

**SAMHSA**

**Disaster Technical Assistance Center  
Supplemental Research Bulletin**

**Greater Impact: How Disasters Affect  
People of Low Socioeconomic Status**

*July 2017*





**CONTENTS**

- INTRODUCTION.....3**
- BEFORE THE DISASTER..... 4**
  - Perception of Disaster Risk.....4
  - Disaster Preparedness..... 4
  - Responses to Warning Communication..... 5
- DISASTER IMPACT..... 6**
  - Housing and Homelessness.....7
  - Residences in Areas at High Risk of Disaster Effects.....7
  - More Serious Injuries and Physical Effects..... 8
  - Financial Effects..... 9
- AFTER THE DISASTER..... 9**
  - Difficulty With Obtaining and Receiving Aid..... 9
  - Lack of Access to Housing.....10
  - Stress Associated With Lack of Resources.....10
  - Greater Prevalence of Distress and Depression.....10
  - Posttraumatic Stress.....11
  - Physical Health and Health Problems.....12
- CONCLUSIONS.....12**
  - Summary of Research.....12
  - Policy Implications and Recommendations.....13
    - Commitment to Improving Outcomes for People of Low SES in Disasters.....13
    - Poverty Mitigation and Reduction.....13
    - Safer Housing for People of Low SES.....14
    - Response and Recovery Efforts Targeted to Lower Income People.....14
    - Response Attuned to Specific Communities, Including People of Low SES.....14
    - Evacuation Support for People of Low SES.....14
    - Increased Access to Loans, Financial Incentives, and Other Post-disaster Aid.....15
- REFERENCES.....16**

SAMHSA is not responsible for the information provided by any of the webpages, materials, or organizations referenced in this communication. Although the *Supplemental Research Bulletin* includes valuable information and links, SAMHSA does not necessarily endorse any specific products or services provided by public or private organizations unless expressly stated. In addition, SAMHSA does not necessarily endorse the views expressed by such sites or organizations nor does SAMHSA warrant the validity of any information or its fitness for any particular purpose.



## INTRODUCTION

This issue of the *Supplemental Research Bulletin* focuses on how people in poverty, with low incomes, and of low socioeconomic status (SES) experience disasters. We explore the differences in risk perception and disaster preparedness, response, and recovery. Although it provides some information on international disaster events, this issue is primarily focused on disasters that have affected communities within the United States.

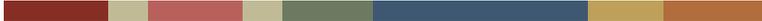
Disaster behavioral health professionals can use this issue of the *Supplemental Research Bulletin* to inform their disaster behavioral health planning for low SES populations. The issue helps to clarify the ways in which people of low SES may be at greater risk than other groups in disasters, as well as barriers to disaster preparedness and other adverse situations or experiences they may face during the phases of disaster impact, response, and recovery. The issue also includes suggestions for policies to support better outcomes for people of low SES in and after disasters.

In selecting research to review for this Bulletin, we took a broad approach to the topics of wealth and poverty, income, and SES. SAMHSA (2014) defines SES in the United States as “related to many factors, including occupational prestige and education, yet . . . primarily associated with income level.” Because SES encompasses occupation and education as well as income, we use it as a general term in this issue. However, because studies cited in this issue look at multiple factors (for example, income level, poverty, and years of education), we also indicate the exact ways related to SES that researchers identify groups of people affected by disasters.

In this issue, we also use the term “vulnerability” broadly, to refer to greater risk of negative experiences, effects, and reactions before, during, and after a disaster. For example, vulnerability for people of low SES may refer to greater likelihood of living in fragile housing, having difficulty accessing resources after a disaster, and experiencing trauma during and after a disaster. It also may refer to lower likelihood of receiving warnings of disasters, having the ability to evacuate in response to disaster warnings, and being able to access post-disaster aid. We use vulnerability as a measure of risk or likelihood—not of actual negative experiences, effects, and reactions.

While the Bulletin includes insights from comprehensive literature reviews, it is not itself a comprehensive review of the literature. It discusses several review studies, as well as studies that have examined the role that SES has played in several disasters—but it is not exhaustive.

In the Bulletin, we focus on low SES individuals and communities in particular—on studies that look at SES as a dimension of disaster vulnerability and on elements of studies that relate to SES. However, much disaster research, especially recent research, focuses on the intersection and overlapping of more than one type of vulnerability. People who are affected by disasters and are vulnerable along one dimension often are vulnerable along others as well (for example, age, gender, disability status, level of disaster exposure). In general, people with less power along a variety of dimensions tend to be more vulnerable and may fare more poorly in and after disasters. In this Bulletin, we use SES as a way to focus on potential disaster vulnerability, but it is by no means the full picture of disaster vulnerability in the real world, where people experience disasters in distinct ways depending on various aspects of their position in society.



## BEFORE THE DISASTER

Being of low SES, in the United States and around the world, may affect how people understand disaster risk, prepare for disasters, and respond to warnings and evacuation orders. Research suggests that people of differing socioeconomic statuses may prepare for a disaster differently.

### Perception of Disaster Risk

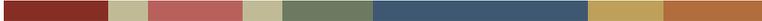
In a review of research on disasters as experienced by people in poverty, Fothergill and Peek (2004) report mixed findings related to perception of disaster risk. They cite some studies (Flynn, Slovic, & Mertz, 1994; Pilisuk, Parks, & Hawkes, 1987; Palm & Carroll, 1998) that found that people who were poorer and with lower incomes perceived more risk and felt more concern regarding both natural and technological disasters. However, they note, other research (Vaughan, 1995; Greene, Perry, & Lindell, 1981) has found people of lower SES and working class people whose jobs involve exposure to risk—those with fewer resources, presumably, than those of higher SES and people of middle or other classes with greater access to resources—to be less cognizant of the risks associated with their work. Still other research they mention found no effect of education or income on risk perception (White, 1974). Given the range of findings in this area, Fothergill and Peek conclude that “a characteristic such as socioeconomic status should be considered as a possible contributor to, and predictor of, how risks are perceived and interpreted (Vaughan, 1995)”—but Fothergill and Peek do not predict what the relationship of SES to risk perception will be in most situations (Fothergill & Peek, 2004).

### Disaster Preparedness

Some research has found Americans of low SES to be less prepared than other Americans for disasters. To provide appropriate context for this finding, it is important to note that Americans in general are not well-prepared for disasters. The National Center for Disaster Preparedness at Columbia University conducted a national survey in which nearly two-thirds of respondent households (65 percent) reported having no disaster plans or having plans that are not adequate (Sury et al., 2016). And according to national survey data from the Federal Emergency Management Agency (FEMA), less than half of Americans are familiar with local hazards, fewer than 40 percent have created a household emergency plan and discussed it with household members, and only about half (52 percent) reported having disaster supplies at home (FEMA, 2014).

Fothergill and Peek report on research that has found people in poverty, with low incomes, and with less education to be less prepared for disasters (Turner, Nigg, & Paz, 1986; Vaughan, 1995; as cited in Fothergill and Peek, 2004). They point out that this finding may relate to the fact that some preparedness actions are costly, and possibly too costly for people in poverty to afford (for example, purchasing earthquake or flood insurance or strengthening a home for greater earthquake resilience) (Palm & Carroll, 1998; Fothergill, 2004; as cited in Fothergill and Peek, 2004). In a paper about the effects of Hurricane Katrina on New Orleans, Louisiana residents Masozera, Bailey, and Kerchner (2007) report that districts of the city with high percentages of people in poverty also had low percentages of people with flood insurance.

