

Frail Elderly as Disaster Victims: Emergency Management Strategies

Lauren S. Fernandez, MS;^{1,2} Deana Byard, BA;¹ Chien-Chih Lin, BA;¹ Samuel Benson, AEMT-P;³ Joseph A. Barbera, MD⁴

1. Graduate Student (Crisis and Emergency Management), Department of Engineering Management and Systems Engineering, School of Engineering and Applied Science, The George Washington University, Washington, DC
2. Senior Member of the Professional Staff, SRA International
3. Director of Health and Medical Preparedness, New York City Office of Emergency Management, New York City, New York
4. Associate Professor of Engineering Management (Crisis and Emergency Management), Clinical Associate Professor of Emergency Medicine, and Co-Director, The Institute for Crisis, Disaster, and Risk Management, The George Washington University, Washington, DC

The opinions and findings in this article are those of the authors and should not be construed as official policies and positions of the New York City Office of Emergency Management.

Correspondence:

Lauren Fernandez
230 N Wakefield St.
Arlington, VA 22203 USA
e-mail: L.Schiff@gwu.edu

Keywords: disaster; elderly; emergency management strategy; emergency management system; frail elderly; vulnerability

Abbreviations

ADL = activities of daily living
CARD = collaborating agencies responding to a disaster
HCERI = High Center For Research and Information
IADL = instrumental activities of daily living
SBA = Small Business Administration

Received: 26 March, 2002

Accepted: 03 April, 2002

Web Publication: 04 November 2002

Abstract

Purpose: To identify the vulnerabilities of elderly to disasters, and to develop strategies to address these vulnerabilities.

Methods: A relevant literature search of journal articles, government training materials, news reports, and materials from senior organizations was conducted.

Results: The vulnerability of the elderly to disasters is related to their impaired physical mobility, diminished sensory awareness, chronic health conditions, and social and economic limitations that prevent adequate preparation for disasters, and hinder their adaptability during disasters. Frail elderly, those with serious physical, cognitive, economic, and psycho-social problems, are at especially high risk.

Conclusions: This segment of the population is growing rapidly. Therefore, it is important that emergency management recognize the frail elderly as a special needs population, and develop targeted strategies that meet their needs. Several management strategies are presented and recommendations for further action are proposed.

Fernandez LS, Byard D, Lin CC, Benson S, Barbera JA: Frail elderly as disaster victims: emergency management strategies. *Prehosp Disast Med* 2002;17(2):67-74.

Introduction

The ability of a disaster victim to prepare for, respond to, and recover from a disaster depends on a variety of factors that often are beyond the individual's immediate control. The severity and longevity of the event, the efficiency of the warning systems, the victim's health status, and his or her access to resources are a few of the factors influencing an individual's response and recovery capacity. Victims who are house-bound, socially isolated, or who have impaired mobility may be compromised in their ability to respond to and recover from disasters. Individuals reliant upon regular medication, medical treatments, or nursing care, and the provision of care and food from service or volunteer agencies also may be vulnerable.

The elderly, along with the help of family and friends who serve as caretakers, have the responsibility to plan for emergencies and disasters. However, others in the community also have a responsibility to ensure that services provided to the elderly enable them to respond to and recover from a disaster. Emergency managers, health-care providers, emergency responders, and local public and private agencies dedicated to the health and well-being of the elderly share in this responsibility.

An elderly person typically is defined as a person who is >65 years of age. Further distinction is made between the "young-old" (65-74 years of age), the "aged" (75-84 years of age), and the "oldest-old" (≥85 years of age).¹ Age does not make a

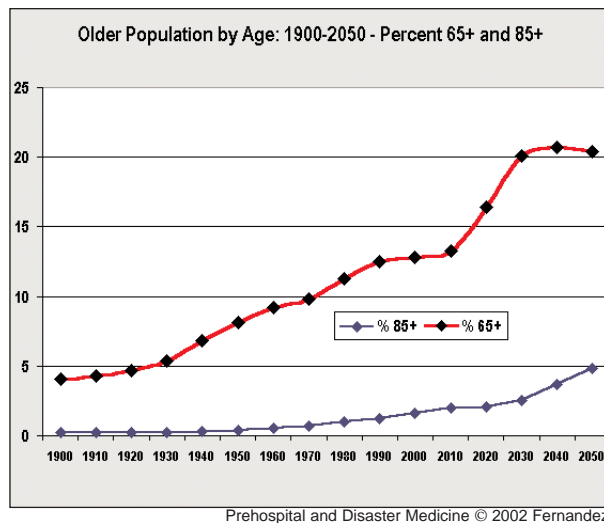


Figure 1—Census forecasts, 2030, older adults from the “baby boom” generation will account for 20% of the nation’s population, up from 13% in 2001.^{3a}

person vulnerable. Rather, it is the correlation between advancing age and the likelihood of having special needs that increase frailty.

