Social Vulnerability to DISASTERS

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7 Age

Lori Peek

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7.1 CHAPTER PURPOSE

The length of time that someone has lived can significantly affect that person's ability to prepare for, respond to, and recover from disaster. Indeed, age is correlated with a number of factors associated with one's likelihood of withstanding a disaster event. For example, age in many ways influences cognitive development, physical ability and mobility, socioeconomic status, access to resources, assumed responsibility for disaster preparedness and response activities, and levels of social integration or isolation. Thus, it is clear that age alone does not make a person vulnerable. Instead age interacts with many other factors to result in the increased vulnerability of some members of our population, particularly the very young and the old. As such, this chapter focuses specifically on the vulnerabilities of children and the elderly in disaster.

7.2 OBJECTIVES

As a result of reading this chapter, readers should be able to

1. Offer definitions for "children" and "the elderly" based on chronological age.
2. Explain why it is important to understand the distinctions between different groups of children (e.g., infants and very young children, young children, and adolescents) and the elderly (e.g., young old, aged, oldest old, and frail elderly).
3. Provide demographic overviews of the youth and elderly populations in the United States, and highlight important variations by age, race, class, and gender.
4. Explain the specific risks that children face across the disaster life cycle, and identify the factors most likely to increase their vulnerability during the warning, evacuation, response, impact, and recovery phases.
5. Explain the specific risks that the elderly face across the disaster life cycle, and identify the factors most likely to increase their vulnerability during the warning, evacuation, response, impact, and recovery phases.
6. Describe several possible approaches for addressing the vulnerability of children and the elderly before and after disaster.

7.3 INTRODUCTION

Social definitions for both childhood and the elderly vary considerably across cultures and contexts and are only loosely linked with chronological age (Boyden 2003; Friedsam 1962). However, for the sake of clarity, in this chapter I refer to children as those individuals age 18 or younger. This is in accordance with the United Nations Convention on the Rights of the Child, although of course the diversity of young people must be recognized and captured in age-disaggregated data. For that reason and where possible, I distinguish between "infants and very young children" (0–5 years of age), "young children" (6–11 years of age), and "adolescents" (12–18 years of age). An elderly person typically is defined as someone who is 65 years of age or older. Further distinction is made between the "young old" (65–74 years of age), the "aged" (75–84 years of age), the "oldest old" (85 years of age or older), and the "frail elderly" (65 years of age or greater, with physical or mental infirmities) (He et al. 2005; Ngo 2001). It is important to understand the distinctions among these age groups because there are clearly differences *among* the elderly, as well as differences *between* older and younger persons in terms of health, function, and interaction in society (Friedsam 1962; Ngo 2001). The following section offers a general demographic description of youth and elderly in the United States, which illustrates the diversity of these populations.

7.4 DEMOGRAPHIC OVERVIEW

Over 300 million persons live in the United States, which is the third most populous and one of the most diverse nations in the world. Almost 25% of the U.S. population is made up of children age 18 or younger, while persons age 65 and over represent 12.4% of the population (U.S. Census Bureau 2006).* Below, I offer a brief overview of the demographic characteristics of American children and the elderly, with a specific focus on sex, racial and ethnic diversity, and poverty rates. It is important to consider the intersections between age and these other characteristics because these factors all influence experiences in disasters, as will be further considered in later sections of this chapter and in other chapters of this book.

* Unless indicated otherwise, all figures included in this section of the chapter come from the U.S. Census Bureau, 2006 American Community Survey data, which are available online at http://www.census.gov/.

7.4.1 Children

In 2006, 73.5 million children lived in the United States. These children were divided proportionately by age group, with about one third of the child population in each of the very young (0–5 years), young (6–11 years), and adolescent (12–18 years) categories. Also, there was basically an even distribution of boys and girls across each age category.

Approximately 96% of children in the United States were born here, while the remaining 4% were born outside the country (about 12.5% of the entire U.S. population is foreign born). Children are actually more racially and ethnically diverse than their adult counterparts. Just over 57% of American children are non-Hispanic white,* while 20% of children are Hispanic or Latino; 15% are African American; 4% are Asian, Native Hawaiian, or Pacific Islander; almost 1% are American Indian; and 8.5% of children identify as some other race.† The child population is a reflection of the growing diversity of the American population, as well as an indicator of the probable further diversification of the nation over the next several decades.

The number of children living in poverty in the United States grew steadily throughout the first decade of the 21st century. Well over 13 million American children live in families with incomes below the federal poverty level, which in 2008 was $21,200 for a family of four (U.S. Department of Health and Human Services 2008). A higher percentage of children in the United States live in poverty (18.3%) than the population as a whole (13.3%). These numbers do not bode well for the future of many of America's youth, and they are even more troubling given that the federal poverty measure is widely viewed as a flawed metric of economic hardship. Research consistently shows that families need an income of about *twice* the federal poverty level to make ends meet. Children living in families with incomes below this level are referred to as low income, and almost 40% of the nation's children live in low-income households (Fass and Cauthen 2007). These "near poor" children and their families are often overlooked and are not eligible to receive public assistance, yet live in incredibly precarious situations nonetheless (Newman and Chen 2007). Poor and low-income children, for example, are much more likely to experience food insecurity, lack health insurance and access to regular health care, struggle as a result of unaffordable housing costs, and attend lower quality schools and thus experience lower educational attainment (Fass and Cauthen 2007; Kozol 1991, 2005).

The percent of children living below the federal poverty level varies significantly by geographic location, with higher concentrations of poverty in the southern United States. Areas with the highest rates of child poverty include the District of Columbia (32.6%), Mississippi (29.5%), Louisiana (27.8%), New Mexico (25.6%), West Virginia (25.2%), Arkansas (24.3%), Oklahoma (24.3%), and Texas (23.9%). These figures can be compared to states with much lower child poverty rates, such as New Hampshire (9.6%) and Maryland (9.7%).

Minority youth are disproportionately poor in the United States. In 2006, 40% of American Indian children, 33% of black children, 27% of Latino children, and 12% of Asian children lived in poor families (Fass and Cauthen 2007; also see Children's Defense Fund 2006). A lower percentage of white children live in poverty (10%), yet white children comprise the largest group of poor children because they represent a larger proportion of the overall population. Having immigrant parents increases a child's chances of being poor, with approximately one in four children with immigrant parents living in poverty (Fass and Cauthen 2007).

Family structure affects access to resources and economic well-being for children as well. Children in single-parent households are among the poorest groups in the nation, with 44% of

* This can be compared with the overall U.S. population, which is about 70% non-Hispanic white. The term non-Hispanic white is used to refer to people who report being white and no other race and who are not Hispanic.

† These numbers do not add up to 100% because of the way the Census Bureau measures race and ethnicity, which has become more complicated over past decades due to the increasing diversity of the population, rising rates of immigration, and the number of interracial marriages. In particular, persons of Hispanic or Latino origin may be of any race, and since the year 2000, parents or guardians are allowed to mark more than one race for those in the household.

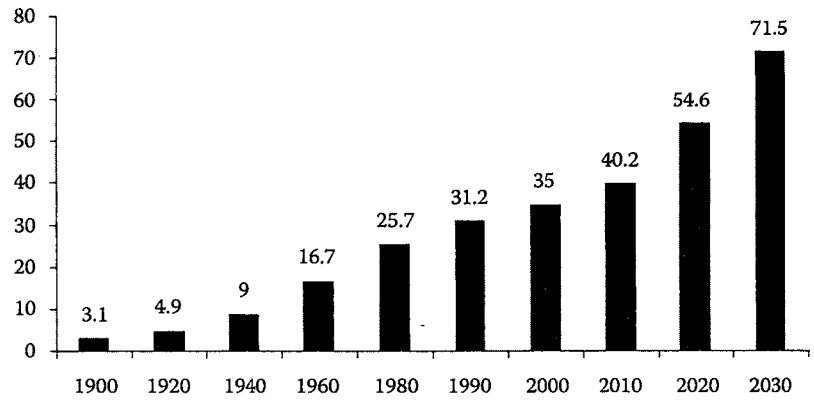

FIGURE 7.1 Number of persons 65 and older, 1900–2030 (numbers in millions). *Source*: U.S. Department of Health and Human Services. Administration on Aging. A profile of older Americans: 2006. Washington, DC, 2006.

children in female-headed households ("no husband present") living in poverty. Comparatively, 22% of children in male-headed households ("no wife present") live below the poverty line, while 8.6% of children in married-couple families are poor.

7.4.2 Elderly

In 2006, about 37 million Americans were age 65 or older, representing 12.4% of the total population. Among the older population, approximately 18 million were aged 65–74 years, 14 million were aged 75–84 years, and 5 million were 85 and older. According to U.S. Census Bureau projections, a substantial increase in the number of older people will occur when the baby boom generation (people born after World War II and between 1946 and 1964) begins to turn 65 in 2011. The older population is projected to double to 71.5 million in 2030, and to increase to 20% of the entire population in the same time period as seen in Figure 7.1 (He et al. 2005, 6). Significantly, the oldest-old population—those aged 85 and above—is also projected to double over the next several decades, to 9.6 million by 2030, and to double again to 20.9 million by 2050 (He et al. 2005, 6).

There is more sex ratio imbalance between older adults than among the rest of the population, with women comprising 58% of the elderly, and men representing only 42% of those over 65 years of age. This is largely because women live longer, on average, than men. Older men are much more likely to be married than older women—72% of men versus 42% of women. The proportion of elderly people living alone has soared since 1950. Almost one in three, or 10.6 million, non-institutionalized older persons live alone, and half of all women over the age of 75 live alone. A relatively small number (about 1.56 million) and percentage (4.5%) of persons over age 65 lived in nursing homes in 2000. However, the percentage increases significantly with age, with about 1.1% of the young old, 4.7% of the aged, and 18.2% of the oldest old living in nursing homes. In addition, about 5% of the elderly live in senior housing or assisted living facilities of some type (U.S. Department of Health and Human Services 2006).

The distribution of older persons varies considerably by state. In 2005, just over half (51.6%) of persons 65 and older lived in nine states: California (3.9 million), Florida (3 million), New York (2.5 million), Texas (2.3 million), Pennsylvania (1.9 million), and Illinois, Ohio, Michigan, and New Jersey each had well over one million elderly residents (U.S. Department of Health and Human Services 2006, 6). Most older persons in the United States live in metropolitan areas, and the elderly are less likely to change residence than other groups (U.S. Department of Health and Human Services 2006; He et al. 2005).

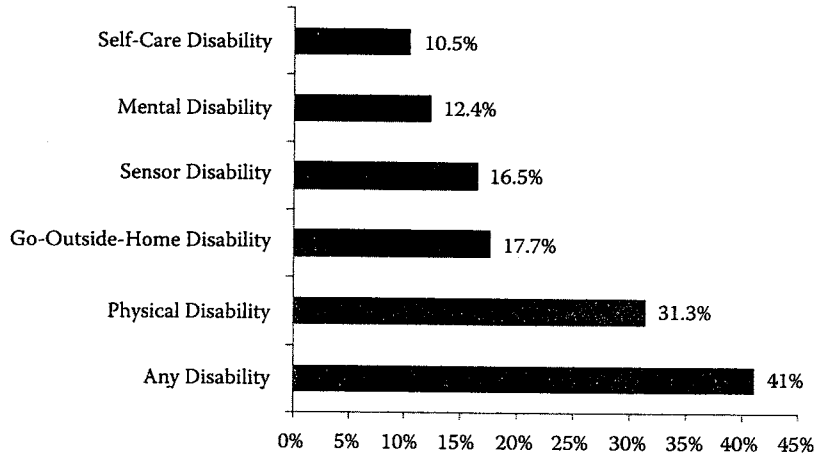

FIGURE 7.2 Disability characteristics among persons 65 and older, 2006. *Source*: U.S. Census Bureau. 2006 American Community Survey data. http://www.census.gov/ (accessed February 1, 2008).

Older persons are less racially and ethnically diverse than other segments of the American population. However, the elderly are expected to grow more diverse over the next several decades, largely reflecting demographic changes in the U.S. population as a whole. In 2006, the elderly population was 81.1% non-Hispanic white, 8.3% black, 6.3% Hispanic or Latino, 3.2% Asian, 0.5% American Indian, and 0.6% of the elderly identified as some other race.

In 2005, the median income of older persons was $21,784 for males and $12,495 for females (U.S. Department of Health and Human Services 2006). Major sources of income for older persons were Social Security (reported by 89% of older persons); income from assets (reported by 55%); private pensions (reported by 29%); earnings (reported by 24%); and government employee pensions (reported by 14%). About 3.5 million older adults (10%) were living in poverty in 2006, which was slightly lower than the national average. People aged 65–74 had a poverty rate of 9%, compared with 12% of those aged 75 and older. Older women were more likely than older men to live in poverty (13% compared to 7%). Non-Hispanic whites (8%) were less likely than older blacks (24%) and older Hispanics (20%) to be living in poverty. Among older women living alone in 2003, poverty rates were 17% for non-Hispanic white women and about 40% for black women and Hispanic women (He et al. 2005).

Limitations of mobility and chronic poor health are difficulties common to older people around the world (International Federation of Red Cross and Red Crescent Societies 2007). In the United States, about 80% of seniors have at least one chronic health condition and 50% have at least two (He et al. 2005). Arthritis, hypertension, heart disease, diabetes, and respiratory disorders are some of the leading causes of activity limitation among older people (He et al. 2005), and these health conditions are exacerbated by poverty and lack of access to affordable and reliable health care. In 2006, 41% of the elderly, representing more than 14.5 million persons, had some type of disability and many seniors reported having two or more disabilities (Figure 7.2; for related information see Chapter 8 on disability). Older women (43%) were more likely than older men (38.2%) to experience disability. And the disabled elderly were more likely to be living in poverty than their non-disabled counterparts.

