U.S. Fire Administration

Fire Risks for the Mobility Impaired

FA-204/December 1999

Homeland Security

Fire Risks for the Mobility Impaired

December 1999

U.S. Fire Administration

Mission Statement

As an entity of the Department of Homeland Security, the mission of the USFA is to reduce life and economic losses due to fire and related emergencies, through leadership, advocacy, coordination, and support. We serve the Nation independently, in coordination with other Federal agencies, and in partnership with fire protection and emergency service communities. With a commitment to excellence, we provide public education, training, technology and data initiatives.

Homeland Security

TABLE OF CONTENTS

OVERVIEW OF THE "FIRE RISKS" SERIES

This report is one in a series of four that discuss the increased fire risks for four groups of the general population:

- older adults;
- the mobility impaired;
- the deaf or hard of hearing; and
- the blind or visually impaired.

Older adults--those over 65 years of age--are a group with one of the highest fire risks in the United States, in large part because they are the fastest growing segment of the U.S. population. Of course, many older adults also may fall into the other three groups, since the elderly suffer some or all of these impairments to a much greater degree than does the general population.

People who are deaf or have hearing impairments, those who are blind or have vision impairments, and those with mobility impairments may face unique challenges in an emergency. Their ability to detect a fire or escape its effects may be hindered by their impairments. As a result, people with these impairments are at a greater risk of death or injury due to fire.

As might be expected, many of the fire safety issues are a concern for all four groups. This commonality is reflected in the reports, particularly in the fire safety tips, most of which apply to all the groups. These safety tips are presented in an Appendix at the end of each report, organized in three sections: before the fire, during the fire, and fire prevention. The tips that are common to all four groups are summarized here:

Before the fire:

- identify the nearest fire exit;
- install smoke alarms;
- live near an exit;
- plan and practice escape plans; and
- involve the fire department.

During the fire:

- get out and stay out;
- test doors before opening them;
- stay low and go;
- what to do if you are trapped; and
- stop, drop, and roll.

Fire prevention:

- cooking;
- electrical safety;
- smoking;
- space heaters;
- heating; and
- fireplaces.

EXECUTIVE SUMMARY

People with mobility impairments are faced with many challenges in life. Personal safety, especially fire safety, is one challenge that many perceive as an obstacle. It does not have to be this way. By being aware of one's own special capabilities and following fire safety practices tailored to certain needs, the mobility-impaired person can lead a fire-safe life.

Mainstream fire safety education and fire protection devices are designed primarily with the able-bodied person in mind. Thus a scarcity of fire safety knowledge exists within both the mobility-impaired community and the fire service. Both groups must work to educate each other to decrease fire-related losses and injuries.

The principal findings of this study are summarized below:

- People with mobility impairments represent a segment of the population with one of the highest risks of dying in a fire.
- The fire safety needs of people with mobility impairments are not addressed through mainstream public fire and life safety education.
- Fire safety engineering has not addressed the capabilities of people with mobility impairments adequately.
- Typical home construction may present people with disabilities with unnecessary impediments to escape.
- The mobility-impaired community is growing.
- Mobility impairments hinder attempts by the disabled not only to escape fires, but also to confine or extinguish small fires.

INTRODUCTION

In 1990, the United States Congress passed the Americans With Disabilities Act (ADA), which extended civil rights protection to individuals with disabilities (Reference 1). Title III of the ADA is most applicable to fire safety, as it prohibits discrimination of disabled persons in places of public accommodation. The proprietors of such businesses are responsible for making their establishments more physically accessible to people with disabilities. The ADA requires the installation of emergency alarms in public places that serve both hearing and nonhearing patrons, the installation of entrance and exit ramps, as well as the widening of doorways to accommodate wheelchairs (Reference 1).

Although Title III greatly improves provisions for the disabled, it does not specifically address fire and disaster evacuation needs in either public buildings or private homes. According to the accessibility guidelines for all new construction, each floor in a public building without a supervised automatic sprinkler system must contain an **area of rescue assistance** (i.e., an area with direct access to an exit stairway where people unable to use stairs may await assistance during an emergency evacuation) (Reference 2). This standard concedes the fact that some people with mobility impairments may not be able to exit a building in the same manner by which they entered. People with mobility impairments are limited by time and physical means for mobility when it comes to escaping a fire emergency. As a result of their inherent limitations, mobility-impaired individuals must be particularly diligent when cultivating a fire escape plan in both public and private places. This plan may be as simple as living on the ground floor of one's home.