On the other hand, Fothergill and Peek also relate that researchers investigating preparedness behavior prior to Hurricane Andrew (which took place in August 1992) found no association between



income levels and timing of preparedness activities, such as having non-electric sources of lighting on hand (for example, candles, a flashlight, a gas-powered lantern), buying or preparing water reserves, buying canned or nonperishable food, and bringing loose objects indoors. The time between beginning preparation and the onset of the hurricane did not vary significantly by income (Gladwin & Peacock, 1997, as cited in Fothergill & Peek, 2004).

In line with the idea that preparedness may be too costly for people of low SES, a report from the World Bank and the Global Facility for Disaster Reduction and Recovery (GFDRR) on the impacts of natural disasters around the world notes that “poor people, with fewer resources, tend to invest less in preventing and mitigating the adverse effects of natural hazards and environmental changes” (Hallegatte, Vogt-Schilb, Bangalore, & Rozenberg, 2017).

One team of researchers looked specifically at preparedness in 1,304 adults ages 50 and older. They found that those in their sample with lower levels of income were significantly less prepared for natural disasters (Al-rousan, Rubenstein, & Wallace, 2014). This suggests that, as noted in the introduction to this Bulletin, more than one type of vulnerability—in this case, older age and lower income—may interact to shape how people prepare for, and perhaps eventually experience, disasters. Another study looked at a range of factors associated with hurricane preparedness in three Texas counties in which hurricane strikes are frequent and the majority of people were poor and Mexican American. The researchers found that more people were prepared for hurricanes among subsets of their sample who also had higher levels of perceived fairness and trust (that is, in response to questions related to these factors, they tended to affirm that they thought most people would try to be fair and that most people could be trusted) (Reininger et al., 2013). Reininger et al. (2013) also highlights how multiple factors interact in shaping how individuals experience disasters, beginning in the pre-disaster phase.

### **Responses to Warning Communication**

Research suggests that in many situations people of low SES may be unable to respond to official warnings about disasters. Fothergill and Peek report on studies that found that groups including poor women; people with lower incomes; public housing residents; and women who were homeless, unemployed, and of low-income status lacked money and resources needed to evacuate—so, although they received warnings, they were less able to respond to them than people of higher SES (Morrow & Enarson, 1996; Gladwin & Peacock, 1997; Morrow, 1997; Enarson, 1999b; as cited in Fothergill & Peek, 2004). However, Fothergill and Peek also report on studies that found no relationship between SES and responses to warnings (Bourque, Russell, & Goltz, 1993; Perry & Lindell, 1991; as cited in Fothergill & Peek, 2004).

In a paper about race and SES and their association with evacuation behavior related to Hurricane Katrina (which took place in August 2005), Thiede and Brown (2013) review research that suggests that SES and race matter, but that location and other variables matter as well. Race and SES are not deterministic alone regarding whether people follow evacuation orders. They mention one study of Florida residents and their evacuation behavior in the 2004 hurricane season that found that race and income did not predict evacuation to a statistically significant extent—but when the researchers zeroed in on regions of the state, race and income *did* predict evacuation behavior in some areas (Smith & McCarty, 2009, as cited in Thiede & Brown, 2013). Thiede and Brown cite additional research on the evacuation behavior



of people in areas affected by Hurricane Katrina based on race and SES. Again, findings suggest that context matters: in New Orleans, low-income people were most likely to have evacuated during or after the hurricane or not at all, but income did not affect evacuation timing and behavior in Katrina-affected areas outside of New Orleans (Elliott & Pais, 2006, as cited in Thiede & Brown, 2013). In another study using some of the same data as Elliott and Pais, Haney, Elliot, and Fussell analyzed data from both New Orleans and surrounding areas and found that “poor householders were more likely to have stayed up to or through the storm, or to have left at least one family member behind” (Haney, Elliott, & Fussell, 2007, as cited in Thiede & Brown, 2013). Evacuation behavior was strongly affected by location: New Orleans households were more than four times less likely than households in other affected areas to have stayed together at home than to have evacuated together (Haney, Elliott, & Fussell, 2007, as cited in Thiede & Brown, 2013).

Thiede and Brown also present the findings of their own review of baseline year data from the Harvard Medical School’s longitudinal study conducted with the Hurricane Katrina Community Advisory Group, a sample of people affected by the hurricane. The researchers use education level as their primary indicator of SES, which they opted to use for two reasons. First, the income variable in the Community Advisory Group data reported household income, which they did not judge to be appropriate in combination with their individual-level outcome variables and other variables of interest in their study. Additionally, people are more likely to incorrectly report income than education (Thiede & Brown, 2013).

Among Community Advisory Group respondents, Thiede and Brown found that black people and people with less than a high school education were less likely to evacuate before the hurricane. They looked specifically at respondents who did not evacuate before the storm and found that within that group, black people and people with less than a high school education were most likely to have been unable to evacuate because of lack of money, transportation, a place to go, or job requirements, or to have been unable to leave prior to the storm for some other reason. For low-education respondents, the difference was statistically significant. They were more than twice as likely to have been unable to evacuate as respondents with at least some college education who did not evacuate the area prior to the storm (Thiede & Brown, 2013).

In another paper about Hurricane Katrina and its effects, researchers report finding a positive correlation between proportion of residents living below the poverty level and the proportion who did not own vehicles in New Orleans neighborhoods (Masozera, Bailey, & Kerchner, 2007). They note that this indicates that people living below the poverty line were more likely to lack access to a key resource needed for evacuation, which resonates with Thiede and Brown’s (2013) finding that people with less than a high school education were more likely to have been unable to evacuate prior to the storm due to lack of transportation, among other issues.

## **DISASTER IMPACT**

Research findings reflect a world in which people of low SES are more vulnerable in the face of disasters and are more likely to suffer more serious consequences during impact, from property damage to homelessness to physical and financial impacts. Disasters can contribute to more adversity for people of low SES than for others who are not low SES—and, as the World Bank and GFDRR report observes, in part due to their financial effects, natural disasters make it more likely that people in poverty will remain in poverty (Hallegatte et al., 2017).



## Housing and Homelessness

In the United States and around the world, people of low SES are more likely to live in homes that are more vulnerable to the impact of disasters than those of people of higher SES. As a result, their experience of a disaster may involve more material losses, less protection from disasters, and perhaps greater damage to or destruction of their homes.

Fothergill and Peek relate studies that found that people of low SES were at greater risk of hazards—and of damage to or destruction of their homes—because of living in homes with lower quality construction (Austin & Schill, 1994; Bolin, 1986; Greene, 1992; Phillips, 1993; Phillips & Ephraim, 1992); older homes (Comerio, Landis, & Rofe, 1994); or mobile homes (U.S. Department of Commerce, 1995). In the World Bank and GFDRR report, authors write that poor people around the world live in homes that are vulnerable in a disaster. In the more than 200 countries for which data are included in the report, the poorest 20 percent of people in terms of consumption are 1.8 times more likely to live in fragile homes (Hallegatte et al., 2017).

