

Function and Response of Nursing Facilities During Community Disaster

Debra Saliba, MD, MPH, Joan Buchanan, PhD, and Raynard S. Kington, MD, PhD, MBA

When disasters occur, communities expect public health agencies and medical practitioners to provide services and leadership.¹ The adequacy of response to these critical public health events is largely determined by the extent to which disaster plans are comprehensive and are tailored to the population's needs and resources. Rapid implementation of such integrated plans is essential both for treating potentially large numbers of injuries^{2,3} and for ensuring the safety of vulnerable populations, especially that of high-risk groups such as persons with disabilities, elderly individuals, and the chronically ill.⁴⁻⁹

Often, these vulnerable populations reside in nursing facilities, an increasingly important component of the US health care system. For instance, almost 2 million adults are admitted to the nation's 16 800 nursing facilities each year.^{10,11} Moreover, 1 in 2 women and 1 in 3 men are expected to spend time in nursing facilities over the next several decades.¹² These statistics reflect the rising prevalence of chronic disease among an aging population and the increased use of nursing facilities for skilled postacute care. Since the late 1980s, hospitals have discharged patients earlier, and nursing facilities have assumed a greater role in caring for these sicker, more medically complex patients.^{13,14}

Despite their expanded role in serving vulnerable populations, nursing facilities often are overlooked as a health resource and generally are not incorporated into disaster-relief plans. In fact, some researchers have dismissed nursing facilities as irrelevant to hospital patient care after disasters.¹⁵ Because few studies have focused on nursing facilities' responses to catastrophes, the role of nursing facilities during these events remains undefined. Furthermore, little is known about the stresses that nursing facilities undergo during a community crisis. Although some data exist on the medical and psychological sequelae of disasters for vulnerable populations,^{6,16-19}

Objectives. We sought to describe the role and function of nursing facilities after disaster.

Methods. We surveyed administrators at 144 widely dispersed nursing facilities after the Los Angeles Northridge earthquake.

Results. Of the 113 (78%) nursing facilities that responded (11 365 beds), 23 sustained severe damage, 5 closed (625 beds), and 72 lost vital services. Of 87 nursing facilities implementing disaster plans, 56 cited problems that plans did not adequately address, including absent staff, communication problems, and insufficient water and generator fuel. Fifty-nine (52%) reported disaster-related admissions from hospitals, nursing facilities, and community residences. Nursing facilities received limited postdisaster assistance. Five months after the earthquake, only half of inadequate nursing facility disaster plans had been revised.

Conclusions. Despite considerable disaster-related stresses, nursing facilities met important community needs. To optimize disaster response, community-wide disaster plans should incorporate nursing facilities. (*Am J Public Health*. 2004;94:1436-1441)

there is scant information on systemwide responses to hospitalized vulnerable populations or nursing facility residents.²⁰ When nursing facilities are mentioned, the focus usually is on a single facility's experiences or on a single problem such as evacuation. These reports indicate that the health care system's response to this population may be problematic.²¹ For example, the general impression after Hurricane Andrew in 1992 was that Florida nursing facilities were ill-prepared to respond to the disaster.^{20,22,23}

To help address this paucity of information, we surveyed Los Angeles County nursing facilities to learn about their experiences after the 1994 Northridge earthquake. Both the extent and the location of this disaster provided a unique opportunity for examining nursing facilities during community crisis. Despite the fact that California prepares for such events, the 6.7-magnitude quake produced widespread damage. Fifty-seven deaths (33 from trauma, 24 from sudden cardiac death) were attributed to the temblor, more than 900 patients were evacuated from damaged hospitals, and more than 9000 people were treated in emergency departments or hospitals.²⁴ The event was so significant that

