabilities who were displaced from their home communities were placed on long waiting lists for psychiatric

care. In addition, several parents noted that it was increasingly difficult or impossible for them to maintain their children's prescribed psychotropic medications, either because they could not find and afford appropriate psychiatric help or their medical records had been lost (Abramson & Garfield, 2006).

In a review of studies of child psychiatric interventions following disaster, La Greca (2001) concludes that when children are able to cognitively reprocess their traumatic experience, treatment of severe levels of PTSD is more successful. A challenge for children with cognitive disabilities, such as mental retardation or autism, is that they have difficulties in processing information, which may impede their psychological recovery postdisaster. Tierney et al. (1988) suggest that the social distancing associated with the label of "disabled" may further limit access to social networks and others sources of psychological support during a disaster. This same social distancing may also make it difficult for a child with a disability to adjust emotionally to a new school, neighborhood, or community.

#### *Educational Vulnerability*

Childhood is a time of rapid intellectual development, and thus children are uniquely vulnerable to negative educational outcomes that may accompany disaster (see Peek, 2008). Our search of the literature revealed limited research on the specific educational impacts of disaster for children with disabilities, likely because almost all of the extant literature on disability and disaster focuses on adult populations. The exception was Christ and Christ's (2006) post-9/11 study of children with learning disabilities. All of the children in their sample were living in one of the five boroughs of New York City at the time of the terrorist attacks and lost their firefighter fathers in the disaster. The researchers found that the children struggled with behavioral issues and increased educational demands after the disaster, although supportive special educators and school environments helped mitigate some of the most severe impacts of their losses.

The literature on the effects of disaster on children's education, in comparison, is much broader. Disasters often destroy school buildings, especially in locations where engineering standards and building codes are not enforced or where buildings are of less structural integrity: Hewitt (2007) inventoried tens of thousands of schools that collapsed in earthquakes over the past two decades in Pakistan, India, Nepal, Egypt, Turkey, Armenia, China, and

other countries. The loss of schools may leave surviving children with few alternatives for an adequate education, and this issue may be especially problematic for children with disabilities as they face many barriers in accessing education during nondisaster times in both developed and developing countries (International Federation of Red Cross and Red Crescent Societies, 2007). When disaster disrupts a community's educational system, schools accessible to children with disabilities may be among the last to be rebuilt and ramps and other forms of access into inclusive schools may become a secondary priority.

After a disaster, teachers and other key school personnel who remain in the affected region may become overburdened and preoccupied with loss and increasing personal and professional demands (Osofsky et al., 2007). Educators may also become displaced, choose not to return to the community, or lose their jobs due to budget shortfalls (Casserly, 2006). The loss of experienced teachers and other typical supporters of children can be disruptive to children's academic progress, and may be especially challenging for children with disabilities. These children and their families often have complex support networks that include health care professionals, education specialists, psychologists, and other experts in their school district before disaster strikes. There is a chronic shortage of special education teachers worldwide, including in the United States, and replacing qualified educators in the postdisaster recovery period can be quite challenging. Competing demands for limited resources in disaster-affected school districts could further delay the hiring of these personnel. Students with disabilities can be highly sensitive to discontinuities in their educational services, and prolonged disruptions could ultimately diminish their long-term educational outcomes. Children with disabilities also tend to have challenges in establishing social relationships, and therefore may experience the loss of their educational support network more acutely (Smart, 2001).

Vital school records are often damaged or destroyed in a disaster, which can delay the enrollment of students in new schools (Picou & Marshall, 2007). Beyond their general school records, children with disabilities typically have extensive educational and medical records, as well as Individual Education Plans, that may be lost. The loss of these documents can pose significant challenges for new teachers who rely on diagnostic assessments of performance to recreate adequate educational plans for students with special needs.