7.5 VULNERABILITY ACROSS THE DISASTER LIFE CYCLE

Recent disaster events in the United States and around the globe tragically illustrate the vulnerability of children and the elderly during times of disaster. The 2004 Indian Ocean earthquake and tsunami claimed the lives of at least 60,000 children, most of who lived in the hardest hit

regions of Indonesia, Sri Lanka, India, and Thailand (Oxfam International 2005). Over 18,000 children perished in the 2005 Pakistan earthquake, largely as a result of the collapse of more than 10,000 school buildings (Hewitt 2007). In 2008, a deadly earthquake struck Sichuan Province in China and caused an estimated 10,000 child fatalities. Schools where predominantly poor children attended were especially hard hit, and many of the youngest victims died in their classrooms (Jacobs 2008). Following Hurricane Katrina, over 160,000 children from Louisiana and Mississippi were displaced from their homes and schools, and this population has subsequently suffered from high rates of emotional and behavioral problems, chronic health conditions, and poor access to medical care (Abramson and Garfield 2006; Abramson et al. 2007; Lauten and Lietz 2008). Old age was the single most important factor in determining who died in Hurricane Katrina. Among the over 1,300 persons who died in New Orleans, 67% were at least 65 years old, although this group represented only about 12% of the pre-storm population (Sharkey 2007). The 1995 Chicago heat wave claimed more than 700 lives, and 73% of the heat-related deaths were among persons over 65 years of age (Klinenberg 2002). The 2003 European heat wave resulted in more than 52,000 deaths, most of which were concentrated among the elderly (Larsen 2006). In the 1995 Kobe earthquake, 53% of the fatalities were among older persons and 10% of the victims were children (Hewitt 2007).

When certain segments of the population suffer disproportionately during times of disaster, it is important to consider what factors place these groups at particular risk before, during, and after the event. The following sections attempt to do just that by drawing on published research literature and agency reports that address the experiences of children and the elderly in disaster. The sections are organized by three major stages of the disaster life cycle: (1) warnings, evacuation, and response; (2) impacts; and (3) short- and long-term recovery (see Fothergill 1996; Fothergill, Maestas, and Darlington 1999; Fothergill and Peek 2004). I begin by discussing issues that children face across the disaster life cycle. Then I consider factors that contribute to the vulnerability of older persons. The chapter concludes with a discussion of the implications of these findings for practice.

7.5.1 Children—Warning, Evacuation, and Response

This phase of the disaster life cycle entails receiving formal warning signals, such as emergency broadcasts and flood sirens or other risk communication of an immediate danger, and taking action with some type of response to the warning, such as evacuating or sheltering in place. To date, very little social science research has focused on how children receive, interpret, or respond to forecasts and warnings (Phillips and Morrow 2007). Dominant models of risk communication do not include youth as either sources or recipients of risk information (Mitchell et al. 2008). Instead it is commonly assumed that parents will inform, warn, and protect their children in the event of a disaster (Adams 1995). The lack of focus on children's understanding of risk and warnings represents a serious gap in knowledge considering that (1) children are often separated from their parents, such as when they are in school, day care, or with their friends; (2) there are an estimated one million homeless and street youth in the United States who totally lack familial support (Unger, Simon, and Newman 1998); and (3) more than 1.6 million American children are home alone every day each year (Phillips and Hewett 2005).

Although children can contribute in meaningful ways during the warning and emergency response phase of disasters, it is important to acknowledge that they do not have the same level of independence or resources available as adults (see Mitchell et al. 2008). In homes, child-care centers, and schools, for example, adults are primarily responsible for making evacuation decisions, providing vital resources, securing shelter, and establishing routine (Peek and Fothergill 2008). Moreover, children and adolescents often turn to the important adults in their lives to help them understand and make sense of uncertain or frightening situations (Prinstein et al. 1996). According to Phillips and Morrow (2007), children model their behavioral response to disaster on the reactions of adults around them. Parents, teachers, and child-care workers give useful clues on how to respond

given that children lack a behavioral repertoire or even a reference framework for disaster situations (Phillips and Morrow 2007, 63).

A number of studies have examined the effect of having children on the evacuation decisions of adults. This work reveals that adults with children are more likely to respond to disaster warnings and evacuation messages than people without children (Carter, Kendall, and Clark 1983; Dash and Gladwin 2007; Edwards 1993; Fischer et al. 1995; Houts et al. 1984; Lindell, Lu, and Prater 2005). This suggests that parents and other caregivers of children would be receptive to hazards education materials that highlight the age- and hazard-specific risks children face, particularly if these materials draw on the principles of sound risk communication and include clear, consistent, and precise messages that are delivered through multiple channels (Mileti and Darlington 1997; Mileti and Fitzpatrick 1992; Mileti and O'Brien 1992).

While adults with children are more likely to respond to evacuation orders, a lack of resources may hinder the ability of low-income families to take recommended protective measures (Dash and Gladwin 2007). In Hurricane Katrina, poor and working-class mothers who were not able to leave New Orleans before the levee system failed faced dangerous and stressful evacuations with their children, as they were forced to wade through the floodwaters or be rescued by helicopter or boat (Fothergill and Peek 2006). In some cases, young people assisted directly with the evacuation of elderly and disabled family members by placing them on mattresses and helping them to float through the flooded city (Kirschke and van Vliet 2005).

Families with pets may also face particular challenges in evacuation. A study by Heath, Voeks, and Glickman (2000) explored evacuation and pet rescue in two communities—one in California that was under an evacuation notice due to flooding, and a second community in Wisconsin that evacuated in response to a hazardous chemical spill. Approximately 20% of pet-owning households in the California disaster and 50% of pet-owning households in the Wisconsin disaster evacuated without their pets. An estimated 80% of persons who reentered the evacuated areas did so to rescue their pet, and attempts to rescue a pet were most common among households with children. The authors posit that children may have become distressed over the abandonment of a pet and, therefore, put pressure on their parents to rescue it. This study demonstrates that pet rescues can endanger the health and well-being of animals and families, especially families with children.

The limited research available on children and emergency response primarily focuses on the household context and the decisions that adults make. But what happens when children are not at home when disaster strikes? Or when parents are separated from their children? Are schools and child-care centers adequately prepared? What factors shape evacuation planning and decision making among school administrators and day-care staff? These questions certainly warrant further consideration. On any given weekday during the academic year, there are approximately 55 million children in public and private schools across the United States (U.S. Census Bureau 2006). In addition to school-age youth, millions more infants and very young children are cared for in licensed child-care centers and in-home day cares.

Research on emergency response has highlighted the importance of household members being able to account for one another before taking recommended protective actions such as sheltering in place or evacuating (see Tierney, Lindell, and Perry 2001). Parents, in particular, are highly unlikely to leave a threatened area until they are reunited with their children or certain that their children have been safely evacuated. Research conducted in the aftermath of the September 11 attacks emphasized the many problems that parents with children attending schools in lower Manhattan faced (Bartlett and Patrarca 2002). For example, because phone service was limited or nonexistent, parents were unable to contact the school to learn more about the situation or their spouses to coordinate who was picking up the child. In several cases, parents could not access their children's school because of the shutdown of public transportation services and street closings, which led to a delay in reuniting families.

Some research has focused on the ability or willingness of teachers and other school personnel to participate in the evacuation of students in the event of an emergency. Johnson (1985) surveyed 232

teachers at 29 public schools located near a nuclear power plant in California. Nearly one third of the teachers indicated that they would not assist in an evacuation effort in the event of a radiological emergency, owing largely to a strong sense of obligation to their families and concerns for personal safety. An additional 10% of teachers qualified their responses by stating that their participation in evacuation efforts would be contingent upon being able to contact their own family members by telephone, limited to a specified length of time, or restricted to the evacuation of their class only. A survey of bus drivers in Suffolk County, New York, indicated that 66% would not report promptly to transport school children to destinations outside of the designated danger zone in the event of a nuclear accident (cited in Johnson 1985, 88). Bus drivers most often specified concern for family as the reason why they would not fulfill their duties. It is important to note that both studies—of teachers in California and bus drivers in New York—were based on hypothetical incidents. Nonetheless, this research raises important questions about the role conflict that school personnel are likely to face as they attempt to care for the children in their schools while also trying to ensure the safety of their own families. Bartlett and Patrarca (2002) and Johnson (1985) recommend that school districts recruit backup emergency personnel who could assist in the event of a major crisis.

Only two studies have explored preparedness and response capabilities among child-care centers. Wilson and Kershaw (2008) surveyed child-care providers in hurricane-prone regions of Florida. Most of the 67 child-care centers included in the sample had experienced a hurricane (83%) or had closed due to hurricane-related concerns (92%) over the past five years. Despite the high-risk area in which these centers were located, only about two thirds of the respondents indicated that their center had a written hurricane response plan (and in about half of these cases, the plans were not frequently reviewed by center staff). Roughly 70% of respondents were either in the process of or had completed assembling a "hurricane kit" (including vital contact numbers, business papers, insurance, and medications). The authors also found that about 40% of the centers had a contingency plan in place in the event that their facility became uninhabitable following a hurricane. Junn and Guerin (1996) examined levels of earthquake preparedness among child-care centers in a seismically active region of Southern California. They found that over half of the 25 centers studied did not have an earthquake plan on file; those that did often failed to share their plan with teachers, staff, parents, or local emergency response agencies. Almost half of the centers lacked basic essentials, such as food or water, which would be necessary to cope comfortably in the aftermath of a major earthquake. In addition, approximately one third of the center directors believed incorrectly that emergency response agencies would evacuate children from child-care facilities for relocation within 24 hours after a disaster. The authors conclude that, at best, only half of the day-care facilities were even minimally equipped to handle the crises associated with a major earthquake.

When evacuation is necessary, families typically seek refuge in the homes of relatives or friends or stay in hotels (Tierney, Lindell, and Perry 2001). Children who do stay in shelters may face special risks, and there is evidence that the United States is ill-prepared to handle disasters that involve large numbers of injured or displaced children (Markenson and Redlener 2004). When shelters first open, they may not have necessary supplies such as diapers, baby wipes, formula, soap, or prescription medicines to support the health and well-being of children, and infants may be especially vulnerable (Garrett et al. 2007). Also, children with disabilities or chronic health conditions may be particularly prone to adverse effects of evacuation and disruption of support systems and routines (Peek and Stough forthcoming; Rath et al. 2007). Brandenburg and colleagues (2006) identified numerous child injury hazards at a National Guard center in Oklahoma that had been converted to a temporary shelter for Katrina evacuees. Risks to children resulted from both preexisting conditions of the facility (e.g., open electrical outlets, lack of smoke detectors, insecure window screens), and hazards created as a result of the relief efforts and influx of evacuees and volunteers (e.g., unsafe toys, open containers of chemicals and cleaning materials, open tubs of water). Children are also at higher risk of acquiring respiratory and gastrointestinal diseases due to unsanitary conditions in shelters (Garrett et al. 2007).

Shelter workers and local volunteers often play crucial roles in helping to minimize the threats to children's physical safety and emotional well-being. For example, Fothergill and Peek (2006) found that after Hurricane Katrina shelter workers organized tutoring programs, play areas, and child drop-off locations that helped children stay active, while giving parents the opportunity to rest or to take care of other important responsibilities. The Church of the Brethren Children's Disaster Services program trains and mobilizes volunteers in the immediate aftermath of disaster and provides free child care to families affected by disasters of all types (Peek, Sutton, and Gump 2008). After the 2007 California wildfires, Save the Children partnered with Children's Disaster Services and the American Red Cross to set up "Safe Spaces" in evacuation centers (Smith 2008). The goal of Safe Spaces was to allow children to play in a secure and structured environment. Save the Children also recently implemented a program in evacuation centers called Resilient and Ready. This program, which is workshop-based, allows children an opportunity to discuss their feelings of worry or concern, and also teaches them what to do in an emergency situation. After the children complete the workshop, they are given a backpack with emergency evacuation supplies.

7.5.2 Children—Impacts

Over the past two decades, an increasing amount of scholarly attention has been devoted to the psychological impact of disasters on children. This literature examines children's responses to natural and technological disasters, as well as to terrorism and other forms of violent conflict (see Weissbecker et al. 2008). The most widely studied reaction to disasters has been that of post-traumatic stress disorder (PTSD) or related symptoms (La Greca et al. 2002; Norris et al. 2002). This work has shown that a significant proportion of children show reactions following exposure to disasters that can substantially interfere with or impair their daily living and can cause distress to them and their families (La Greca et al. 2002). In their review of the literature on the psychosocial consequences of disaster, Norris and colleagues (2002) found that youth were more likely to be severely affected by disasters than adults, with 48% of school-age samples suffering from moderate post-disaster impairment and 52% experiencing severe or very severe effects in communities that had suffered a major natural disaster. Udwin (1993, 124) notes that there is a growing body of evidence to show that most children react adversely after exposure to traumatic events, and that a significant proportion of child survivors of disasters (possibly 30%–50%) are likely to develop PTSD symptoms, which may persist for long periods of time.

Disaster impacts on children vary by age group, prior experiences, and stage of physical and mental development. For very young children, problems include clinginess, dependence, nightmares, refusing to sleep alone, irritability and temper tantrums, aggressive behavior, incontinence, hyperactivity, and separation anxiety (Norris et al. 2002). Older children may exhibit marked reactions of fear and anxiety, increased hostility with siblings, somatic complaints, sleep disorders, problems with school performance, social withdrawal, apathy, re-enactment through play, PTSD, and anxiety (Mandalakas, Torjesen, and Olness 1999). Adolescents may experience decreased interest in social activities and school, rebellion and other behavioral problems, sleep and eating disorders, somatic complaints, increased or decreased physical activity, confusion, lack of concentration, a decline in responsible behaviors; engage in risk-taking behaviors; suffer from PTSD; and be at increased risk for alcohol or drug misuse after disaster (Mandalakas, Torjesen, and Olness 1999; Reijneveld et al. 2005; Shannon et al. 1994).