Donna Shalala, then Secretary of Health and Human Services, activated the National Disaster Medical System and sent Disaster Medical Assistance Teams to the area. By examining nursing facilities' responses to this crisis, we hoped to expand the data on how these facilities function after disasters, to identify problems they may experience, and to gain a better understanding of their potential role in the larger health service delivery system. Acquiring better information in this area is particularly important in light of the recent terrorist attacks in the United States and the increased focus on improving community disaster response.²⁵

METHODS

Sampling Frame

We attempted to identify nursing facilities that were structurally damaged by the earthquake. We contacted the Los Angeles Building Inspector's Office, the state and county Departments of Health Services, the state and county Offices of Emergency Services, and the Office of Statewide Health Planning and Development to determine whether these organizations had obtained any information on

earthquake damage related to nursing facilities. We also contacted the *Los Angeles Times*, the leading Los Angeles newspaper, which provided extensive earthquake coverage. None of the public data collected by these groups after the earthquake included nursing facilities as a category or even listed such facilities as health facilities.

We matched Los Angeles Building Inspector's Office maps outlining areas of commercial/residential damage with California health facility planning area (HFPA) maps to determine which HFPAs were affected by the earthquake. With this mapping process, we identified 7 HFPAs that experienced significant damage. We then used Office of Statewide Health Planning and Development data to identify nursing facilities located within these HFPAs. We determined that 144 non-government and government nursing facilities were located within the 7 affected areas.

We mailed a disaster response survey to the administrators of the 144 facilities that we had identified in the affected areas. The surveys were mailed in June 1994, 5 months after the January 17 earthquake. A cover letter encouraged administrators from both damaged and undamaged facilities to respond. This letter included endorsements from the California Association of Health Facilities and the California Association of Homes and Services for the Aging, 2 voluntary statewide organizations representing long-term care and nursing facilities. In August, all nonrespondents received a follow-up telephone call and mailing. Nursing facilities returned completed surveys between June and September 1994. No financial incentive was provided.

Survey Items

Our survey addressed 5 phases of disaster planning and management that have been identified in the public health literature: anticipation and prevention, alert and warning, immediate postevent, assistance and relief, and rehabilitation.²⁶ We also incorporated feedback from members of a local nursing facility consortium. Specifically, the survey questions addressed nursing facilities' disaster plans, structural damage sustained, postdisaster assistance contacts received, changes in admission patterns after the disaster, and

problems experienced after the earthquake. The 5-month delay between the earthquake and the survey mailing allowed us also to query nursing facilities about rehabilitation after the acute recovery phase. We pilot tested the survey with administrators from 3 nursing facilities and used the pilot data to revise the survey. Although most questions were multiple-choice format, we included some open-ended questions to better elicit each facility's experiences.

Structured Interviews

After mailing the surveys, we conducted separate structured interviews with 3 social workers who participated in discharge planning for different hospitals and with 3 social workers from different nursing facilities. We interviewed persons who were actively serving clients in the HFPAs at the time of the event and who were continuing to do so at the time of the interview. One social worker was from a damaged hospital that had evacuated patients, and 2 were from hospitals that continued to operate. Likewise, 1 nursing facility representative was from a facility that had closed because of damage, and 2 were from facilities that remained open.

RESULTS

Respondents

One hundred thirteen nursing facilities, representing 11 365 patient beds, responded

(response rate=78%). Of these, 23 facilities (20%) reported significant or severe structural damage; 5 of these facilities, representing 625 beds, had closed because of structural damage. We defined "structural damage" as building damage that interfered with the facility's primary operations or that rendered parts of the facility unsafe.

We contacted the 31 nonresponding nursing facilities (representing 2976 beds). Seven reported a change in administrator and director of nursing since the earthquake, and the remaining 24 either felt that they did not have time to complete the survey or did not want to participate. None of the nonresponding nursing facilities had closed or had transferred patients out of the facility because of the disaster.

