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CHAPTER

13

Identifying and addressing social vulnerabilities

Elaine Enarson

This chapter provides an understanding of

- The concept and complexity of social vulnerability
- Approaches to reducing social vulnerability: strategies and tools.

An abiding commitment to public safety keeps emergency managers awake at night and on the go all day. This core value motivates them to reduce avoidable harm, giving special attention to those people most exposed to hazards and least able to cope with disasters. As the practice of emergency management as a whole becomes more holistic, participatory, and community based, local managers are reaching out more to vulnerable populations—groups that, for a variety of reasons, have fewest defenses against a disaster and are least resilient in its aftermath.

Addressing the needs of these populations is not a new concern in emergency management. Planning ahead to assist residents with disabling physical or mental conditions, the very young, the frail elderly, and those who are not fluent in English has long been part of community education, outreach, and preparedness in emergency management offices across the nation. However, the overall national shift in focus from response to mitigation gives more prominence to the need for approaches that also, in the long run, help reduce social vulnerabilities—social and economic conditions that make it hard to cope. Mitigation aims to reduce the risk of disasters, and its foundation is planning ahead to assist and develop the capacities of those whose resources are not as great as their exposure.

The everyday patterns of life put some people more than others at risk. Emergency managers who understand those patterns will be better able to direct and manage scarce resources efficiently and equitably. By the same token, emergency managers who do not pay careful attention to the living conditions, needs, and resources of population groups at high risk may not be able to ensure that vital preparedness, response, and recovery resources reach those most in need. An approach that strives to reduce social vulnerabilities as well as respond to them challenges emergency managers to move beyond obvious needs—for sign language interpretation, for example, or life-preserving medical equipment or services—to consider the less obvious potential of vulnerable populations as partners throughout the disaster cycle. For instance, when emergency managers strive to reach non-English-speaking and recent immigrants, their best allies may be other immigrants living in poverty in hazardous places who are seen as trustworthy, can translate local languages, are informal opinion leaders in their neighborhoods, and have gained know-how navigating government bureaucracies.

A vulnerability-reducing approach also means that throughout the disaster cycle, emergency managers will be able to act on their knowledge of the resources as well as on the needs of highly vulnerable groups. For example, they will be able to offer decision makers expert testimony about the implications that choices made on issues of social policy, land use, housing, and transportation have for social vulnerability. They can advocate for community-led post-disaster relief and recovery approaches that reflect the capacities and vulnerabilities of those affected. (For a good discussion about involving the community in mitigation, see Chapter 6.) What happened in New Orleans after Hurricane Katrina underlines the need for this kind of informed advocacy.

After Hurricane Katrina, the iconic photo of an elderly African American woman wrapped in the American flag (see Figure 13-1) bore witness to the moral imperative in emergency management of equal protection for all—before, during, between, and after catastrophic events. Local emergency management can advance this goal by capitalizing on the nation's heightened awareness of social vulnerability in disasters. Now more than ever, a clear analysis of the forces that increase vulnerability is imperative. What are the characteristics of everyday life that put people in harm's way, and what can be done to make people safer? What are the fault lines in the community that will enable some more than others to meet the challenges of a disastrous earthquake, oil spill, biological attack—or devastating Gulf Coast hurricane? These questions about social vulnerability are more present than ever before in communities large and small. Focusing on high-need populations is sometimes seen as an “add on” to an already complex job or is mistaken for political advocacy, but it is neither. For only if emergency management professionals and other emergency responders understand the social as well as physical aspects of vulnerability—and work in tandem with high-need populations



Photo courtesy of Alan Chin

Figure 13-1 Waiting in the Superdome for help to arrive after Katrina

and their advocates—will the nation be better prepared for the next catastrophe, whether it be a pandemic, a political attack, or an extreme environmental event.

This chapter begins with an extended discussion of social vulnerability as a concept and of the difference that an understanding of the concept makes in practice. It then reviews a number of planning strategies and tools available for use by emergency managers, who serve a complex and often divided people in an era of increased risk. The chapter concludes with a look at some implications for the profession as a whole in the future.

Social vulnerability: The theory and the reality

In the 1990s, a global consensus emerged that better preparedness, response, and relief cannot fundamentally reduce people's risk of natural, technological, or human-induced disaster. Spearheading this evolution were, first, the International Decade for Natural Disaster Reduction (1990s) and, subsequently, the International Strategy for Disaster Reduction. It has come to be understood that clear analysis of the root causes of risk is needed, along with a pragmatic approach geared to anticipating and reducing to the extent possible the specific needs of highly vulnerable people in disasters. As two leading researchers have noted: "Vulnerabilities precede disasters, contribute to their severity, impede effective disaster response and continue afterwards. Needs, on the other hand, arise out of the crisis itself, and are relatively short-term. Most disaster relief efforts have concentrated on meeting immediate needs, rather than on addressing and lessening vulnerabilities."¹

The distinction between vulnerabilities, which are underlying conditions, and needs, which are created by the particular crisis, is one that was thrust on all Americans by the Gulf Coast hurricanes of 2005. Hurricane Katrina, especially, called into question the efficiency and effectiveness of local, state, and national emergency management systems, and it represented a clarion call for change in the way the nation protects its most vulnerable people and places. Because of Katrina, the people of the nation have a heightened awareness of their own and others' social vulnerability in disasters. Whether the costs of Katrina are measured narrowly, in terms of fatalities or physical damage, or more broadly, in terms of the suffering of survivors and the still-unknown economic, environmental, and political costs, Katrina drew attention to

the social dimensions of the distribution of risk in the United States. What happened in New Orleans turned a spotlight on political choices made about economic and social development without regard to the long-term vulnerability of the city and its people in a catastrophic hurricane. The result, of course, was that countless Gulf Coast residents found themselves at the mercy not just of hurricane winds and floodwaters but also of more extreme social conditions that had marginalized many well before the storm. Katrina also made it evident that tabletop drills, media exposés, technical expertise, and science-based advance knowledge about known barriers to evacuation and other measures were, in fact, insufficient to prepare the residents of the Gulf Coast for a severe hurricane.

With these important lessons in mind, the section that follows discusses the changing concepts of social vulnerability, its complexity, "hidden" vulnerabilities, and structural trends that are increasing the nation's social vulnerability.

Changing concepts of vulnerability

Traditionally, disasters were viewed as "acts of nature" that were also "social levelers," in that they had similar impacts on those who were similarly exposed to a physical hazard. Vulnerability is still seen largely as a function of exposure to a natural hazard, with the exposure resulting from location and from attributes of the built environment deriving from such things as building codes, lifeline systems (i.e., water, power, and telecommunication services), and transportation infrastructure. Although vulnerabilities resulting from these exposures are understood to have differential social impacts (the young are not likely to be trapped in a nursing home by an earthquake), attention has been mainly on spatial vulnerability—vulnerability derived from physical space (location and the built environment) rather than from social attributes. In addition, individual attributes are traditionally seen as the cause of vulnerability—for example, the obvious needs of an infant or of a wheelchair-bound person living in a high-rise building. Special-need populations, as the term suggests, are considered to be disadvantaged by a special and individual life condition such as disability or ethnicity (see Table 13-1). Vulnerability may also simply be confused with poverty or may be viewed as a one-dimensional and stable point along a vulnerability continuum. Moreover, vulnerability has traditionally been regarded primarily as a response issue. For example, planners might ask how infants and toddlers could best be evacuated from a child care center, or seniors from high-rise buildings along Miami Beach.

In contrast, the approach to social vulnerability used here is broader. It asks which social groups across the community are more and less likely to have access to, and control over, the key assets and resources that help people "anticipate, cope with, resist, and recover from the impact of a natural hazard."² This highlights (1) people as members of groups with a shared social status, (2) the assets and resources that are available to the group, and (3) the possibility of increasing these capacities well before a disaster.