Most definitions of “frail elderly” focus on the health-related conditions that limit the individual’s independence, and increase his or her need for assistance and dependency on others.¹⁻⁵ The term, “frail elderly”, often is used to distinguish the elderly who have serious health problems, and as a result, may be more vulnerable during disasters. The limitations experienced by the frail elderly during and after a disaster, however, do not stem from health-related conditions alone. Other factors, such as economic constraints or social isolation, also may contribute to these limitations. A definition of frail elderly from the geriatrics literature by Balducci and Extermann, best summarizes the vulnerability of this population: “The frail elderly person utilizes his or her whole functional reserve for basic survival, and has no reserve to cope even with minimal stress.”⁵ It is becoming increasingly important to address the needs of the elderly before, during, and after a disaster, because the size of this population is growing. The United States Census Bureau forecasts that by 2020, California and Florida (both geographic areas at high risk for disaster) will double their 1993 elderly populations.¹ The census also forecasts that by 2030, older adults from the “baby boom” generation will account for 20% of the nation’s population, up from 13% in 2001 (Figure 1).⁶ Information from the Administration on Aging indicated that from 1994–1995, 1.86 million people >65 years old reported difficulties with two or more activities of daily living (ADL).⁷ Activities of daily living include bathing, dressing, eating, getting in or out of beds and chairs, using the bathroom, and mobility around the home. Instrumental Activities of Daily Living (IADL) include preparing meals, shopping, managing money, using the telephone, taking prescription medication in the right dose at the right time, attending to one’s own acute and chronic medical needs, doing light house work, and traveling outside.^{1,8} Since disability prevalence

increases with age, the significant increase in the number of the “oldest-old” is a concern. Between 1960 and 1994, the “oldest old” population increased 274%.⁹ In addition to the increase in the number of elderly in the population, managed care has increased the likelihood that the elderly receive many medical services at home that previously were provided in hospitals, nursing homes, and other facilities. This home care can be especially difficult to maintain during a disaster, and the post-impact phase of the disaster. As a result of the population shift, and the home delivery of critical medical services, the challenge of addressing the needs of frail elderly before, during, and after disasters is growing for emergency managers.

If the special needs of the frail elderly are not incorporated into emergency planning, resources may be overwhelmed and critical needs will not be met. Unmanaged disaster impact upon the frail elderly often leads to expensive and difficult medical, psychological, and chronic care needs; therefore, it is important to evaluate and address these issues during the mitigation and preparedness phases of emergency management programs.

The purpose of this study was to define the term “frail elderly”, identify the vulnerabilities of frail elderly to disasters, and develop strategies and tactics to address these vulnerabilities.

Methods

A medical literature search and web site review was conducted using the Washington Research Libraries Consortium, *Medline*, and the Google Internet search engine with the keywords: “elderly”, “disaster”, and “frail elderly”. Source articles were a mix of scientific studies, field reports, literature provided by organizations for aging, and news items. Due to this variation in scope, focuses, and scientific rigor used, a basic analytical methodology was applied. Factors related to disaster vulnerability were grouped into general categories (e.g., physical impairment, diminished sensory acuity, etc.). Then, based upon emergency management concepts, strategies and tactics were developed to address each of these vulnerability factors. Strategy descriptions include examples of tactics that can be used during the mitigation, preparedness, response, and recovery phases of a disaster.

Findings

The literature addresses the range of impacts on the elderly population from disasters, including hurricanes, floods, tornados, earthquakes, and heat and cold waves. The bulk of reviewed literature concentrates on mental health, the social-psychological impacts, and the definition and evaluation of loss. Studies also focus on the utilization and role of external aid sources, physical impacts, and financial response and recovery.

The data are contradictory as to whether the elderly groups are more vulnerable than are other age-defined population groups. These disparities may exist because “elderly” can be defined to begin at a younger age (55 or >60 years), and studies can exclude the elderly population in long-term care or other medical/nursing settings. Studies that identified an increased vulnerability of the

elderly to disasters primarily attributed it to impaired physical mobility, diminished sensory awareness, pre-existing health conditions, and social and economic constraints. These categories are described separately.

Physical impairments

One of the most prominent symptoms of aging is deteriorating physical ability. Many elderly exhibit impaired balance, decreased motor strength, poor exercise tolerance, and functional limitations defined as difficulty in performing personal care, ADLs, and IADLs. The ability to walk, travel outside the home, eat, use the telephone, and perform a variety of other activities decreases as age advances.¹ These physical disabilities are intensified by disease conditions, from complications of medical treatments, and/or from medications.

Pre-existing physical limitations such as impaired mobility can present major disadvantages during disasters. In sudden-onset disasters such as earthquakes and floods, the elderly physically may be unable to duck-and-cover, or quickly evacuate a building.¹⁰ Studies indicate that the elderly have higher injury and disaster-related death rates in these types of incidents compared to other age groups.¹¹ Sustained power outages can impact an individual's life-support equipment, such as an oxygen generator, ventilator, or electric wheelchair (all require battery recharging). In multi-story residential buildings, loss of electricity disrupts the operation of elevators, which prevents the elderly from obtaining food, medications, and ongoing medical services easily.¹² A loss of electricity also may impact water pumps and lead to problems with obtaining potable water. Housebound elderly also may lack transportation out of the disaster-affected area or to aid distribution centers.¹³ Those that rely on regular care providers for daily needs such as meal delivery, home cleaning, and bathing may be isolated when service providers cannot reach them due to impassable roads, or because the providers themselves are impacted by the disaster.