Few data are available on the actual number of fire deaths and injuries among people with disabilities. This is true primarily because of lack of reporting and reporting mechanisms. Neither of the two national sources for fire death data--the National Center for Health Statistics (NCHS) and the National Fire Incident Reporting System (NFIRS)--indicate whether the deceased was disabled. Although the U.S. Fire Administration's (USFA's) NFIRS specifically provides a forum for both civilian fire death and fire injury data to be collected, analyzed, and interpreted, it does not contain an entry for the presence of physical or mental disabilities. This civilian casualty report does contain a segment that describes theoretical reasons as to why an individual did not escape the fire. In the entry entitled **condition preventing escape,** the reporting fire service representative may postulate as to whether a physical impediment prohibited the victim's escape, whether the victim "moved too slowly," or whether the victim was "incapacitated." Although these last two descriptions may technically cover a wide range of disabilities, they also cover a victim under the influence of drugs or alcohol. Any available fire death and injury data regarding individuals with physical disabilities must be viewed under this caveat. The numbers of fire-related deaths and injuries sustained by the disabled are no doubt underreported and underemphasized in public fire education and fire prevention efforts.

This report focuses on disabilities that impair or alter the mobility of an individual in a fire emergency. It is directed to those people who depend on artificial means for moving about, including wheelchairs, walkers, and assisted-walking devices.

The report is divided into three principal sections. The first section defines the term **disability** and discusses the impact of disabilities. Also discussed are the current and projected population estimates of people with mobility impairments.

The second section of this report focuses on the characteristics of people with mobility impairments that place them at risk for injuries, especially fire injuries.

The final section provides tips to fire service professionals for enhancing fire safety for people with disabilities. A reproduction-ready Appendix presents fire safety tips. Fire service professionals may photocopy the Appendix for use in public education activities.

WHAT IS A DISABILITY?

To the general public, a disability is some type of physical impairment that prohibits one from performing the normal activities of daily life. People with disabilities, however, view themselves in an entirely different light. To the disabled community, the disabilities that they experience stem not from physical impairments but from the way others perceive disabilities and the conscious or unconscious decision to construct an environment that does not meet their needs. From this paradigm, true disability stems from the social response to bodies that fail to meet social expectations and is reflected in both the social and built environments (Reference 3). By providing reasonable accommodations in public areas for people with disabilities, the design community is merely compensating for the unacknowledged benefits that the existing environment provides to those who are free from disability.

There are wide variations in the definition of disability. Equally wide are the variations in the reporting mechanisms that gauge the size of this population. According to the ADA, a disability is defined as (1) a physical or mental impairment that substantially limits one or more of the major life activities of such an individual; (2) a record of such an impairment; or (3) being regarded as having such an impairment. Major life activities refer to functions such as caring for oneself, performing manual tasks, walking, seeing, hearing, speaking, breathing, learning, and working. As a result of its legal implications, the ADA requirements for having a qualified disability are broad. The ADA was passed to prohibit discrimination toward individuals with real or perceived disabilities, as either may have detrimental effects in the social and business worlds (Reference 4).

Individuals with disabilities also are entitled to Federal benefits and supplemental income. In 1999, 6 million people received disability benefits under either the Supplemental Security Income program or the Old-Age, Survivors and Disability Insurance program (Reference 5).

According to the U.S. Census Bureau's Survey of Income and Program Participation (SIPP), 20 percent of noninstitutionalized Americans had some form of disability (Reference 6). The SIPP is the most current source of periodic data on the prevalence and characteristics of disabilities in the United States. The SIPP incorporates variables such as income, employment, health insurance coverage, and the receipt of program benefits. The definitional criteria used to describe the two levels of disability are as follows (References 6 and 7):

Disability

- Person uses a wheelchair or is a long-term user of a cane, crutches, or walker.
- Has difficulty performing one or more functional activities--seeing, hearing, speaking, lifting/carrying, using stairs, or walking.
- Has difficulty with one or more activities of daily living (ADL)--getting around inside the home, getting in or out of a bed or chair, bathing, dressing, eating, or toileting.
- Has difficulty with one or more of the instrumental activities of daily living (IADL)--going outside the home, keeping track of money or bills, preparing meals, doing light housework, taking prescription medicines in the right amount at the right time, or using the telephone.
- Has one or more of the following conditions: learning disability, mental retardation, or another developmental disability (Alzheimer's disease or some type of mental or emotional condition).
- Is limited in the ability to do housework.