Relative vulnerabilities and capacities are both structural and situational. They may be shaped by structural patterns grounded in politics, economics, environmental management practices, race and class relations, the gender-based division of labor, and other factors. They may also be shaped by social status and situational or context-specific living conditions that vary over time—for example, temporary disabilities, a group's sense of safety on the streets, or degrees of functional literacy. Structural and situational vulnerabilities are often compounding; for example, Native American children living in substandard housing on isolated reservations are also likely to be exposed to contaminants from toxic-waste dumps nearby.

The significance of structural patterns was emphasized in the conclusion of the nation's second assessment of scientific knowledge about hazards and disasters, which looked at the distribution of risk and referred to disasters "by design."³ In affluent and low-income nations alike, the distribution of risk reflects the social trends, environmental pressures, and social divisions of the larger society as well as physical differences and people's own actions. As noted in a leading text, "It is necessary to move beyond looking at disasters as simply physical events and consider the social and economic factors that make people and their living conditions unsafe or secure to begin with. Fragile livelihoods are as important as fragile buildings in understanding vulnerability to environmental hazards."⁴

Table 13-1 Selected vulnerability indicators for U.S. households, 2006

Selected characteristic	Number	Percent
Senior population, 65 years and over, as percentage of total population ^a	37,191,004	12
Children under 5 years, as percentage of total population ^a	20,385,773	7
Foreign born, as percentage of total population ^a	37,547,789	13
Speaks language other than English at home, as percentage of civilian noninstitutionalized population 5 years and over ^b	54,858,424	20
Disabled population, as percentage of civilian noninstitutionalized population 5 years and over ^b	41,259,809	15
Children with all parents in family in labor force, as percentage of parents with children 6-17 years ^c	32,019,857	70
Female householder, no husband present, with own children under 18 years, as percentage of all family households ^d	8,305,456	11
Renter-occupied housing, as percentage of all occupied housing units ^e	36,530,917	33
Nonfamily householders living alone, as percentage of total households ^e	30,496,588	27
Less than ninth-grade education, as percentage of persons 25 years and over ^f	12,743,555	7
Unemployed, as percentage of civilian population in the labor force ^g	9,702,558	6
Grandparents living with own grandchildren and responsible for grandchildren under age 18 ^h	2,455,102	41
Individuals below poverty level	n/a	13
Percentage of families with female householder, no husband present, with related children under age 5 only, whose income in the past twelve months was below the poverty level	n/a	45
People 65 years and over whose income in the past twelve months was below the poverty level	n/a	10
No vehicles available	9,803,809	n/a
No telephone service available	6,571,249	n/a

Source: U.S. Census Bureau, 2006 *American Community Survey*, tables for social, economic, housing, and demographic data, available at factfinder.census.gov/servlet/ACSSAFFacts?_submenuid=factsheet_1&_sse=on (accessed October 1, 2007).

^aBased on total U.S. population in 2006: 299,398,485.

^bBased on total U.S. civilian noninstitutionalized population aged 5 years and over: 273,835,465.

^cBased on total U.S. population with children aged 6-17 years: 45,942,524.

^dBased on total number of U.S. family households: 74,564,066.

^eBased on total number of U.S. households/occupied housing units: 111,617,402.

^fBased on total U.S. population aged 25 years and over: 195,932,824.

^gBased on total U.S. population aged 16 years and over in the civilian labor force: 151,203,992.

^hBased on total number of grandparents living with own grandchildren under age 18 years: 6,062,034.

The everyday living conditions of the nation's poorest, sickest, most dependent, and most isolated residents directly and indirectly increase the exposure of these residents to physical hazards and to the social, economic, political, and psychological impacts of disastrous events. Living with old age or disabilities or both in a society designed for the young and able-bodied, for example, is a challenge in "normal" or pre-disaster times, but being elderly or disabled in substandard housing and in a risky place, or being poor and homeless and also in proximity to pollutants, translates into increased susceptibility to the impacts of disaster. According to estimates from the 2000 census, 20 percent of adults and 18 percent of children in the United States live in "distressed" neighborhoods with compounded vulnerabilities; these are places with very high levels of poverty, single-headed households, high school drop-out rates, and unemployment. In 2000, these neighborhoods were also racially distinct (55 percent were black, 29 percent Hispanic).⁵ Such neighborhoods can be seen as "vulnerability hot spots."

Other factors that increase vulnerability do so by undermining community solidarity—an attribute that fosters resilience in the face of disaster. The undermining occurs when any

group outside the mainstream is made to feel marginal; examples are when there is bias against new immigrants or certain religious groups, disapproval of women and men in non-traditional living arrangements, or unwarranted fear of those living with HIV/AIDS (human immunodeficiency virus/acquired immune deficiency syndrome). Social divisions along these lines are as much a part of life as their opposite—the positive social connections and social strengths that make Neighborhood Watch programs and voluntary neighborhood preparedness teams successful. Both the divisions and the connections are an important part of the social context of local emergency management.

The complexity of social vulnerability

The complexity of social vulnerability, even in American communities in the same hazard zone, has been graphically demonstrated by the Gulf Coast hurricanes and other recent events. The point is illustrated also by Chicago during an extreme heat wave in 1995. Here, two communities (one primarily African American, the other primarily Hispanic) appeared to be substantially comparable on statistical measures of social vulnerability such as poverty, single-headed households, high school drop-out rates, and unemployment. Nonetheless, very different death rates occurred, and researchers demonstrated that the difference was due to differences in the “social ecology” underlying the statistical comparability of the two communities (see accompanying sidebar). Effective emergency managers must consider the complexity of social vulnerability as they strive to reduce avoidable harm.

In particular, complexity often causes social vulnerability to be underestimated. For example, researchers were surprised to find that of the 26,000 South Carolina households affected by Hurricanes Bonnie, Dennis, and Floyd, 14 percent included physically disabled persons. These residents more often lived in mobile homes, were elderly, and owned pets; those on lower incomes suffered economic losses as high as 80 percent of their per capita income. Residents in households that included persons with disabilities had not neglected to prepare their

Heat wave: A tale of two neighborhoods

A “social autopsy” to determine why some neighborhoods were more hard-hit by Chicago’s 1995 extreme heat wave than others revealed that African American seniors died more often than Hispanic seniors, although the surroundings of the two groups were more alike than different and the groups appeared equally vulnerable. Sociologist Erik Klinenberg discovered why the death rates differed by getting to know the social history of each area better, noting that significant differences were masked by statistical similarities in proportion of single-headed households, age, poverty, and minority ethnicity.

Predominantly Hispanic South Lawndale still has a “village feel,” with an active street culture and a strong local business community. Never as strictly segregated as predominantly African American North Lawndale, South Lawndale had an infrastructure that had not deteriorated as severely, and new waves of immigration kept the population high and small ethnic businesses strong. Fewer seniors died there than in North Lawndale because

- Local amenities and public spaces drew seniors out of their homes, so they learned of the danger and of the help available to them.
- Seniors were accustomed to frequenting thriving local businesses, and these were air-conditioned.
- Strong ties to neighbors and lower crime rates made seniors less fearful of leaving their homes.
- An active street culture based on walking rather than driving improved seniors’ overall health.
- Seniors often cared for grandchildren, so they retained close ties to adult children who could help.
- Powerful churches that were actively engaged in community life reached out to seniors.

Klinenberg concludes, “We have collectively created the conditions that made it possible for so many Chicago residents to die in the summer of 1995, as well as the conditions that make these deaths so easy to overlook and forget. We can collectively unmake them, too, but only once we recognize and scrutinize the cracks in our social foundation that we customarily take for granted and put out of sight” (p. 11).

Source: Erik Klinenberg, *Heat Wave: A Social Autopsy of Disaster in Chicago* (Chicago: University of Chicago Press, 2002).

homes, stockpile food, or rehearse plans for evacuation, but they were somewhat less likely to evacuate, citing transportation problems and a perceived lack of access to shelters.⁶ For these kinds of social vulnerability patterns to be well understood and integrated into local emergency management planning, the complex aspects of social vulnerability must be investigated.