Several factors influence children's psychological and emotional reactions to traumatic events (see Green et al. 1991; La Greca, Silverman, and Wasserstein 1998; Vernberg et al. 1996). One of the most critical predictors of children's post-disaster distress is the *extent and intensity of exposure* to the traumatic event. Children who experience life threat, become separated from family members, lose a loved one, suffer extensive damage to their homes and communities, or witness scenes of disaster destruction either directly or through media intake are at particular risk for developing PTSD, anxiety, or depression (Lengua et al. 2005; McFarlane 1987; Pfefferbaum et al. 1999; Saylor

et al. 2003; Shannon et al. 1994). The *characteristics of the child,* including demographic characteristics and pre-disaster functioning, also influence children's reactions to disaster. Girls, racial and ethnic minorities, and children from lower-socioeconomic backgrounds seem to be at increased risk for psychological impairment after disaster, although results are not always consistent (Lonigan et al. 1994; Shannon et al. 1994; Vogel and Vernberg 1993). Children with poorer behavioral and academic functioning prior to disaster are also likely to suffer higher rates of post-disaster impairment (La Greca, Silverman, and Wasserstein 1998). *Characteristics of the post-disaster environment,* including parental distress, lack of access to social support, and the occurrence of additional life stressors (abuse, poverty, divorce, death or illness of a family member) have been linked to children's adverse mental health outcomes and behavioral problems in the aftermath of disaster (Maida, Gordon, and Strauss 1993; Stuber et al. 2005; Swenson et al. 1996; Warheit et al. 1996; Wasserstein and La Greca 1998). Finally, the *coping skills of the child* and *the coping assistance received* also influence children's ability to adapt and respond to highly traumatic events (Jeney-Gammon et al. 1993; Prinstein et al. 1996).

Compared to the number of studies that examine the mental health effects of disasters on children, much less research has explored children's risk for physical injury or loss of life in disasters of various types. The research that is available has examined the rates of injuries and fatalities among children in particular disaster events (Glass et al. 1977; Ikeda 1995; Parasuraman 1995; Ramirez et al. 2005). Most of this work has focused on developing countries because they are much more prone to large-scale natural catastrophes that cause extensive loss of life. In contrast to developing countries, the risk of child mortality by forces of nature in the United States is relatively low. The Centers for Disease Control and Prevention (2004) recorded 6108 deaths caused by natural disaster events between 1999 and 2003. Of the persons killed, 530 were children and youth between the ages of 0 and 24 years.

Researchers have identified several social and environmental factors that contribute to children being at risk for death or injury in disaster. These include residing in poorer countries and communities (Sapir and Lechat 1986), living in and going to school in substandard structures (Hewitt 2007; Parasuraman 1995), losing a parent or becoming separated from family members (Sapir 1993; Sapir and Lechat 1986), and experiencing malnutrition and poor diet (Webster 1994; Young and Jaspars 1995) or artificial feeding (i.e., bottle feeding) (Kelly 1993). Female youths are at higher risk of death (Ramirez et al. 2005; Rivers 1982; Sapir 1993), at least in developing nations. However, research by Zahran, Peek, and Brody (2008) shows that in disasters in the United States, the death rate for male children is higher than the death rate for female children across all age cohorts. There is no consensus in the literature on the age at which children are most at risk for death or injury in disasters, largely because different types of disaster seem to differentially impact children of various ages. For example, Zahran, Peek, and Brody (2008) found that in the United States infants and very young children age 0–4 are most likely to die of exposure to extreme heat, 5–14 year olds are most likely to die in cataclysmic storms and flood events, and adolescents and young adults age 15–24 are most likely to die of excessive cold.

Increased rates of physical abuse may also contribute to children's vulnerability in the aftermath of disaster. In one of the first attempts to empirically examine whether or not child abuse escalates after natural disasters, Curtis, Miller, and Berry (2000) discovered statistically significant increases in child abuse reports in the first six months following Hurricane Hugo and the Loma Prieta earthquake, but found no statistically significant change in abuse rates following Hurricane Andrew. Keenan and colleagues (2004) examined whether there was an increase in traumatic brain injury (TBI, commonly referred to as shaken baby syndrome) among children two years old or younger after Hurricane Floyd. The results showed an increase in the rate of inflicted TBI in the most affected counties for six months following the disaster, possibly reflecting increased injury risk due to prolonged stress among caregivers.

Following the 2004 Indian Ocean tsunami, the media and advocacy organizations drew attention to the risks of sexual violence and human trafficking that children, and especially girls, faced in

displaced person camps (Enarson, Fothergill, and Peek 2006). Drawing on interviews with women's advocacy organizations, Fisher (2005) documented incidents of rape, molestation, and physical abuse perpetrated against women and girls in the tsunami aftermath. Over 2000 sex offenders were lost in the chaos of the Hurricane Katrina evacuation, giving rise to reasonable fears about child predators in and around shelters (see Lauten and Lietz 2008). After Katrina, some efforts were enacted to identify children separated from their legal guardians, to help thwart abductions, and to prevent child physical and sexual abuse (Brandenburg et al. 2007; National Center for Missing and Exploited Children 2006). However, the mere size of the mass shelters that opened after Katrina—as many as 60,000 people sought refuge at the Louisiana Superdome, with up to 25,000 at the nearby New Orleans Convention Center—exposed children to potential violence and compromised the ability of parents to establish a sense of safety for their families (Garrett et al. 2007; Lauten and Lietz 2008). These security threats continued as Katrina evacuees were moved into trailer parks, where almost half of the residents did not feel safe walking in their community at night and 45% did not feel comfortable letting their children play in the trailer parks during the day (International Medical Corps 2006). These settings were enormously stressful for the parents as well as for the children themselves (Fothergill and Peek 2006).

The impact of disasters on children's academic progress and educational outcomes is another area that has received increasing, although still insufficient, attention in the research literature (see Peek 2008). 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 several developing countries. The loss of schools may leave surviving children with few alternatives for an adequate education. Following Katrina, displaced students, many of whom were already behind their peers in reading and math, suffered significant challenges (Casserly 2006; Children's Defense Fund 2006). Vital records were lost in the storm, which resulted in delayed enrollment for some youth (Picou and Marshall 2007). Although getting children back into school was a top priority among parents (Fothergill and Peek 2006), many families did not immediately enroll their children in new schools because they were unsure how long they would be staying in their new community, and others simply did not want to let their children out of their sight (Casserly 2006). Some students were forced to enroll in several different schools as families moved across state lines in search of employment and affordable housing (Abramson and Garfield 2006; Picou and Marshall 2007). One study found that children experienced between one and eleven school changes over a three-month period following the storm, with an average of three moves per child (Lauten and Lietz 2008).

7.5.3 Children—Short- and Long-Term Recovery

Much of the literature available on children and recovery is geared toward adults and the ways that they can help children in the disaster aftermath. Parents are often recognized as the single most important source of social support for children following disaster (Prinstein et al. 1996). Parents provide material and emotional support, give comfort and nurturance, and offer a sense of physical safety. In addition to parents, other individuals such as teachers, peers, school counselors, psychologists, pediatricians, disaster relief volunteers, and shelter workers have been identified as playing key roles in re-establishing normalcy, allowing children to express their emotions, and assisting in coping efforts (Barrett, Ausbrooks, and Martinez-Cosio 2008; Johnston and Redlener 2006; Peek and Fothergill 2006; Peek, Sutton, and Gump 2008; Shen and Sink 2002; see also Figure 7.3). Indeed, Fothergill and Peek (2006, 122) argue that these various "support agents" play different, but vitally important, roles in the short- and long-term post-disaster recovery of children.

Some scholars have underscored the importance of encouraging traumatized children to express their feelings—verbally, in written form, through art, and play—to begin healing and recovery (Fothergill and Peek 2006; Looman 2006; Peek, Sutton, and Gump 2008; Raynor 2002). These

FIGURE 7.3 Walkaround Elmo entertains children in New York City as part of a FEMA Crisis Counseling session through the State of New York Office of Mental Health. *Source*: Photo by Andrea Booher/FEMA news photo.

different outlets may help children to articulate their sadness, fears, anxieties, most pressing needs, and hopes for the future. As Looman (2006) notes, however, the age of the child will likely determine the preferred mode of expression: younger children tend to want to draw about their experiences, while adolescents prefer to talk or write about what happened to them in a disaster.

The importance of reopening schools and day-care centers quickly after a disaster has also been highlighted as essential to the successful recovery of children, families, and communities (U.S. Government Accountability Office 2006; Wilson and Kershaw 2008). Indeed, schools are central to children's return to routine and normalcy. However, when a disaster causes widespread infrastructure damage and leads to the loss of teachers and other vital personnel, school reopening may be significantly delayed. Reopening schools may also be complicated by the presence of evacuated residents and emergency response personnel, since schools are often used as shelter facilities in disasters.

School-aged children who are displaced to new schools may face particular challenges in the recovery process. Picou and Marshall (2007) found that students who were displaced to Alabama following Katrina lacked reliable access to transportation and experienced unstable living situations, which led to attendance problems and negatively impacted academic performance. Moreover, families of displaced students suffered severe financial burdens that manifested in a lack of financial support for the daily needs of many displaced students. The rapid influx of new students also created challenges for teachers, school staff, and administrators. Teachers had to go to great lengths to ensure that evacuee children's emotional and academic needs were met, while also balancing the demands of the rest of the students in the class. Barrett, Ausbrooks, and Martinez-Cosio (2008) surveyed displaced middle and high school students who evacuated to Texas after Katrina. They found that nine months after the storm, there were few differences between the relocated Katrina evacuees and their peers in their new schools in terms of emotional well-being. However, evacuee youth were more prone to participate in risky behaviors and fewer protective behaviors (such as school sports or other extracurricular activities) than their non-evacuee peers. The findings indicate that the youths who built positive relationships with their new school, and those who had garnered positive support from adults (especially with their teachers), were managing better than those without a positive source of social support.

Children are at special risk for adverse psychological responses to disaster, but symptoms typically decrease rapidly and recovery is generally complete by 18 months to 3 years post-event (Vogel and Vernberg 1993). Some children suffer longer-term impairment, however. Children most at risk for protracted psychological reactions and delayed recovery include those who experienced highly stressful disasters that involved direct life threat; significant loss; separation from parents; and intense parental stress reactions (see Garrett et al. 2007; Vogel and Vernberg 1993). Chemtob, Nomura, and Abramovitz (2008) explored the long-term emotional and behavioral consequences of the September 11 terrorist attacks for 116 children who were five years old or younger and living or going to preschool in Manhattan at the time of the disaster. Nearly one fourth of the children in the study were exposed to high-intensity events, such as seeing the World Trade Center towers collapse, seeing injured people or dead bodies, or witnessing people jump out of buildings. The study found that children exposed to such traumatic events were nearly five times more likely to suffer from sleep problems and almost three times more likely to be depressed or anxious than children who were not exposed to the attacks. In a follow-up study to the Buffalo Creek flood, Green and colleagues (1991) evaluated child survivors 17 years post-event when they were adults (the subjects were first evaluated in 1974, two years after the disaster). The findings show that the survivors experienced a general decline in impairment over time, suggesting that most of the participants had indeed recovered from the disaster.

The long-term physical health effects for child disaster survivors are complex and not well understood. In the aftermath of September 11, children in Manhattan were exposed to high levels of contaminants in the air as a result of the dust and debris generated by the collapse of the twin towers and other surrounding buildings (Bartlett and Patrarca 2002). Experts testified that the clouds of dust contained benzene, mercury, dioxins, fiberglass, and asbestos, among other substances, and that children could potentially face long-term health issues as a result of exposure (Bartlett and Patrarca 2002, 9). Tens of thousands of Gulf Coast children who lived in FEMA-issued trailers after Katrina may experience lifelong health problems due to the formaldehyde present in the units (Gonzales 2008). Children, as well as adults, suffered ear, nose, and throat irritation; nausea; severe headaches; and asthma, and could potentially develop cancer as a result of the exposure to formaldehyde. The World Health Organization (2005) reports that an increasing number of children are becoming physically disabled due to an increase in sudden-onset disasters, malnutrition, chronic illness, war and other forms of violence, accidents, and environmental damage.

7.5.4 Elderly—Warning/Evacuation/Response

The ultimate goal of communicating warnings is to motivate individuals to take appropriate protective actions in the event of an impending threat. Yet few studies have explored ways to most effectively warn or communicate risk to the elderly. This means that we know very little about how older people prefer to receive warnings or how they interpret that information (Phillips and Morrow 2007). Mayhorn (2005) draws upon the literature on aging to illustrate how documented normative age-related changes in perception, attention, memory, text comprehension, and decision making all may affect the processing of hazard-related risk and warning messages. Based on this information, Mayhorn asserts that when developing messages for older adults, designers should tailor the characteristics of the messages to compensate for age-related declines in visual and auditory perception and should take account of different types of memory limitations. With the rapid advent of new communication technologies—such as email and other Web-based advancements, cell phone text messaging, and automatic telephone alert notification systems—it has become increasingly important to consider the ways that an older person's age and related physical and cognitive abilities, as well as their income, prior experience, social conditions, and educational backgrounds, might affect their capabilities to access and utilize these technologies.