- Is 16 to 67 years old and limited in the ability to work at a job or business.
- Is receiving Federal benefits based on an inability to work.

Severe Disability

- Person uses a wheelchair or is a long-term user of a cane, crutches, or walker.
- Is unable to perform one or more functional activities.
- Needs personal assistance with an ADL or an IADL.
- Has a developmental disability or Alzheimer's disease.
- Is unable to do housework.
- Is 16 to 67 years old and unable to work at a job or business.
- Is receiving Federal disability benefits.

The SIPP covers in great detail many conditions that alter or hamper functional activities. The estimates derived from the SIPP are based on individual interpretation of the criteria for disabilities and are subjective in nature. The Federal guidelines under the ADA have been left broad and vague intentionally to allow for the widest possible interpretation of the term **disability** (Reference 4). As a result, the SIPP data include a large number of people who would not be considered "disabled" by the lay person. Nevertheless, the SIPP is considered by many to be the best estimate of the number of individuals with disabilities. For the purpose of this report, the mobility-impairment guidelines outlined in the SIPP will serve as the criteria for defining mobility impairments.

Mobility Impairments

People with physical disabilities rely on a variety of artificial means for mobility. Such devices range from canes and walkers to motorized wheelchairs. Approximately 1.8 million people in the United States use a wheelchair, and 5.2 million people have used a cane, crutches, or a walker for longer than 6 months (Reference 6). The most prevalent causes of mobility impairments are orthopedic in nature, the result of paralysis or other deformities, such as the absence of a limb. Others are organic in nature, stemming from birth defects, illness, and degenerative nerve disorders. Organic causes also include cerebral palsy, muscular dystrophy, multiple sclerosis, Parkinson's disease, polio, epilepsy, and stroke (Reference 8).

Growing Disability Community

According to the NCHS's National Health Interview Survey, nearly 20 percent of the U.S. population, or 54 million people, have some type of disability. Of this group, almost half (48 percent) are classified as having a severe disability. The number of disabled persons has risen dramatically over the past 20 years and is expected to continue to increase. While some of this growth may be attributed to the expanding government definitions of what constitutes a disability, much of it is the result of the demographic shift of the elderly population. Of the 54 million disabled people in this country, 13.4 percent are males over the age of 65, and 20.4 percent are females over the age of 65 (Reference 9). With people living longer, the number of disabled people can be expected to rise. While it is difficult to quantify how many of these individuals would be mobility impaired, it would be reasonable to assume that the "graying of America" will result in more mobility impairments.

FIRE RISKS

Individuals who have lived with a mobility impairment for a number of years, or even a lifetime, have, for the most part, adapted extremely well to their environments. Those who are newly or temporarily disabled may find it difficult to adapt, even in familiar surroundings. This "inexperience" may increase their risk for starting a fire and at the same time may reduce their chances of safely escaping a fire. Traditional routes of escape no longer may be viable to the individual who is temporarily in a cast or wheelchair. A disabled individual's chances for escape are further limited if the person lives alone and cannot receive immediate assistance or does not live on the ground floor.

Limited Means for Escape

As noted earlier, almost 2 million people in the United States are confined to a wheelchair, and over 5 million use a cane, crutch, or walker (Reference 6). This physical limitation requires various accommodations for moving safely into, through, and out of a building. Even under normal circumstances, moving about may be time consuming. In the event of a fire, some accommodations used to move about in a building--elevators, for example--may pose a grave risk to users. When first introduced, elevators were extolled as a safe and effective means for moving throughout a structure. They quickly gained popularity and are used in nearly every building with multiple stories. In conjunction with ramps, they allow many existing structures to be retrofitted to comply with ADA standards. In the event of a fire, however, elevators are anything but safe. In fact, they can trap people inside a burning building. During a fire, elevator shafts act as chimneys, funneling smoke and toxic fumes to floors above (Reference 10). In addition, heat emanating from a fire may activate the button to call the elevator, thereby bringing elevator riders directly to the floor of the fire. Fire emergencies necessitate alternative means for egress.