Environmentally displaced children in developing countries are sometimes forced to stop attending school in order to assist with household chores or to participate in wage labor (Babugura, 2008). In the United States, children displaced by Hurricane Katrina suffered numerous educational challenges, including multiple school relocations, unstable family situations, and unwelcoming and hostile classroom environments (Fothergill & Peek, 2006; Picou & Marshall, 2007). Counselors and teachers who worked with Katrina-affected youth described worrisome behaviors in both elementary and secondary school students, including an inability to pay attention in class, disruptive actions, changes in their friendships, and increased risk taking (Osofsky et al., 2007). Individuals with disabilities are generally more vulnerable to dislocating events (Garfinkel et al., 2005). As a result, children with disabilities may be at special risk for educational delays, diminished academic achievement, or negative behavioral responses in the classroom.

#### **Vulnerability and Resilience: Future Research Needs**

Our overview of the relevant literature in two distinct areas of scholarship—one on individuals with disabilities in disaster, the other on children in disaster—points to a number of factors that may contribute to the physical, psychological, and educational vulnerability of children with disabilities in the context of disaster. Specifically, children with disabilities may be expected to show: higher poverty rates, elevated exposure to hazards, greater vulnerability in the context of traumatic loss or separation from caregivers, more strain on parents, and worse postdisaster outcomes unless special medical, familial, social, and educational protections are in place and vital social networks can be quickly reestablished. Consistent with a bioecological systems approach (e.g., Bronfenbrenner & Ceci, 1994; Cicchetti & Lynch, 1993), these factors are interactive and therefore create a *layering of vulnerabilities* that may place children with disabilities differentially at risk before, during, and in the aftermath of disaster.

This review has highlighted the potential vulnerabilities of children with disabilities in disaster as well as the social-ecological nature of that vulnerability. Due to the limited research on the effects of disaster on children with disabilities, our review has said little about the resilience of children with disabilities following disaster. Masten and

Obradovic (2008) have previously used resilience theory to examine how systems interact with individuals in disaster-related events and to delineate different patterns of individual functioning in the aftermath of disaster. In their conceptualization, resiliency refers to how individuals regain normal functioning following exposure to disaster and is described in terms of "recovery, bouncing back, normalization, or self-righting" (p. 9). When considering recovery postdisaster, we can anticipate that children with disabilities will follow one of Masten and Obradovic's patterns in which individuals enter the disaster impact stage already demonstrating a lower level of adaptive functioning. This suppressed level of functioning may also result from, as we have discussed, the interaction between the preexisting condition of the child with the external risk factors to which they were exposed pre-disaster. The developmental trajectory that children with disabilities will subsequently follow post-disaster, however, is less obvious.

Existing research illuminates the reliance of children with disabilities upon the broader macrostructure to protect them from disaster and it is likely that they will be equally dependent upon this same macrostructure to help them recover in the aftermath of disaster. Thus, when considering resilience postdisaster, we can predict that without a home that is physically accessible, a school system that provides appropriate academic modifications, or a town that has health services, many children with disabilities will no longer be able to successfully function within their own communities. Disability is thus both *magnified* and *amplified* through the interaction between the psychological or physical condition of the child with disabilities and the ongoing disruption of their environmental setting. When the postdisaster context no longer provides affordances for their disability, the individual functioning of a child with disabilities becomes more salient.

For these reasons, we see community recovery as a primary contributor to the resilience of children with disabilities following disaster. The more quickly essential services are restored within a community, the more likely children with disabilities and their families will be able to access needed supports and accommodations. Thus, the recovery of an individual child with disabilities may be closely connected to the recovery of the community macrosystem. In their community resilience framework, Norris, Stevens, Pfefferbaum, Wyche, and Pfefferbaum (2008) suggest that in order to increase their resilience to disaster, communities need to attend to their areas of greatest social vulnerability.

Children with disabilities are one of these socially vulnerable populations, but we do not yet know what parts of the community infrastructure are most critical to support their resilience in the post-disaster context.