Early studies on the elderly and disaster suggested that older persons are less likely to receive warnings than younger persons. Isolated living arrangements, diminished social networks, lower

rates of information-seeking behavior, and limited physical and mental capacities were all identified as possible obstacles to the receipt of warning messages among seniors (Friedsam 1962; Perry 1979). Klinenberg's (2002) research on the 1995 Chicago heat wave, where almost three fourths of the fatalities were among the elderly, revealed that city agencies and the media delayed warning the public about the imminent heat wave. Hundreds of the most vulnerable were dead before officials activated the city's heat emergency plan. When volunteers and city workers began canvassing neighborhoods to warn people of the dangers of the heat, many Chicago seniors refused to open their doors out of fear. Others were unable to engage in recommended protective actions (such as turning on fans or air conditioners or walking to air conditioned public spaces) due to financial constraints and physical limitations.

The research available on warning response among the elderly is conflicting. Some of the first studies on this topic characterized older persons as a population in need of special attention among emergency managers because of their noncompliance to warnings and unwillingness to cooperate with authorities (see Perry 1990). Possible explanations for elderly warning noncompliance included social isolation among some members of the population, inflexibility, a strong sense of independence, refusal to be separated from normal surroundings, limited mobility and higher degrees of physical infirmity, and fears of being mistreated by authorities (Friedsam 1962; Turner 1976). More systematic research by Perry and Lindell (1997), however, has challenged these assumptions about the elderly (also see Hutton 1976). Specifically, Perry and Lindell (1997) evaluated warning response among older persons across a variety of natural and technological disaster events, and found that citizens aged 65 and older who received warning messages were no less likely to comply with warnings and evacuation orders than their younger counterparts. In some cases, the elderly were actually more likely to comply. The authors conclude that while age alone is not a useful predictor of warning compliance, age is clearly important in the warning phase to the extent that related physical, psychological, financial, and social conditions impact such things as the probability of receiving a warning, understanding it, and taking action based upon it (p. 264).

Although evacuation—moving citizens from a place of danger to a place of relative safety—has long been used as a protective mechanism when disasters threaten (Perry 1990, 94), seniors often face additional challenges in the evacuation process. For instance, evacuation potentially entails significant financial (e.g., use of automobile, fuel, hotel stay, etc.), emotional (e.g., fear of the unknown; reluctance to leave pets, property, or possessions; etc.), and social (e.g., reliance on relatives, stigma, mistreatment, etc.) costs that may be exacerbated for elderly populations (International Federation of Red Cross and Red Crescent Societies 2007; Mayhorn 2005). Low-income seniors, the homebound, and those with physical or cognitive disabilities face compounded barriers that often make self-evacuation highly unlikely or impossible. For the frailest seniors, the risks of leaving must be balanced with the risks of staying. For example, when Hurricane Rita threatened the Gulf Coast, 2.5 million people evacuated the region, largely motivated by fears of another Katrina-like catastrophe (Garrett et al. 2007). Of the 111 storm-related deaths in Rita, 90 were due to the evacuation process itself as gridlock on the highway and oppressive heat took its toll on the chronically ill and elderly (Garrett et al. 2007, 192). As Moody (2006, 14) notes, on the one hand, leaving the home in which an elder has lived for years can provoke "transfer trauma" and even cause death. On the other hand, simply leaving individuals alone to risk death is tantamount to abandonment of the weakest members of our society.

Nine out of ten, or 90%, of elderly Americans live at home, and an increasing number of these individuals live alone (U.S. Census Bureau 2006). Even when early warnings (as with a slow-rising flood or hurricane) are issued hours or days before a disaster occurs, few communities have plans in place to identify and reach out to older adults most likely in need of evacuation assistance (Wilson 2006). For many older adults, especially those with disabilities or who require special medical equipment, exiting their homes can be a great challenge when evacuation is required (McGuire, Ford, and Okoro 2007). Yet the responsibility to evacuate is placed on these individuals and their loved ones, which is particularly problematic in the United States where people move frequently,

families are often spatially dispersed, and it is common for seniors to lose valuable sources of social support as they age (Klinenberg 2002). Seniors who live at home may be at even greater risk when a disaster strikes with little or no warning (as with an earthquake, industrial accident, and terrorist attack). After the September 11 attacks, a number of older adults and persons with disabilities were left for three days in buildings in lower Manhattan that had been evacuated, which highlights the pressing need to identify vulnerable people who are not in institutional settings or connected to community service agencies (O'Brien 2003).

Most emergency evacuation planning for seniors has actually been geared toward nursing homes and other assisted living facilities (Lafond 1987), although less than 10% of elderly adults in the United States live in these settings. Nursing home residents are generally frail and at risk of rapid medical decline in the absence of continuous care (Laditka et al. 2007), and thus the stresses of evacuation can be particularly challenging for this population. However, the burden to evacuate is not placed upon each resident because long-term care establishments ostensibly have disaster and evacuation plans. The facility decides whether to evacuate, selects and arranges the mode of transportation, and plans appropriate temporary lodging (McGuire, Ford, and Okoro 2007). Yet, this certainly does not guarantee the safety and survival of residents, as was widely acknowledged after Hurricane Katrina. The owners of St. Rita's Nursing Home in St. Bernard Parish, just outside of New Orleans, were charged with the deaths of 35 elderly patients who drowned after the owners decided not to evacuate the facility. What received less attention from the media, however, was that of the approximately 60 nursing homes directly affected by Katrina, only 21 evacuated before the storm (Hull and Struck 2005). A number of these nursing home facilities, which are obviously located in an extremely hazardous region, did not even have an evacuation plan on file (Wilson 2006).

Prior studies have identified numerous problems encountered in evacuating nursing home residents during emergencies and disasters, including (1) the absence of specific evacuation plans; (2) an insufficient number of vehicles that can accommodate walkers, wheelchairs, and other specialized medical equipment; (3) transportation delays and the resultant length of time required to move nursing home residents to their designated shelters; (4) elevated stress and discomfort among the elderly as they wait for transport; (5) staff not being permitted to pass through police checkpoints after being called in to assist with an evacuation; (6) lack of adequate staff and high staff–client ratios; (7) large numbers of frail elderly and persons in need of specialized medical attention; (8) communication system disruption; and (9) lack of water, food, medicine, and other essential supplies (Mangum, Kosberg, and McDonald 1989; Vogt 1991; Wilson 2006). Vogt (1991) discovered that preparing for emergencies is a low priority within most nursing homes and related health care organizations, and that too often these organizations utilize fire drills to prepare for all types of emergencies when the majority of events are non-fire related. There is some evidence, however, that the catastrophic consequences of Hurricane Katrina have caused at least some nursing home administrators to reconsider their disaster preparedness and evacuation plans (Laditka et al. 2007).

Most elderly, like other members of the population, do not evacuate to public shelters but instead relocate to the homes of relatives or friends (Tierney, Lindell, and Perry 2001). However, elderly adults who do utilize public shelters may encounter settings—such as churches and public schools—that are difficult to navigate because the facilities are located on more than one level (Vogt 1991). The elderly often evacuate without medications, eyeglasses, and other supplies, and thus may arrive at shelters without necessary provisions or knowledge of the whereabouts of their doctors (Ketteridge and Fordham 1998). Nursing home residents are frequently evacuated to other nursing homes or to hospitals, where the professional staff can relatively easily care for their needs. In some mass evacuations, however, nursing home residents end up in settings that were never intended to accommodate physically or mentally impaired persons. This creates numerous challenges related to feeding, cleaning, dressing, providing medications, and caring for these vulnerable individuals (Mangum, Kosberg, and McDonald 1989; Wilson 2006).

Sheltering in place during an emergency, either as a recommended action or because of a lack of other viable options, can lead to potentially life-threatening situations for the elderly. After

September 11, service personnel lacked access to older and frail residents living in the area surrounding Ground Zero where the twin towers collapsed. Essential services such as meals for the homebound and home health care were not delivered because staff had no official authorization to carry out their responsibilities. In some cases, elderly and disabled persons were left alone for days with no electricity (and therefore no television, lights, elevators, or refrigerators), no running water, and no information about what was happening (O'Brien 2003).

7.5.5 Elderly—Impacts

When disaster does strike, older adults are among those most likely to perish (Bourque et al. 2006). In the United States, the Centers for Disease Control and Prevention (2004) recorded 6108 deaths caused by natural disaster events between 1999 and 2003. Over 40% (2670) of those who died were persons 65 years of age and above, although the elderly represent only about 12% of the entire population. Research has also shown that the proportion of elderly injured in disasters is higher than would be expected based on the population distribution of this age group (see Eldar 1992).

A number of factors place the elderly at increased risk for disaster-related injuries, mortality, and morbidity. Many older adults, and especially elderly women of color, live in socially and economically marginalized positions prior to a disaster. Low-income seniors may be unable to increase their preparedness for disasters—by storing food, purchasing emergency first-aid equipment, stockpiling medicines, or upgrading their dwellings—which puts them at special risk in times of disaster. Sensory impairment, resulting from vision or hearing loss, may reduce the likelihood than an older adult will receive, accurately perceive, or appropriately act on hazard warnings (Eldar 1992; Mayhorn 2005). Age-related mobility problems make it more difficult for some older adults to escape during times of disaster. For instance, some seniors are physically incapable of walking to an evacuation point in the event of a tsunami warning or hiking up a hillside in a flash flood, both of which are recommended protective actions obviously aimed at more able-bodied persons. Reduced thermoregulatory capacity in the elderly, combined with a diminished ability to detect changes in their body temperatures, may partly explain their higher susceptibility to death from extreme cold and extreme heat (Medina-Ramón et al. 2006).

For the growing number of older persons who suffer from chronic ailments, the shock of a disaster may further exacerbate poor overall health and could lead to premature death (Medina-Ramón et al. 2006). Seniors are also more vulnerable because they typically have a lower injury threshold and a decreased ability to survive injury once it has occurred (Eldar 1992). A disaster can force individuals to go for extended periods of time without adequate food, water, shelter, or access to regular medications, and the elderly are among those who have the hardest time withstanding these sorts of conditions. Older adults who take refuge in public shelters may suffer additional trauma and stress from the lack of privacy, crowded and noisy environment, uncomfortable sleeping arrangements, and lack of assistance with activities of daily living (HelpAge International 2005). Older people with ailments such as diabetes or cancer may face difficulty in resuming life-sustaining treatment due to lost medical histories, lack of health insurance, or insufficient financial resources. Disasters can result in disabling conditions for some elderly, as they are forced to go without eyeglasses, hearing aids, walkers, and other devices that assist their daily living (Eldar 1992). These persons, who may have been relatively independent before the disaster, could become totally reliant on others.

Where the elderly live also puts them at risk for financial loss, death, or injury in disasters. A substantial proportion of older adults in the United States are concentrated in some of the most hazard-prone states. In fact, the four states with the highest number of federal disaster declarations—Texas, California, Florida, and New York—also happen to be the four states with the largest number of elderly residents (FEMA 2008; U.S. Census Bureau 2006). Older persons who live in low-cost housing are exposed to greater risks because of the lower quality construction of these buildings, which may be particularly susceptible to floods, fires, tornados, or earthquakes (Fothergill and Peek 2004). Elderly persons who live in high-crime, high-poverty neighborhoods that are run down and

lack viable public spaces are more likely to suffer from social isolation and to receive insufficient assistance in a disaster (Klinenberg 2002).

Increased rates of elder abuse may contribute to the physical and emotional vulnerability of some older persons in communities struck by disasters, although this is a largely unexplored topic. After the Exxon Valdez oil spill in Alaska, community leaders responding to a survey reported an 11% increase in elder abuse (Araji 1992). The stresses of living in a post-disaster environment often strain family relationships (Morrow 1997), and individuals may become overwhelmed as they attempt to cope with their own or their family members' traumatic reactions to disaster, the loss of material possessions and valued family memorabilia, financial difficulties, and increased demands for carework between adults and their elderly parents. All of these factors could contribute to a higher incidence of elder abuse in the aftermath of disaster.

Although older persons are at greater risk for death or physical injury, available research suggests that they are actually less likely than their younger counterparts to suffer adverse psychological impacts in the aftermath of natural and human-made disasters (Ngo 2001). In their extensive review of the disaster mental health literature, Norris and colleagues (2002) report that negative psychological responses to disaster decline with age, and that middle-aged adults are actually most likely to be adversely affected. Greater chronic stress and additional demands related to providing care and support for dependent relatives may explain why being middle-aged is a risk factor for post-disaster distress (Bolin and Klenow 1988; Thompson, Norris, and Hanacek 1993). The elderly seem to be more psychologically resilient because of the greater life experience, maturity, and fewer obligations and responsibilities that come with age (Ngo 2001; Norris et al. 2002). In addition, the lower psychological vulnerability of older adults might be attributed to previous disaster exposure and related improved preparedness and positive coping skills (Bell, Kara, and Batterson 1978; Huerta and Horton 1978; Lawson and Thomas 2007; Ngo 2001; Norris and Murrell 1988).

While older adults as a whole may exhibit lower rates of post-disaster distress, they are still at risk for adverse psychological outcomes after exposure to natural disaster. Indeed, a number of studies have confirmed that the elderly have suffered from anxiety, depressive symptoms, and considerable physical and mental distress for months or even several years in the aftermath of disaster (Krause 1987; Melick and Logue 1985; Ollendick and Hoffmann 1982; Phifer 1990). Furthermore, rates of psychological distress tend to vary significantly among the elderly, as some segments of the older adult population are more vulnerable than others to disaster. In particular, pre-disaster characteristics and conditions of the elderly (e.g., socioeconomic status, race, gender, marital status, family size, available support networks, prior traumatic experiences) and disaster impacts (e.g., severity of exposure, financial and material loss, displacement) all influence mental health outcomes in the immediate and longer-term aftermath of disaster (Bolin and Klenow 1988; Ngo 2001; Norris et al. 2002; Tracy and Galea 2006).