Fothergill and Peek also note that disasters in some cases have been more likely to make low-income people homeless. They cite research on the effects of the Loma Prieta earthquake (which occurred in October 1989) in California, which was more likely to cause homelessness for groups including low-income Latinos, and Hurricane Hugo (which took place in September 1989), which affected North Carolina, South Carolina, Florida, Georgia, and several mid-Atlantic and northeastern states in the United States and led to homelessness for an estimated 60,000 people, including many people with low incomes (Phillips, 1998; FEMA, 1990).

## Residences in Areas at High Risk of Disaster Effects

In the World Bank and GFDRR report, authors observe a worldwide trend, among people at all levels of wealth and poverty, toward living in high risk of disaster locations: “From 1970 to 2010 the world population grew by 87 percent, while the population in flood plains increased by 114 percent and in cyclone-prone coastlines by 192 percent” (Hallegatte et al., 2017). The authors go on to cite an assessment of damages from natural disasters around the world, which showed that costs of damages from natural disasters have risen correspondingly over a similar period. The assessment examined average annual damages over two 10-year periods—from 1976 to 1985 and from 2005 to 2014—and found that the averages increased more than tenfold from the earlier to the later period, from \$14 billion to over \$140 billion (GFDRR, 2016, as cited in Hallegatte et al., 2017).

World Bank and GFDRR report authors note that people in poverty around the world are more likely than others to live in areas at high risk of disaster impacts. They explain that this may be the case because these more dangerous areas are less expensive, or simply more available, in parts of the world with limited space for housing (Hallegatte et al., 2017). They also look at the likelihood of poor people living in areas exposed to specific types of hazards, noting that people in poverty are more likely to have to endure high temperatures and droughts by virtue of where they live. While there are mixed findings about the relationship of poverty to living in flood-prone areas, the situation is less ambiguous in urban areas. “In most countries (about 73 percent of the analyzed population),” the authors write, “poor urban households are more exposed to floods than the average urban population. There is no such pattern for rural households, suggesting that land scarcity is a driver of flood risk in urban areas” (Hallegatte et al., 2017).



A paper about the effects of Superstorm Sandy (which occurred in October–November 2012) on New York City essentially concurs (Faber, 2015). The author analyzed the demographics of flooded areas and reports that New York City had 812 high-poverty census tracts at the time of the storm and that only 44 of those tracts were flooded. On the other hand, in flooded tracts, a larger percentage of the population than in non-flooded tracts was living below the poverty line (18.7 percent below the poverty line in flooded tracts versus 14.7 percent in non-flooded tracts); this difference is statistically significant. The author also found differences by race and age:

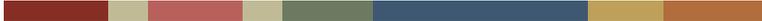
Vulnerability in the form of direct exposure to Hurricane Sandy’s storm surge was shaped by the intersection of multiple social factors. The poverty rate in flooded areas was higher than that in dry tracts—nearly one of every three flooded census tracts had a poverty rate of 20 percent or higher. Black New Yorkers and poor blacks in particular were more likely to live in flooded areas. While Latinos were less likely to live in flooded areas, those that did were generally poorer than Latinos in dry areas. Whites in flooded communities were more likely to be over 65 years old and [to have] higher rates of poverty compared to whites in areas that remained dry (Faber, 2015).

A paper on the effects of Hurricane Katrina on New Orleans, Louisiana, presents findings that similarly paint a somewhat complex picture of the relationship of hurricane damages to income levels of areas around the city (Masozera, Bailey, & Kerchner, 2007). The authors conducted an analysis that indicated that low-income parts of the city did not experience more flooding than higher income areas. However, they also cite a report that found that nearly 30 percent of people in areas with moderate or more severe levels of damages were living in poverty, while only about 25 percent of people in areas with limited damages or no damages were poor (Logan, 2006, as cited in Masozera, Bailey, & Kerchner, 2007).

### **More Serious Injuries and Physical Effects**

Fothergill and Peek cite research on the effects of a tornado in Texas that found that the poor and other groups with less power in their communities suffered more injuries, and were even more likely to lose their lives, because of the tornado (Aguirre, 1988, as cited in Fothergill & Peek, 2004). They also cite a review (Rossi, Wright, Weber-Burdin, & Pereira, 1983) that found higher rates of injury in natural disasters in lower income households (Fothergill & Peek, 2004).

Additionally, Fothergill and Peek report on heat waves in the Midwest in which the majority of those who died were of low SES or low-income, as well as older adults. According to congressional testimony, in a 1980 heat wave, free fans were distributed, but many of the people who died were poor and on fixed incomes, and so they did not use the fans because of worries about high utility bills (U.S. House of Representatives, 1980, as cited in Fothergill & Peek, 2004). They also mention a Chicago heat wave in 1995 that claimed 739 lives—and again, most of those who died were low-income individuals (Klinenberg, 2002, as cited in Fothergill & Peek, 2004). In discussing the same heat wave, the authors of the World Bank and GFDRR report relate that “people who did not have a working air-conditioner, access to an air-conditioned lobby, or an air-conditioned place to visit were 20–30 percent more likely to die than people with access to air-conditioning” (Semenza et al., 1996, as cited in Hallegatte et al., 2017). They add that a meta-analysis of heat wave studies found that people in affected communities were 23 percent to 34 percent less likely to die if they had air conditioning at home (Bouchama et al., 2007, as cited in Hallegatte et al., 2017).



## Financial Effects

From an economic standpoint, disasters have a proportionally greater effect on poor people around the world, as explained in the introduction to the World Bank and GFDRR report:

Economic losses from natural disasters totaled \$92 billion in 2015, and average annual losses have been estimated at more than \$300 billion a year. ... Although these numbers are useful—they provide information on the trends and costs of disasters—they fail to detail how disasters affect people's well-being. Obviously, \$1 in losses does not mean the same thing to a rich person and a poor person, and the severity of a \$92 billion loss depends on who experiences it. The same loss affects poor and marginalized people far more because their livelihoods depend on fewer assets, their consumption is closer to subsistence levels, they cannot rely on savings to smooth the impacts, their health and education are at greater risk, and they may need more time to recover and reconstruct. ... By focusing on aggregate losses, the traditional approach examines how disasters affect people wealthy enough to have wealth to lose and so does not take into account most poor people (Hallegatte et al., 2017).

The report goes on to examine the greater vulnerability of the poor in depth. The authors point out that poor people around the world are more likely to have their savings concentrated in their homes and livestock, both of which may be damaged, injured, or lost in disasters (Moser & Felton, 2007; Nkedianye et al., 2011; as cited in Hallegatte et al., 2017). In contrast, people who are not poor are more likely to have their savings in various places, including financial institutions, which means their wealth is better protected from natural disasters. This in part may be why natural disasters alone push 26 million more people around the world into poverty each year (World Bank, 2016).

## AFTER THE DISASTER

As would be expected, there are differences associated with low SES in how people experience the post-disaster period. This section covers differences linked to being of low SES in access to disaster aid and to important resources, stress and depression, posttraumatic stress and growth, and physical health.

### Difficulty With Obtaining and Receiving Aid

Fothergill and Peek cite extensive evidence of barriers faced by people with lower incomes and in poverty in interacting with bureaucratic systems to receive housing and other types of aid. Research has highlighted barriers including lack of knowledge of the systems through which disaster survivors receive aid; discomfort with these systems; and issues in getting to and from disaster assistance centers, such as transportation, child care, and work schedules (Rovai, 1994; Fothergill, 2004; Dash, Peacock, & Morrow, 1997; as cited in Fothergill & Peek, 2004).