ADA accessibility guidelines dictate that public buildings contain areas where persons with disabilities may wait until further help or instructions arrive (Reference 1). While private, multiresident homes are not subject to the same standards, current trends in fire safety design are beginning to include this feature. Rescue areas must be directly accessible to an exit and fire resistant for at least 1 hour. Refuge areas must be able to hold 10 percent of the occupants on the floor, with 15 square feet allotted to each occupant. Two such areas must be provided on each floor, and ductwork must be designed to prevent the passage of smoke (Reference 2).

Limited Mobility

Individuals with mobility impairments have a diminished capacity to deal with fire. Fires grow rapidly and may quickly overpower a person who is not equipped with an extinguishing device readily at hand. If clothing or flammable materials near a disabled person have caught fire, traditional methods of extinguishing the flames are not applicable. "Stop, Drop, and Roll," a popular message directing the proper method for extinguishing burning clothing, may not be a viable option for persons with severe mobility impairments.

The Newly Disabled

Traumatic injuries occur every day in this country. In fact, trauma is the leading cause of death for people between the ages of 1 and 40 (Reference 11). In addition to claiming lives, unintentional injuries may permanently or temporarily alter an individual's mobility. Such "newly disabled" people may be at greater risk for re-injuring themselves than individuals who have lived with a physical disability all of their lives. A substantially limiting injury forces an individual to adapt to a new way of life--one with new dimensions, obstacles, and setbacks. Suddenly an individual's own home may become a hazardous environment filled with potentially dangerous items. Walking, cooking, driving, and working--activities that previously were taken for granted--suddenly become challenges.

During the reacclimation phase following an injury, such activities pose a risk for further injuries. Cooking is a prime example. Unaccustomed to limited mobility, an individual suddenly confined to a wheelchair, or to the use of just one limb, can easily get burned on the stove or have a garment catch fire. Even fires common among the nondisabled are more dangerous. A grease fire can quickly grow out of control if the newly disabled person cannot extinguish it promptly. Learning to live with a disability means acknowledging the vulnerability to dangers inherent in the environment.

Residence

A mobility impairment may require an individual to reside in a long-term care facility or a group home to receive assistance with ADL's. Fire emergencies in these facilities place these residents at significant risk for a variety of reasons. Due to their impairments, these residents are most in need of staff assistance when evacuating to escape a fire. There are typically fewer staff than patients, and the ratio may become more unfavorable at night (fewer staff generally work at night) (Reference 12). During a fire emergency, at least two staff members are required to evacuate a bedridden or wheelchair-bound person, further depleting staff resources and leaving those with less severe disabilities or mobility impairments with less assistance available.

Another risk is the construction of nursing and group homes. Often these facilities are designed with open ceilings that facilitate the passage of smoke through upper levels (Reference 13). During the time it takes to evacuate people needing assistance, residents as well as staff members can easily succumb to smoke inhalation (Reference 14). Moreover, many of these facilities were built before current fire codes were enacted, and thus have limited means for egress, combustible interior finishes, and a lack of automatic sprinkler systems (Reference 13).

People with mobility impairments living in private residences may receive little or no help in the event of a fire. Whether the disabled person is living alone or with friends and family members, a house fire can trap him or her inside a room. Often the door is the only exit, and escape through a window may not be possible. Such individuals must create a contingency plan for this type of situation. When escape is not an option, fire protection devices such as sprinkler systems, fire-safe compartmentation walls, and flame-resistant blankets must be used. Fire hazards unique to people with disabilities can be circumvented with the appropriate behavior and fire protection technology.

FIRE SAFETY FOR SPECIAL-NEEDS POPULATIONS: TIPS FOR FIRE SERVICE PROFESSIONALS

You have been asked to provide advice on the fire safety needs of a mobility-impaired individual. Where do you begin? There are the "generic" fire safety tips routinely given out to all who ask, but how do you tailor your recommendations to those with special needs? The first thing to remember is that the generic fire safety tips still apply. Individuals with physical impairments or disabilities are people first and foremost, and will benefit from the years of conventional wisdom that created existing fire safety programs.