Given the dearth of empirical studies that actually explore how disaster affects children with disabilities in disaster, our review is necessarily speculative. Theoretically informed and methodologically rigorous quantitative and qualitative research is still needed to delineate the special risks and vulnerabilities that children with disabilities may experience both before and after disaster and to identify vital protective factors. Consequently, several key questions have not yet been addressed: How do various child characteristics (i.e., age, developmental level, intelligence, personality, gender, ethnicity, social class, family structure, geographic location) intersect with disability to influence the experiences of children with disabilities in disaster? How does disability type (i.e., auditory, visual, physical, cognitive) impact the ability of children with disabilities and their families to prepare for, respond to, and recover from different types of disaster? What roles do social stigma and institutional exclusion play in limiting the access of children with disabilities to emergency preparedness planning, sheltering options, therapeutic interventions, and other disaster-related resources? How are individuals within the social network of a child with a disability (e.g., parents, teachers, friends) affected by disaster and how does this influence the psychological response of the child? Are school-aged children with disabilities more likely to endure academic disruption, and if so, what are the developmental consequences of that disruption? What factors best support the resilience of children with disabilities postdisaster?

In order to design effective interventions for children with disabilities in disaster, future research needs to recognize the multilayered effects of how families, schools, communities, and societies shape the environment around children with disabilities as well as the types of adversity that they face during and following disaster (see Masten & Obradovic, 2008). In particular, we need to understand not only what makes these children vulnerable to disaster but also what can make them more resilient to disaster. Although disasters, at first glance, may appear to be what Lynch and Cicchetti (1998) refer to as *transient* risk factors, our discussion reveals them as potentially *enduring* vulnerability factors that represent ongoing conditions of inequity that place these children and their families at risk.



Given that children with disabilities often already face developmental challenges, disaster is one more risk factor that can lead to unfolding adverse consequences as these children develop.

All children, including those with disabilities, have the right to be safe and protected from natural and technological hazards and willful human-caused disasters. Certainly, children with disabilities should have equal access to disaster-related services as do their nondisabled peers, and in a just world, disability should not make them differentially at risk for injury, death, or psychological impairment following disaster.