Diminished sensory awareness

The senses of vision, hearing, smell, taste, and touch diminish with age, and loss can be intensified by chronic disease. Poor night and peripheral vision can cause difficulties for the elderly in unfamiliar environments or during a rapid evacuation. Hearing impairment is especially common, with one study indicating that among non-institutionalized people >75 years of age, nearly 50% of the men and >35% of the women were affected.¹ This may cause problems avoiding hazards during the event and the disaster, and create difficulty in understanding emergency instructions in environments with excessive background noise. Additionally, the older population's reduced senses of smell and taste may make them more likely to eat spoiled food, a potentially significant risk when electrical power is unavailable for extended periods of time.¹³

Pre-existing medical conditions and sensitivities

The probability of contracting multiple chronic illnesses increases with age.¹ In 1997, 30% of those aged 65–74 years reported a limitation caused by a chronic condition.

Over half of those >75 years of age were limited by chronic conditions, and of those >80 years, almost 75% reported having at least one significant disability.² Maintaining treatment for common illnesses and conditions such as arthritis, hypertension, heart disease, diabetes, cancer, stroke, and other diseases, often is dependent on a patient's consistent and timely access to care centers, health facilities, medications, and adequate nutrition. When disasters compromise health resources, patients may find it difficult to effectively manage their own illnesses or chronic conditions. For example, when Hurricane Floyd struck eastern North Carolina in September of 1999, 21 of 29 outpatient ambulatory centers closed due to flooding. Patients reliant on dialysis and chemotherapy had to be routed to other facilities.¹⁴ This can be a major logistical burden for those whose ability to travel is dependent upon local public transportation or the good will of others.

Disasters also may overwhelm health and nursing facilities that are forced to manage not only injuries caused by the disaster, but also chronic conditions in persons who have been unable to obtain the normal care needed to manage their conditions at home due to the disaster. During a severe snowstorm in 1987, northeastern New York hospitals were filled with a high number of patients with normally outpatient-managed, chronic respiratory problems. This was attributed to an inability to provide self-care without electrically powered medical equipment, and the inability to cope with the loss of home heat. Power loss caused home nebulizers, oxygen therapy equipment, and suction devices to become inoperable.¹⁵ Few of these patients were acutely ill or required hospitalization, but they could not be easily discharged. As a result, emergency departments were required to operate above their intended capacity for an extended period of time. In today's health-care environment, this could cause a severe financial impact for hospitals, since these additional length-of-stay costs may not be recoverable.

Not only are the elderly more likely to have chronic pre-disaster conditions, they also are prone to suffer health-related consequences as a direct result of a disaster and to require longer recovery periods for these problems.¹⁶ Since they may have impaired ability to regulate body temperature, disasters involving environmental extremes may cause elevated rates of hyperthermia or hypothermia. The absence of a temperature-controlled living environment, in conjunction with common pre-existing health conditions, such as poor vascular circulation, organ disease, high blood pressure, special dietary needs,¹⁷ poor living conditions, memory disorders, and consumption of certain medications,¹⁸ increase the risk of heat or cold injury and death. Other disaster-related environmental factors such as increased stress may contribute to irregular eating and medication schedules.¹⁹ If environmental controls, regular diet, and normal care for pre-existing conditions cannot be maintained, the frail elderly are likely to be impacted more significantly by a disaster. This problem is compounded in cases of inappropriate medical treatment during disasters. In many cases, frail elderly are dropped-off at shelters and nursing homes without care instructions or medical records.^{20,21} Dementia and other neurological impairments may prevent them from providing even a rudimentary

medical history, compounding the critical lack of information on medical and everyday care needs. Additionally, medical providers may inappropriately dismiss diminished functional capacity during the disaster as chronic effects of aging.²²

Post-disaster, physical health needs appear to dissipate over time. Studies performed greater than one year after natural disasters, show elderly victims self-rating their health as near national norms,¹² and in some cases, better than elderly non-victims.²³ Self-ratings of health, however, should be analyzed in a context of a person's psychological recovery. One can speculate that those who are better recovered psychologically may provide more positive ratings of their physical health.

Social and psychological impairment

Several studies have noted that the elderly may be less likely to heed disaster warnings than are younger persons. Elderly may be reluctant to leave their home for financial and psychological reasons.^{24,25} Elderly who have previously experienced disasters, may feel that they can survive another in their own home, while others may have difficulties evacuating, or perhaps they are more isolated from information about the risks of not evacuating.²⁵ Other studies however, have shown that elderly pay equal or greater attention to warnings.²⁶ This disparity may exist because of the varying age criteria used to define the elderly or the exclusion, in some studies, of subjects that do not live independently. This phenomenon requires further examination.