Role of Nursing Facilities

Fifty-nine nursing facilities (52% of respondents) reported disaster-related admissions immediately after the earthquake. As Figure 1 shows, these admissions were in response to a variety of community needs. In addition to the increased volume of admissions, the patterns of referrals to nursing facilities changed. For example, 35% of facilities reported that they had received transfer requests from hospitals that normally did not send them patients. Moreover, 31% of respondents reported a greater number of disaster-related requests for admission after the event than actual admissions, indicating that nursing facilities may

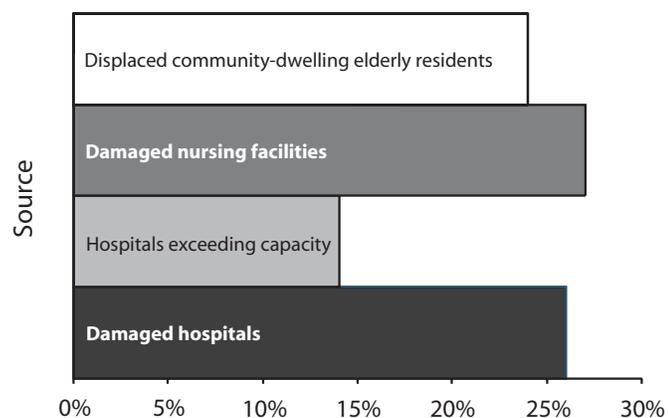


FIGURE 1—Percentage of nursing facilities admitting new residents, by source.

have received more community requests than they could accommodate.

Our interviews with social workers corroborated these findings. These individuals commented on the need to rapidly transfer hospital patients from damaged hospitals and the importance of both hospitals and nursing facilities in accommodating these needs. They also noted that the event adversely affected many community-dwelling elderly, who were displaced from affordable rental housing, became fearful of living alone, or found themselves unable to remain in the community when their support systems were disrupted by the earthquake. The social workers confirmed that these factors resulted in increased admissions to nursing facilities from the community, both for respite care (i.e., short supportive stays) and for long-term care after the disaster.

Problems Reported

Although nursing facilities assumed greater responsibilities after the earthquake, they experienced significant stress as they did so.

Sixty-four percent of respondents reported that their facility lost at least 1 vital service (e.g., telephone, water, or electricity) after the disaster. These losses occurred in 78% of damaged nursing facilities and in 60% of undamaged nursing facilities. Fifteen nursing facilities transferred residents to other facilities. Eighty-seven nursing facilities (77%) implemented disaster plans, and 65% of these facilities cited a problem with their plans. In all, we identified 42 different types of disaster plan problems, which we grouped into the 9 categories displayed in Table 1.

Staff absences were cited most frequently as the problem that disaster plans inadequately addressed. Reasons for postdisaster absences included loss of transportation, loss of childcare or other dependent coverage, damages/losses sustained at home, and limited access to the nursing facilities because of blocked roads. Although most nursing facilities reported that staff shortages did not interfere with patient care, some noted that the shortages forced available employees to

work more than 24 hours so that essential resident care could continue. Many other reported problems might also be anticipated across other settings (e.g., loss of functioning telephone lines, impeded evacuations resulting from the loss of elevator function, or debris blocking beds and exits). Problems more specific to health care settings included lack of access to emergency communications equipment; inability to notify families or providers when residents were relocated because collated family or provider lists were unavailable; difficulty keeping cognitively impaired persons out of unsafe areas; inappropriate evacuation sites (e.g., high school gym) for residents receiving intravenous therapy, complex wound care, or continuous tube feeding; blocked roads that hindered access to nursing facilities and required facilities to be self-supporting for extended time periods; severe structural damage mandating evacuation to unsheltered areas without access to emergency water supplies or medications; and lack of appropriate or handicap-accessible evacuation vehicles.