### References

- Abramson, D., & Garfield, R. (2006). *On the edge: Children and families displaced by Hurricane Katrina and Rita face a looming medical and mental health crisis*. New York: Columbia University Mailman School of Public Health.
- Abramson, D., Redlener, I., Stehling-Ariza, T., & Fuller, E. (2007). *The legacy of Katrina's children: Estimating the numbers of at-risk children in the Gulf Coast states of Louisiana and Mississippi*. New York: Columbia University Mailman School of Public Health.
- Aldrich, N., & Benson, W. F. (2008). Disaster preparedness and the chronic disease needs of vulnerable older adults. *Preventing Chronic Disease, 5*(1), 1–6.
- American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders* (4th Ed., Text Rev.). Washington, DC: Author.
- Americans with Disabilities Act. (1990). 42 U.S.C.A. Section 12101 et seq. (West 1993).
- Appleyard, K., & Osofsky, J. D. (2003). Parenting after trauma: Supporting parents and caregivers in the treatment of children impacted by violence. *Infant Mental Health Journal, 24*, 111–125.
- Babugura, A. A. (2008). Vulnerability of children and youth in drought disasters: A case study of Botswana. *Children, Youth and Environments, 18*(1), 126–157.
- Barile, M., Fichten, C., Ferraro, V., & Judd, D. (2006). Ice storm experiences of persons with disabilities: Knowledge is safety. *The Review of Disability Studies, 2*(3), 35–48.
- Bartlett, S. (2008). The implications of climate change for children in lower-income countries. *Children, Youth and Environments, 18*(1), 71–98.
- Breton, J., Valla, J., & Lambert, J. (1993). Industrial disaster and mental health of children and their parents. *Journal of the American Academy of Child and Adolescent Psychiatry, 32*, 438–445.
- Bronfenbrenner, U., & Ceci, S. J. (1994). Nature-nurture reconceptualized in developmental perspective: A bioecological model. *Psychological Review, 101*, 568–586.
- Bystritsky, M. D., Vapnik, R., Maidment, K., Pynoos, R. S., & Steinberg, A. M. (2000). Acute responses of anxiety disorder patients after a natural disaster. *Depression and Anxiety, 11*, 43–44.
- Casserly, M. (2006). Double jeopardy: Public education in New Orleans before and after the storm. In C. Hartman & G. D. Squires (Eds.), *There is no such thing as a natural disaster: Race, class, and Hurricane Katrina* (pp. 197–214). New York: Routledge.
- Christ, G. H., & Christ, T. W. (2006). Academic and behavioral reactions of children with disabilities to the loss of a firefighter father: The New York World Trade Center attack 9/11/01. *The Review of Disability Studies, 2*(3), 68–77.
- Cicchetti, D., & Lynch, M. (1993). Toward an ecological/transactional model of community violence and child maltreatment: Consequences for children's development. *Psychiatry, 56*, 96–118.
- Cutter, S. L., Boruff, B. J., & Shirley, W. L. (2003). Social vulnerability to environmental hazards. *Social Science Quarterly, 84*, 242–261.
- Dash, N., & Gladwin, H. (2007). Evacuation decision making and behavioral responses: Individual and household. *Natural Hazards Review, 8*, 69–77.
- Dubow, E. F., & Tisak, J. (1989). The relation between stressful life events and adjustment in elementary school children: The role of social support and social problem-solving skills. *Child Development, 60*, 1412–1423.
- Fothergill, A., & Peek, L. (2004). Poverty and disasters in the United States: A review of the sociological literature. *Natural Hazards, 32*, 89–110.
- Fothergill, A., & Peek, L. (2006). Surviving catastrophe: A study of children in Hurricane Katrina. In Natural Hazards Center (Ed.), *Learning from catastrophe: Quick response research in the wake of Hurricane Katrina* (pp. 97–130). Boulder: Institute of Behavioral Science, University of Colorado.
- Fox, M. H., White, G. W., Rooney, C., & Rowland, J. L. (2007). Disaster preparedness and response for persons with mobility impairments. *Journal of Disability Policy Studies, 17*(4), 196–205.
- Garfinkel, I., Kaushal, N., Teitler, J., & Garcia, S. (2005). Vulnerability and resilience: New Yorkers respond to 9/11. In N. Foner (Ed.), *Wounded city: The social impact of 9/11* (pp. 28–75). New York: Russell Sage Foundation.
- Green, B. L., Korol, M., Grace, M., Vary, M. G., Leonard, A. C., Goldine, C. G., et al. (1991). Children and disaster: Age, gender, and parental effects on PTSD symptoms. *Journal of the Academy of Child and Adolescent Psychiatry, 30*, 945–951.
- Hemingway, L., & Priestly, M. (2006). Natural hazards, human vulnerability, and disabling societies: A disaster for disabled people? *The Review of Disability Studies, 2*(3), 57–67.
- Hewitt, K. (1997). *Regions of risk: A geographical introduction to disasters*. Boston: Addison Wesley Longman.