The elderly have a strong need for social support during a disaster in order to mitigate the effects of stress. The support and availability of a spouse, friends, and/or family particularly can be important to the emotional well-being and recovery, statistically more so for elderly than younger age groups.²⁷ However, the likelihood of living with a spouse or family member decreases with age. Only 24% of people >85 years of age live with a spouse, and nearly half live alone. In the aftermath of a disaster, elderly victims may be subjected to frequent and stressful residential changes as they are moved among different families or shelters.¹ Other potential sources of stress include language and cultural barriers, lower reading ability, and speaking difficulties that may cause confusion and misunderstanding between the elderly and those trying to communicate with them.⁹ Therefore, it is commonly assumed that the elderly suffer disproportionately from stressful events. Studies, however, are contradictory. In an investigation of response to devastating tornados, Bolin and Klenow found that there does not appear to be a significant difference in the emotional recovery of the elderly and the non-elderly one year after the disaster.¹¹ As time passes after the occurrence of the disaster, elderly report fewer physiological manifestations of stress (i.e., difficulty sleeping and loss of appetite).¹² In fact, several studies noted that the elderly recovered better psychologically than did the non-elderly.^{11,27}

Aid receipt

Elderly receive less proportionate aid in the aftermath of a disaster than do their younger counterparts.^{11,23,28} Several

theories are proposed to explain this disparity. One study noted that nearly all of the aid accepted by the elderly was not requested, but rather offered.²³ Some speculate that the elderly do not request aid due to the stigma that is associated with certain types of aid such as welfare or mental health assistance.²⁹ Additionally, the elderly have expressed an unfounded concern that receipt of aid may impact their other sources of funding, causing a loss of benefits if they exceed an income limit. Other elderly who experienced the Great Depression of the 1930s, are reluctant to request aid out of the belief that "others could use the aid more". For example, following a flood caused by Hurricane Agnes, only 2% of elderly in a sample population sought cash aid from the Department of Public Welfare. More elderly sought aid that was not associated directly with welfare, such as Small Business Administration low interest loans.³⁰

According to the Aging Network, older people also are slower to register for disaster assistance. When they do, they more commonly have difficulty in effectively navigating the complicated processes, comprehending the large amounts of tedious information,³¹ and completing the applications and procedures required to obtain such assistance.¹⁹ Unfamiliar, bureaucratic systems can be difficult particularly for those elderly whose spouse had previously dealt with these issues.³² Perhaps, because the human services system is organized to dispense aid in response to demand, the elderly's reticence to initiate or complete the aid processes results in less assistance.²⁹ A targeted outreach with simplified systems is required to address this problem.

In general, counseling and social resources for elderly are substantial after a disaster, perhaps because it is assumed that they are more vulnerable psychologically.²⁸ However, despite the availability, the elderly exhibit a relatively minor need for these services. The aid they do request is oriented more for housing and finance.²⁹

Financial vulnerability

The response community may perceive this population as needing less financial assistance because in some communities, the elderly commonly reside in debt-free housing,²⁸ but this is not true in urban environments like New York City. In reality, the frail elderly actually can be more vulnerable to property damage due to lack of insurance, a smaller financial cushion, and poor credit-worthiness due to fixed income and lack of employment.¹¹

The elderly may utilize financial aid sources less than do other age groups simply because they do not meet the qualifications to obtain such assistance. For example, many elderly on fixed incomes cannot qualify for low-interest, Small Business Association (SBA) disaster loans to rebuild property. Even when the aid received is commensurate with the amount of damage, it is more problematic for the elderly to acquire additional money for uncovered losses.¹¹ Voluntary charitable organizations may be important for addressing this gap. Elderly have fewer opportunities and less ability to generate income, are increasingly reliant on Social Security benefits, and are more likely to live near or at poverty level than are the non-elderly.¹ Although poverty rates for the elderly in the United States have decreased dramatically over the past 40 years, the 2000 U.S. Census

found that 10.2% of people aged 65 years and older remain at or below the poverty line.³³

Economic recovery appears to be the area where elderly fare worse than non-elderly. Younger age groups are better able financially to recover from a disaster. The inability to recover financially can result in a change in the victims' standard of living. A study following an area impacted by a tornado, found that 32.2% of elderly reported a drop in their standard of living as compared to 12.5% of the non-elderly. In another example, one year after a devastating Texas tornado, 33.9% of elderly victims reported that they were in an advanced stage of economic recovery as opposed to 48.4% of younger victims.¹¹

Discussion and Recommendations

The term "frail elderly" has been inconsistently defined in the literature. The following operational definition should be used for the frail elderly population in the context of emergency management: *Individuals aged 65 years or older with physical, cognitive, social, psychological, and/or economic circumstances that will likely limit their ability to perform, or have performed for them, one or more of Activities of Daily Living (ADLs) or Instrumental Activities of Daily Living (IADLs) during and after a disaster.*

Advanced age alone does not equate with vulnerability, with the elderly population exhibiting a wide range of individual health and frailty. In 1990, the number of non-institutionalized elderly people in the United States who were dependent in at least one ADL or IADL numbered 6.7 million.³⁴ With the anticipated increase in the elderly population, it can be anticipated that the number of non-institutionalized people who are dependent in at least one ADL or IADL will grow, with more healthcare and life-support interventions being home-based. Therefore, it is imperative that emergency management develop strategies to specifically address the frail elderly's disaster-related vulnerabilities and needs.