TABLE 1—Reported Problems With Disaster Plan and 5-Month Revisions to Disaster Plan

Problem Category	Percentage of Nursing Facilities That Cited Problems With Their Disaster Plan ^a	Percentage of Nursing Facilities With Any Problem That Addressed This Problem Within 5 Months
Staff absences	32	5
Phone equipment not working	29	7
Immediate movement and evacuation, staff knowledge of policies and procedures (blocked exits, movement from upper floors to lower floors, resident confusion, turning off sprinklers)	23	29
Insufficient water supply	20	14
Insufficient emergency generator fuel	21	11
Other supplies insufficient (flashlights, blankets, food, linens)	18	32
Obtaining needed information and assistance not directly related to problems with phone equipment (information on available beds for transfers out, safety of building, external damage and needs)	15	5
Transfers out (obtaining appropriate transportation, evacuation to an inappropriate off-site location)	12	3
Other (lack of information needed to contact families and attending physician, cognitively impaired patients wandering into unsafe areas, addressing fears of staff and residents)	10	7

^aPercentage of nursing facilities with any problem that cited 1 or more problems in the category.

System Response to Nursing Facilities

Despite nursing facilities' potential role in disaster response and the significant stresses that they experienced after the earthquake, the early disaster assistance they received was limited. Seventy-two percent of respondents (65% of damaged facilities, 74% of undamaged facilities) reported that no person or entity acted as a regional or area "central clearinghouse" for information about facility needs, bed availability, and community resources. The social workers also noted the lack of such a system and commented on the challenges of identifying available beds for patients in need of transfer, as well as other potential needs after the earthquake. They emphasized the need for a central information clearinghouse.

In the first 24 hours after the event, public service agencies (e.g., paramedics, the Red Cross) contacted 2 damaged and 7 undamaged nursing facilities; oversight agencies (e.g., the health department, the city building inspector, the Office of Statewide Health Planning and Development, the Occupational Safety and Health Administration) contacted 2 undamaged and 6 damaged nursing facili-

ties. In addition, most nursing facilities reported that their medical directors were absent and therefore unable to provide triage assistance during this critical period: only 17 nursing facilities (5 damaged, 12 undamaged) reported that their medical directors were present at the facility during the first 24 hours after the disaster. Finally, only 6 damaged and 28 undamaged nursing facilities reported the presence of a physician during this 24-hour interval.

Interestingly, we found that other nursing facilities served as a source of support after the event. Almost one third of respondents reported that other nursing facilities called to offer assistance in the first 24 hours after the earthquake. These contacts seemed to be well targeted—all 23 damaged nursing facilities received such telephone calls. In addition, 10 undamaged facilities reported that other nursing facilities had contacted them to offer help. These communications occurred spontaneously, independent of any formal or predetermined interfacility contact system.

Rehabilitation and Preparation/ Prevention for Future Events

During the 5 months after the earthquake, only 1 of the 5 nursing facilities that closed because of earthquake damage had reopened. During the 3 years following the disaster, an additional 3 facilities reopened. During the 5-month period, some but not all, of the nursing facilities changed their transfer or disaster plans. Table 1 displays the percentage of facilities that reported a problem with their plans and that modified the plan to correct the problem within 5 months of the disaster. Of the 23 facilities without a transfer plan, only 1 had created such a plan. Of the 56 nursing facilities citing any problem with their disaster plans, 29 had made changes. In addition, although 42 facilities reported a need for resident or staff counseling after the disaster, only 18 had offered professional counseling within the 5 months.

DISCUSSION

This survey provided important information about nursing facilities' function and role in a community after a major disaster. Facilities experienced internal and external stresses

that were not limited to structural damage. Most reported a lack of public assistance; other nursing facilities, rather than public agencies, were primary support contacts for damaged facilities. Despite considerable challenges, nursing facilities met a variety of community needs and accepted new residents from multiple disaster-related sources, including damaged hospitals and nursing facilities, hospitals exceeding their bed capacity, and displaced community-dwelling residents. This increase in admissions was done without advance organization and often without coordination from a central information clearinghouse.