First, social vulnerability is not inevitably synonymous with lack of resilience, for a group may be vulnerable without lacking or losing the capacity to cope, adapt and bounce back from adversity. Affluent tourists, for example, may be temporarily exposed to high winds and floodwaters while at an oceanfront resort, but they are also more able than other transients or members of the resort's local staff to replace damaged possessions and resume employment. To take another example, being large or headed by a single individual can increase a household's vulnerability, but it does not inevitably do so. The Dominican married mother of one who works as a domestic for a professional single mother of three may well be less able to cope with the challenges of a major earthquake than her employer.

Second, as seen in the Chicago heat wave, apparent commonalities can mask significant differences. In one area, a neighborhood in which many Asian Americans reside may be very lightly affected because of household mitigation, good insurance coverage, and secure incomes. But in another area with the same proportion of Asian Americans, residents may be less affluent or may have recently emigrated from low-income nations. They may lack the money to improve their homes or to buy insurance, and they may be divided from one another by language or fear of gang violence. Within neighborhoods, some households include two earners and others only one. And within households, women may care for children single-handedly, may share caregiving responsibilities with their partners, or may rely heavily on child care centers that, in turn, may or may not be retrofitted or have emergency plans in place.

Social vulnerability is not inevitably synonymous with lack of resilience.

Third, physical commonalities can mask important differences. One heavily pregnant woman may move slowly but her family may own a car and be ready and able to help her prepare the household, pack belongings, evacuate, clean up, and return home. But across town, another woman in late pregnancy may live in a home for runaway teens, be without access to a car, have no contact with her family, and depend entirely on the facility manager or other residents for help. Predicting the relative vulnerability of elderly people and people with disabilities is equally complex because of the diversity and range of their life experiences.⁷

Fourth, residents of the same or nearby municipalities may have very different levels of exposure both to hazards (e.g., hazardous material spills or the flooding of low-lying lands) and to social vulnerability (the social and economic conditions that make it hard to cope). Among the factors that make some communities less resilient than others are a poor tax base, reliance on a single industry or crop, absence of strong institutions (schools, churches, social organizations), poor cooperation and coordination across institutions, ineffective government and leadership, inadequate land use planning and enforcement, minority segregation and discrimination, and a transient or unstable population. In any community with high hazard exposure, important differences exist between neighborhoods and households.

Hidden social vulnerabilities

As indicated, reducing the vulnerabilities of special populations requires an appreciation of community complexity.⁸ This may include looking below the radar and behind the scenes to identify high-need groups not eager to be contacted. One example is abused women in shelters. After the 1997 flood in Grand Forks, North Dakota, crisis line calls to the domestic violence center increased by 47 percent over the same period one year earlier, and protection order requests increased by 65 percent. A domestic abuse advocate at the local shelter questioned whether designated evacuation centers would be safe for women who had

left their homes in fear of violence, especially in small rural communities, fearing that this “compromises the security and safety element for women. . . . Grand Forks isn’t a large enough place where [abusers] might not think of some of the other places that we might be putting them. . . . It’s very easy to track somebody down, and that doesn’t provide the kind of security and safety we want to be able to provide for our clients.”⁹

Members of some highly vulnerable groups lay low from fear of government authorities, social discrimination, or harassment. One community organizer reported after the Loma Prieta earthquake in 1989 that “many Latinos around here think the federal government can just load them up in box cars and ship them off to Mexico, no matter how long they’ve lived here.”¹⁰ Runaway teens living on the streets may fear being returned by authorities to an abusive home. In the highly charged post-September 11 climate, an Arab American youth may well run from uniformed first responders, as do other youth of color in some American cities. Being required to describe their household living arrangements to relief agencies can be too threatening for gays and lesbians who already feel at risk of discrimination, harassment, and hate-motivated assault.

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Other groups that will have trouble protecting themselves in the event of a biological attack, hazardous spill, or flood may also be especially hard to reach because of stigma, transience, privacy needs, or mistrust of authorities. These include street children, homeless people who are mentally ill, severely ill AIDS patients cared for at home, substance-abusing street prostitutes, and noninstitutionalized people living with cognitive disabilities. Another important vulnerability that is hidden in plain sight is functional illiteracy. When non-English-speaking residents are excluded from the population, nearly one-quarter of U.S. adults (approximately 44 million people) are considered to be functionally illiterate. In most communities as many as one in four people (the proportion will be higher or lower depending on the social group) will need special assistance and materials written or presented in ways that are accessible to them. Like the deaf community, these residents can be challenging to identify and reach owing to the severe barriers they face in acquiring the information and other resources they need to protect their homes and families from hazards and to recover from disaster.

Another problem for local emergency managers is that the vulnerability and losses of some populations are simply not “seen” as readily as those of other populations. After the 2003 wildfires in San Diego County, for example, the media focused on the damage to houses in high-end suburbs more than on the damage to the San Pasqual Indian Reservation, where one-third of all residents had lost badly needed housing. One community leader told a reporter that whether they lose a mansion or a trailer, people are “equal when they are homeless.”¹¹ But in fact, as emergency managers know, people are far from equally affected by the loss of a residence. Moreover, those most likely to be affected in the event of a disastrous accident, attack, or extreme environmental event may not even live in the immediate area. In the attacks of September 11, the dead included an estimated 500 undocumented workers employed in low-wage service jobs, many of whom left women and children in Central American villages without income.¹²

Structural trends that increase social vulnerability

Emergency managers and other local government officials should be aware of social changes that lead to heightened vulnerability. At the local level, for example, questions that officials need to ask about vulnerable subgroups include these: Are people here gaining or losing access to resources that can help to protect them or help them to cope and recover? Are the spaces they inhabit becoming more or less hazardous? Are they more or less well organized as a group now, and are we emergency managers more or less well connected with them? Unless emergency managers understand the significant trends that affect social vulnerability and can

Selected U.S. demographic trends increasing social vulnerability

- **Population:** According to one estimate, the nation's population as of the year 2000 is expected to double to 571 million by the end of this century.¹
- **Migration:** Between 1995 and 2005, newly arrived unauthorized migrants have added about 700,000-800,000 a year to the U.S. population, roughly the same number as legal migrants have added.²
- **Coastal populations:** Population in the coastal states most at risk of an Atlantic hurricane increased by 244 percent between 1950 and 2006. In 2006, 12 percent of the nation's population (nearly 35 million people) were living in coastal communities from North Carolina to Texas, compared with 7 percent (10.2 million) in 1950.³
- **Minority populations:** Populations self-identified as American Indian, Asian/Pacific Islander, Hispanic, and black—groups historically subject to discriminatory treatment and social marginalization—are expected to constitute nearly half (47 percent) of the U.S. population in 2050, up from 28 percent in 1999.⁴
- **Senior population:** As the baby boomers age, the number of Americans age 65 and older will grow dramatically, from 12 percent of the nation's population in 2000 to an estimated 20 percent in 2030. The fastest rate of growth within this population is currently among those 85 and older, whose numbers are projected to more than double over this period.⁵
- **Children's poverty:** The poverty rate among children under age 18 remains high at 17 percent—roughly the same rate as in 1980; as a proportion of all Americans, this percentage is nearly twice that of elderly Americans age 65 and older, which declined from 16 percent to 9 percent between 1980 and 2006.⁶
- **Demand for caregiving:** Demand for family caregivers will outpace supply. While the population of people over 65 is expected to increase by 2.3 percent a year, the number of family members available to care for them will increase by only 0.8 percent a year.⁷
- **Health and disability:** Declines in disability related to age may be undercut by rising obesity as older Americans who are obese have more chronic illnesses and lower activity rates than older Americans had in the past. According to some research, baby boomers aged 51 to 56 report being in poorer health; having more difficulty with daily tasks; and having more pain, more chronic conditions, and more psychiatric problems than were reported by people in this age group just a decade ago. Disability rates for Americans aged 50 to 69 are projected to increase from 8 percent in 2005 to 9 percent in 2015.⁸
- **Single-parent households:** Among all U.S. households, single-parent households increased from 9 percent in 1960 to 28 percent in 2003, while family households (households including two or more people related by birth, marriage, or adoption) declined from 85 percent to 68 percent.⁹
- **Solitary living:** The percentage of adults living alone, including those in the age groups most likely to marry, increased from 8 percent in 1970 to 14 percent in 2002. Older Americans are the most likely to live alone.¹⁰

¹Martha Farnsworth Riche, "America's Growth and Diversity: Signposts for the 21st Century," *Population Bulletin* 55, no. 2 (June 2000): 7, available at prb.org/Source/ACFD2C.pdf (accessed September 30, 2007).