One consistent finding in the literature is that poor or low-income seniors are often most vulnerable to adverse psychological outcomes. This differential vulnerability may be directly related to associated deficits in coping tactics and low social support resources (Phifer 1990). While some research has found that men exposed to disaster exhibit higher rates of stress and may engage in negative coping behaviors (e.g., alcohol abuse) (Phifer 1990), numerous studies have shown that older women are more vulnerable to the effects of stress than older men (see Fothergill 1996; Ollenburger and Tobin 1999). Older women, and especially older minority women, are more likely to be unmarried, live alone, have more caretaking roles, and have fewer socioeconomic resources, which puts them at risk for stress-related illness after disaster (Ollenburger and Tobin 1999). However, older women typically have more social support, which suggests that their superior support networks may help them cope more effectively than men (Klinenberg 2002; Krause 1987; Tyler 2006).

Even though the elderly exhibit less post-impact psychological disruption than younger cohorts, they tend to experience greater proportional dollar losses (Bell 1978; Bolin and Klenow 1983; Kilijanek and Drabek 1979; Poulshock and Cohen 1975). These higher losses have been attributed to the elderly living in hazardous areas and residing in housing less resistant to forces of

nature, although more systematic research across time, place, and disaster type is necessary to better understand the actual extent of losses suffered by the elderly (Ngo 2001). Early research by Friedsam (1961, 1962) and Bolin and Klenow (1983) discovered that older citizens were more likely to report greater material losses, despite indications that damages were evenly distributed across age groups. However, work by Huerta and Horton (1978) found no pattern of over-reporting among the elderly. One thing that is certain is that those who have lived the longest often are at the greatest risk of losing the accumulated assets of a lifetime. Indeed, as a group, the elderly tend to lose more irreplaceable items, and it is the loss of these possessions that often causes great distress among older persons (Huerta and Horton 1978; Ketteridge and Fordham 1998; Kilijanek and Drabek 1979).

7.5.6 Elderly—Short- and Long-Term Recovery

The stress confronted by disaster victims is multifaceted, involving not only immediate loss and trauma but also a continuing requirement to adapt to a changing environment during the disaster recovery period (Norris and Hutchins 1989, 34). The research evidence available suggests that seniors often face financial, physical, and emotional obstacles as they struggle to recover and rebuild after a disaster. However, older adults who suffer less severe disruptions and have access to sufficient resources and sources of social support are able to cope effectively in the short- and longer-term aftermath of disaster.

As described previously, several studies have found that older citizens tend to experience greater proportional dollar losses in disasters. Yet many seniors, and especially elderly women, have inadequate savings or insurance coverage to help begin the process of disaster recovery (Bolin 1982; Childers 1999; Morrow-Jones and Morrow-Jones 1991). Moreover, relative to younger groups, the elderly are less likely to qualify for low-interest loans (Bolin 1982; Bolin and Klenow 1988). In an examination of the disaster loan process following the 1995 flooding in New Orleans, Childers (1999) found that poor elderly women were five times less likely than other elderly households, and almost six times less likely than younger people, to be approved for a loan. This is despite the fact that these low-income elderly women were over-represented in the population applying to FEMA for loans.

Many aid agencies assume—incorrectly—that generalized emergency and recovery aid will reach older people or that family members will look after their interests (International Federation of Red Cross and Red Crescent Societies 2007). This assumption is particularly problematic in light of past research that has documented that older adults are among those least likely to take advantage of aid (in the form of food, shelter, health care, or mental health services) or cash assistance from government or private sources (Poulshock and Cohen 1975). In their study of the long-term impacts of a tornado disaster on the elderly, Kilijanek and Drabek (1979, 559) argued that seniors and their families suffered from a "pattern of neglect." Of nine categories of potential help sources—(1) relatives, (2) friends, (3) religious organizations, (4) Red Cross, (5) Salvation Army, (6) other voluntary organizations, (7) governmental agencies, (8) strangers, and (9) employers—victims over 60 years of age received aid from all categories less frequently than did younger victims. Furthermore, nearly 20% of older citizens who suffered the most extensive damage received no aid whatsoever from any of the nine sources.

The elderly may not receive adequate recovery assistance for several reasons. First, discrimination against the elderly by government agencies, humanitarian organizations, and communities may limit their access to vital post-disaster aid (HelpAge International 2005; International Federation of Red Cross and Red Crescent Societies 2007). Second, overly bureaucratic agency procedures may discourage the elderly from applying for assistance. A number of scholars have noted that the elderly tend to feel confused, intimidated, and frustrated by complicated claim forms and procedural regulations (Bell, Kara, and Batterson 1978; Huerta and Horton 1978; Phillips and Morrow 2007). FEMA no longer requires that disaster victims travel to an application center and wait in line to fill

out myriad forms (Childers 1999), a process that was particularly problematic for older persons who required additional support or transportation assistance to leave their homes (Poulshock and Cohen 1975). However, new technologies—such as voice-prompt telephone systems and Internet-based aid applications—may be similarly inaccessible to certain segments of the elderly population. Third, the elderly, especially those with limited social networks, may lack the necessary information and support mechanisms to navigate increasingly complex recovery aid application processes (Childers 1999). Fourth, a generational emphasis on self-sufficiency and independence may lead some elderly to fear that accepting aid will leave them dependent (Bell, Kara, and Batterson 1978; Ngo 2001). Fifth, and related to the previous point, the perceived stigma attached to accepting "welfare" may discourage elderly from requesting any type of assistance (Huerta and Horton 1978; Poulshock and Cohen 1975).

Some studies have found that the elderly tend to suffer serious long-term health effects after disaster, including persistent depressive symptoms and perceived deterioration of physical health (Friedsam 1962; Melick and Logue 1985; Phifer 1990; Takeda, Tamura, and Tatsuki 2003; Tyler and Hoyt 2000). Yet other research suggests that older persons do not suffer lasting negative physical or mental health impacts (Hutchins and Norris 1989; Kilijanek and Drabek 1979), and that they actually rebound at equal rates or more quickly than younger persons (Bell, Kara, and Batterson 1978; Bolin and Klenow 1988; Miller, Turner, and Kimball 1981). In fact, some research has shown that the elderly experience positive impacts such as strengthened familial relationships and an increase in civic mindedness (as evidenced by higher rates of volunteerism and community involvement) during the recovery period (Bell, Kara, and Batterson 1978; Takeda, Tamura, and Tatsuki 2003).

Resource and social support differentials may help explain these conflicting findings regarding the long-term effects of disasters for elders (Takeda, Tamura, and Tatsuki 2003; Tyler 2006). Following a major tornado in Paris, Texas, Bolin and Klenow (1988) compared the psychosocial recovery of black and white elderly and non-elderly disaster victims. They discovered that elders within each racial group were more likely to be psychosocially recovered than were the younger victim samples, although a significantly higher proportion of white elders were fully recovered at eight months post-impact than were black elders. A number of characteristics had a positive effect on psychosocial recovery for both black and white elderly disaster victims, including higher socioeconomic status, being married, having adequate insurance and sources of federal aid, and experiencing fewer post-disaster moves while in temporary housing. This study clearly indicates that the black and white elderly victims who recovered the fastest had more financial, social, and emotional resources available to help them in coping with the numerous demands of the post-disaster environment.

It is also important to acknowledge that the lasting effects of disaster and prospects for recovery among the elderly may be shaped by the severity of the event. Disasters that cause more severe losses, trauma exposure, and ongoing displacement seem to be particularly stressful for the elderly and subsequently lead to slower recovery (Miller, Turner, and Kimball 1981). For example, post–Hurricane Katrina, seniors suffered more serious health declines in much greater numbers than younger storm victims (Spiegel 2006). In addition, in the year following Katrina's landfall, Stephens and colleagues (2007) observed a significant increase in the proportion of deaths (43% increase over baseline) among current and former New Orleans residents. The researchers argue that the excess mortality, especially among the elderly and other vulnerable groups, demonstrates the enduring health consequences of a major natural disaster. They also suggest that the indirect deaths largely resulted from a virtually destroyed public health infrastructure. Sanders, Bowie, and Bowie (2003) interviewed elderly African American public housing residents who were forcibly relocated from their homes when Hurricane Andrew struck Florida. They found that the seniors suffered from various physical and mental health conditions, but only about one fourth of the older adults had their health care needs met during the relocation. The physical and emotional challenges that the elderly faced were exacerbated by their separation from family, friends, former health care providers, and various community support services.

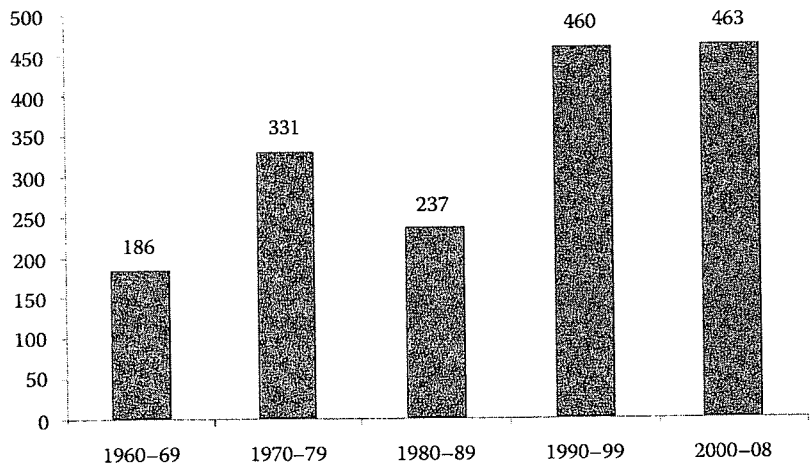

FIGURE 7.4 Number of U.S. federal disaster declarations, 1960–2008. *Source*: FEMA (Federal Emergency Management Agency). Declared disasters by year or state. http://www.fema.gov/news/disaster_totals_annual.fema (accessed February 4, 2008).

7.6 FUTURE RISK AND IMPLICATIONS FOR ACTION

Disaster risk is on the rise in the United States. Over the past five decades, the number of federal disaster declarations has increased substantially (Figure 7.4). The economic losses, damage to the built and natural environment, and human costs of these major disasters have been severe. Adjusting for inflation, natural disasters resulted in approximately $387 billion in property losses and over $85 billion in crop losses in the United States from 1960–2005. During the same time period, disasters claimed the lives of nearly 19,000 Americans and injured over 170,000 more (SHELDUS 2005).

Beyond better tracking and reporting, the increase in the number of disaster events may be attributed to various demographic, socioeconomic, environmental, and technological factors. The U.S. population more than tripled from 1900 to 2000, placing more people in harm's way. The growing population has been accompanied by greater diversity, longer life expectancies, and more significant gaps between high- and low-income populations. Climate change, coastal land loss, and environmental degradation have resulted in more extreme weather events and have impacted fragile ecosystems. In addition, increased urbanization, infrastructure decay, and unsustainable development in hazard-prone areas such as floodplains, coastal regions, and earthquake fault zones have contributed to rising disaster losses.

Most experts agree that the financial and human tolls of disasters will continue to increase throughout the 21st century (Mileti 1999). Without a significant change in practice and policy, children and the elderly will also continue to be among those most affected when disaster strikes. Therefore, this final section presents some possible approaches for addressing the vulnerability of children and the elderly before and after disaster.

7.6.1 Recognize the Vulnerability of Children and the Elderly

A first step in reducing the vulnerability of children and the elderly involves recognition that these groups often have fewer resources and limited capacity to prepare for disaster, may suffer disproportionate losses when disaster strikes, and tend to face barriers in the recovery process. Available research evidence in the United States and in international contexts shows that children and the elderly are among those most at risk for death and injury in disaster; they may experience both short- and longer-term psychological impairment in the aftermath of disaster; they often suffer increased risk in shelters due to poor design and planning decisions; and they may require additional

emotional, financial, and/or educational support during the recovery period. Volunteers, emergency managers, and other professionals who assist with disaster preparedness, response, and recovery activities must be encouraged to consider the elevated risks that children and the elderly face across the disaster life cycle. Moreover, these professionals should be taught to recognize the root causes—from increased exposure to hazards to unequal access to resources—that contribute to the vulnerability of the very young and the very old.

A growing number of research studies, policy briefings, and field reports focus on the experiences and needs of children and older persons in disasters. This information should be integrated into higher education curriculum for emergency managers, disaster planning and training exercises, emergency response protocols, shelter planning activities, and community preparedness and education materials. A sustained focus on the special needs of children and the elderly will help to ensure that these groups are not rendered invisible in disaster planning and post-disaster resource allocation.

7.6.2 Acknowledge Differential Vulnerability and Target Resources Accordingly

In the United States, children and the elderly have very different pre- and post-disaster experiences on the basis of their age and stage of development, income and access to resources, race, gender, physical and mental abilities, geographic location, housing situation, and family structure. These critical social and demographic factors influence whether young people and older adults will prepare for disaster, receive warnings, take recommended protective actions, access aid, or recover fully from trauma. Thus, while it is important to recognize that children and the elderly are among the most vulnerable groups in emergency situations, it is also vital to acknowledge that not all children and not all elderly are equally vulnerable. Indeed, age intersects with many other factors to determine differential rates of vulnerability among children and older adults. For instance, a poor, elderly African American woman living alone in substandard rental housing is at increased risk for death or physical injury in a sudden-onset disaster. This is largely due to what Phillips and Morrow (2007, 63) refer to as the "clustering" of vulnerability factors that ultimately leads to amplified risk in disaster for the most marginalized members of society.