In the World Bank and GFDRR report, the authors note that people in the United States and other countries may rely on non-disaster aid programs, including Medicare and unemployment insurance, in coping with disaster consequences and losses. However, they add, there are limits to the support these programs can provide after a disaster, particularly in developing countries. The programs are not designed or funded to be as rapidly responsive as disasters often require, or to be targeted to disaster-related needs, and transfers of funds to people in poverty are typically smaller than those to people with greater wealth. "Even in the United States," they write, "transfers from non-disaster programs [such



as unemployment insurance and public medical payments] are larger than earning losses for weak hurricanes (categories 1 and 2), but much lower for stronger ones (category 3 and higher)” (Deryugina, 2016, as cited in Hallegatte et al., 2017). This suggests that non-disaster aid programs are not sufficient to offset at least some types of disaster-related financial losses, even in wealthier countries like the United States.

### **Lack of Access to Housing**

As noted, people of low SES around the world are more likely to live in homes that are vulnerable to disasters and to have their homes damaged or destroyed in the event of a disaster. Fothergill and Peek mention research that has found that many people who become homeless after disasters are of lower SES than those who do not (Katayama, 1992; Phillips & Ephraim, 1992; as cited in Fothergill & Peek, 2004).

Fothergill and Peek also highlight research that has found that specific low SES groups—people with average or less-than-average incomes, people with unreliable employment, low-income families, and older adult women living in poverty—have encountered problems in receiving housing loans from the Small Business Administration and other sources (Bolin, 1993; Fothergill, 2004; Childers, 1999; as cited in Fothergill & Peek, 2004). Additionally, they discuss further evidence that housing often is a major issue for people of low SES following a disaster—due to lack of housing because of the disaster, fewer programs for people with low incomes, and the time required for rebuilding coupled with lack of capacity in agencies to provide the low-income housing needed after a disaster (Quarantelli, 1994; Comerio et al., 1994; Greene, 1992; as cited in Fothergill & Peek, 2004).

### **Stress Associated With Lack of Resources**

Fothergill and Peek note that multiple studies have shown that low-income and low SES households lack access to resources after disasters that they need for coping. As a result, they have a harder time from a stress standpoint following disasters than do people of higher income and SES. In some cases, disaster-related losses aggravate stressors and other issues households had before the disaster (Bolin and Stanford, 1998; Hewitt, 1997; Bolin & Bolton, 1986; Cooper & Laughy, 1994; Tierney, 1988; as cited in Fothergill & Peek, 2004).

In an article describing findings of a rapid needs assessment conducted in the Rockaway Peninsula, part of New York City, 3 weeks after Superstorm Sandy, authors report that lower income households were significantly more likely to express worry about food than higher income households (Subaiya, Moussavi, Velasquez, & Stillman, 2014). Additionally, higher SES households were 4.5 times more likely to leave the Rockaways to get food. Given that the storm and its aftermath severely affected public transportation for the Rockaways and also damaged and destroyed many cars, it is probable that lower income households worried more about food because of the difficulty of getting to a grocery store (Marritz, 2012, as cited in Subaiya et al., 2014). Subaiya et al. (2014) also found a trend toward psychological disturbance among low SES households in their rapid needs assessment, but the trend was not statistically significant.

### **Greater Prevalence of Distress and Depression**

Research on survivors of Hurricane Ike (which took place in September 2008) found that two factors



related to low SES were associated with greater likelihood of depression (Tracy, Norris, & Galea, 2011). Specifically, among 658 adults who had been living in Ike-affected areas during the hurricane and who were interviewed 2 to 5 months later, those with a lower annual household income and fewer years of education (a high school degree or equivalent, as opposed to some college or more years of education) were more likely to be depressed. The researchers note that “the observation here of a strong link between low socioeconomic position (SEP) and depression, particularly when other hurricane-related events and stressors are accounted for, suggests that there might be other underlying vulnerabilities among those with low SEP that importantly shape the risk of psychopathology after mass traumatic events” (Tracy, Norris, & Galea, 2011, p. 671). They cite additional studies that point to an association of low SES and greater risk of depression (Norris et al., 2002; Ginexi, Weihs, Simmens, & Hoyt, 2000; Person, Tracy, & Galea, 2006; as cited in Tracy, Norris, & Galea, 2011).

Similarly, in a study analyzing data from people who were affected by the Deepwater Horizon oil spill (which occurred in April to September 2010), two factors related to SES—being unemployed and having less than \$25,000 in annual household income—were associated with depression and frequent mental distress. The researchers used data from the Gulf States Population Survey (GSPS), which identified mental distress as frequent if for 14 or more of the past 30 days respondents said that their mental health was not good as a result of stress, depression, or problems with emotions (Fan, Prescott, Zhao, Gotway, & Galea, 2015).

The researchers in this study also found that people who had lost a job and income because of the oil spill were more likely to be depressed. They note that this matches findings of other research on the association of income loss and poor mental health after the Exxon Valdez oil spill (which occurred in March 1989), as well as other research on the Deepwater Horizon oil spill (Palinkas, 2009; Buttke, Vagi, Bayleyegn, et al., 2012; Buttke, Vagi, Schnall, et al., 2012; Grattan et al., 2011; Osofsky, H. J., Osofsky, J. D., & Hansel, 2011; Centers for Disease Control and Prevention, 2016; as cited in Fan et al., 2015).

### **Posttraumatic Stress**

In another study drawing on baseline survey data from the Hurricane Katrina Community Advisory Group, researchers examined posttraumatic stress and posttraumatic growth, or positive changes in personal, spiritual, and social dimensions of life after trauma, in relation to race; other demographics, including poverty and educational attainment; and additional, experiential variables among survivors of Hurricane Katrina (Rhodes & Tran, 2012). The researchers looked only at data from people who identified themselves as black or African American or as white. In the introduction to their paper, they describe problems with the emergency response to Hurricane Katrina, and they relate that “although all racial groups were impacted by the disaster and problems with the emergency response, it is notable that low-income African Americans were disproportionately affected, and more likely to view the problems in the governmental response to be discriminatory” (Adams, O’Brien, & Nelson, 2006; Shapiro & Sherman, 2005; Pew Research Center, 2005; Sanders, 2005; as cited in Rhodes & Tran, 2012). Because they were interested in understanding more about the emergency response and how African American Katrina survivors conceived of it, and the implications for their well-being, the researchers looked specifically at African American and white survivors.

Rhodes and Tran found that one factor associated with low SES—low educational attainment—was



linked to greater posttraumatic growth about 6 months after Hurricane Katrina. Living below the poverty line, however, was not associated with greater posttraumatic growth, though it was linked to greater posttraumatic stress. This finding is troubling in that research has found that people often experience posttraumatic stress and posttraumatic growth together—enough so that, as Rhodes and Tran relate, “scholars and clinicians in the field of trauma treatment argue that the construction of positive beliefs and meanings about the impact of trauma on one’s life is an important component of recovery and contributes toward psychological adjustment” (Bonanno, 2004; Park & Helgeson, 2006; Tang, 2006; Herman, 1997; Park & Ai, 2006; as cited in Rhodes & Tran, 2012). It seems from this study that the Katrina survivors living below the poverty line were experiencing posttraumatic stress without the common benefits of concomitant growth.