²Jeffrey S. Passell, "Estimates of the Size and Characteristics of the Undocumented Population," Report of the Pew Hispanic Center (March 21, 2005), 2, available at pewhispanic.org/files/reports/44.pdf (accessed September 30, 2007).

³U.S. Census Bureau Press Release, "Special Edition: 2007 Hurricane Season Begins," available at census.gov/Press-Release/www/releases/archives/facts_for_features_special_editions/010106.html (accessed September 30, 2007).

⁴Riche, "America's Growth and Diversity," 16.

⁵Administration on Aging, "A Profile of Older Americans: 2003," available at aoa.gov/prof/statistics/profile/2003/4.asp (accessed September 30, 2007).

⁶Mark Mather, "U.S. Racial/Ethnic and Regional Poverty Rates Converge, but Kids Are Still Left Behind," Population Reference Bureau (August 2007), available at prb.org/Articles/2007/USRacialEthnicAndRegionalPoverty.aspx (accessed September 30, 2007).

⁷Katherine Mack and Lee Thompson with Robert Friedland, "Adult Children," *Data Profiles, Family Caregivers of Older Persons* (Washington, D.C.: Center on an Aging Society, Georgetown University, May 2001), 2, available at ihcrp.georgetown.edu/agingociety/pdfs/CAREGIVERS2.pdf (accessed October 1, 2007).

⁸D'Vera Cohn, Mark Mather, and Marlene Lee, "Disability and Aging," Population Reference Bureau (August 2007), available at prb.org/Articles/2007/DisabilityandAging.aspx?p=1 (accessed September 30, 2007).

⁹Mark Mather, Kerri L. Rivers, and Linda A. Jacobsen, "The American Community Survey," *Population Bulletin* 60, no. 3 (September 2005), available at prb.org/pdf/05/60.3The_American_Community_Survey.pdf (accessed September 30, 2007).

¹⁰AmeriStat Staff, "Solitaire Set Continues to Grow," Population Reference Bureau (March 2003), available at prb.org/Articles/2003/SolitaireSetContinuestoGrow.aspx (accessed September 30, 2007).

anticipate the consequences of those trends and take steps to reduce them, the nation's people and places will be at increased risk, and the burdens on emergency managers will continue to increase as well.

Paradoxically, despite the nation's wealth, high levels of education, advanced technologies, and the political capital devoted to risk management, a number of trends are increasing risk. While local emergency managers are not expected to be social scientists, they need a general understanding of how the changes in American society are affecting disaster resilience, and how the decisions and activities of politicians and leaders in the private and public sectors are affecting disaster risk. For example, when political and corporate leaders make decisions about transportation systems or wetland development, the climate is altered and natural hazards are affected in an indeterminate but certain way. Decisions made about fiscal policy, trade, and immigration also affect risk because they affect personal employment and income, the financing of affordable-housing construction, the feasibility of retrofitting critical facilities, and so forth. Clearly, the nation's population growth and economic development strategies are increasing the pressures on land development, especially along the coasts, and continuing urbanization concentrates the impacts of disaster events on people and commerce.

Social and demographic changes also contribute to the lessening of social bonds and therefore play a part in increasing vulnerability and decreasing resilience. The long hours that

Vulnerabilities and disparate impacts in Hurricane Katrina

Long-term effects are still uncertain, but the profile of those most affected by Katrina is strikingly similar to what was predicted in the Federal Emergency Management Agency's 2004 tabletop exercise, Hurricane Pam. What were the barriers to actions that might have reduced avoidable harm before Katrina hit and in the storm's aftermath?

- In Orleans Parish, where the city of New Orleans is located, 47 percent of the people whose deaths were attributed to Katrina were over age 75; men were disproportionately represented among the known fatalities relative to their age distribution.¹
- Before the hurricane, the 464 buses available for evacuation could evacuate only 10 percent of those known not to have cars.
- African Americans constituted 44 percent of all Katrina's victims.²
- One-fifth of the population most directly affected by the hurricane was poor; their poverty rate of 21 percent was well above the national poverty rate of 12 percent.
- Nearly one in five (19 percent) of all residents in the affected areas—and a third of the residents aged seventy-five or older—had no car.
- Just 27 percent of poor families owned a home, compared with 62 percent of nonpoor families.
- Of persons 65 or older living in flooded or damaged areas, one in two (48 percent) lived with at least one disability, and one in four lived with two or more types of disability.
- Of community-based groups working with people with disabilities, 86 percent did not know how to link with the emergency management system. Fewer than a third of all shelters in New Orleans had access to American Sign Language interpreters, 80 percent lacked TTY (text telephone) capabilities, and 60 percent lacked televisions with open-caption capability. Just over half of these groups maintained areas for posting oral announcements.³
- Of those people displaced to the Houston Astrodome, 74 percent reported pretax incomes under \$30,000, 72 percent did not own credit cards, and two-thirds were "unbanked" (i.e., lacking savings or checking accounts).⁴
- Louisiana ranked worst in the region (and nation) for poverty among African American women when the hurricane struck; in the city of New Orleans alone, 26 percent of women were poor, compared with 20 percent of men.⁵
- Before Katrina there were nearly 900,000 single mothers living in Alabama, Louisiana, and Mississippi, and 40 percent of them lived in poverty.
- In the city of New Orleans, 41 percent of female-headed families with children lived in poverty compared with 10 percent of families headed by married couples; more than half (56 percent) of all families with related children under eighteen were headed by women.
- Nearly 25 percent of people over age sixty-five in the city of New Orleans were poor, and nearly two-thirds of them were women (61 percent vs. 14 percent of men).

women and men now work outside the home leave fewer people with the time or energy to volunteer in traditional community education programs. Additionally, population mobility continues to be high (on average, just under half of all Americans move every five years),¹³ so large numbers of community residents may be newcomers who lack knowledge about local hazards and preparedness. Demographic changes such as the growth in the Latino population in the United States make the nation more culturally and linguistically diverse—and the diversity can increase social vulnerability if linguistic and cultural barriers and disparities in living conditions are not addressed.¹⁴

Trends in housing play a part as well. Because of the declining availability of housing that poor and marginally employed people can afford, homelessness has increased, leaving more people unprotected and less able to get back on their feet in the aftermath of a disaster.¹⁵ Low-income renters especially are increasingly likely to reside in low-cost manufactured homes situated in high-risk places.¹⁶ Preparedness is far less possible for the low-income households most likely to live in flimsy housing; these populations are also more likely to rely on public transportation and to lack key economic recovery assets such as regular income, savings, insurance, and health benefits.

Aging, poor health, and sex play a part as well. More retired Americans than ever before are living on fixed incomes. Older women are less likely than older men to have been fully

- More than 40 percent of children under six lived below the federal poverty level in New Orleans before the hurricane. Because young children are more likely to live in poor families than older children or adults, they were least likely to be evacuated and most likely to spend time in the Superdome and other large shelters.⁶
- Minority residents and renters made up 74 percent and 54 percent, respectively, of area residents most susceptible to flooding. The majority (38 of 49) of census tracts characterized by extreme poverty were flooded—all located within the city of New Orleans and all predominantly African American.⁷
- Compared with the nation as a whole, the residents of New Orleans disproportionately lacked health insurance (19 percent vs. 16 percent for the nation); among those without health insurance there were more than twice as many black as white women.⁸

Nearly a quarter of a million people of Latin descent lived in the affected states, with an estimated 140,000 Hondurans in New Orleans alone. Residents who were characterized as “undocumented” on the basis of racial profiling were reportedly denied assistance and, in some cases, evicted from emergency shelters. The area before the hurricanes was also home to 115,000 Asian Americans and Asian immigrants. Some 10,000 Vietnamese settled in Houston, where they faced language and cultural barriers to accessing much-needed assistance.⁹

⁶For this and the following point, see Linda Bourque et al., “Weathering the Storm: The Impact of Hurricanes on Physical and Mental Health,” *Annals of the American Academy of Political and Social Science* 604, no. 1 (2006): 138-140.