Strategies

The study identifies how and why the elderly are vulnerable to disasters. The next step was to derive strategies and tactics to address these vulnerabilities. Building on the paradigm regularly incorporated into emergency management, the City→State→Federal progression of responsibility for disaster assistance, a similar paradigm should be adapted at a micro level: the Personal→Agency→Community progression of responsibility for personal preparedness. The *Personal* level represents the elderly individual and their family. It is as important to promote self-reliance among the elderly as it is with other populations, and to avoid actions that disempower them. Even if the elderly have fewer resources (in the broadest sense of the term), this does not equate with "no resources". Because elderly persons maintain the primary responsibility for caring for themselves, one of the greatest resources is self-preparation, and reminding them and their families of this responsibility is important. Special needs populations, including the frail elderly, have less ability than others to respond to the stress of disasters. For this cohort,

encouraging family (and/or legal guardian) responsibility is the next level of attention.

For those whose families cannot "fill the gap" for disaster preparedness, a determination should be made as to whether there is a special "agency" relationship with the individual that includes this responsibility. *Agency* is used to denote a broad range of relationships between individuals and larger entities, both private and public. Some agencies may have the responsibility for only a small segment of the elderly client's care (such as meal services). At the other end of the spectrum are those who receive 24-hour home-based care that includes a "custodial" relationship in which there exists a direct care-giver relationship for someone who otherwise is unable to care for him/herself. In the event of an emergency, these individuals would be unable to "respond" (seek safety, self-care, etc.) without assistance. Responsibility for the client during times of disaster should be emphasized to custodial organizations. Finally, *community* response assets (i.e., public services) assume responsibility for general preparedness.

The following strategies are proposed for further exploration by emergency management professionals:

1. Personal Strategies

Educate the elderly for preparedness and response—Perhaps, one of the greatest resources for the frail elderly is self-preparation. Disaster checklists and other educational materials can be developed for distribution to the frail elderly, their family, and friends through social networks, community-based service organizations, and healthcare providers. During a disaster, public service announcements can remind the community to check on elderly neighbors. It may be helpful to set-up a special hotline number for the elderly to obtain information during the disaster. For example, if a county is evacuating due to an approaching hurricane, the hotline could provide information on transportation resources.^a The elderly themselves should not be the only specific target of education. Their representatives and families should be involved during emergency preparedness planning, and preparedness education should also target them.

2. Agency/ Community Strategies

Recognize the value of existing resources in planning and preparedness—It is not necessary or even desirable, to create completely new services that are dedicated solely to reducing the vulnerability of the elderly. Instead, emergency managers should focus on leveraging the services provided by existing organizations, sensitize them to disaster issues, and encourage them to incorporate disaster-planning principles into their operations. It was noted in this review that the frail elderly population commonly is connected to multiple service-oriented resources. Entities such as Meals on Wheels, home nursing programs, special needs transportation (e.g., ambulance or ambulette companies that cater to the elderly), church-based service groups, and community-based organizations already have identified much of the elderly population having pre-disaster special needs.

^a See the coastal storm evacuation information and EMOLS on the NYC-OEM web-site: www.nyc.gov/oem

Additionally, utility companies often maintain lists of Life Support Equipment (LSE) customers, and some property management companies and retirement communities have lists of special needs residents. The strategy of using these existing agencies and resources that already are regularly focused on servicing the elderly population should be used. Properly engaged and linked into the emergency management system, they should provide effective assistance in identifying the at-risk elderly population during the risk assessment phase of preparedness, and in developing preparedness procedures. During a response, a successful surveillance system using these organizations not only will promote initial needs identification, but also provide evaluation of the effectiveness of response interventions. Existing organizations can work with the local government before a disaster, to develop a data collection system and gather baseline data for comparison during future disasters. Other efforts could include the development of a registry that would allow the frail elderly or their care-takers to enter the individual's name, address, care-taker contact information, medical and other needs into a database that later could be used to link those in need with potential service providers.

In addition to surveillance, elderly service organizations are valuable in actually providing interventions, particularly to the frail elderly, during the disaster preparedness, response, and recovery phases. For instance, in New York City, Meals on Wheels delivers up to four days of meals when bad weather (such as major snowstorms) is forecast. These organizations also could provide an effective avenue for education of and pre-planning with, their clients.

Assist agencies in developing disaster continuity capabilities—

The above demonstrates that disaster planning and response should be a responsibility of elderly service organizations, with their planning closely coordinated with their clients. Strengthening the organizations' abilities to maintain their provision of services to the frail elderly during disasters will increase the likelihood that they will continue to have access to medical care, transportation, financial resources, and other forms of assistance that they need to respond successfully to and recover from a disaster. Emergency managers and staff could assist such organizations during mitigation and preparedness, in the development of enhanced assistance capabilities by helping the organizations to: 1) identify and address their own hazard vulnerabilities; 2) better ensure their capability to continue services throughout the disaster incident (and for business continuity); 3) prepare to receive technical and other assistance (including financial) from public agencies during the disasters to maintain their operations and possibly maximize their surge capacity; and 4) develop procedures to enhance the organization's recovery from the incident. Examples of tactics to implement this four-phase strategy include:

1. *Mitigation*—Determine whether an organization's headquarters should be relocated or "hardened" to reduce its exposure to flooding.