### **Physical Health and Health Problems**

In the study using data from the GSPS of people affected by the Deepwater Horizon oil spill, researchers found that being unemployed and earning less than \$25,000 in annual household income were associated not only with frequent mental distress and depression, but also with frequent physical distress. As with mental distress, physical distress was considered frequent if GSPS respondents said that their health had not been good for 14 or more of the past 30 days (Fan et al., 2015).

Disasters differentially affect people in poverty around the world, according to the World Bank and GFDRR report, and health is a key area in which they do so. “Disasters force poor households to make choices that have detrimental long-term effects, such as withdrawing a child from school or cutting health care expenses,” the authors write (Hallegatte et al., 2017).

## **CONCLUSIONS**

This section reviews findings of research included in this issue. It also presents recommendations for policy and practice to improve outcomes for people of low SES—and all community members—following disasters.

### **Summary of Research**

Findings are mixed regarding the effects of SES on perception of disaster risk. Some research suggests that people of low SES are less prepared for disasters than others, although if this is the case, it may relate to the fact that people of low SES cannot always afford more expensive preparedness actions, such as purchasing flood or earthquake insurance or making home improvements to increase resilience in certain types of disasters. People of low SES may be less likely to evacuate in response to disaster warnings, even though many factors influence evacuation behavior, and when people of low SES do not evacuate in response to warnings, it may be because they are unable to do so.

People in the United States and around the world who are of low SES are more likely to live in housing that is vulnerable to disasters. They also may live in areas where risks from disasters are higher. Additionally, research suggests they may fare more poorly from a health standpoint in certain types of disasters, such as heat waves. Because people of low SES have fewer assets, they have less to lose, and when they experience financial loss in disasters, a given amount of loss has a greater financial impact on them than it will on people of higher SES, as the loss is proportionally greater relative to a



poorer person's assets than it will be relative to the assets of someone of higher SES. They also may have their savings concentrated in fewer possessions, such as home and livestock, and so they may be more vulnerable to economic losses in disasters than people of higher SES who have their savings distributed more widely and saved in financial institutions.

Following a disaster, people of low SES face many barriers to receiving aid to help them rebuild their homes and meet their other needs. Research indicates they may also have trouble getting access to housing and other resources. The stress linked to lack of resources may have emotional and behavioral health consequences. People of lower SES after a disaster may be more likely to experience distress and depression. Additionally, they may have physical health problems that people of higher SES do not.

### **Policy Implications and Recommendations**

Several of the articles discussed in this issue include suggestions for future directions in policy and practice. Some do not make overt suggestions, but their findings have implications for policy.

#### **COMMITMENT TO IMPROVING OUTCOMES FOR PEOPLE OF LOW SES IN DISASTERS**

Fothergill and Peek (2004) note that government and other organizations across the United States should commit to increasing the safety and well-being of people in poverty in the event of a disaster, as these larger organizations are more likely to have the resources and authority to make policies that people in poverty do not. Thiede and Brown (2013) also suggest commitment to supporting people of low SES by officials involved in policymaking and disaster preparedness—including targeting evacuation aid before future Gulf Coast hurricanes to low SES and black households.

Similarly, the World Bank and GFDRR report calls for action at the level of national government (Hallegatte et al., 2017). It proposes global resilience policy packages, one aimed at reducing asset losses in natural disasters and the other with policy actions to increase resilience. Many actions in the packages involve reducing vulnerability and increasing resilience for poor people around the world. For example, the action “reduce exposure of the poor” includes the sample policies “upgrade slums with improved drainage; initiate resettlement programs away from at-risk areas; undertake ecosystem conservation and management” and a note that this action “reduces total exposure by 5 percent through reduction in poor people’s exposure” and can help nations around the world avoid a total of \$7 billion in asset losses (Hallegatte et al., 2017). Nations can use actions in both packages in tailoring a package appropriate for their populations. In an online article announcing the release of the report, an infographic notes that these changes could lead to annual worldwide savings of \$100 billion (World Bank, 2016).

#### **POVERTY MITIGATION AND REDUCTION**

Several authors of articles in this bulletin recommend poverty mitigation and reduction to improve post-disaster outcomes for populations around the world. For example, Faber cites other research in emphasizing the importance of understanding how closely efforts to address poverty are linked to efforts to improve disaster and post-disaster outcomes (Eakin & Luers, 2006, as cited in Faber, 2015).

In their paper on the effects of Hurricane Katrina in New Orleans, Masozera, Bailey, and Kerchner (2007) suggest several directions for development of policy to reduce the impact of future disasters on people with low incomes. They focus on New Orleans, but their suggestions are relevant to other locations. In



terms of poverty reduction, they suggest promotion of more equitable distribution of wealth through living-wage jobs. They note that living-wage promotion could begin during reconstruction, with government contracting with firms that have committed to paying all their employees a living wage. It could also be achieved by ordinance.

The World Bank and GFDRR report also highlights the relationship of poverty alleviation to disaster preparedness and resilience-building. The report presents steps that nations can take that will help to address poverty as well as building disaster resilience and protecting assets around the world.

#### **SAFER HOUSING FOR PEOPLE OF LOW SES**

Around the world, people in poverty are more likely to live in fragile housing (Hallegatte et al., 2017). Fothergill and Peek (2004) suggest that officials develop policies that foster increased safety of all housing, including low-income housing, without making housing unaffordable for low-income people. They note that this could involve requiring landlords to fund improvements, or providing them with subsidies or other support for doing so. It could also involve policy to encourage construction of safer mobile homes and require provision of tornado shelters by owners of mobile home parks.

#### **RESPONSE AND RECOVERY EFFORTS TARGETED TO LOWER INCOME PEOPLE**

In light of Subaiya et al.'s (2014) findings that lower income households in the area they studied were more likely to worry about food after a hurricane they experienced and also showed a trend toward greater post-disaster distress, they suggest that response and recovery organizations consider targeting lower income households for support. Faber (2015) too discusses the importance of policymakers' providing support to people of low SES.

#### **RESPONSE ATTUNED TO SPECIFIC COMMUNITIES, INCLUDING PEOPLE OF LOW SES**

Given the preponderance of materials included in this bulletin that show the complexity of overlapping identities and group memberships within specific contexts in shaping vulnerability and how people experience disasters, it seems to make sense to urge all involved in disaster planning, preparedness, and response to attune their efforts to the specific communities they serve. Fothergill and Peek (2004) recommend that nationwide disaster preparedness and response agencies and organizations continuously work to understand the diversity of the communities where they work, including communities diverse in SES. In light of the research findings Thiede and Brown (2013) review about the relationship of SES to disaster evacuation behavior—that is, SES matters, but so do other variables—they recommend that SES be taken into account, and also that officials develop policy that is responsive to the particular needs and context of their areas.

#### **EVACUATION SUPPORT FOR PEOPLE OF LOW SES**

Several authors of materials included in this bulletin note that people of low SES may lack access to the transportation and other resources they need to comply with evacuation orders. Therefore, a prudent policy priority might be to take steps to ensure access to transportation for people of low SES as part of disaster planning and preparedness.

Thiede and Brown (2013) note that their finding that black people and people with less than a high



school education (their proxy for low SES) were less likely to have evacuated before Hurricane Katrina and more likely to have been unable to do so suggests that in the Gulf Coast area, evacuation aid should be targeted to people in these groups. In their paper on the effects of Hurricane Katrina in New Orleans, Masozera, Bailey, and Kerchner (2007) suggest improvement of access to transportation by offering better public transportation in New Orleans. Specifically, they recommend that the city invest in transportation, including buses and light rail.