⁷For this and the following four points about pre-Katrina social life, see Thomas Gabe, Gene Falk, and Maggie McCarthy, *Hurricane Katrina: Social-Demographic Characteristics of Impacted Areas*, CRS Report for Congress, RL33141 (Washington, D.C.: Congressional Research Service, Library of Congress, 2005), available at gnocdc.org/reports/crsrept.pdf (accessed September 22, 2007).

⁸National Organization on Disability, *Report on Special Needs Assessment for Katrina Evacuees (SNAKE) Project* (Washington, D.C.: National Organization on Disability, 2005), available at nod.org/Resources/PDFs/katrina_snake_report.pdf (accessed September 22, 2007).

⁹Julia S. Cheney and Sherrie L. W. Rhine, “How Effective Were the Financial Safety Nets in the Aftermath of Katrina?” discussion paper (Philadelphia, Pa.: Payment Cards Center, Federal Reserve Bank of Philadelphia, 2006), 9, available at philadelphiafed.org/pcc/papers/2006/HurricaneKatrinaJan06.pdf (accessed September 22, 2007).

¹⁰For this and the following three points, see Barbara Gault et al., “The Women of New Orleans and the Gulf Coast: Multiple Disadvantages and Key Assets for Recovery: Part I. Poverty, Race, Gender and Class,” briefing paper, IWPR D464 (Washington, D.C.: Institute for Women’s Policy Research, October 2005), available at iwpr.org/pdf/D464.pdf (accessed September 22, 2007).

¹¹Olivia Golden, “Young Children after Katrina: A Proposal to Heal the Damage and Create Opportunity in New Orleans” (Washington, D.C.: Urban Institute, February 2006): 1, 3, available at urban.org/UploadedPDF/900920_young_children.pdf (accessed September 22, 2007).

¹²*New Orleans after the Storm: Lessons from the Past, a Plan for the Future* (Washington, D.C.: Metropolitan Policy Program, Brookings Institution, October 2005), 16-17, available at media.brookings.edu/mediaarchive/pubs/metro/pubs/20051012_NewOrleans.pdf (accessed September 22, 2007).

¹³Center for American Progress, “Who Are Katrina’s Victims?” (Washington, D.C., September 2005), available at americanprogress.org/kt/katrinavictims.pdf (accessed September 22, 2007).

¹⁴Brenda Muñiz, *In the Eye of the Storm: How the Government and Private Response to Hurricane Katrina Failed Latinos* (Washington, D.C.: National Council of La Raza, 2006), available at nclr.org/content/publications/detail/36812 (accessed September 22, 2007).

employed or to be receiving pensions or Social Security, yet on their lower incomes they live longer than men; thus, older women are growing increasingly vulnerable to disaster and are forming the majority of the senior population that is most likely to be frail and living alone.¹⁷ In addition, the aging of the baby boomers translates into larger numbers of residents likely to have physical and cognitive limitations. The frail elderly population, a group increasing in size, is disproportionately female and hence more likely to be poor than other seniors. In addition, this group tends to rely on caregivers who themselves are disproportionately female, of low-income, and of minority ethnic status.¹⁸

Household and family life, too, is changing in ways that increase risk. The percentage of female-headed households is increasing, and the women who are heads of households live in poverty at twice the rate of male heads of households; these women are also disproportionately from marginalized racial and ethnic groups.¹⁹ Owing to maternal poverty and related factors, the children from these homes often live in substandard housing with caregivers who may lack jobs with secure benefits, not to mention reliable transportation in a disaster. High and increasing rates of child poverty in the nation also mean that growing numbers of children lack health insurance and therefore are without regular health care, so they are often facing the uncertainties of hazards and disasters while in poor health.²⁰ The national shift away from state-supported social services especially affects families like these that depend on the social safety net in the best of times.

Finally, because so many elements of the critical infrastructure of modern life are interdependent, the complexity of modern life itself increases the vulnerability of high-need populations. The schools, hospitals, local employers, and government social service agencies that serve the people who are at increased risk in disasters are affected by the susceptibility of some of the nation's complex electrical grids to ice storms and other environmental stresses. Vulnerability to such lifeline failures is compounded by the nation's increasing reliance on computer-based information management systems that depend on functioning grids.

Emergency managers who are working in government or the private sector must take such structural changes and trends in the nation at large into account in their work at the local level.

Strategies and tools for planning a broad approach

Clearly, effective outreach to high-need groups demands a good understanding of the major social trends increasing risk in American life, as well as specific knowledge of different forms of social vulnerability across the community and of the hidden pockets of vulnerability that may exist within a neighborhood. Working relationships are also needed with those who are most knowledgeable about the capacities—as well as the self-evident needs—of the residents who are most likely to be hard-hit in a disaster. This section offers strategies and models to promote just such a comprehensive and multidimensional approach to reducing social vulnerability.

Knowledge-building strategies

As all emergency managers know, the central tenet of the nation's mitigation strategy is "all mitigation is local." A critical element of local mitigation is striving to reduce social vulnerabilities, and this effort begins with local knowledge. Knowing their communities inside out and from the bottom up helps practitioners design and implement hazard mitigation initiatives that are tailored to local groups and conditions. With this knowledge, risk managers preparing for an impending strong hurricane or monitoring the course of an out-of-control wildfire can make the most of their time, energy, and resources to avoid costly missteps. For example, they will be better able to

- Build on local community knowledge of hazards, past disaster experiences, local resources, and local capacities
- Prepare and deliver effective warning messages that reach the intended recipients with the right message delivered the right way

- Develop and test evacuation, shelter, and recovery plans that meet the needs of all at-risk residents, with special attention given to those most in need
- Anticipate the special need for translators, child care, medical equipment, faith-based counseling, and other population-specific services
- Avoid using scarce resources in a costly and inefficient way through unintended bias or lack of information.

In particular, to increase community resilience, emergency managers need knowledge related to communication. They must know the kinds of media that specific groups perceive as credible, the languages that are commonly spoken, literacy levels, who has what degree of access to which kinds of information, the role of local opinion leaders and organizations that filter and translate information, and the alternative communication networks used by vulnerable groups.

Questions about vulnerability must be asked and answered at every phase as part of routine emergency management planning: Who in this census block or on this side of town or in this household will be least and most vulnerable today—and in ten years? How will vulnerable populations—undocumented immigrants employed off the books in reconstruction work, small businesswomen displaced to nearby states, or elderly men widowed by the tornado or flood—fare? What can be done now to increase protection of responders from the long-term health and economic effects of contaminated water or the stress of their occupations?²¹ The accompanying sidebar lists other important questions.

It can be hard to gain the data or information needed to assess vulnerabilities and begin to answer these kinds of questions. For emergency managers seeking a more in-depth and bottom-up profile of their community and its most disaster-vulnerable people, a combination of strategies is vital. Quantitative information is typically the starting point—for example,

Planning questions for vulnerability reduction, by phase

Prevention or mitigation phase

- What social groups are less likely to be able to invest in making their homes safer?
- What social groups are likely to engage in occupations that expose them to higher risk from natural hazards?
- Are there locations or kinds of structures where certain social groups live that are more exposed to natural hazards than other locations or structures?

Preparedness phase

- What social groups are unlikely to have time to train in first aid and other kinds of self-protection?
- What social groups are less able to purchase critical items or supplies for self-protection?

Warning phase

- What social groups are likely not to receive warning messages or not to understand them or take them seriously? Why?

Response phase

- Are there characteristics of social groups that may make it more difficult for them to be rescued, to receive adequate emergency medical care, or to access or feel safe in an emergency shelter?
- What transportation or language barriers do some people have?