Recommendations for Assisting Mobility-Impaired People in an Evaluation of Their Fire Safety Needs

Focus groups found that being identified as "special" or "needy" was a concern for individuals with mobility impairments (Reference 15). This mirrors the findings of a 1981 fire safety report from the National Center for a Barrier Free Environment. That study concluded that impaired individuals often feel that official concern for fire safety can restrict their freedom of choice--for example, denying an impaired student a bedroom on the upper floor of a college dormitory (Reference 16). These opinions also reflect those expressed at the Solutions 2000 Conference, held by the USFA and the North American Coalition for Fire and Life Safety Education in April of 1999. In addition, individuals in the focus groups also worried about falling victim to crime if their home was marked for fire department recognition of their needs. The key to dealing with individuals with a mobility impairment is to acknowledge their ability to help themselves, while guiding them to recognize their limitations in an emergency situation without drawing undue attention to them as impaired individuals.

The importance of exit drills should be stressed to assist mobility-impaired individuals in recognizing their physical limitations in crisis settings. If the individual lives on an upper floor or requires other special assistance, it is important for the fire service to be involved in these drills, if at all possible. Mobility-impaired individuals may have an unrealistic view of the capabilities of the fire department. There may be unforeseen obstacles or barriers to exit or rescue. These should be identified and addressed before a fire occurs.

The use of smoke alarms must be **strongly** advocated. The USFA considers smoke alarms to be the single most important piece of fire safety technology employed today. The importance of early recognition of a fire cannot be stressed enough in populations where physical limitations may increase the time needed to exit a burning building safely.

If you are called upon to assess the needs of an individual with mobility impairment, the Center for Fire Research at the National Institute of Standards and Technology (formerly the National Bureau of Standards) recommends assessment of the following seven risk factors (Reference 17):

1. **The risk that the individual will resist leaving the structure.** For example, is the individual fearful of leaving with a stranger; unwilling to leave pets, belongings, and cherished items; or exhibiting confusion or other symptoms consistent with possible mental impairments?

2. **The individual's response to fire drills.** For example, does the individual's escape plan work during drills?

3. **The individual's response to instructions.** For example, are there language differences or other communication barriers?

4. **The individual's mobility impairments (and the resources necessary to overcome them).** For example, is the individual capable of reasonably safe self-rescue from a burning structure? How much can the person assist his or her rescuers?

5. **The need for extra help.** This may be related to the actual egress or the period immediately following. For example, a ventilator-dependent quadriplegic may require medical resources once outside the structure.

6. **The individual's waking response to alarms.** Will there be a difference between the day-time and nighttime fire safety needs of the individual?

7. **The probability that the individual will lose consciousness in an emergency.** For example, is the individual dependent on specific equipment for life support? Is there adequate backup to provide for emergency situations?

Note the emphasis on performance-based assessment. The risk assessment cannot be based on an individual's impairment, but rather must be based on his or her demonstrated abilities to evacuate a structure in an emergency.

Building Design and Codes

The following recommendations are based on *Design for Accessibility,* a guide for architects that focuses on designing barrier-free environments (Reference 18). They should provide some insight into the role of building design in the fire safety needs of the mobility-impaired population.

- Provide exit signs set to flash (less than 5 hertz) when a fire alarm sounds. These signs should be connected to the emergency power system.

- Provide audible fire alarms that exceed the average ambient sound level by a minimum of 15 decibels (15 phones). These alarms should exceed a noise of 30 seconds or less by a minimum of 5 decibels (5 phones). The maximum audible emergency signal should not exceed 120 decibels (120 phones).

- Provide visual/light alarm signals in all areas occupied by individuals who are deaf or hard of hearing.

- Provide under-pillow vibrating alarm signals in bedrooms for deaf or hard-of-hearing individuals.

- Provide a minimum of two accessible exits or horizontal exits for all accessible areas of all buildings.

- Where there is only one accessible exit, provide a minimum of one fireproof refuge area (fire-rated enclosed elevator lobby preferred, or enlarged landing area in a fire-rated stair enclosure). The fire refuge area should be a minimum of 16 square feet (1.5 square meters) outside of exit circulation paths. Provide an occupancy/call system from refuge areas to fire department enunciator location or entrance vestibules.

- Cover open fireplaces with tempered glass doors and guard them by a 9- to 18-inch (23- to 46-cm) raised hearth.