2. *Preparedness*—Provide instruction and training to allow the organization's staff to coordinate more effectively with emergency management services when a disaster occurs. Public agency education about patient assistance programs, the need for establishing memorandums of understanding (MOUs) or, at least, some type of operational relationships with the emergency management system to facilitate cooperation and funding are important.
3. *Response*—Integrate the organizations into the community incident management system. Provide additional communication equipment, geographic information system (GIS) data, and technical assistance before the precipitating event and during the immediate post-impact phase of the event in order to allow the organization to provide maximum service to the frail elderly population in the community. For example, funding an upgrade in the organization's transportation assets to all-wheel drive capability in exchange for a response commitment, may provide both increased capacity and a preparedness incentive.
4. *Recovery*—Help the organization identify technical expertise, volunteer staff, and additional funding sources that would assist them in providing services during their recovery activities.

An implemented example of such a strategy can be found in Alameda County, California, which has developed a system to augment the resources that regularly provide services for the elderly.³⁶ The Alameda Emergency Services Division and Collaborating Agencies Responding to Disasters (CARD) provides emergency management systems training to community-based organizations that traditionally serve the needs of at-risk and vulnerable people. Memoranda of Understanding are developed that outline member responsibilities, and representatives from CARD and the organizations become a part of the city's incident command system.

3. *Community Strategies*

Incorporate needs into the overall emergency management system—The Administration on Aging has concluded "special efforts are necessary in each disaster if older persons are to be served on a comparable basis."³² Five aspects of emergency response have been identified that can be enhanced to address the needs of the elderly: 1) transportation; 2) healthcare access; 3) aid distribution; and 4) warning design.

1. *Transportation needs*—Transportation appears to be one of the greatest limitations for the elderly during a disaster, primarily due to their physical limitations. In general, the elderly experience high functional capacity inside the home, but are dependent on services outside the home.²⁹ House-bound elderly may be unable to get to central aid distribution. During the 1995 heat wave in Chicago, many elderly did not travel to shelters and aid distribution centers. In response to this problem, the city revised its response plan so that during subsequent heat waves, city workers were dispatched to knock on the doors of the elderly to

deliver food and water, and provide transportation to the cooling shelters.²⁴ Emergency managers could assist aid and service agencies by helping them plan for the increased transportation needs of the elderly during and after an event/disaster. Such plans may include increasing the provision of services to those elderly who, prior to the disaster, were able to care for themselves, as well as transferring the services that were normally provided in the home to the shelters and other aid distribution centers where the elderly may temporarily be housed. Therefore, transportation must be viewed as a two-way issue: The elderly may need to travel for shelter or for disaster services or, alternatively, may have to “shelter in place” and receive services, including services above and beyond those of the “normal” population, at home.

2. *Healthcare access*—Treatment of chronic health conditions is difficult and can overwhelm resources during disasters. Medical assistance for the treatment of traumatic injuries is needed for only a relatively short period of time during the post-impact phase of disaster response. The need, however, to care for chronic conditions exacerbated by environmental stressors continues for long periods. Medical planning should be done accordingly. Healthcare is more than hospitals. Home-based care, out-patient care for chronic conditions, access to medications, access to dialysis and other critical services are related to transportation, and this highlights the interdependencies of emergency response.
3. *Aid distribution*—Agencies that regularly provide financial, medical, food, and/or transportation assistance should be proactive in offering assistance to the frail elderly, rather than waiting for requests. The American Red Cross Central Maryland Chapter and Meals on Wheels of Central Maryland joined to distribute meals to disaster victims and serve more frail elderly through a home-delivered meal program. Under this program, disaster victims receive a prepackaged tray consisting of two balanced meals, assembled under the supervision of a registered staff dietitian and nutritionist.³⁷ When food is distributed at a central location, fast-track queues can be created for the frail, especially where there is high physical competition for relief supplies.²² The elderly also can be utilized as a resource to reach more vulnerable members of their community. They can provide aid in the form of delivering food and supplies to the less mobile elderly, conducting vulnerability assessments, and providing assistance with shelter management. The elderly that have weathered previous disasters often are less affected psychologically,³⁸ and could assist those who are new victims.
4. *Warning design*—Given the visual, auditory, and cognitive impairments common to the frail elderly, emergency warnings should be designed with these limitations in mind. Such warnings should be redundant and communicated using multiple venues. Service providers and agencies with regular contact

with the frail elderly also could be used to distribute more detailed information about where to seek shelter or assistance.