Recovery phase

- Which social groups are likely to experience problems with economic recovery? What about emotional recovery?
- Which groups will take longer to recover?

Source: Adapted from Ben Wisner, "Development of Vulnerability Analysis," in *A Social Vulnerability Approach to Disasters* (Washington, D.C.: Higher Education Project, FEMA Emergency Management Institute, 2002), 15-16, available at training.fema.gov/EMIWeb/edu/sovul.asp (accessed September 21, 2007).

tracking the proportion of elderly people in the city or the number of renters in a census tract. For more culturally-specific local knowledge—concerning, for example, the family relationships of highly vulnerable populations—additional strategies are useful. This section discusses sources of both quantitative and qualitative data, including statistical measures of vulnerability, pre- and post-disaster studies, data created within the community itself, and staff involvement with the community.

Statistical measures of vulnerability Census data for state, county, tract, and block are often used to assess vulnerabilities. Typical measures include income levels and ethnic/racial composition; homeownership and rental patterns; use of public or private transportation; percentage of elderly people, single-headed households, or high-school graduates; and other demographic characteristics of persons living in the same place. Some common sources of statistical community data are local, state, and regional planning offices; research institutes in nearby universities or colleges; law enforcement agencies; and social service agencies.

The disadvantages of using census data and other population statistics, however, are that such data need frequent updating, may be limited by methodological bias (e.g., sampling populations may consist only of people with known addresses or telephones), and may not provide all the information that emergency managers need. Knowing the proportion of renters in a flood-prone area, for example, does not tell practitioners much about the specific needs that renters may have. What is the group's general income level? Are the renters organized in a tenant's association that could work with community planners to mitigate hazards? How did they respond to past disasters? An additional drawback of population statistics is that they rarely provide data disaggregated by sex. Data on sex and data on minorities are often reported separately, even though sex and ethnicity have interdependent effects on disaster-related behavior. Planners, especially those at the local level, need more complete and accurate data.

Accordingly, statistical methods alone are less likely than community-based, multidimensional approaches to yield the grounded knowledge on which to base the proactive planning needed to reduce social vulnerability. Community-based approaches (discussed further on in this chapter) involve a variety of data-gathering strategies, including collaboration with local university research institutes, advanced students seeking internships, and researchers in the private sector. It is important to note, though, that emergency managers cannot be expected to do their own research; they should ask for what they need and should be critical consumers of statistical and other information.

Pre- and post-disaster studies Disaster events themselves are great teachers. Among the "lessons learned" following every disaster are the characteristics of those who fell through the cracks. Participating in local "unmet needs committees" (likely to arise in the aftermath of a disaster) is useful for gaining insight into both familiar and emergent concerns of vulnerable populations. Emergency management authorities can initiate post-event debriefing with key social service agencies and community-based organizations.

Action-oriented statistical research projects on actual disaster events also provide useful insight into special populations at risk, and emergency managers can initiate or participate in such projects. Case studies offer vivid evidence of the disparate impacts between and within communities, neighborhoods, and households and can help practitioners plan ahead to reduce avoidable harm in future disasters.

Social science research on vulnerability conducted before disasters is invaluable. A team of hazard researchers based in Massachusetts conducted a data envelopment analysis to help provide information for practitioners seeking to reach high-need groups. Working first with thirty-four variables for which block-level census data were available, and then with the five vulnerability clusters that emerged from their analysis (poverty, transience, disabilities, immigrants, and young families), the researchers integrated social vulnerability and hazard maps. As the authors note, "Many potential initiatives can be identified through vulnerability analysis, and the more 'proactive' or 'upstream' the step taken, the greater the downstream benefit."²²

Data created within the community In addition to statistical data, lessons learned from actual disasters, and pre-disaster research, needs assessments, and user surveys conducted by nongovernmental or community-based groups should be used. For instance, a local coalition coordinating a crisis line might publish annual reports about factors affecting public health (e.g., rates of suicide, domestic abuse, substance abuse, homelessness, or interpersonal violence) and therefore the well-being of a community. Or the United Way or its member agencies might conduct needs assessments collecting highly relevant information.

Moreover, emergency management agencies and professionals are well positioned to get useful information through outreach to senior centers, health care facilities, and schools. They will also find that Voluntary Organizations Active in Disaster (VOAD), the network of local nonprofits that collaborate for integrated emergency response, has helpful organizational knowledge of the community.

As noted above, some special-need groups are easily overlooked through biased research methods or people's desire for social invisibility. To minimize such invisibility, practitioners may work with community researchers to modify survey questions, or with social service agencies to coordinate focus group discussions with vulnerable groups. In addition, community surveys can be used to build and update community registries of specific populations, although significant challenges would still remain, such as reaching at-risk individuals moving in and out of nursing homes.²³ Practitioners can also work directly with highly vulnerable groups to assess risk. This can accomplish two things: it can produce new information, and it can build or strengthen social networks with these important constituencies. Participatory information gathering for use in comprehensive community planning is highly useful "for the information it generates and distributes, for the sense of community it can foster, for the ideas that grow out of it, and for the sense of ownership it creates."²⁴

Staff involvement in the community Still another way for emergency management staff to learn about social vulnerability is by being as actively involved at the grassroots level as possible, seeking community partnerships with members of high-need social groups and their advocates and representatives. To the extent feasible, practitioners can benefit from visibly participating in community events, seeking out high-need populations in relevant faith-based organizations; at sporting or cultural events; and through routine visits to local businesses, clinics, grocery stores, laundromats, parks, schools, and community centers. Regular consultation with people who are local experts on high-need groups is helpful; such people might include the residents, staff, and directors of halfway homes or home health care agencies, or groups operating local crisis lines or counseling new immigrants. Community experts in the social and human services and in grassroots advocacy groups are often eager to share their knowledge of the living conditions, predictable needs, and resources of people likely to be at increased risk.

Knowing the community by walking the community enables practitioners to more realistically assess the match (or mismatch) between need and resources.

Emergency managers are likely to already be working with local and regional governments, major employers and worker associations, health care and education providers, social service agencies, lifeline utilities, and such established community groups as Neighborhood Watch, VOADs and the American Red Cross. The approach to social vulnerability being urged here means also partnering with child care coalitions, street clinics, after-school programs serving ESL (English as a second language) students, grassroots women's groups, housing cooperatives working with migrants, associations of public housing residents, community groups working against violence, and other advocacy and service groups able to articulate and represent the interests of populations that will be highly vulnerable in a crisis.

Another vital resource may be new groups organized in the wake of a disaster. One example among many is the Emergency Network of Los Angeles (ENLA), a coalition of more than

thirty organizations that united on behalf of the area's many low-income Central American immigrants after the Northridge earthquake in 1994. ENLA is now well established: it participates in the Los Angeles VOAD, trains other nonprofits, and contracts with city and county authorities to operate an information and referral hotline and other services. ENLA is also represented on the Emergency Preparedness Commission for the municipalities and counties that make up Greater Los Angeles.²⁵ It may be that many coalitions and associations emerging in the wake of Hurricane Katrina will also be significant partners for local emergency managers seeking to absorb the lessons of that disaster.

Through these relationships, emergency managers can both gather and exchange information, perhaps increasing vulnerable groups' awareness about hazards and hazard mitigation. Knowing the community by walking the community enables practitioners to more realistically assess the match (or mismatch) between need and resources—and enables them to connect with the advocacy organizations of vulnerable groups well in advance of a disaster event. Knowing the community by walking it also enhances emergency managers' ability to assess trends affecting these groups and allocate resources accordingly, and to plan ahead for preparedness and relief programs that build on community strength instead of increasing dependency. Strong networks with vulnerable communities also allow the tracking of long-term recovery among the community's most vulnerable people in the aftermath of a disaster; such tracking is a vital part of equitable and effective vulnerability reduction. Importantly, partnering with grassroots organizations that are "below the radar" not only helps practitioners assist highly vulnerable people but also builds a foundation of communication and trust for the future.