Resources for disaster preparedness, emergency response and sheltering, and long-term recovery should be allocated in such a way that acknowledges that some children and some older adults are more vulnerable to the harmful impacts of disaster and thus require greater assistance. Of course, determining the relative vulnerability of children and the elderly and identifying those most at risk before and after a disaster can be challenging. However, emergency management agencies and community organizations can work together to develop means to find and work with the most vulnerable groups of children and the elderly (Table 7.1).

7.6.3 Mandate Institutional Preparedness

The limited research evidence available suggests that day-care centers, schools, nursing homes, and other institutions that serve the needs of children or the elderly are often not prepared for disasters. These institutions should be required to (1) stockpile food, water, medications, and other necessary emergency supplies; (2) upgrade their dwellings (for example, structures in earthquake zones should be retrofitted and heavy items such as bookcases should be bolted down); (3) develop emergency response guidelines and evacuation plans in consultation with local emergency management agencies; and (4) review emergency plans on a regular basis with staff and parents of children or family members of the elderly.

Private and public day-care centers and schools, nursing homes, senior living facilities, and other institutions may require financial support to carry out various preparedness activities that would help increase the safety of the populations they serve. This means that local, state, and federal government entities must commit the necessary resources to ensure that these organizations can appropriately prepare and can reopen in a timely manner in the aftermath of disaster.

TABLE 7.1
Indicators of Increased Vulnerability among Children and the Elderly

Children	Elderly
Very young (0–5 years of age)	Oldest old (85 years of age or older)
Live in a single-parent household	Frail elderly
Homeless	Poor
Poor	Chronically ill
Mentally or physically disabled	Mentally or physically disabled
Occupy older or less stable housing	Experience sensory or mobility limitations
Racial or ethnic minorities	Live alone
Pet owners	Socially isolated
Attend inadequately prepared day-care centers or schools	Renters
Lack access to social support	Occupy older or less stable housing
Have limited coping resources	Live in inadequately prepared nursing homes or senior living facilities
Reside in a hazard-prone area	Racial or ethnic minorities
	Pet owners
	Reside in a hazard-prone area

7.6.4 Build Capacities and Involve Children and the Elderly

Children and the elderly represent over one third of the entire U.S. population. Beyond their sheer numbers, both children and older adults have considerable strengths that could serve as a significant resource for families, communities, and organizations attempting to prepare for, respond to, and recover from disasters. Rather than excluding their voices, children and the elderly should be actively encouraged to participate in disaster planning and relief efforts. Below I offer just a few examples of ways that children and the elderly can, and have, contributed in meaningful ways to vulnerability reduction efforts.

An increasing number of children are learning about hazards in schools, on the Internet, and through popular media (Wachtendorf, Brown, and Nickle 2008; Wisner 2006). Children can draw on their newly acquired knowledge to help their families assemble emergency supply kits and develop household evacuation plans. Adolescents across the United States are becoming involved in Teen School Emergency Response Training (Teen SERT) programs, which help students to learn basic preparedness and response skills so they can handle emergency situations. Bilingual children may translate disaster warnings and other materials for non-English speaking adults in their families and communities (Mitchell et al. 2008). During the emergency response phase of disaster, children may actively engage in search and rescue activities and assist less able-bodied family members with evacuation (Kirschke and van Vliet 2005). Children often express a strong desire to be involved with post-disaster community rebuilding efforts, and have contributed to reconstruction planning and design, assisted with cleanup activities, and helped to rebuild houses and schools (see Peek 2008).

The elderly have a wealth of knowledge and experience accumulated over a lifetime. Older persons know the history of their community, and their experiences and memories of past disasters can assist in planning and risk mitigation activities. The elderly are aware of the unique needs of older adults, and they can articulate those needs to emergency managers and other professionals. Shelter planning committees and local emergency management agencies could include members of the elderly community on decision-making and advisory bodies such as disaster preparedness committees. Given that the elderly population of the United States is projected to double in coming decades, and that an increasing number of seniors live alone, the elderly can play an active role in identifying and reaching out to the most vulnerable members of the community. Building these types of social networks with elders could ultimately save the lives of those who are socially isolated

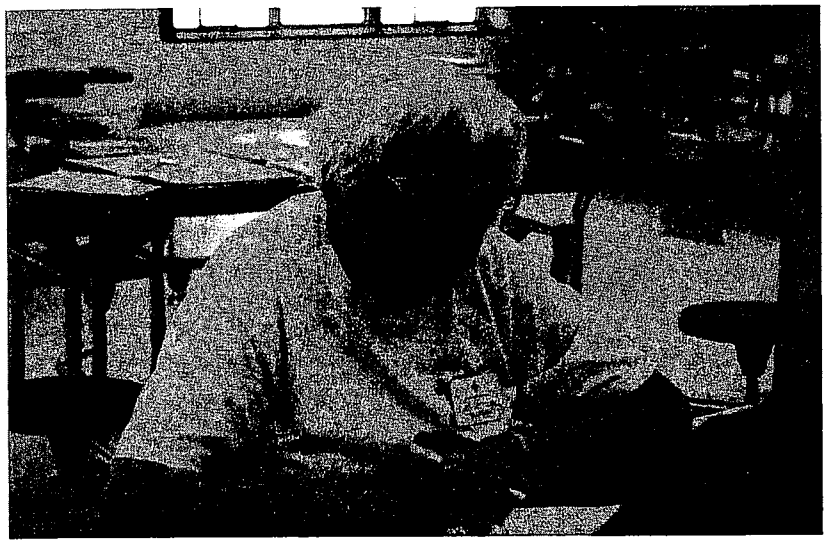

FIGURE 7.5 A Red Cross volunteer assists survivors at a recovery center. *Source*: Photo by Liz Roll/FEMA news photo

or have mobility impairments (Klinenberg 2002). The elderly already comprise a large percentage of volunteers in nongovernmental organizations and in disaster relief and recovery (Lafond 1987). They should be acknowledged for their myriad contributions and encouraged to continue serving in this important capacity (Figure 7.5).

7.7 SUMMARY

Although disasters occur across the United States, their impacts are distributed unevenly. As this chapter has demonstrated, children and the elderly are often among the most vulnerable to natural and human-made hazards. Yet the vulnerability of these groups is neither inherent nor inevitable. Because vulnerability is rooted in social, economic, and cultural processes, it is possible to reduce many of the risks that children and the elderly face in disasters. Like other forms of social change, however, reducing vulnerability among these groups will require a sustained commitment from families, communities, emergency management agencies, disaster relief organizations, and all levels of government.

7.8 DISCUSSION QUESTIONS

1. In what ways do race, class, gender, physical and mental ability, and age interact and influence the experiences of children and the elderly in disaster?
2. What challenges does growing diversity among both youth and elderly populations pose for disaster planning and response? What opportunities for reducing vulnerability may emerge as a result of increasingly diverse younger and older populations?
3. How does unequal access to resources influence the experiences of children and the elderly before and after disaster?
4. How can organizations active in disaster planning, emergency management, and long-term recovery be more responsive to the specific needs of children and the elderly?
5. How can families and communities be more responsive to the specific needs of children and the elderly?
6. In what ways could the research findings detailed in this chapter be applied to emergency preparedness, response, or recovery activities?

7. Although an increasing number of studies have focused on the experiences of children and the elderly in disaster contexts, important gaps in knowledge remain. What do you see as the most pressing research needs in this subfield of disaster research?
8. What do you view as the greatest strengths of children and the elderly, especially as they relate to potential contributions to disaster planning and response?
9. How could children and the elderly be more actively engaged in disaster planning and response?

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REFERENCES

Abramson, D., and R. Garfield. 2006. *On the edge: Children and families displaced by Hurricanes Katrina and Rita face a looming medical and mental health crisis.* New York: Columbia University Mailman School of Public Health.

Abramson, D., I. Redlener, T. Stehling-Ariza, and E. Fuller. 2007. *The legacy of Katrina's children: Estimating the numbers of hurricane-related at-risk children in the Gulf Coast states of Louisiana and Mississippi.* New York: Columbia University Mailman School of Public Health.

Adams, J. 1995. *Risk.* London: UCL Press.

Araji, S. 1992. The Exxon-Valdez oil spill: Social, economic, and psychological impacts on Homer. Unpublished final report to the community of Homer, Department of Sociology, University of Alaska.

Barrett, E. J., C. Y. B. Ausbrooks, and M. Martinez-Cosio. 2008. The school as a source of support for Katrina-evacuated youth. *Children, Youth and Environments* 18 (1): 202–36.

Bartlett, S., and J. Patrarca. 2002. *Schools of Ground Zero: Early lessons learned in children's environmental health.* Washington, DC: American Public Health Association and Healthy Schools Network, Inc.

Bell, B. D. 1978. Disaster impact and response: Overcoming the thousand natural shocks. *The Gerontologist* 18:531–40.

Bell, B. D., G. Kara, and C. Batterson. 1978. Service utilization and adjustment patterns of elderly tornado victims in an American disaster. *Mass Emergencies* 3:71–81.

Bolin, R. 1982. *Long-term family recovery from disaster.* Boulder: Institute of Behavioral Science, University of Colorado.

Bolin, R., and D. J. Klenow. 1983. Response of the elderly to disaster. *International Journal of Aging and Human Development* 16(4):283–96.

———. 1988. Older people in disaster: A comparison of black and white victims. *International Journal of Aging and Human Development* 26 (1): 29–43.

Bourque, L. B., J. M. Siegel, M. Kano, and M. M. Wood. 2006. Morbidity and mortality associated with disasters. In *Handbook of disaster research,* eds. H. Rodríguez, E. L. Quarantelli, and R. R. Dynes, 97–112. New York: Springer.

Boyden, J. 2003. Children under fire: Challenging assumptions about children's resilience. *Children, Youth and Environments* 13 (1). http://colorado.edu/journals/cye (accessed March 1, 2008).

Brandenburg, M. A., M. B. Ogle, B. A. Washington, M. J. Garner, S. A. Watkins, and K. L. Brandenburg. 2006. 'Operation Child-Safe': A strategy for preventing unintentional pediatric injuries at a Hurricane Katrina evacuee shelter. *Prehospital and Disaster Medicine* 21 (5): 359–65.

Brandenburg, M. A., S. M. Watkins, K. L. Brandenburg, and C. Schieche. 2007. Operation Child-ID: Reunifying children with their legal guardians after Hurricane Katrina. *Disasters* 31 (3): 277–87.

Carter, M. T., S. Kendall, and J. P. Clark. 1983. Household response to warnings. *International Journal of Mass Emergencies and Disasters* 9 (1): 94–104.

Casserly, M. 2006. Double jeopardy: Public education in New Orleans before and after the storm. In *There is no such thing as a natural disaster: Race, class, and Hurricane Katrina,* eds. C. Hartman and G. D. Squires, 197–214. New York: Routledge.

Centers for Disease Control and Prevention. 2004. *Compressed mortality file: Underlying cause of death.* http://wonder.cdc.gov/mortSQL.html (accessed February 8, 2008).

Chemtob, C. M., Y. Nomura, and R. A. Abramovitz. 2008. Impact of conjoined exposure to the World Trade Center attacks and to other traumatic events on the behavioral problems of preschool children. *Archives of Pediatrics and Adolescent Medicine* 162 (2): 126–33.

Childers, C. D. 1999. Elderly female-headed households in the disaster loan process. *International Journal of Mass Emergencies and Disasters* 17 (1): 99–110.

Children's Defense Fund. 2006. *Katrina's children: A call to conscience and action.* Washington, DC: Children's Defense Fund.

Curtis, T., B. C. Miller, and E. H. Berry. 2000. Changes in reports and incidence of child abuse following natural disasters. *Child Abuse and Neglect* 24:1151–62.

Dash, N., and H. Gladwin. 2007. Evacuation decision making and behavioral responses: Individual and household. *Natural Hazards Review* 8 (3): 69–77.

Edwards, M. L. 1993. Social location and self-protective behavior: Implications for earthquake preparedness. *International Journal of Mass Emergencies and Disasters* 11 (3): 293–303.

Eldar, R. 1992. The needs of elderly persons in natural disasters: Observations and recommendations. *Disasters* 16 (4): 355–58.

Enarson, E., A. Fothergill, and L. Peek. 2006. Gender and disaster: Foundations and directions. In *Handbook of disaster research,* eds. H. Rodríguez, E. L. Quarantelli, and R.R. Dynes, 130–46. New York: Springer.

Fass, S., and N. K. Cauthen. 2007. *Who are America's poor children? The official story.* New York: National Center for Children in Poverty, Columbia University Mailman School of Public Health.

FEMA (Federal Emergency Management Agency). 2008. *Declared disasters by year or state.* http://www.fema.gov/news/disaster_totals_annual.fema (accessed February 4, 2008).

Fischer III, H. W., G. F. Stine, B. L. Stoker, M. L. Trowbridge, and E. M. Drain. 1995. Evacuation behavior: Why do some evacuate while others do not? A case study of Ephrata, Pennsylvania (USA) evacuation. *Disaster Prevention and Management* 4 (4): 30–36.

Fisher, S. 2005. Gender based violence in Sri Lanka in the aftermath of the 2004 Tsunami crisis: The role of international organizations and international NGOs in prevention and response to gender based violence. PhD dissertation, University of Leeds.

Fothergill, A. 1996. Gender, risk, and disaster. *International Journal of Mass Emergencies and Disasters* 14 (1): 33–56.

Fothergill, A., E. Maestas, and J. Darlington. 1999. Race, ethnicity, and disasters in the United States: A review of the literature. *Disasters* 23 (2): 156–73.