Each disaster provides the public health community opportunities to better prepare for future events.^{1,22,27} Our findings indicate that incorporating nursing facilities into disaster planning may increase the flexibility of emergency response systems and hospitals, facilitating triage to the lowest safe level of care. Advance planning also may minimize stresses experienced by already vulnerable older persons. Finally, nursing facilities that are prepared to respond during a crisis, require less attention from emergency response personnel and therefore place less stress on the disaster response system.

The nursing facilities in our study reported increased admission requests from the community after the disaster. Despite the often-expressed goal of maintaining the elderly in their own residences, this population is often overlooked in community disaster planning. Some community-dwelling elderly may be more vulnerable after a disaster owing to interrupted access to medical services needed to manage chronic disease,²⁸ disaster-induced health problems (e.g., falls, dehydration) or psychological stress,^{6,9,18,28} loss of informal support systems, failure to match services to the populations most in need,^{8,19} and lack of low-cost housing for the elderly and other vulnerable populations after disasters.²⁹ Clearly, the appropriate role of nursing facilities and of alternative support services (e.g., nonnursing facility, community-based support services) for this population bears closer examination, and advance planning.

Some problems reported by nursing facilities might have been anticipated from the ex-

periences of vulnerable populations in other disasters. For instance, in various weather-related disasters, older persons with complex medical needs were evacuated to unsuitable locations^{4,21}; poor planning impeded coordination among hospitals, nursing facilities, and home health agencies²⁰; shelters were unable to accommodate persons with disabilities⁴; and psychological stress was widespread.^{30,22}

Unfortunately, other problems reported by the respondents seem to reflect the lower standing of nursing facilities within the medical system. Limited aid from conventional sources, staffing problems, and the relative absence of medical directors and physicians, as compared to other healthcare settings,³¹ reflect and magnify such facilities' isolated status even during times of relative calm. Most nursing facilities chronically confront the problems of low staffing ratios,^{32–34} barely-subsistence-level wages for nursing staff,³⁵ infrequent visits by a small number of physicians,^{31,36} and inadequate coordination with hospitals.^{37–39} Although the health system expends great effort and resources to protect hospitalized older persons,^{15,22} interest appears to wane when these patients enter nursing facilities.

Despite this resource disparity, nursing facilities and hospitals share the paradox of possessing disaster resources while simultaneously risking disruption or closure when disasters occur.^{22,40,41} Although nursing facilities cannot treat severe trauma, hospitals are not as focused on vulnerable older persons and postacute care as are nursing facilities. Thus, both may make unique contributions. Nevertheless, most proposals for disaster response integrate hospitals but not nursing facilities,^{15,41–43} thereby reinforcing the discrepancy in advance preparation and implementation of disaster plans between hospitals and nursing facilities. Many nursing facilities in our study failed to address problems with their disaster plans or to provide counseling, indicating that nursing facilities needed more resources and assistance to improve their planning.

Disaster plans should be flexible, allowing facilities to respond to internal and external stressors, and should be tailored to each community's resources and to the disasters it is likely to face. Relevant recommendations from literature in other settings (e.g., hospitals,

emergency departments, field triage units) include maintaining medical disaster backpacks and equipment modules³; stocking 1 week's worth of supplies and generator fuel²²; creating centralized portable information lists that include patients' medical requirements and family contacts; sharing contingency plans for staff absences and transportation needs²²; and assigning professionals trained in community-based emergency response to assess damage and capacity.³ Clear communication protocols and backup plans are critical.^{42,44,45} Finally, plans should identify appropriate shelters for nursing facilities residents and other persons with complex medical needs.⁴

It is encouraging that after we completed this study, the Hospital Council of Southern California and the Los Angeles County Department of Health Services Emergency Medical Services Agency met with representatives of several health facilities and organizations to discuss the inclusion of nursing facilities in regional disaster plans. Moreover, a subsequent communitywide drill included nursing facilities. We hope that this study will prompt other communities to incorporate nursing facilities into their disaster plans.