Tools for assessing community vulnerability and capacity

A number of tools for assessing community vulnerability and capacity are now available for local emergency managers, and many more are likely to become available in the future as awareness of the need to reduce social vulnerabilities in disasters grows. There is no magic bullet, but the sections below describe new ways of indexing social vulnerabilities, the expanding capabilities of computer modeling, the use of community-based risk assessments, and vulnerability resources for practitioners.

Vulnerability Index Although some experts think that "vulnerability science is really in its infancy,"²⁶ the emphasis on vulnerability assessment in the Disaster Mitigation Act of 2000 makes it a significant and growing aspect of effective emergency management. No agreed-upon set of variables or features for assessing vulnerability exists in the United States. The Social Vulnerability Index developed by Susan Cutter and her colleagues, however, guides users to a wide range of statistical data available at the county level on such key vulnerability factors as urban density, infrastructure dependence, housing stock and tenancy, population growth, medical services, and social dependence as well as socioeconomic status, ethnicity and race, age, sex, and physical abilities.²⁷ A number of international efforts are also under way to develop standards, indices, and best-practice vulnerability assessment models.²⁸ In light of the diversity of hazards and vulnerabilities in play in modern life, a "one-size-fits-all" approach seems unlikely.

Underlying all the efforts is the view that

[W]hat is needed is knowledge about who the most socially vulnerable people are within a population and where those less resilient reside. If we have a spatial understanding of the differences in social vulnerability, policies, procedures, and disaster management protocols can be put into place before an event occurs to minimize the impact of disaster events, thus saving lives and reducing property losses, rather than afterward. It highlights the need for proactive rather than reactive approaches to vulnerability reduction.²⁹

Computer-assisted risk assessment Thanks to advances in mapping technologies, vivid portraits of risk that show an abundance of detail have entered the mainstream of emergency management. Practitioners can now create useful maps of changing "American hazardscapes"³⁰ by using geographic information system (GIS) mapping software that integrates data to give three types of information: (1) the spatial location of physical hazards; (2) indicators

Checklist for assessing resilience and vulnerability

- Has a vulnerability study been conducted? Has a resilience assessment been undertaken? Are the results current? Are the results useful? Should new studies be conducted?
- How can you divide your area up into localities/areas that are useful for social and community analysis?
- What data are available? What additional data or information will be required? Have appropriate data sources been identified? What methods are most appropriate to achieve practical results in assessing resilience and vulnerability?
- What risks does your area face? Are there individuals, groups of people, services, or areas that are particularly susceptible to risks?
- Are there resources, services, skills, or networks within the community that can be built on to optimize resilience and reduce vulnerability?
- What action has been taken on the findings about vulnerability?
- What action has been taken on the findings about resilience?
- Has the local emergency management plan been updated? Has a schedule to review the analysis of resilience and vulnerability been set?

Source: Adapted from Philip Buckle, *Guidelines for Assessing Resilience and Vulnerability in the Context of Emergencies* (Melbourne, Victoria, Australia: Victorian Government Department of Human Services, 2000), 5, available at proventionconsortium.org/themes/default/pdfs/CRA/Victorian_government_2000_meth.pdf (accessed September 22, 2007).

of social vulnerability, such as income level and ethnic composition, of neighborhoods subject to natural hazards; and (3) technological hazards such as waste disposal sites, train lines, oil refineries, and pollution-generating facilities. Computer-aided mapping can help emergency managers “ensure congruence between the maps of risk and the maps of preparedness.”³¹ Mapping both hazards and social conditions that increase vulnerability best promotes mitigation. In an area of high immigration, for example, emergency managers can assume the need for multilingual risk communications and can plan accordingly. In an area of high population mobility, emergency evacuation plans can be adjusted to ensure earlier warning and evacuation and the availability of transportation for those less physically able or mobile.³²

The original and the multihazard (MH) HAZUS software packages developed by the Federal Emergency Management Agency (FEMA) are powerful tools using quantitative data.³³ With these tools, emergency managers can access maps and databases for their physical and social environments, which they can then use to estimate and depict the likely impacts of a range of hazards at different levels of analysis. Both direct and indirect effects can be projected for the hazard impacts on, for example, neighborhoods; facilities housing the young, sick, ill, and poor; commercial and industrial sites; critical infrastructures and lifeline facilities; structures with potential for high loss, such as dams or military installations; and other socially significant sites. HAZUS analysis, with its overlaying of physical hazard maps and social vulnerability maps, can help managers pinpoint high-need areas and locate shelters and other resources accordingly. For example, in high-income areas, residents will use shelters less often.

Computer-aided mapping can help emergency managers “ensure congruence between the maps of risk and the maps of preparedness.”

As useful as GIS risk maps can be, however, practitioners’ comfort levels with sophisticated mapping software vary,³⁴ and certainly maps are only as good as the data on which they are based. As the author of a major GIS handbook observed when addressing local emergency managers, “HAZUS creators acknowledge that coaxing some of this localized data from reluctant organizations may require considerable effort. They do not, however, include a scenario for having the software do this coaxing—that will be up to you.”³⁵

The data on which mapping is partly based are statistics for well-established indicators of vulnerability (e.g., percentage below poverty, racial/ethnic composition, educational level). Although necessary, these statistics are not sufficient, and practitioners need more specific

and substantive knowledge. In some cases, statistical profiling is an especially weak tool. For example, some researchers have studied gender-based vulnerability by using the general sex ratio in the local population, but this ratio is relatively constant and cannot reflect the gender norms that bear on people's capacity and willingness to act in disasters. In a heat wave, for example, gender relations, relationships between the old and the young, and cultural and faith-based values all come into play but cannot be mapped with the use of readily available statistical indicators. Nonetheless, both maps and statistical profiles can be integrated into the emergency manager's broader base of knowledge about community strengths and weaknesses.

A user-friendly model used for assessing social vulnerabilities is the Community Vulnerability Assessment Tool (CVAT), supported by the National Oceanic and Atmospheric Administration and the H. John Heinz III Center. It consists of seven steps for gathering, assessing, and mapping information about hazards, vulnerabilities, and risks as part of a comprehensive community planning approach.³⁶ The CVAT model relies on quantitative data about infrastructure, critical facilities, economic conditions, and hazards of all kinds. The Societal Vulnerability Analysis (SVA) part of the model has three dimensions: identification of "special consideration areas," such as areas with high concentrations of poverty; identification of highly vulnerable people and areas, achieved by overlaying "special consideration" and hazard maps; and construction of a community inventory to determine where vulnerable facilities are located and what other issues need special consideration.

The SVA can be a benchmark that then supports further investigation. For example, the information-gathering strategies discussed above can be used to supplement the SVA by answering such questions as these: What community organizations (governmental, nongovernmental, public, private) are active in the community? What population sectors are well represented? What groups are not at the table? Which groups are most likely to be active after a disaster? Who is underserved? What support services (including child care, family counseling, domestic violence services, home health care, and recreational programs) are there for vulnerable families? Are there any bodies coordinating the activities of organizations that work with high-risk groups? What is the level of participation in the political process? Who speaks for minority groups? Who are the community leaders? What are the formal and informal power structures? Which people are likely to be the key players in disaster recovery?

Community-driven risk assessments Informal community mapping offers another perspective on local hazards, vulnerabilities, and capacities. Many international models exist that can be adapted for use in the United States and can be accessed through the Community Risk Assessment Toolkit on the website of the ProVentium Consortium.³⁷ Collaborating with or enabling local risk assessment also connects emergency managers with significant groups likely to be involved in emergency relief and long-term recovery efforts at the community level.

The Capacity and Vulnerability Analysis (CVA) matrix was originally created for development agencies responding to disasters, and it distinguishes among physical/material vulnerabilities (what productive resources, skills, and hazards exist?), social and organizational considerations (what are the relations and organization among people?), and attitudinal or motivational vulnerabilities and capacities (how does the community view its ability to create change?).³⁸ The matrix facilitates disaggregation by sex or economic status or race and ethnicity and can be used to highlight changes along different dimensions over time.