- Provide fire detectors, especially in institutions, in accordance with the recommendations presented in the table below:

Recommended Smoke Alarms

Type of Smoke Alarm				
Area of Residence in Which to Install Alarm	**Rate of Temperature Rise**	**Fixed Temperature, Adjustable**	**Fixed Temperature, Permanent Setting 175° to 240°F (79° to 116°C)**	**Smoke/Products of Combustion**
Kitchen	Preferred			
Basement	Preferred	Acceptable		
Storage	Preferred	Acceptable		
Trash	Preferred	Acceptable		
Garage		Preferred		
Accessible Attic			Preferred	
Sleeping Area				Preferred
Hallways	Acceptable			Preferred

Source: Based on Robert James Sorensen, *Design for Accessibility* (New York: McGraw-Hill Book Company), 1979.

Instructional Materials

In addition to the reproduction-ready fire safety materials provided in the Appendix at the end of this report, other materials, such as "Emergency Procedures for Employees With Disabilities in Office Occupancies," is available from the USFA Publications Office or on its Web site at www.usfa.fema.gov

CONCLUSIONS

Individuals with mobility impairments have unique needs and capabilities that put them at risk for fire injuries. These limitations, ranging from wheelchair confinement to walking with a cane, also may subsequently increase the chance that the individual will accidentally start a fire. Traditional fire safety messages are designed with the capabilities of the nondisabled population in mind. A disabled individual may have difficulty performing even the most basic of these fire safety practices.

When designing fire safety programs and fire-safe structures for the mobility impaired, it is important to look at the nature of the impairments, the types of residences (single-family homes, highrise buildings, boarding homes, nursing homes, group assisted-living facilities), and the social setting or the degree of assistance one can expect from others. Each variable contributes to the level of risk and degree of assistance to which people with mobility impairments may be exposed.

Mobility impairments may restrict the individual's ability to take swift action when faced with a small fire or to escape a larger fire. As a result, people with mobility deficits require construction alterations that help facilitate their timely exit in the event of a fire. This varies by occupancy type. Single-family homes, apartment buildings, and group assisted-living facilities each pose unique challenges to escaping a fire. In a private home, the mobility-impaired individual is most likely to incorporate modifications, such as installing exit ramps and living on the ground floor. In an apartment setting, the mobility-impaired individual may reside several floors from the ground and far from the exit stairs. Elevators that are convenient and safe during normal conditions are not viable escape mechanisms in the event of a fire. Group assisted-living homes present risks because the number of residents requiring assistance often greatly exceeds the number of staff available to provide it. Construction elements and design, as well as hazardous medical supplies and equipment, create additional dangers in the event of a fire.

The degree of support that a mobility-impaired individual receives from family, friends, or neighbors affects his or her ability to lead a fire-safe life. Clearly, individuals living alone and without support are more susceptible to fire risks. They also are less likely to perform basic fire prevention practices due to physical limitations. Outside assistance may be necessary for installing and maintaining smoke alarms, cleaning grease buildup around the stove, or replacing worn or frayed electrical wiring.

Fire safety education, engineering, and legislation must adapt to accommodate the needs of the mobility impaired. Awareness through educational campaigns can encourage people with mobility deficits to practice techniques that will decrease their chances of accidentally starting a fire. Accessibility improvements will provide construction that dramatically eases the mobility-impaired person's ability to escape a fire. Enhanced fire safety technology, such as a fire-safe elevator, can help ensure the disabled individual's safe egress from a burning building. By cultivating programs that approach the problem from multiple dimensions, fire safety no longer has to be an insurmountable challenge.

APPENDIX: FIRE SAFETY TIPS FOR MOBILITY-IMPAIRED PEOPLE

The following fire safety tips are organized in three sections: before the fire, during the fire, and fire prevention. While these tips represent many fire safety approaches, the use of smoke alarms and exit planning should be considered the most crucial. The USFA considers smoke alarms to be the single most important piece of fire safety equipment available today. Exit planning also is extremely important, especially for individuals who may have difficulty exiting a burning building.

These fire safety tips are reproduction-ready. They may be used as educational material by fire service, life safety, or health educators. Permission to replicate them for that purpose is granted. Proper credit should be given to the USFA and the Federal Emergency Management Agency (FEMA).

Before the Fire

Identify the Nearest Emergency Exit. Whether you are at home or elsewhere, you always should know the location of the nearest exit. This could save your life in an emergency.

Heed Fire Safety and Design Guidelines. Walkways and doorways should accommodate any mobility impairment the individual may have. For example, doorways should accommodate a wheelchair's width, and flooring material should accommodate artificial limbs or canes.