- Hewitt, K. (2007). Preventable disasters: Addressing social vulnerability, institutional risk, and civil ethics. *Geographischs Rundschau International Edition*, 3(1), 43–52.
- Institute of Medicine. (2001). *Neurological, psychiatric, and developmental disorders: Meeting the challenge in the developing world*. Washington, DC: National Academy Press.
- International Federation of Red Cross and Red Crescent Societies. (2007). *World disasters report 2007: Focus on discrimination*. Bloomfield, CT: Kumarian Press.
- Kailes, J. I., & Enders, A. (2007). Moving beyond 'special needs': A function-based framework for emergency management and planning. *Journal of Disability Policy Studies*, 17(4), 230–237.
- Kinne, S., Patrick, D. L., & Doyle, D. L. (2004). Prevalence of secondary conditions among people with disabilities. *American Journal of Public Health*, 94(3), 443–445.
- La Greca, A. M. (2001). Children experiencing disasters: Prevention and intervention. In J. Hughes, A. La Greca, & J. Conoley (Eds.), *Handbook of psychological services for children and adolescents* (pp. 195–224). New York: Oxford University Press.
- La Greca, A. M., Silverman, W. K., Vernberg, E. M., & Roberts, M. C. (Eds.). (2002). *Helping children cope with disasters and terrorism*. Washington, DC: American Psychiatric Association.
- Lynch, M., & Cicchetti, D. (1998). An ecological-transactional analysis of children and contexts: The longitudinal interplay among child maltreatment, community violence, and children's symptomatology. *Development and Psychopathology*, 10, 235–257.
- Masten, A. S. (2001). Ordinary magic. Resilience processes in development. *The American Psychologist*, 56, 227–238.
- Masten, A. S., & Obradovic, J. (2008). Disaster preparation and recovery: Lessons from research on resilience in human development. *Ecology and Society*, 13(1), 9.
- McMillen, C., North, C., Mosley, M., & Smith, E. (2002). Untangling the psychiatric comorbidity of posttraumatic stress disorder in a sample of flood survivors. *Comprehensive Psychiatry*, 43(6), 478–485.
- Mitchell, T., Haynes, K., Hall, N., Choong, W., & Oven, K. (2008). The role of children and youth in communicating disaster risk. *Children, Youth and Environments*, 18(1), 254–279.
- Morrow, B. H. (1999). Identifying and mapping community vulnerability. *Disasters*, 23(1), 1–18.
- National Organization on Disability. (2005). *Report on special needs assessment for Katrina evacuees (SNAKE) project*. Washington, DC: National Organization on Disability.
- Neumayer, E., & Plümper, T. (2007). The gendered nature of natural disasters: The impact of catastrophic events on the gender gap in life expectancy, 1981–2002. *Annals of the Association of American Geographers*, 97(3), 551–566.
- Norris, F. H., Friedman, M. J., Watson, P. J., Byrne, C. M., Diaz, E., & Kaniasty, K. (2002). 60,000 Disaster victims speak: Part I. An empirical review of the empirical literature, 1981–2001. *Psychiatry*, 65(3), 207–239.
- Norris, F. H., Stevens, S. P., Pfefferbaum, B., Wyche Karen, F., & Pfefferbaum, R. L. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *American Journal of Community Psychology*, 41, 127–150.
- O'Keefe, P., Westgate, K., & Wisner, B. (1976). Taking the naturalness out of natural disasters. *Nature*, 260, 566–567.
- Osofsky, J. D. (1995). The effects of exposure to violence on young children. *American Psychologist*, 50, 782–788.
- Osofsky, J. D., Osofsky, H. J., & Harris, W. W. (2007). Katrina's children: Social policy considerations for children in disasters. *Social Policy Report*, 21(1), 3–18.
- Peek, L. (2008). Children and disasters: Understanding vulnerability, developing capacities, and promoting resilience. *Children, Youth and Environments*, 18(1), 1–29.
- Peek, L., & Fothergill, A. (2008). Displacement, gender, and the challenges of parenting after Hurricane Katrina. *National Women's Studies Association Journal*, 20(3), 69–105.
- Penrose, A., & Takaki, M. (2006). Children's rights in emergencies and disasters. *The Lancet*, 367, 698–699.
- Phillips, B. D., & Morrow, B. H. (2007). Social science research needs: Focus on vulnerable populations, forecasting, and warnings. *Natural Hazards Review*, 8(3), 61–68.
- Picou, J. S., & Marshall, B. K. (2007). Social impacts of Hurricane Katrina on displaced K-12 students and educational institutions in coastal Alabama counties: Some preliminary observations. *Sociological Spectrum*, 27, 767–780.
- Rooney, C., & White, G. W. (2007). Narrative analysis of a disaster preparedness and emergency response survey from persons with mobility impairments. *Journal of Disability Policy Studies*, 17(4), 206–215.
- Rowland, J. L., White, G. W., Fox, M. H., & Rooney, C. (2007). Emergency response training practices for people with disabilities. *Journal of Disability Policy Studies*, 17(4), 216–222.
- Scotti, J. R., Stevens, S., Cavender, A., Morford, M., Jacoby, V., Freed, R., et al. (2007). *Response of persons with mental retardation/developmental disabilities to emergency situation: Implications for disaster preparedness*. Paper presented at the annual meeting of the International Society for Traumatic Stress Studies, Baltimore.
- Smart, J. (2001). *Disability, society, and the individual*. Gaithersburg, MD: Aspen.
- Spence, P. R., Lachlan, K., Burke, J. M., & Seeger, M. W. (2007). Media use and information needs of the disabled during a natural disaster. *Journal of Health Care for the Poor and Underserved*, 18, 394–404.
- Stough, L. M. (2009). The effects of disaster on the mental health of individuals with disabilities. In Y. Neria, S. Galea, & F. H. Norris (Eds.), *Mental health consequences of disasters* (pp. 264–276). New York: Cambridge University Press.
- Stough, L. M., & Sharp, A. N. (2007). *The recovery of individuals with disabilities following Hurricane Katrina*. Paper