Fothergill, A., and L. Peek. 2004. Poverty and disasters in the United States: A review of the sociological literature. *Natural Hazards* 32:89–110.

———. 2006. Surviving catastrophe: A study of children in Hurricane Katrina. In *Learning from catastrophe: Quick response research in the wake of Hurricane Katrina,* ed. Natural Hazards Center, 97–130. Boulder: Institute of Behavioral Science, University of Colorado.

Friedsam, H. J. 1961. Reactions of older persons to disaster-caused losses. *The Gerontologist* 1:34–37.

———. 1962. Older persons in disaster. In *Man and society in disaster,* eds. G. W. Baker and D. W. Chapman, 151–82. New York: Basic Books.

Garrett, A. L., R. Grant, P. Madrid, A. Brito, D. Abramson, and I. Redlener. 2007. Children and megadisasters: Lessons learned in the new millennium. *Advances in Pediatrics* 54:189–214.

Glass, R. I., J. J. Urrutia, S. Sibony, H. Smith, B. Garcia, and L. Rizzo. 1977. Earthquake injuries related to housing in a Guatemalan village. *Science* 197:638–43.

Gonzales, J. M. 2008. Kids in Katrina trailers may face lifelong ailments. *Denver Post,* May 28.

Green, B. L., M. Korol, M. C. Grace, M. G. Vary, A. C. Leonard, G. C. Gleser, and S. Smitson-Cohen. 1991. Children and disaster: Age, gender, and parental effects on PTSD symptoms. *Journal of the American Academy of Child and Adolescent Psychiatry* 30 (6): 945–51.

He, W., M. Sengupta, V. A. Velkoff, and K. A. DeBarros. 2005. *65+ in the United States: 2005.* U.S. Census Bureau, Current Population Reports. Washington, DC: U.S. Government Printing Office.

Heath, S. E., S. K. Voeks, and L. T. Glickman. 2000. A study of pet rescue in two disasters. *International Journal of Mass Emergencies and Disasters* 18 (3): 361–81.

HelpAge International. 2005. The impact of the Indian Ocean Tsunami on older people: Issues and recommendations. London: HelpAge International.

Hewitt, K. 2007. Preventable disasters: Addressing social vulnerability, institutional risk, and civil ethics. *Geographischs Rundschau International Edition* 3 (1): 43–52.

Houts, P. S., M. K. Lindell, T. W. Hu, P. D. Cleary, G. Tokuhata, and C. B. Flynn. 1984. The protective action decision model applied to evacuation during the Three Mile Island crisis. *International Journal of Mass Emergencies and Disasters* 2 (1): 27–39.

Huerta, F., and R. Horton. 1978. Coping behavior of elderly flood victims. *The Gerontologist* 18 (6): 541–46.

Hull, A., and D. Struck. 2005. At nursing home, Katrina dealt only the first blow: Nuns labored for days in fatal heat to get help for patients. *Washington Post,* September 23.

Hutchins, G. L., and F. H. Norris. 1989. Life change in the disaster recovery period. *Environment and Behavior* 21 (1): 33–56.

Hutton, J. R. 1976. The differential distribution of death in disaster: A test of theoretical propositions. *Mass Emergencies* 1:261–66.

Ikeda, K. 1995. Gender differences in human loss and vulnerability to natural disasters: A case study from Bangladesh. *Indian Journal of Gender Studies* 2 (2): 171–93.

International Federation of Red Cross and Red Crescent Societies. 2007. *World disasters report 2007: Focus on discrimination.* Bloomfield, CT: Kumarian Press.

International Medical Corps. 2006. *Displaced in America: Health status among internally displaced persons in Louisiana and Mississippi travel trailer parks.* Santa Monica, CA: International Medical Corps.

Jacobs, A. 2008. Parents grief turns to rage at Chinese officials. *New York Times,* May 28.

Jeney-Gammon, P., T. K. Daugherty, A. J. Finch Jr., R. W. Belter, and K. Y. Foster. 1993. Children's coping styles and report of depressive symptoms following a natural disaster. *The Journal of Genetic Psychology* 154 (2): 259–67.

Johnson, J. H. 1985. Role conflict in a radiological emergency: The case of public school teachers. *Journal of Environmental Systems* 15 (1): 77–91.

Johnston, C., and I. Redlener. 2006. Critical concepts for children in disasters identified by hands-on professionals: Summary of issues demanding solutions before the next one. *Pediatrics* 117 (5): 458–60.

Junn, E. N., and D. W. Guerin. 1996. Factors related to earthquake preparedness among child care professionals: Theory and policy implications. *International Journal of Mass Emergencies and Disasters* 14 (3): 343–59.

Keenan, H. T., S. W. Marshall, M. A. Nocera, and D. K. Runyan. 2004. Increased incidence of inflicted traumatic brain injury in children after a natural disaster. *American Journal of Preventive Medicine* 26 (3): 189–93.

Kelly, M. 1993. Infant feeding in emergencies. *Disasters* 17 (2): 110–21.

Ketteridge, A., and M. Fordham. 1998. Flood evacuation in two communities in Scotland: Lessons from European research. *International Journal of Mass Emergencies and Disasters* 16 (2): 119–43.

Kilijanek, T. S., and T. E. Drabek. 1979. Assessing long-term impacts of a natural disaster: A focus on the elderly. *The Gerontologist* 19 (6): 555–66.

Kirschke, J., and W. van Vliet. 2005. 'How can they look so happy?' Reconstructing the place of children after Hurricane Katrina: Images and reflections. *Children, Youth and Environments* 15 (2): 378–91.

Klinenberg, E. 2002. *Heat wave: A social autopsy of disaster in Chicago.* Chicago: University of Chicago Press.

Kozol, J. 1991. *Savage inequalities: Children in America's schools.* New York: Crown Publishers.

———. 2005. *The shame of the nation: The restoration of apartheid schooling in America.* New York: Crown Publishers.

Krause, N. 1987. Exploring the impact of a natural disaster on the health and psychological well-being of older adults. *Journal of Human Stress* 13 (12): 61–69.

La Greca, A. M., W. K. Silverman, E. M. Vernberg, and M. C. Roberts. 2002. Introduction. In *Helping children cope with disasters and terrorism,* eds. A. M. La Greca, W. K. Silverman, E. M. Vernberg, and M. C. Roberts, 3–8. Washington, DC: American Psychological Association.

La Greca, A. M., W. K. Silverman, and S. B. Wasserstein. 1998. Children's predisaster functioning as a predictor of post-traumatic stress following Hurricane Andrew. *Journal of Consulting and Clinical Psychology* 66 (6): 883–92.

Laditka, S. B., J. N. Laditka, S. Xirasagar, C. B. Cornman, C. B. Davis, and J. V. E. Richter. 2007. Protecting nursing home residents during emergencies and disasters: An exploratory study from South Carolina. *Prehospital and Disaster Medicine* 22 (1): 42–48.

Lafond, R. 1987. Emergency planning for the elderly. *Emergency Preparedness Digest* 14 (3): 15–21.

Larsen, J. 2006. *Setting the record straight: More than 52,000 Europeans died from heat in summer 2003.* Washington, DC: Earth Policy Institute.

Lauten, A. W., and K. Lietz. 2008. A look at the standards gap: Comparing child protection responses in the aftermath of Hurricane Katrina and the Indian Ocean Tsunami. *Children, Youth and Environments* 18 (1): 158–201.

Lawson, E. J., and C. Thomas. 2007. Wading in the waters: Spirituality and older Black Katrina survivors. *Journal of Health Care for the Poor and Underserved* 18:341–54.

Lengua, L. J., A. C. Long, K. I. Smith, and A. N. Meltzoff. 2005. Pre-attack symptomatology and temperament as predictors of children's responses to the September 11 terrorist attacks. *Journal of Child Psychology and Psychiatry* 46:631–45.

Lindell, M. K., J. Lu, and C. S. Prater. 2005. Household decision making and evacuation in response to Hurricane Lili. *Natural Hazards Review* 6 (4): 171–79.

Lonigan, C. J., M. P. Shannon, C. M. Taylor, A. J. Finch, Jr., and F. R. Sallee. 1994. Children exposed to disaster: II. Risk factors for the development of post-traumatic symptomatology. *Journal of the American Academy of Child and Adolescent Psychiatry* 33 (1): 94–105.

Looman, W. S. 2006. A developmental approach to understanding drawings and narratives from children displaced by Hurricane Katrina. *Journal of Pediatric Health Care* 20 (3): 158–66.

Maida, C. A., N. S. Gordon, and G. Strauss. 1993. Child and parent reactions to the Los Angeles area Whittier Narrows earthquake. *Journal of Social Behavior and Personality* 8:421–36.

Mandalakas, A., K. Torjesen, and K. Olness. 1999. How to help the children in complex humanitarian emergencies: A practical manual. http://www.ipa-world.org/programs/Children_in_Disasters.pdf (accessed May 30, 2008).

Mangum, W. P., J. I. Kosberg, and P. McDonald. 1989. Hurricane Elena and Pinellas County, Florida: Some lessons learned from the largest evacuation of nursing home patients in history. *The Gerontologist* 29 (3): 388–92.

Markenson, D., and I. Redlener. 2004. Pediatric disaster terrorism preparedness national guidelines and recommendations: Findings of an evidence-based consensus process. *Biosecurity and Bioterrorism* 2 (4): 301–14.

Mayhorn, C. B. 2005. Cognitive aging and the processing of hazard information and disaster warnings. *Natural Hazards Review* 6 (4): 165–70.

McFarlane, A. C. 1987. Family functioning and overprotection following a natural disaster: The longitudinal effects of post-traumatic morbidity. *Australian and New Zealand Journal of Psychiatry* 21:210–18.

McGuire, L. C., E. S. Ford, and C. A. Okoro. 2007. Natural disasters and older U.S. adults with disabilities: Implications for evacuation. *Disasters* 31 (1): 49–56.

Medina-Ramón, M., A. Zanobetti, D. P. Cavanagh, and J. Schwartz. 2006. Extreme temperatures and mortality: Assessing effect modification by personal characteristics and specific cause of death in a multi-city case-only analysis. *Environmental Health Perspectives* 114 (9): 1331–36.

Melick, M. E., and J. N. Logue. 1985. The effect of disaster on the health and well-being of older women. *International Journal of Aging and Human Development* 21 (1): 27–37.

Mileti, D. S. 1999. *Disasters by design: A reassessment of natural hazards in the United States*. Washington, DC: Joseph Henry Press.

Mileti, D. S., and J. D. Darlington. 1997. The role of searching in shaping reactions to earthquake risk information. *Social Problems* 44:89–103.

Mileti, D. S., and C. Fitzpatrick. 1992. Causal sequence of risk communication in the Parkfield earthquake prediction experiment. *Risk Analysis* 12 (3): 393–400.

Mileti, D. S., and P. W. O'Brien. 1992. Warnings during disaster: Normalizing communicated risk. *Social Problems* 39:40–57.

Miller, J. A., J. G. Turner, and E. Kimball. 1981. Big Thompson flood victims: One year later. *Family Relations* 30 (1): 111–16.

Mitchell, T., K. Haynes, N. Hall, W. Choong, and K. Oven. 2008. The role of children and youth in communicating disaster risk. *Children, Youth and Environments* 18 (1): 254–79.

Moody, H. R. 2006. The ethics of evacuation. *The Public Policy and Aging Report* 16 (2): 14–15.

Morrow, B. H. 1997. Stretching the bonds: The families of Andrew. In *Hurricane Andrew, ethnicity, gender, and the sociology of disaster,* eds. W. G. Peacock, H. Gladwin, and B. H. Morrow, 141–70. London: Routledge.

Morrow-Jones, H. A., and C. R. Morrow-Jones. 1991. Mobility due to natural disaster: Theoretical considerations and preliminary analysis. *Disasters* 15:126–32.

National Center for Missing and Exploited Children. 2006. National Center for Missing and Exploited Children reunites last missing child separated by Hurricanes Katrina and Rita. Press release. Alexandria, VA: National Center for Missing and Exploited Children.

Newman, K. S., and V. T. Chen. 2007. *The missing class: Portraits of the near poor in America.* Boston: Beacon Press.

Ngo, E. B. 2001. When disasters and age collide: Reviewing vulnerability of the elderly. *Natural Hazards Review* 2 (2): 80–89.

Norris, F. H., M. J. Friedman, P. J. Watson, C. M. Byrne, E. Diaz, and K. Kaniasty. 2002. 60,000 disaster victims speak: Part I. An empirical review of the empirical literature, 1981–2001. *Psychiatry* 65 (3): 207–39.

Norris, F. H., and G. L. Hutchins. 1989. Life change in the disaster recovery period. *Environment and Behavior* 21 (1): 33–56.

Norris, F. H., and S. A. Murrell. 1988. Prior experience as a moderator of disaster impact on anxiety symptoms in older adults. *American Journal of Community Psychology* 16:665–83.

O'Brien, N. 2003. *Emergency preparedness for older people*. New York: International Longevity Center-USA.

Ollenburger, J. C., and G. A. Tobin. 1999. Women, aging, and post-disaster stress: Risk factors. *International Journal of Mass Emergencies and Disasters* 17 (1): 65–78.

Ollendick, D. G., and M. Hoffman. 1982. Assessment of psychological reactions in disaster victims. *Journal of Community Psychology* 10:157–67.

Oxfam International. 2005. Back to work: How people are recovering their livelihoods 12 months after the tsunami. Oxfam briefing paper. London: Oxfam International.

Parasuraman, S. 1995. The impact of the 1993 Latur-Osmanabad (Maharashtra) earthquake on lives, livelihoods, and property. *Disasters* 19 (2): 156–69.