Limitations

Limitations of this study include the possibility that the retrospective self-reports of nursing facilities might over- or underrepresent their postdisaster problems and contributions. In addition, given that disasters are unique events, the generalizability of our conclusions may be limited. Finally, our methodology did not independently assess the disaster's effect on facility residents' health.

Conclusions

As nursing facilities increasingly assume responsibility for greater numbers of frail, medically complex patients, their effective functioning during community disasters will gain even more importance. The potential of nursing facilities to increase the capacity and flexibility of disaster plans is particularly important in view of the recent US focus on disaster response. To fully realize their expanded role, nursing facilities should be incorporated into community disaster plans, assisted in the creation of formal disaster plans, and included in epidemiological disaster assessments. ■

About the Authors

Debra Saliba is with Health Services Research and Development, Veterans Administration Greater Los Angeles Health Care System, Los Angeles, Calif, the University of California, Los Angeles—Veterans Administration Medical Center Multicampus Program in Geriatrics, and the RAND Corporation, Santa Monica, Calif. Joan Buchanan is with the Department of Health Care Policy, Harvard Medical School, Cambridge, Mass. Raynard S. Kington is with the National Institutes of Health, Bethesda, Md.

Requests for reprints should be sent to Debra Saliba, MD, MPH, RAND, 1700 Main St M-28, Santa Monica, CA 90407 (e-mail: saliba@rand.org).

This article was accepted April 11, 2003.

Contributors

D. Saliba led all aspects of the study, including planning, literature review, survey design, research questions, analysis, and article preparation. J. Buchanan contributed to the survey design, research questions, analysis design, and article preparation. R. Kington contributed to research design and to recruitment of nursing homes and reviewed analyses and all drafts.

Acknowledgments

D. Saliba's work is supported by a Veterans Administration Health Services Research and Development career development award (RCD 01-006).

We thank Dr Arthur Rivin and the Santa Monica/West Los Angeles Nursing Home Clinical Research Cooperative for their early input into the survey development. We also thank the California Association of Homes and Services for the Aging and the California Association of Health Facilities for their support. Valuable assistance in survey development and literature review was provided by Joanne Teoh and Steve Wong.

Human Participant Protection

The study underwent expedited review by the Rand, University of California, and Department of Veterans Affairs institutional review boards and approval was obtained prior to mailing the survey. The survey did not solicit individual patient data. Each administrator was assured that the identity of individual facilities would remain confidential.

References

- Logue JN. Disasters, the environment, and public health: improving our response. *Am J Public Health.* 1996;86:1207–1210.
- Noji EK. Public health challenges in technological disaster situations. *Arch Public Health.* 1992;50:99–104.
- Schultz CH, Koenig KL, Noji EK. A medical disaster response to reduce immediate mortality after an earthquake. *N Engl J Med.* 1996;334:438–444.
- Gulitz E, Kurtz A, Carrington L. Planning for disasters: sheltering persons with special health needs. *Am J Public Health.* 1990;80:879–880.
- Eldar R. The needs of elderly persons in natural disasters: observations and recommendations. *Disasters.* 1992;16:355–358.
- Kenney WL, Hodgson JL. Heat tolerance, thermoregulation and ageing. *Sports Med.* 1987;4:446–456.
- Logue JN, Melick ME, Hansen H. Research issues

and directions in the epidemiology of health effects of disasters. *Epidemiol Rev.* 1981;3:140–162.