Install Smoke Alarms. The single most important step you can take to save your life during a fire is to install a smoke alarm that suits your needs. A working smoke alarm can make a vital difference in the event of a fire, and may reduce the risk of dying in a fire by as much as 60 percent. A properly functioning alarm can alert you to the presence of deadly smoke while there is still time to escape. Place alarms next to each sleeping area and on every floor of your home. Keep smoke alarms clean by vacuuming or having them vacuumed regularly. Test batteries monthly, and replace them annually. Ask friends, family members, building managers, or someone from the fire department to install and test the batteries of a smoke alarm if it is hard to reach. If your smoke alarms are hard-wired (connected to the electric circuitry of your residence), make sure they also are equipped with battery backups.

To accommodate wheelchair users in public buildings, manual alarm pull stations should bemounted no higher than 48 inches from the floor. If manual alarms are mounted higher than 48 inches, these devices should be retrofitted with attachments that make them accessible to a wheelchair user.

Have a Fire Extinguisher--and Learn How to Use It. If you are confined to a wheelchair, consider mounting (or having someone mount) a small "personal use" fire extinguisher in an accessible place on your wheelchair, and become familiar with its use. Then, if you cannot "stop, drop, and roll" during a fire, you should "pull, aim, squeeze, and sweep."

Live Near an Exit. If you live in an apartment building, try to get an apartment on the ground floor. If this is not possible, know where the exit stairwell is and plan to wait there for help if you cannot take the stairs in the event of a fire.

If you live in a multistory house, try to sleep on the ground floor. Make sure a phone is next to your bed, within arm's reach. Keep emergency telephone numbers handy as well. If necessary, construct an exit ramp for emergency exits. It is recommended that ramps be at least 36 inches wide. Guardrails and handrails should be 44 to 48 inches high and 34 to 38 inches wide.

Plan and Practice Escape Plan. Knowing your escape plan is one of the most important steps you can take to save your life in a fire. Plan your escape around your capabilities. Know at least two exits

from every room. Make sure you can unlock all your doors and windows. Be sure you know how to open your windows. If security devices, such as bars, are installed across the windows, ensure that they release from the inside. Make any necessary accommodations (such as installation of exit ramps) to facilitate an emergency escape.

Involve the Fire Department. Ask the fire department to help you plan an escape route, and inform them of your special needs. Ask the fire department to help identify any fire hazards in your home and explain how to correct them. Any areas you plan to use as a rescue area must be identified and agreed upon by you and officials from the fire department. Learn the fire department's limitations, and make fire officials aware of yours.

During the Fire

Get Out and Stay Out. Leave your home as soon as possible, Do not try to gather personal possessions or attempt to extinguish a fire. Do not use the elevator. Once out, **do not go back inside.**

Test the Doors Before Opening Them. Using the back of your hand, reach up high and touch the door, the doorknob, and the space between the door and the frame. If anything feels hot, keep the door shut and use your second exit. If everything feels cool, open the door slowly and exit as low to the ground as possible if smoke is present.

Stay Low and Go. Crawl low and keep under the smoke, if you are physically able. If not, try to cover your mouth and nose to avoid breathing toxic fumes, and make your way to safety as quickly as possible.

What to Do If You Are Trapped. Close all the doors between you and the fire. Fill cracks in doors and cover all vents with a damp cloth to keep smoke out. If possible, call the fire department and tell them where you are located. Signal rescuers from a window with a light-colored cloth.

Stop, Drop, and Roll. If any part of you catches fire, do not run and do not try to extinguish the flames with your hands. Cover your face with your hands. Drop to the ground, rolling over and over. If you have a disability that prevents your taking these actions, try to keep a flame-resistant blanket or rug nearby to smother any flames.

Fire Prevention

Cooking. Never leave the stove unattended while cooking. If you need to step away from the stove, turn it off. Wear tight-fitting clothing when cooking over an open flame, and keep towels and pot-holders away from the flame. If food or grease catches fire, smother the flames by sliding a lid over the pan and turning off the heat. Do not try to use water to extinguish a grease fire. When deep-frying, never fill the pan more than one-third full of oil or fat. Never put foil or other metals in the microwave. Make sure the stove is kept clean and free of grease buildup. Turn pot handles away from the front of the stove so they cannot be knocked off or pulled down.