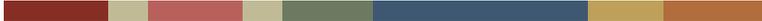
#### **INCREASED ACCESS TO LOANS, FINANCIAL INCENTIVES, AND OTHER POST-DISASTER AID**

Many researchers also note that people of low SES may have more difficulty than people of higher SES in accessing loans and other financial support to help with disaster recovery. For instance, in light of their findings, Masozera, Bailey, and Kerchner (2007) recommend that equal access to loans and other financial incentives be facilitated for all members of disaster-affected communities, including low SES members. As part of the global resilience policy packages proposed in the World Bank and GFDRR report, Hallegatte et al. (2017) suggest financial services to support post-disaster rebuilding, as well as increased accessibility of social safety nets.

These policy implications and recommendations exceed traditional disaster behavioral health or emergency planning operations roles and responsibilities. In order to better meet the needs of people of low SES and mitigate the risks they face in disasters, disaster behavioral health professionals should consider developing robust partnerships with social service, economic, transportation, and housing agencies and organizations.

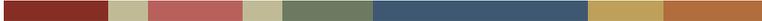
## REFERENCES

- Adams, G., O'Brien, L. T., & Nelson, J. C. (2006). Perceptions of racism in Hurricane Katrina: A liberation psychology analysis. *Analyses of Social Issues and Public Policy*, 6(1), 215–235.
- Aguirre, B. E. (1988). The lack of warnings before the Saragosa tornado. *International Journal of Mass Emergencies and Disasters*, 6(1), 65–74.
- Al-rousan, T. M., Rubenstein, L. M., & Wallace, R. B. (2014, March). Preparedness for natural disasters among older U.S. adults: A nationwide survey. *American Journal of Public Health*, 104(3), 506–511. doi: 10.2105/AJPH.2013.301559
- Austin, R., & Schill, M. (1994). *Unequal protection*. San Francisco, CA: Sierra Club Books.
- Bolin, B. (2007). Race, class, ethnicity, and disaster vulnerability. *Handbook of disaster research* (pp. 113–129). New York, NY: Springer.
- Bolin, R. (1986). Disaster impact and recovery: A comparison of black and white victims. *International Journal of Mass Emergencies and Disasters*, 4(1), 35–50.
- Bolin, R. (1993). *Household and Community Recovery After Earthquakes*, Program on Environment and Behavior Monograph No. 56, University of Colorado, Institute of Behavioral Science, Natural Hazards Research and Applications Information Center, Boulder.
- Bolin, R., & Bolton, P. (1986). *Race, religion, and ethnicity in disaster recovery*, Program on Environment and Behavior Monograph No. 42, University of Colorado, Institute of Behavioral Science, Natural Hazards Research and Applications Information Center, Boulder.
- Bolin, R., with Stanford, L. (1998). *The Northridge earthquake: Vulnerability and disaster*. New York, NY: Routledge.
- Bonanno, G. A. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *American Psychologist*, 59(1), 20–28.
- Bouchama, A., Dehbi, M., Mohamed, G., Matthies, F., Shoukri, M., & Meanne, B. (2007). Prognostic factors in heat wave–related deaths: A meta-analysis. *Archives of Internal Medicine*, 167, 2170–2176. doi:10.1001/archinte.167.20.ira70009
- Bourque, L. B., Russell, L. A., & Goltz, J. D. (1993). Human behavior during and immediately after the earthquake. In P. A. Bolton (Ed.), *The Loma Prieta, California, earthquake of October 17, 1989: Public response* (pp. B3–B22). Washington, DC: U.S. Government Printing Office.
- Buttke, D., Vagi, S., Bayleyegn, T., Sircar, K., Strine, T., Morrison, M., . . . Wolkin, A. (2012, October). Mental health needs assessment after the Gulf Coast oil spill—Alabama and Mississippi, 2010. *Prehospital and Disaster Medicine*, 27(5), 401–408. doi: 10.1017/S1049023X12001100
- Buttke, D., Vagi, S., Schnall, A., Bayleyegn, T., Morrison, M., Allen, M., & Wolkin, A. (2012, December). Community Assessment for Public Health Emergency Response (CASPER) one year following the Gulf Coast oil spill: Alabama and Mississippi, 2011. *Prehospital and Disaster Medicine*, 27(6), 496–502. doi: 10.1017/S1049023X12001380
- Centers for Disease Control and Prevention. (2016). Behavioral Risk Factor Surveillance System. Available online at <https://www.cdc.gov/brfss>
- Childers, C. D. (1999). Elderly female-headed households in the disaster loan process. *International Journal of Mass Emergencies and Disasters*, 17(1), 99–110.
- Comerio, M. C., Landis, J. D., & Rofe, Y. (1994). Post-Disaster Residential Rebuilding, Working Paper 608, Institute of Urban and Regional Development, University of California, Berkeley, CA.
- Cooper, F., & Laughy, L. (1994). Managing hazards in a changing multinational world. Unpublished manuscript.
- Dash, N., Peacock, W. G., & Morrow, B. H. (1997). And the poor get poorer: A neglected black community. In W. G. Peacock et al. (Eds.), *Hurricane Andrew: Ethnicity, Gender, and the Sociology of Disasters* (pp. 206–225). New York, NY: Routledge.