Address Recovery Needs

In general, mental health issues during and following disasters do not seem to affect the elderly for extended periods of time, and most elderly are not dramatically affected by mental health problems following disasters. The demand for mental health assistance for the elderly also appears to be low. Instead, significant evidence exists that indicates a far greater need for economic assistance during recovery. For reasons cited above, elderly victims are more likely to experience long-term decline in their standard of living than are younger victims.²⁷ A variety of measures could be taken to improve their access to aid, and to minimize any reduction in standard of living. Lists of potential sources of financial assistance, along with simple information on how to contact such sources, could be provided to the elderly. In order to determine whether aid applications were completed correctly and filed in an appropriate and timely manner, agencies and volunteer groups could conduct follow-up. Finally, organizations that advocate on behalf of the elderly should sensitize lawmakers to the various factors that prevent the elderly from obtaining financial assistance that readily is available to other disaster victims. Grant programs should be reviewed to ensure that the elderly have equal access to disaster assistance.

Conclusions

Using the Emergency Management lifecycle approach, Emergency Management professionals can address the needs of the elderly in a comprehensive, cost-effective, and sustainable fashion. Strategies for the person address increasing awareness, promote self-help, and educate the elderly and their families for preparedness and response. At the following levels of responsibility, strategies call upon emergency management professionals to incorporate the special needs into the overall emergency management system to ensure that the system's structure, procedures, resources, and policies are designed to meet the needs of the frail elderly. Augmenting the existing emergency management system and the existing services already supporting the frail elderly is more likely to be successful and sustainable than developing and maintaining separate, independent capabilities. Finally, the community must acknowledge and address the special recovery needs of the elderly.

The authors recommend that these proposed strategies be developed further and tested in order to determine if such steps lead to a confirmed reduction in the disaster-related vulnerabilities of the frail elderly. Research also should be directed towards further defining and validating these types of strategies and tactics. Poorly understood phenomena, such as the significant gap in economic rebound for the frail elderly, should be investigated. Most importantly, quantitative studies and measures of effectiveness must be developed and implemented to investigate

many of our broad-based assumptions about this very important population. While this investigation centered on the frail elderly, the findings may be applicable to other similarly impaired special needs populations.

Acknowledgement

Special thanks to Elizabeth A. Davis, JD, EdM, Special

Needs Advisor, New York City Office of Emergency Management, for her insightful contributions. We thank the Institute for Crisis, Disaster, and Risk Management for creating an open environment for study of emergency management.