Electrical Safety. Electric blankets should conform to the appropriate standards and have overheating protection. Do not wash blankets repeatedly as this can damage their electrical circuitry. If an appliance begins to smell suspicious or emit smoke, unplug it immediately. Replace all frayed or broken electrical cords. Never use an appliance with exposed wires. Never overload extension cords, and keep them out of traffic areas. Use only tested and UL-listed electrical appliances.

Smoking. Never smoke in bed. Make sure that you are alert when you smoke. If a gas stove or oxygen source is nearby, do not smoke. Place signs stating that oxygen is in use and warning visitors to refrain from smoking. Do not smoke while under the influence of alcohol or if you are taking prescription drugs that can cause drowsiness or confusion. Never leave smoking materials unattended,

and collect them in large, deep ashtrays. Check around furniture, especially upholstered furniture, for any discarded or smoldering smoking materials. Soak the ashes in the ashtray before discarding them.

Space Heaters. Give space heaters space. Keep heaters at least 3 feet from any combustible material, including people. Follow the manufacturers' directions regarding operation, fueling, and maintenance of your space heater. Do not use heaters or other heating devices to dry clothing.

Heating. Have your heating systems and chimneys checked and cleaned annually by a professional. Never store fuel for heating equipment in the home. Keep fuel outside or in a detached storage area or shed.

Fireplaces. Open fireplaces can be hazardous; they should be covered with tempered glass doors and guarded by a raised hearth 9 to 18 inches high.

For more information, contact:

The United States Fire Administration
Office of Fire Management Programs
16825 South Seton Avenue
Emmitsburg, MD 21727

Or visit the USFA Web site: www.usfa.fema.gov

REFERENCES

1. Department of Justice, *Final Rule on Title III of the Americans With Disabilities Act of 1990* (42 U.S.C. 12181).

2. U.S. Department of Justice, Architectural and Transportation Barriers Compliance Board, *Americans With Disabilities Act Accessibility Guidelines for Buildings and Facilities* (Washington: GPO), 1991.

3. R. W. Weitz, *The Sociology of Health, Illness, and Health Care* (New York: Wadsworth Publishing Co.), 1996.

4. J. LaDou, *Occupational and Environmental Medicine, 2nd Ed.* (Stamford, CT: Appleton and Lange), 1997.

5. Social Security Administration, Office of Research, Evaluation and Statistics, *Highlights of Social Security Data--June 1999.*

6. U.S. Department of Commerce, Economic and Statistics Administration, U.S. Bureau of the Census, Household Economic Studies, *Americans With Disabilities: 1994-95,* Current Population Reports, Number P70-61 (Washington: GPO), 1997.

7. U.S. Department of Commerce, Economics and Statistics Administration, U.S. Bureau of the Census, *Americans With Disabilities,* Statistical Brief, January 1994.

8. K. L. McCance and S. E. Huether, *Pathophysiology: The Biologic Basis for Disease in Adults and Children* (St. Louis: Mosby), 1994.

9. U.S. Department of Commerce, Economics and Statistics Administration, U.S. Bureau of the Census, Household Economic Studies, *Americans With Disabilities: 1991-92,* Number P70-33 (Washington: GPO), 1994.

10. E. Mahoney, *Fire Suppression Practices and Procedures* (Englewood Cliffs, NJ: Prentice-Hall), 1992.

11. U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census, *Statistical Abstract of the United States,* 113th Ed. (Washington: GPO), 1993.

12. R. L. Cherry, "Agents of Nursing Home Quality of Care: Ombudsmen and Staff Ratios Revisited," *Gerontologist,* June 3, 1991.

13. P. Blye and J. P. Yess, "Fire Safety in Elderly Housing," *NFPA Journal,* November/December 1987.

14. J. S. Petraglia, "Fire and the Aging of America," *NFPA Journal,* March/April 1991.

15. United States Fire Administration, Federal Emergency Management Agency, *Fire Stops With You--Special Population Campaign: Fire Risks for the Visually Impaired, Deaf and Hard of Hearing, and Older Adults,* 1999.

16. B. Levin, R. Paulsen, and J. Klote, "Fire Safety," *Access Information Bulletin,* National Center for a Barrier Free Environment, 1981.

17. J. Kuns, "Public Education," *Proceedings of the 1980 Conference on Life Safety and the Handicapped,* National Bureau of Standards, NBS-GCR Series (Washington DC: GPO), 1981.

18. Robert James Sorensen, *Design for Accessibility* (New York: McGraw-Hill Book Company), 1979.