- presented at the annual meeting of the International Society for Traumatic Stress Studies, Baltimore.
- Tierney, K. J., Petak, W. J., & Hahn, H. (1988). *Disabled persons and earthquake hazards*. Boulder, CO: Institute of Behavioral Science, University of Colorado.
- United Nations Human Settlements Programme. (2007). *Enhancing urban safety and security: Global report on human settlements*. London: Earthscan.
- United Nations International Children's Emergency Fund. (2007). *Promoting the rights of children with disabilities*. Florence, Italy: UNICEF Innocenti Research Center.
- U.S. Census Bureau. (2005). *Survey of income and program participation, June–September 2005*. Retrieved May 8, 2010, from <http://www.census.gov/hhes/www/disability/sipp/disab05/d05tb4.pdf>
- U.S. Census Bureau. (2006). *2006 American community survey data*. Washington, DC: U.S. Census Bureau. Retrieved February 1, 2008, from <http://www.census.gov/acs/www/>
- U.S. Department of Education, Office of Special Education and Rehabilitative Services, Office of Special Education Programs. (2009). *28th annual report to Congress on the Implementation of the Individuals with Disabilities Education Act, 2006, Vol. 1*. Washington, DC: Author.
- U.S. Federal Emergency Management Agency and Department of Homeland Security Office for Civil Rights and Civil Liberties. (2008). *Interim emergency management planning guide for special needs populations, Version 1.0*. Washington, DC: U.S. Federal Emergency Management Agency and Department of Homeland Security Office for Civil Rights and Civil Liberties.
- Van Willigen, M., Edwards, T., Edwards, B., & Hesse, S. (2002). Riding out the storm: Experiences of the physically disabled during Hurricanes Bonnie, Dennis, and Floyd. *Natural Hazards Review*, 3(3), 98–106.
- Weissbecker, I., Sephton, S. E., Martin, M. B., & Simpson, D. M. (2008). Psychological and physiological correlates of stress in children exposed to disaster: Review of current research and recommendations for intervention. *Children, Youth and Environments*, 18(1), 30–70.
- White, B. (2006). Disaster relief for deaf persons: Lessons from Hurricanes Katrina and Rita. *The Review of Disability Studies*, 2(3), 49–56.
- Wisner, B., Blaikie, P., Cannon, T., & Davis, I. (2004). *At risk: Natural hazards, people's vulnerability, and disasters*, 2nd ed. New York: Routledge.
- World Health Organization. (2001). *International classification of functioning, disability, and health*. Geneva, Switzerland: Author.
- World Health Organization. (2005). *Disability, including prevention, management, and rehabilitation*. Geneva, Switzerland: Author.