Peek, L. 2008. Children and disasters: Understanding vulnerability, developing capacities, and promoting resilience. *Children, Youth and Environments* 18 (1): 1–29.

Peek, L., and A. Fothergill. 2006. Reconstructing childhood: An exploratory study of children in Hurricane Katrina. Quick response report #186. Boulder: Natural Hazards Center, University of Colorado.

———. 2008. Displacement, gender, and the challenges of parenting after Hurricane Katrina. *National Women's Studies Association Journal* 20 (3): 69–105.

Peek, L., and L. M. Stough. Forthcoming. Children with disabilities in disaster. Under review at *Child Development*.

Peek, L., J. Sutton, and J. Gump. 2008. Caring for children in the aftermath of disaster: The Church of the Brethren Children's Disaster Services program. *Children, Youth and Environments* 18 (1): 408–21.

Perry, R. W. 1979. Evacuation decision making in natural disasters. *Mass Emergencies* 4:25–38.

———. 1990. Evacuation warning compliance among elderly citizens. *Disaster Management* 3 (2): 94–96.

Perry, R. W., and M. K. Lindell. 1997. Aged citizens in the warning phase of disasters: Re-examining the evidence. *International Journal of Aging and Human Development* 44 (4): 257–67.

Pfefferbaum, B., S. J. Nixon, P. M. Tucker, R. D. Tivis, V. L. Moore, R. H. Gurwitch, R. S. Pynoos, and H. K. Geis. 1999. Post-traumatic stress responses in bereaved children after the Oklahoma City bombing. *Journal of the American Academy of Child and Adolescent Psychiatry* 38:1372–79.

Phifer, J. F. 1990. Psychological distress and somatic symptoms after natural disaster: Differential vulnerability among older adults. *Psychology and Aging* 5 (3): 412–20.

Phillips, B. D., and P. L. Hewett. 2005. Home alone: Disasters, mass emergencies, and children in self-care. *Journal of Emergency Management* 3 (2): 31–35.

Phillips, B. D., and B. H. Morrow. 2007. Social science research needs: Focus on vulnerable populations, forecasting, and warnings. *Natural Hazards Review* 8 (3): 61–68.

Picou, J. S., and B. K. Marshall. 2007. Social impacts of Hurricane Katrina on displaced K–12 students and educational institutions in coastal Alabama counties: Some preliminary observations. *Sociological Spectrum* 27:767–80.

Poulshock, S. W., and E. S. Cohen. 1975. The elderly in the aftermath of a disaster. *The Gerontologist* 15 (4): 357–61.

Prinstein, M. J., A. M. La Greca, E. M. Vernberg, and W. K. Silverman. 1996. Children's coping assistance: How parents, teachers, and friends help children cope after a natural disaster. *Journal of Clinical Child Psychology* 25 (4): 463–75.

Ramirez. M., M. Kano, L. B. Bourque, and K. I. Shoaf. 2005. Child and household factors associated with fatal and non-fatal pediatric injury during the 1999 Kocaeli earthquake. *International Journal of Mass Emergencies and Disasters* 23 (2): 129–47.

Rath, B., J. Donato, A. Duggan, K. Perrin, D. R. Bronfin, R. Ratard, R. VanDyke, and M. Magnus. 2007. Adverse health outcomes after Hurricane Katrina among children and adolescents with chronic conditions. *Journal of Health Care for the Poor and Underserved* 18 (2): 405–17.

Raynor, C. M. 2002. The role of play in the recovery process. In *Children and disasters: A practical guide to healing and recovery*, eds. W. N. Zubenko and J. Capozzoli, 124–34. New York: Oxford University Press.

Reijneveld, S. A., M. R. Crone, A. A. Schuller, F. C. Verhulst, and S. P. Verloove-Vanhorick. 2005. The changing impact of a severe disaster on the mental health and substance misuse of adolescents: Follow-up of a controlled study. *Psychological Medicine* 35:367–76.

Rivers, J. P. W. 1982. Women and children last: An essay on sex discrimination in disasters. *Disasters* 6 (4): 256–67.

Sanders, S., S. L. Bowie, and Y. D. Bowie. 2003. Lessons learned on forced relocation of older adults: The impact of Hurricane Andrew on health, mental health, and social support of public housing residents. *Journal of Gerontological Social Work* 40 (4): 23–35.

Sapir, D. G. 1993. Natural and man-made disasters: The vulnerability of women-headed households and children without families. *World Health Statistics Quarterly* 46:227–33.

Sapir, D. G., and M. F. Lechat. 1986. Reducing the impact of natural disasters: Why aren't we better prepared? *Health Policy and Planning* 1 (2): 118–26.

Saylor, C. F., B. L. Cowart, J. A. Lipovsky, C. Jackson, and A. J. Finch, Jr. 2003. Media exposure to September 11: Elementary school students' experiences and post-traumatic symptoms. *American Behavioral Scientist* 46 (12): 1622–42.

Shannon, M. P., C. J. Lonigan, A. J. Finch Jr., and C. M. Taylor. 1994. Children exposed to disaster: I. Epidemiology of post-traumatic symptoms and symptom profiles. *Journal of the American Academy of Child and Adolescent Psychiatry* 33 (1): 80–93.

Sharkey, P. 2007. Survival and death in New Orleans: An empirical look at the human impact of Katrina. *Journal of Black Studies* 37 (4): 482–501.

SHELDUS (Spatial Hazards Events and Losses Database for the United States). 2005. *2005 U.S. hazards losses*. http://www.cas.sc.edu/geog/hrl/SHELDUS.html (accessed May 30, 2008).

Shen, Y., and C. A. Sink. 2002. Helping elementary-age children cope with disasters. *Professional School Counseling* 5 (5): 322–31.

Smith, F. 2008. The smallest victims of California wildfires are often forgotten. Crisis and Emergency Management Newsletter 14(1). http://www.seas.gwu.edu/~emse232/february2008_7.html (accessed February 18, 2008).

Spiegel, A. 2006. Katrina's impact on elderly still resonates. *National Public Radio,* March 1.

Stephens, K. U., D. Grew, K. Chin, P. Kadetz, P. G. Greenough, F. M. Burkle, Jr., S. L. Robinson, and E. R. Franklin. 2007. Excess mortality in the aftermath of Hurricane Katrina: A preliminary report. *Disaster Medicine and Public Health Preparedness* 1 (1): 15–20.

Stuber, J., S. Galea, B. Pfefferbaum, S. Vandivere, K. Moore, and G. Fairbrother. 2005. Behavior problems in New York City's children after the September 11, 2001 terrorist attacks. *American Journal of Orthopsychiatry* 75 (2): 190–200.

Swenson, C. C., C. F. Saylor, P. Powell, S. J. Stokes, K. Y. Foster, and R. W. Belter. 1996. Impact of a natural disaster on preschool children: Adjustment 14 months after a hurricane. *American Journal of Orthopsychiatry* 66 (1): 122–30.

Takeda, J., K. Tamura, and S. Tatsuki. 2003. Life recovery of 1995 Kobe earthquake survivors in Nishinomiya city: A total-quality-management-based assessment of disadvantaged populations. *Natural Hazards* 29:565–83.

Thompson, M. P., F. H. Norris, and B. Hanacek. 1993. Age differences in the psychological consequences of Hurricane Hugo. *Psychology and Aging* 8:606–16.

Tierney, K. J., M. K. Lindell, and R. W. Perry. 2001. *Facing the unexpected: Disaster preparedness and response in the United States.* Washington, DC: Joseph Henry Press.

Tracy, M., and S. Galea. 2006. Post-traumatic stress disorder and depression among older adults after a disaster: The role of ongoing trauma and stressors. *Public Policy and Aging Report* 16 (2): 16–19.

Turner, R. 1976. Earthquake prediction and public policy. *Mass Emergencies* 1 (3): 179–202.

Tyler, K. A. 2006. The impact of support received and support provision on changes in perceived social support among older adults. *International Journal of Aging and Human Development* 62 (1): 21–38.

Tyler, K. A., and D. Hoyt. 2000. The effects of an acute stressor on depressive symptoms among older adults: The moderating effects of social support and age. *Research on Aging* 22:143–64.

Udwin, O. 1993. Annotation: Children's reactions to traumatic events. *Journal of Child Psychology and Psychiatry* 34 (2): 115–27.

Unger, J. B., T. R. Simon, and T. L. Newman. 1998. Early adolescent street youths: An overlooked population with unique problems and service needs. *Journal of Early Adolescence* 18 (4): 324–48.

U.S. Census Bureau. 2006. *2006 American Community Survey data*. http://www.census.gov/ (accessed February 1, 2008).

U.S. Department of Health and Human Services, Administration on Aging. 2006. *A profile of older Americans: 2006*. Washington, DC.

U.S. Department of Health and Human Services. 2008. *The 2008 Health and Human Services poverty guidelines*. http://aspe.hhs.gov/poverty/08poverty.shtml (accessed February 1, 2008).

U.S. Government Accountability Office. 2006. *Lessons learned for protecting and educating children after the Gulf Coast hurricanes*. www.gao.gov/new.items/d06680r.pdf (accessed February 1, 2008).

Vernberg, E. M., A. M. LaGreca, W. K. Silverman, and M. J. Prinstein. 1996. Prediction of post-traumatic stress symptoms in children after Hurricane Andrew. *Journal of Abnormal Psychology* 105 (2): 237–48.

Vogel, J. M., and E. M. Vernberg. 1993. Part 1: Children's psychological responses to disasters. *Journal of Clinical Child Psychology* 22 (2): 464–84.

Vogt, B. M. 1991. Issues in nursing home evacuations. *International Journal of Mass Emergencies and Disasters* 9 (2): 247–65.

Wachtendorf, T., B. Brown, and M. C. Nickle. 2008. Big Bird, disaster masters, and high school students taking charge: The social capacities of children in disaster education. *Children, Youth and Environments* 18 (1): 456–69.

Warheit, G. J., R. S. Zimmerman, E. L. Khoury, W. A. Vega, and A. G. Gil. 1996. Disaster related stresses, depressive signs and symptoms, and suicidal ideation among a multi-racial/ethnic sample of adolescents: A longitudinal analysis. *Journal of Child Psychology and Psychiatry* 37 (4): 435–44.

Wasserstein, S. B., and A. M. LaGreca. 1998. Hurricane Andrew: Parent conflict as a moderator of children's adjustment. *Hispanic Journal of Behavioral Sciences* 20 (2): 212–24.

Webster, C. 1994. Saving children during the Depression: Britain's silent emergency, 1919–1939. *Disasters* 18 (3): 213–20.

Weissbecker, I., S. E. Sephton, M. B. Martin, and D. M. Simpson. 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.

Wilson, N. 2006. Hurricane Katrina: Unequal opportunity disaster. *Public Policy and Aging Report* 16 (2): 8–13.

Wilson, S. L., and M. A. Kershaw. 2008. Caring for young children after a hurricane: Childcare workers reflect on support and training needs. *Children, Youth and Environments* 18 (1): 237–53.

Wisner, B. 2006. *Let our children teach us! A review of the role of education and knowledge in disaster risk reduction*. Bangalore, India: Books for Change.

World Health Organization (WHO). 2005. Disability, including prevention, management, and rehabilitation. Geneva, Switzerland: World Health Organization.

Young, H., and S. Jaspars. 1995. Nutrition, disease, and death in times of famine. *Disasters* 19 (2): 94–109.

Zahran, S., L. Peek, and S. D. Brody. 2008. Youth mortality by forces of nature. *Children, Youth and Environments* 18 (1): 371–88.

RESOURCES—CHILDREN AND DISASTERS

Books

Gordon, N. *Children and disasters*. New York: Routledge, 1999.

LaGreca, A. M., W. K. Silverman, E. M. Vernberg, and M. C. Roberts, eds. *Helping children cope with disasters and terrorism*. Washington, DC: American Psychological Association, 2002.

Ronan, K. R., and D. Johnston. *Promoting community resilience in disasters: The role for schools, youth, and families*. New York: Springer, 2005.

Rosenfeld, L. B., J. S. Caye, O. Ayalon, and M. Lahad. *When their world falls apart: helping families and children manage the effects of disasters*. Washington, DC: NASW Press, 2005.

Zubenko, W. N., and J. A. Capozzoli, eds. *Children and disasters: A practical guide to healing and recovery*. New York: Oxford University Press, 2002.

Key Web Sites

American Red Cross Masters of Disaster Program
http://www.redcross.org/disaster/masters/

Children, Youth, and Environments. Special Issue on Children and Disasters. 18 (1), 2008.
http://www.colorado.edu/journals/cye/18_1/index.htm

Church of the Brethren Children's Disaster Services
http://www.brethren.org/genbd/BDM/CDSindex.html

FEMA for Kids
http://www.fema.gov/kids/index.htm

Ready Kids
http://www.ready.gov/kids/home.html

Save the Children
http://www.savethechildren.org/usemergency

RESOURCES—ELDERLY AND DISASTERS

Books

Bolin, R. *Long-term family recovery from disaster.* Boulder: Institute of Behavioral Science, University of Colorado, 1982.

International Federation of Red Cross and Red Crescent Societies. *World disasters report 2007: Focus on discrimination.* Bloomfield, CT: Kumarian Press, 2007.

Klinenberg, E. *Heat wave: A social autopsy of disaster in Chicago.* Chicago: University of Chicago Press, 2002.

Key Web Sites

Administration on Aging
http://www.aoa.gov/

American Association of Retired People
http://aarpforemost.com/safety/preparefordisaster/disaster.htm

American Red Cross
http://www.redcross.org/services/disaster/0,1082,0_603_,00.html

Gray Panthers
http://www.graypanthers.org/

National Organization on Disability
http://www.nod.org/