An additional model is *Working with Women at Risk: Practical Guidelines for Communities Assessing Disaster Risk*.³⁹ Women in high-risk villages in four Caribbean nations participated in a workshop providing basic training and information about hazards, disasters, and the gathering of qualitative data. Through "low-tech" risk maps, focus groups, semistructured interviewing, and community analysis, local women created community vulnerability profiles to educate community members and emergency managers about risky living conditions and resources facing the community as a whole. A step-by-step set of guidelines that are not specific to either sex and can easily be adapted is available online in both Spanish and English.

Also emphasizing the participation of local community members is a set of guidelines developed by Emergency Management Australia for assessing and reducing community vul-

nerability. These guidelines urge coordination with community groups in order to gain (and then use) knowledge about highly vulnerable people, and they offer useful checklists and guidance for assessing a community's strengths as well as its needs.⁴⁰

Vulnerability resources for practitioners A growing number of informational, planning, preparedness, and good practice guides are now available to emergency managers who are oriented to a social vulnerability approach. These are useful resources for bridging the gap between the concerns of especially vulnerable residents and the concerns of emergency management authorities.

By networking with advocacy and service organizations in the local area and around the nation, emergency managers may access a range of self-help checklists, guidelines, and resource materials for working with vulnerable populations to reduce risk. Among these are good practice guides for working with people with disabilities. For example, following the 9/11 attacks, the National Organization on Disability (NOD) launched an Emergency Preparedness Initiative (EPI) resulting in the *EPI Guide for Emergency Managers, Planners & Responders*; like all NOD materials, the guide emphasizes the need to respect "the innate resourcefulness, ingenuity and determination gained through the daily challenges of disability that can help the

Working with vulnerable populations to reduce risk

The following social groups are among those that are often, but not always, at increased risk because of proximity to hazards, unsafe housing, lack of information, and limited capacity for self-protection and recovery.

Renters/public housing residents	Low-income/poor
Mobile home residents	Home workers and the self-employed
Single-headed households	Marginally employed
Pre-disaster homeless	Residents of institutions and group homes
Residents living alone	Persons with disabilities or chronic illness
Multifamily households	Religious minorities
Households with many dependents	Women
Female-headed households	Infants/young children
Newcomers	The functionally illiterate
Recent immigrants	The frail elderly
Residents dependent on state resources	Sexual minorities
Residents of unincorporated areas	Members of stigmatized groups
Migrant workers	Those who do not speak English
Undocumented residents	Marginalized racial and ethnic groups
Tourists/transients	Socially or geographically isolated residents

In all groups, consider diversity based on gender, sexuality, age, ethnicity, race, social class, and abilities.

For all groups, consider specific needs likely to arise for

Targeted communications	Community networking
Diversity of media outlets	Translators
Specialized equipment	Special needs shelters
Trained volunteers	Economic recovery assistance
Extended recovery period	Targeted mental health
Additional and prolonged recovery aid	Targeted reproductive health care
Child care/elder care assistance	Specialized transportation
Follow-up care and services	Assistance with evacuation

For all groups, consider capacities and resources that may exist:

Strong social networks	Multilingual skills
Neighborhood bonds	Connections with advocacy groups
Extended family ties	Everyday survival skills
Valuable life experience	Prior disaster experience

Plan ahead to reduce vulnerability through

Vulnerability and capacity assessments	Outreach to high-need groups
Coordination with social services	Coordination with advocacy groups
Diversity on the emergency manager's own staff	Community involvement

community at large and enhance the effectiveness of emergency operations."⁴¹ PrepareNow, an American Red Cross initiative, is an excellent resource that addresses persons with mobility restrictions, those who depend on life support systems, chemically sensitive persons, owners of service animals, and persons with psychiatric illnesses, among others.⁴² The U.S. Department of Justice Civil Rights Division also has materials available about equity in service for disabled persons in disasters.⁴³

In the case of seniors, many of whom may also have mobility restrictions, the online guide *Disaster Preparedness for Seniors by Seniors* is useful.⁴⁴ It was inspired by the experiences of one Red Cross chapter after a two-week power loss. Regarding children, the Institute for Business & Home Safety offers *Protecting Our Kids from Disasters*, a kit to help parents and staff in child care centers undertake various kinds of nonstructural mitigation.⁴⁵

Materials are also available about working with vulnerable people generally. With support from FEMA's Higher Education Project, a no-cost, online college instructor's guide (*A Social Vulnerability Approach to Disasters*) can now be downloaded.⁴⁶ Course materials include analysis of social vulnerability causes and patterns, discussion of the practical implications for emergency management, and slides and handouts that can be used in community education and training as well as in the college classroom. In addition, the California Governor's Office of Emergency Services has produced a helpful planning manual, *Meeting the Needs of Vulnerable People in Times of Disaster: A Guide for Emergency Managers*.⁴⁷ This document urges emergency authorities in local government to contract in advance with community organizations for specific services (e.g., operating a hotline or providing hot meals to low-income seniors after a flood) and to seek recovery for these contractual costs. The guide also offers ideas for locating and working with community groups; tips for developing local associations that bring emergency managers and vulnerable people together; a sample protocol for pre-disaster collaboration with local organizations representing high-risk groups; and other practical materials for working with vulnerable populations to reduce risk.

VOAD member organizations often produce publications that focus on high-need groups. Two such organizations are Collaborating Agencies Responding to Disaster (CARD), based in California, and Community Emergency Response Teams (CERTs). A Red Cross initiative of interest is the Northern California Disaster Preparedness Network, which prepared a "Guide to Organizing Neighborhoods for Preparedness, Response and Recovery."⁴⁸ This guide includes tips for organizing Neighbors with Special Needs teams and registries for special-needs groups.

Emergency managers will learn of more and better guides and resources in the future through regular communication with proactive community-based advocacy groups that understand the capacities and needs of high-risk groups. When establishing such communication is not possible at a personal level, the many online and print guides now available to local emergency managers can be useful for integrated planning to address cross-cutting vulnerabilities or to help jump-start local initiatives with vulnerable groups.

Concluding comments

As this chapter has shown, social vulnerability to hazards and disasters is as much a concern in the United States and other affluent societies as it is in the developing world, where the vulnerability is often more obvious. Understanding the patterns and trends of vulnerability is now an important part of managing emergencies and disaster, and it affects the work of emergency managers throughout the disaster cycle. This chapter has presented concrete strategies and tools for addressing these concerns in practice. More generally, the message of the chapter is to "face social and demographic reality: plan through an inclusive, deliberate process. Rely on community resources within potentially affected populations. Build relationships before disaster to mitigate physical and social effects."⁴⁹

Addressing the needs of vulnerable populations is not a new concern in emergency management, but for reasons given above, the project has taken on more urgency and breadth. The changing face of America makes vulnerability reduction an essential component of the skill set of tomorrow's emergency managers. (Indeed, as more diverse career paths into the profession evolve, the face of emergency management will change as well.) All emergency

managers of the future will find it necessary to develop or strengthen their ability to analyze, understand, and reduce the vulnerabilities of many specific populations within their communities. They must become more knowledgeable about the complexity of their communities, resisting easy stereotypes about different cultures, different kinds of abilities, different ways of organizing family life, and different relationships between women and men, the young and the old. They must be skilled in communicating with high-risk groups, not just through translation or interpretation but by understanding communication barriers of all kinds and working with community representatives to tailor messages and media as needed. They will be increasingly motivated to forge close working relationships with communities at risk and will be needed as advocates on behalf of those communities when tough political decisions must be made about the distribution and use of all the nation's resources. When the next disaster unfolds, the efforts made by local emergency managers to identify "hidden" vulnerabilities, meet critical needs, build on the capacities of even the most vulnerable, and partner creatively with high-risk groups will be well-rewarded.

Reducing social vulnerability is not a short-term or simple process—but it is also not "mission impossible." In a climate of uncertainty about the national capacity to protect all residents exposed to and victimized by disastrous events, a risk management approach geared to recognizing and reducing social vulnerabilities is essential. Local emergency managers who take the lead will be honored for their efforts by future generations of Americans at risk.

Notes

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