- 
- Deryugina, T. (2016). The fiscal cost of hurricanes: Disaster aid versus social insurance. Cambridge, MA: National Bureau of Economic Research.
- Dow, K. (1992). Exploring differences in our common future(s): The meaning of vulnerability to global environmental change. *Geoforum*, 23(3), 417–436.
- Eakin, H., & Luers, A. L. (2006). Assessing the vulnerability of social-environmental systems. *Annual Review of Environment and Resources*, 31, 365–394.
- Elliott, J. R., & Pais, J. (2006). Race, class, and Hurricane Katrina: Social differences in human responses to disaster. *Social Science Research*, 35(2), 295–321
- Enarson, E. (1999a). Women and housing issues in two U.S. disasters: Hurricane Andrew and the Red River Valley flood. *International Journal of Mass Emergencies and Disasters*, 17(1), 39–64.
- Enarson, E. (1999b). *Women, work, and family in the 1997 Red River Valley Flood: Ten lessons learned*. Unpublished report.
- Faber, J. W. (2015). Superstorm Sandy and the demographics of flood risk in New York City. *Human Ecology*, 43(3), 363–378. doi: 10.1007/s10745-015-9757-x
- Fan, A. Z., Prescott, M. R., Zhao, G., Gotway, C. A., & Galea, S. (2015, January). Individual and community-level determinants of mental and physical health after the Deepwater Horizon oil spill: Findings from the Gulf States Population Survey. *Journal of Behavioral Health Services & Research*, 42(1), 23–41. doi: 10.1007/s11414-014-9418-7
- Federal Emergency Management Agency. (1990). Interagency Hazard Mitigation Team Report. Hurricane Hugo, Report #843 DR/SC. Washington, DC: Federal Emergency Management Agency.
- Federal Emergency Management Agency. (2014, August). *Preparedness in America: Research insights to increase individual, organizational, and community action*. Retrieved from [https://www.fema.gov/media-library-data/1409000888026-1e8abc820153a6c8cde24ce42c16e857/20140825\\_Preparedness\\_in\\_America\\_August\\_2014\\_Update\\_508.pdf](https://www.fema.gov/media-library-data/1409000888026-1e8abc820153a6c8cde24ce42c16e857/20140825_Preparedness_in_America_August_2014_Update_508.pdf)
- Flynn, J., Slovic, P., & Mertz, C. K. (1994). Gender, race, and perception of environmental health risks. *Risk Analysis*, 14(6), 1101–1108.
- Fothergill, A. (2004). *Heads above water: Gender, class, and family in the Grand Forks flood*. Albany, NY: State University of New York Press, Albany.
- Fothergill, A., & Peek, L. A. (2004). Poverty and disasters in the United States: A review of recent sociological findings. *Natural Hazards*, 32, 89–110.
- Ginexi, E. M., Weihs, K., Simmens, S. J., & Hoyt, D. R. (2000). Natural disaster and depression: A prospective investigation of reactions to the 1993 Midwest floods. *American Journal of Community Psychology*, 28, 495–518.
- Gladwin, H., & Peacock, W. G. (1997). Warning and evacuation: A night for hard houses. In W. G. Peacock, H. Gladwin, & B. H. Morrow (Eds.), *Hurricane Andrew: Ethnicity, gender, and the sociology of disasters* (pp. 52–74). New York, NY: Routledge.
- Global Facility for Disaster Reduction and Recovery (GFDRR). (2016). The making of a riskier future: How our decisions are shaping future disaster risk. Washington, DC: World Bank. Retrieved from <https://www.gfdr.org/sites/default/files/publication/Riskier%20Future.pdf>
- Grattan, L. M., Roberts, S., Mahan, W. T., Jr., McLaughlin, P. K., Otwell, W. S., & Morris, J. G., Jr. (2011). The early psychological impacts of the Deepwater Horizon oil spill on Florida and Alabama communities. *Environmental Health Perspectives*, 119, 838–843. doi: 10.1289/ehp.1002915
- Greene, M. (1992). Housing recovery and reconstruction: Lessons from recent urban earthquakes. In Proceedings of the 3rd U.S./Japan Workshop on Urban Earthquakes, Oakland, CA: Earthquake Engineering Research Institute (EERI) Publication No. 93-B.

- Greene, M., Perry, R., & Lindell, M. (1981). The March 1980 eruptions of Mt. St. Helens: Citizen perceptions of volcano threat. *Disasters*, 5(1), 49–66.
- Hallegatte, S., Vogt-Schilb, A., Bangalore, M., & Rozenberg, J. (2017). *Climate Change and Development Series: Unbreakable; Building the resilience of the poor in the face of natural disasters*. Washington, DC: World Bank. doi:10.1596/978-1-4648-1003-9 License: Creative Commons Attribution CC BY 3.0 IGO
- Haney, T. J., Elliot, J. R., & Fussell, E. (2007). Families and hurricane response: Evacuation, separation, and the emotional toll of Hurricane Katrina. In D. L. Brunsma, D. Overfelt, & J. S. Picou (Eds.), *The sociology of Katrina: Perspectives on a modern catastrophe* (pp. 71–90). New York, NY: Rowman and Littlefield.
- Herman, J. L. (1997). *Trauma and recovery*. New York, NY: Basic Books.
- Hewitt, K. (1997). *Regions of risk: A geographical introduction to disasters*. London, England: Longman.
- Katayama, T. (1992). Aftermath of the Loma Prieta earthquake: How radio responded to the disaster. INCEDE Report No. 2.
- Klinenberg, E. (2002). *Heat wave: A social autopsy of disaster in Chicago*. Chicago, IL: University of Chicago Press.
- Logan, J. R. (2006). *The impact of Katrina: Race and class in storm-damaged neighborhoods*. Unpublished report, Spatial Structures in the Social Sciences (S4), Hurricane Katrina Project, Brown University, Providence, Rhode Island. <https://s4.ad.brown.edu/Projects/Hurricane/report.pdf>
- Marritz, I. (2012, December 8). Next post-Sandy challenge: The sea of damaged cars. All Things Considered. National Public Radio. Retrieved from <https://www.npr.org/2012/12/08/166777949/next-post-sandy-challenge-the-sea-of-damaged-cars>
- Masozera, M., Bailey, M., & Kerchner, C. (2007). Distribution of impacts of natural disasters across income groups: A case study of New Orleans. *Ecological Economics*, 63(2–3), 299–306. doi: 10.1016/j.ecolecon.2006.06.013
- Morrow, B. H. (1997). Stretching the bonds: The families of Andrew. In W. G. Peacock, H. Gladwin, & B. H. Morrow (Eds.), *Hurricane Andrew: Ethnicity, gender, and the sociology of disasters* (pp. 141–170). New York, NY: Routledge.
- Morrow, B. H., & Enarson, E. (1996). Hurricane Andrew through women's eyes: Issues and recommendations. *International Journal of Mass Emergencies and Disasters*, 14(1), 5–22.
- Moser, C., & Felton, A. (2007). Intergenerational asset accumulation and poverty reduction in Guayaquil, Ecuador, 1978–2004. In C. Moser (Ed.), *Reducing Global Poverty: The Case for Asset Accumulation* (pp. 15–50). Washington, DC: Brookings.
- Nkedianye, D., de Leeuw, J., Ogutu, J. O., Said, M. Y., Saidimu, T. L., Kifugo, . . . Reid, R. S. (2011). Mobility and livestock mortality in communally used pastoral areas: The impact of the 2005–2006 drought on livestock mortality in Maasailand. *Pastoralism*, 1, 1–17. doi: 10.1186/2041-7136-1-17
- Norris, F., Friedman, M., Watson, P., Byrne, C., Diaz, E., & Kaniasty, K. (2002). 60,000 Disaster victims speak: Part I, an empirical review of the empirical literature, 1981–2001. *Psychiatry*, 65, 207–239.
- Osofsky, H. J., Osofsky, J. D., & Hansel, T. C. (2011). Deepwater Horizon oil spill: Mental health effects on residents in heavily affected areas. *Disaster Medicine and Public Health Preparedness*, 5(4), 280–286. doi: 10.1001/dmp.2011.85
- Palinkas, L. A. (2009). The Exxon Valdez oil spill. In Y. Neria, S. Galea, & F. Norris (Eds.), *Mental health and disasters* (pp. 454–472). New York, NY: Cambridge University Press.
- Palm, R., & Carroll, J. (1998). *Illusions of safety: Culture and earthquake hazard response in California and Japan*. Boulder, CO: Westview Press.
- Park, C. L., & Ai, A. L. (2006). Meaning making and growth: New directions for research on survivors of trauma. *Journal of Loss & Trauma*, 11, 389–407.
- Park, C. L. & Helgeson, V. S. (2006). Introduction to the special section: Growth following highly stressful events—current status and future directions. *Journal of Consulting and Clinical Psychology*, 74(5), 791–796.