References

- Hobbs F, Damon B: 65+ in the United States. Washington, D.C.: U.S. Government Printing Office; April 1996. Identification No.: P23-190. Sponsored by the United States National Institute on Aging's Office of Demography of Aging.
- Duncker A, Greenberg S: *Profile of Older Americans: 2000*. Sponsored by the Administration on Aging. U.S. Department of Health and Human Services. [accessed 10 October 2001]. Available from: http://www.aoa.dhhs.gov/aoa/stats/profile/_http://www.aoa.dhhs.gov/aoa/stats/profile/_.
- Taber's Cyclopedic Medical Dictionary*. 18th ed, Philadelphia: F.A. Davis Company. Frail Elderly; 1993, p756.
- Contandriopoulos A-P, Kergoat M-J, Latour J, Lebel, P, Leduc N, Roberge D, et al. Assessment of the Care and Treatment of the Frail Elderly in Geriatric Assessment Units. Health Canada Online. Project #: 6605-4559-602. [accessed: 10 October 2001] Available from: http://www.hc-sc.gc.ca/iacob-dgiac/nhrdp/abstract_n/abstract7_e.htm
- Balducci L, Extermann M: Cancer in the elderly. *Clinical Geriatrics* [serial online] 1998; 6(12). [accessed 10 October 2001] Available from: <http://www.mmhc.com/cg/articles/CG9812/balducci.html>.
- Administration on Aging. U.S. Department of Health and Human Services: Older Adults and Mental Health: Issues and Opportunities. Jan 2001. [accessed 10 October 2001]. <http://www.aoa.dhhs.gov/mh/report2001/default.htm>.
- Administration on Aging: Number and Percent of Persons Reporting Problems with Two or More Activities of Daily Living (ADLs), By Age, Race, Gender, Poverty, Living Arrangements, Region, and Area of Residence. 1994-1995. Compiled by Westat, Inc. under contract to the U.S. Administration on Aging based on the 1994-1995 National Health Interview Survey on Disability (Phase I), NCHS, CDC, U.S. DHHS. Available from: <http://www.aoa.gov/>
- McNeil J: Current Population Reports — Americans with Disabilities: 1994-95. Census Bureau. Aug 1997 [accessed 10 October 2001] Publication number P70-61:2. Available from: <http://www.census.gov/prod/3/97pubs/p70-61.pdf>
- Oriol W: *Psychosocial Issues for Older Adults in Disasters*. DHHS Publication No. ESDRB SMA 99-3323. [accessed 10 October 2001] Available from: <http://www.mentalhealth.org/publications/allpubs/SMA99-3323/99-821.pdf>.
- Imperiale P: Special needs in emergency planning and preparedness. *Networks* 1991;6(2):8-10.
- Bolin R, Klenow DJ: Response of the elderly to disaster: An age-stratified analysis. *Intl J Aging and Human Development* 1982-3;16(4):283-297.
- Krause N: Exploring the impact of a natural disaster on the health and psychological well-being of older adults. *Journal of Human Stress* 1987;13(2):61-69.
- Federal Emergency Management Agency: Disaster-Related Needs of Seniors and Persons with Disabilities. Emergency Management Institute, 1997.
- Axelrod C, Killam P, Gaston M, Stinson N: Primary health care and the midwest flood disaster. *United States Department of Health and Human Services Public Health Report* 1994;109:601-605.
- Geehr EC, Salluzzo R, Bosco S, Braaten J, Wahl T, Wallenkampf V: Emergency health impact of a severe storm. *American Journal of Emergency Medicine* 1989;7(6):598-604.
- Morrow BH: Identifying and mapping community vulnerability. *Disasters* 1999;23(1):1-18.
- National Institute on Aging: *Fact Sheet: Hypertbermia — A Hot Weather Hazard for Older People*. [accessed 10 October 2001]. Available from: URL: <http://www.nia.nih.gov/health/agepages/hyperthe/htm>.
- National Institute on Aging: *Fact Sheet: Accidental Hypothermia — The Cold Can Be Trouble for Older People*. [accessed 10 October 2001]. Available from: <http://www.nia.nih.gov/health/agepages/hypother.htm>.
- Administration on Aging: *Disaster Services and the Elderly*. Sept 16 1999 [accessed 10 October 2001]. Available from: <http://www.aoa.dhhs.gov/aoa/disaster/disasterservices.html>
- Reed M: Disaster preparedness pays off. *Journal of Nursing Administration* 1998; 28(6):25-31.
- Silverman M, Weston M, Llorente M, Beber C, Tam R: Lessons learned from Hurricane Andrew: Recommendations for care of the elderly in long-term care facilities. *Southern Medical Journal* 1995;88(6):603-608.
- HelpAge International: *Older People in Disasters and Humanitarian Crisis: Guidelines for Best Practice*. London: HelpAge International Secretariat Communications Team. 2000.
- Kilijaneck TS, Drabek TE: Assessing long-term impacts of a natural disaster: A focus on the elderly. *The Gerontologist* 1979;19(6):555-566.
- Terry D: U.S. Agents in Chicago track a subtle health hazard: Heat. *The New York Times*; 04 October 1995; Sect. A:9 (col 1).
- Gladwin H, Peacock WG: Warning and evacuation: A night for hard houses. In: Peacock WG, Morrow BH, Gladwin H (eds.) *Hurricane Andrew: Ethnicity, Gender, and the Sociology of Disasters*. London: Routledge, 1997.
- Perry RW: Aged citizens in the warning phase of disasters: Re-examining the evidence. *Intl J Aging and Human Development* 1997;44(4):257-267.
- Bolin R, Klenow DJ: Older people in disaster: A comparison of black and white victims. *Intl J Aging and Human Development* 1988;26(1):29-43.
- Kaniasty K, Norris FH: In search of altruistic community: Patterns of social support mobilization following Hurricane Hugo. *American Journal of Community Psychology* 1995;23(4):447-477.
- Poulshock SW, Cohen ES: The elderly in the aftermath of a disaster. *The Gerontologist* 1975;15(4):357-361.
- Benson S, Personal interview. 20 July 2002.
- Administration on Aging: *Emergency Prepared Manual for the Aging Network*. March 1995 [accessed 10 October 2001] Available from: <http://www.aoa.dhhs.gov/aoa/disaster/manual/atitloc.html>
- Administration on Aging: *Actions by the Administration on Aging to Strengthen the Disaster Response Capacity to Serve Older People*. July 1995 [accessed 10 October 2001]. Available from: <http://www.aoa.gov/aoa/pages/distrpln.html>
- Dalaker J: *Poverty in the United States: 2000*. Washington, DC: U.S. Government Printing Office. U.S. Census Bureau, Current Population Reports; September 2001 Series P60-214.
- Hing E, Bloom B: *Long-Term Care for the Functionally Dependent Elderly, Vital and Health Statistics*. National Center for Health Statistics 1990;13(104), DHHS Pub. No. (PHS)90-1765.
- Department of Health, Education, and Welfare: *Planning for the Elderly in Natural Disaster*. 1976. Sponsored by the Administration on Aging under grant no. 90A444/01, Washington DC.
- Lunsford D: The Triad alliance: Preparing vulnerable populations. *Public Management*. 82(10):17-19.
- Meals on Wheels of Central Maryland: *E-Meals for Disaster Relief*. [accessed 10 October 2001] Available from: <http://www.emials.org/emials.htm>.
- Norris FH, Murrell SA: Prior experience as a moderator of disaster impact on anxiety symptoms in older adults. *American Journal of Community Psychology* 1988,16(5):665-683.
- Administration on Aging: *Older Population by Age*. Chart developed by the U.S. Administration on Aging based on Census Bureau data. [accessed 10 October 2001] Available from: <http://www.aoa.dhhs.gov/aoa/stats/AgePop2050Chart-numbers.html>.