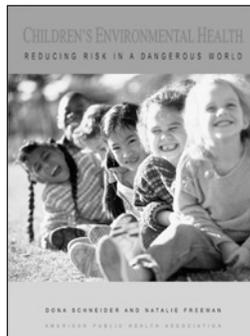
- Tanida N. What happened to elderly people in the great Hanshin earthquake. *BMJ.* 1996;313:1133–1135.
- Mahue-Giangreco M, Mack W, Seligson H, Bourque LB. Risk factors associated with moderate and serious injuries attributable to the 1994 Northridge earthquake, Los Angeles, California. *Ann Epidemiol.* 2001;11:347–357.
- Rhoades J, Potter EB, Krauss N. Research findings #4: nursing homes—structure and selected characteristics, 1996. Rockville, MD: Agency for Healthcare Policy and Research; May 2001. Available at: http://www.meps.ahrq.gov/papers/rf4_98-0006/rf4.htm. Accessed March 19, 2002.
- Gabrel CS. Characteristics of elderly nursing home residents and discharges: data from the 1997 National Nursing Home Survey. *Adv Data.* 2000;No. 312:1–15.
- Kemper P, Murtaugh CM. Lifetime use of nursing home care. *N Engl J Med.* 1991;324:595–600.
- Kahn KL, Keeler EB, Sherwood MJ, et al. Comparing outcomes of care before and after implementation of the DRG-based prospective payment system. *JAMA.* 1990;264:1984–1988.
- Shaughnessy PW, Kramer AM. The increased needs of patients in nursing homes and patients receiving home healthcare. *N Engl J Med.* 1990;322:21–27.
- Pointer JE, Michaelis J, Saunders C, et al. The 1989 Loma Prieta earthquake: impact on hospital care. *Ann Emerg Med.* 1992;21:1228–1233.
- Kario K, Ohashi T. Increased coronary heart disease mortality after the Hanshin-Awaji earthquake among the older community on Awaji Island. *J Am Geriatr Soc.* 1997;45:610–613.
- Leor J, Poole WK, Kloner RA. Sudden cardiac death triggered by an earthquake. *N Engl J Med.* 1996;334:413–419.
- Phifer JF, Kaniasty KZ, Norris FH. The impact of natural disaster on the health of older adults: a multi-wave prospective study. *J Health Soc Behav.* 1988;29:65–78.
- Kilijaneck TS, Drabek TE. Assessing long-term impacts of a natural disaster: a focus on the elderly. *Gerontologist.* 1979;19:555–566.
- Sabatino F. Stories of survival. Hurricane Andrew. South Florida hospitals shared resources and energy to cope with the storm's devastation. *Hospitals.* 1992;66:26–30.
- Mangum WP, Kosberg JI, McDonald P. Hurricane Elena and Pinellas County, Florida: some lessons learned from the largest evacuation of nursing home patients in history. *Gerontologist.* 1989;29:388–392.
- Friedman E. Coping with calamity. How well does health care disaster planning work? *JAMA.* 1994;272:1875–1879.
- Silverman MA, Weston M, Llorente M, Beber C, Tam R. Lessons learned from Hurricane Andrew: recommendations for care of the elderly in long-term care facilities. *South Med J.* 1995;88:603–608.
- Cowen AR, Denney JP. Earthquake. *Emerg Med Serv.* 1994;23:58–64.
- US Dept of Health and Human Services. HHS

provides new aid to cities for disaster preparedness: 25 awards today bring total to 97 cities so far receiving assistance. Press release. October 3, 2001. Available at: <http://hhs.gov/news/press/2001pres/20011003.html>. Accessed March 19, 2002.