- Perry, R. W., & Lindell, M. K. (1991). The effects of ethnicity on decision-making. *International Journal of Mass Emergencies and Disasters*, 9(1), 47–68.
- Person, C., Tracy, M., & Galea, S. (2006). Risk factors for depression after a disaster. *Journal of Nervous and Mental Disorders*, 194, 659–666.
- Pew Research Center. (2005). *Huge racial divide over Katrina and its consequences: Two-in-three critical of Bush's relief efforts*. Retrieved from <http://www.people-press.org/2005/09/08/two-in-three-critical-of-bushs-relief-efforts>
- Phillips, B., & Ephraim, M. (1992). Living in the Aftermath: Blaming Processes in the Loma Prieta Earthquake, Working Paper No. 80, University of Colorado, Institute of Behavioral Science, Natural Hazards Research and Applications Information Center, Boulder.
- Phillips, B. D. (1993). Cultural diversity in disasters: Sheltering, housing, and long term recovery. *International Journal of Mass Emergencies and Disasters*, 11(1), 99–110.
- Phillips, B. D. (1998). Sheltering and housing of low-income and minority groups in Santa Cruz County after the Loma Prieta earthquake. In J. Nigg (Ed.), *The Loma Prieta, California, Earthquake of October 17, 1989—Recovery, Mitigation, and Reconstruction* (pp. D17–D28). Washington, DC: U.S. Government Printing Office.
- Pilisuk, M., Parks, S. H., & Hawkes, G. (1987). Public perception of technological risk. *Social Science Journal*, 24(4), 403–413.
- Quarantelli, E. L.: 1994, Technological and natural disasters and ecological problems: Similarities and differences in planning for and managing them, Article #262, University of Delaware Disaster Research Center, Reprinted from *Memoria del Coloquio Internacional: El Reto de Desastres Technologicos*. Mexico City, Mexico: Academia Mexicana de Ingenieria, pp. 87–112. (Without references; for them see DRC Preliminary Paper #192).
- Reininger, B. M., Rahbar, M. H., Lee, M., Chen, Z., Alam, S. R., Pope, J., & Adams, B. (2013). Social capital and disaster preparedness among low income Mexican Americans in a disaster prone area. *Social Science & Medicine*, 83, 50–60. doi: 10.1016/j.socscimed.2013.01.037
- Rhodes, A. M., & Tran, T. V. (2012). Predictors of posttraumatic stress and growth among black and white survivors of Hurricane Katrina: Does perceived quality of the governmental response matter? *Race and Social Problems*, 4(3–4), 144–157. doi: 10.1007/s12552-012-9074-6
- Rossi, P. H., Wright, J. D., Weber-Burdin, E., & Pereira, J. (1983). *Victims of the environment: Loss from natural hazards in the United States, 1970–1980*. New York, NY: Plenum Press.
- Rovai, E. (1994). The social geography of disaster recovery: Differential community response to the North Coast earthquakes. Association of Pacific Coast Geographers: Yearbook 56.
- Sanders, K. (2005). Katrina victims blame racism for slow aid: Emotions flare as black survivors testify before special House panel. NBC News. Retrieved from [https://www.nbcnews.com/id/10354221/ns/us\\_news-katrina\\_the\\_long\\_road\\_back/t/katrina-victims-blame-racism-slow-aid/#.WLMYxm\\_yu2w](https://www.nbcnews.com/id/10354221/ns/us_news-katrina_the_long_road_back/t/katrina-victims-blame-racism-slow-aid/#.WLMYxm_yu2w)
- Semenza, J. C., Rubin, C. H., Falter, K. H., Selanikio, J. D., Flanders, W. D., Howe, H. L., & Wilhelm, J. L. (1996). Heat-related deaths during the July 1995 heat wave in Chicago. *New England Journal of Medicine*, 335, 84–90. doi: 10.1056/NEJM199607113350203
- Shapiro, I., & Sherman, A. (2005). Essential facts about the victims of Hurricane Katrina. Center on Budget and Policy Priorities. Retrieved from <http://www.cbpp.org/cms/?fa=view&id=658>
- Smith, S. K., & McCarty, C. (2009). Fleeing the storm(s): An examination of evacuation behavior during Florida's 2004 hurricane season. *Demography*, 46(1), 127–145.
- Subaiya, S., Moussavi, C., Velasquez, A., & Stillman, J. (2014, April). A rapid needs assessment of the Rockaway Peninsula in New York City after Hurricane Sandy and the relationship of socioeconomic status to recovery. *American Journal of Public Health*, 104(4), 632–638. doi: 10.2105/AJPH.2013.301668
- Sury, J., Chandler, T., Herrera, C., Bhaskar, S., Sehnert, E., Martinez, S., . . . Redlener, I. (2016, May 12). The American Preparedness Project: Where the U.S. public stands in 2015 (Research Brief 2016\_2). New York, NY: National Center for Disaster Preparedness at Columbia University's Earth Institute. doi: 10.7916/D84Q7TZN Retrieved from <https://academiccommons.columbia.edu/catalog/ac:198722>

- 
- Tang, C. S. (2006). Positive and negative postdisaster psychological adjustment among adult survivors of the Southeast Asian earthquake-tsunami. *Journal of Psychometric Research*, 61(5), 699–705.
- Thiede, B. C., & Brown, D. L. (2013). Hurricane Katrina: Who stayed and why? *Population Research Policy Review*, 32, 803–824. doi: 10.1007/s11113-013-9302-9
- Tierney, K. (1988). The Whittier Narrows, California earthquake of October 1, 1987—Social aspects. *Earthquake Spectra*, 4(1), 11–23.
- Tracy, M., Norris, F. H., & Galea, S. (2011). Differences in the determinants of posttraumatic stress disorder and depression after a mass traumatic event. *Depression and Anxiety*, 28, 666–675.
- Turner, R. H., Nigg, J. M., & Paz, D. H. (1986). *Waiting for disaster: Earthquake watch in California*. Berkeley, CA: University of California Press.
- U.S. Department of Commerce, National Weather Service's Office of Meteorology. (1995). A Summary of Natural Hazard Fatalities for 1994 in the United States. Washington, DC: U.S. Government Printing Office.
- Substance Abuse and Mental Health Services Administration. (2014). *Treatment Improvement Protocol (TIP) Series: No. 59. Improving cultural competence* (HHS Publication No. [SMA] 14-4849). Rockville, MD: Substance Abuse and Mental Health Services Administration. Retrieved from <https://store.samhsa.gov/product/TIP-59-Improving-Cultural-Competence/SMA15-4849>
- Federal Emergency Management Agency. (2014, August). *Preparedness in America: Research insights to increase individual, organizational, and community action*. Retrieved from [https://www.fema.gov/media-library-data/1409000888026-1e8abc820153a6c8cde24ce42c16e857/20140825\\_Preparedness\\_in\\_America\\_August\\_2014\\_Update\\_508.pdf](https://www.fema.gov/media-library-data/1409000888026-1e8abc820153a6c8cde24ce42c16e857/20140825_Preparedness_in_America_August_2014_Update_508.pdf)
- U.S. House of Representatives. (1980). *Federal efforts to aid low-income and elderly individuals affected by life-threatening heat conditions*, 96th Congress. Washington, DC: U.S. Government Printing Office.
- Vaughan, E. (1995). The significance of socioeconomic and ethnic diversity for the risk communication process. *Risk Analysis*, 15(2), 169–180.
- White, G. F. (Ed.). (1974). *Natural hazards: Local, national, global*. New York, NY: Oxford University Press.
- The World Bank. (2016, November 14). Breaking the link between extreme weather and extreme poverty. <https://www.worldbank.org/en/news/feature/2016/11/14/breaking-the-link-between-extreme-weather-and-extreme-poverty>