26. Lechat M. Accident and disaster epidemiology. *Public Health Rev.* 1993-94;21:243-253.
27. Muller JE, Verrier RL. Triggering of sudden death—lessons from an earthquake. *N Engl J Med.* 1996;334:460-461.
28. Murden RA, Faro J. The need for respite care following natural disasters. *Gerontologist.* 1987;27:356-358.
29. Bolin R, Stanford L. The Northridge earthquake: community-based approaches to unmet recovery needs. *Disasters.* 1998;22:21-38.
30. Centers for Disease Control and Prevention. Comprehensive assessment of health needs 2 months after Hurricane Andrew—Dade County, Florida, 1992. *MMWR Morb Mortal Wkly Rep.* 1993;42:434-437.
31. Katz PR, Karuza J, Kolassa J, Hutson A. Medical practice with nursing home residents: results from the National Physician Professional Activities Census. *J Am Geriatr Soc.* 1997;45:911-917.
32. Harrington C, Kovner C, Mezey M, et al. Experts recommend minimum nurse staffing standards for nursing facilities in the United States. *Gerontologist.* 2000;40:5-16.
33. Kayser-Jones J, Schell ES, Porter C, Barbaccia JC, Shaw H. Factors contributing to dehydration in nursing homes: inadequate staffing and lack of professional supervision. *J Am Geriatr Soc.* 1999;47:1187-1194.
34. Wunderlich GS, Kohler P, eds. *Improving the Quality of Long-Term Care.* Washington, DC: National Academy Press; 2001.
35. Diamond T. How do you make it on just one job. In: *Making Gray Gold.* Chicago, Ill: University of Chicago Press; 1992:35-52.
36. Reichman WE, Coyne AC, Borson S, et al. Psychiatric consultation in the nursing home. A survey of six states. *Am J Geriatr Psychiatry.* 1998;6:320-327.
37. Saliba D, Kington R, Buchanan J, et al. Appropriateness of the decision to transfer nursing facility residents to the hospital. *J Am Geriatr Soc.* 2000;48:154-163.
38. Morrison RS, Olson E, Mertz KR, Meier DE. The inaccessibility of advance directives on transfer from ambulatory to acute care settings. *JAMA.* 1995;274:478-482.
39. Ouslander JG, Weinberg AD, Phillips V. Inappropriate hospitalization of nursing facility residents: a symptom of a sick system of care for frail older people. *J Am Geriatr Soc.* 2000;48:230-231.
40. Haynes BE, Freeman C, Rubin JL, Koehler GA, Enriquez SM, Smiley DR. Medical response to catastrophic events: California's planning and the Loma Prieta earthquake. *Ann Emerg Med.* 1992;21:368-374.
41. Milsten A. Hospital responses to acute-onset disasters: a review. *Prehospital Disaster Med.* 2000;15:32-45.
42. Niemtzow RC, Yarbrough G, Harwood KL, et al. The Amateur Radio Emergency Service (ARES) and the National Disaster Medical System (NDMS). *Mil Med.* 1993;158:259-263.
43. Klein JS, Weigelt JA. Disaster management.

Lessons learned. *Surg Clin North Am.* 1991;71:257-266.

44. Garshnek V, Burkle FM. Telecommunications systems in support of disaster medicine: applications of basic information pathways. *Ann Emerg Med.* 1999;34:213-218.
45. Palafox J, Pointer JE, Martchenko J, Kleinrock M, Michaelis J. The 1989 Loma Prieta earthquake: issues in medical control. *Prehospital Disaster Med.* 1993;8:291-297.



ISBN 0-87553-241-1
2000 ■ 149 pages ■ softcover
\$13.50 APHA Members
\$19.95 Nonmembers
plus shipping and handling

Children's Environmental Health

by Dona Schneider and Natalie Freeman

The health of our children is a critical issue facing our society today. The toll of childhood death and disability extends well beyond the individual child to affect all of us. This book empowers readers by providing clear information about environmental threats and what we can do to prevent them.

The six chapters include Infectious Diseases in the Environment; Injuries and Child Health; The Legacy of Lead; Environmental Chemicals and Pests; Childhood Asthma; and Reducing Environmental Health Risks. An Appendix of activities to do with children is included.

Pediatricians, child health care practitioners and parents will find this book an invaluable resource.



American Public Health Association

Publication Sales

Web: www.apha.org
E-mail: APHA@TASCO1.com
Tel: (301) 893-1894
FAX: (301) 843-0159

CE01J7