

U.S. Fire Administration/National Fire Data Center

The Fire Risk to Older Adults

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Findings

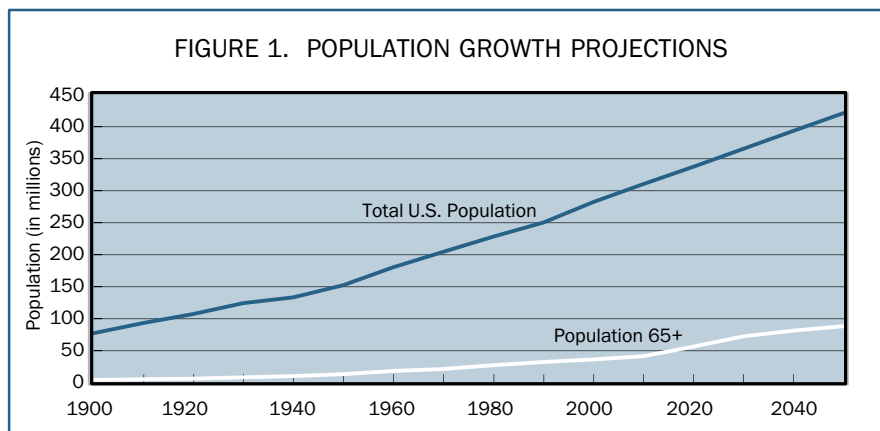
- In 2001, the elderly (over 64 years old) represented 12% of the U.S. population but suffered more than 30% of all fire deaths.
- The relative risk of individuals aged 65+ dying in a fire is 2.5 times greater than the general population. The risk worsens as age increases: the risk is 1.8 for adults aged 65–74, but soars to 4.6 for those over age 84.
- Smoking fires are the leading cause of fatalities among the elderly; cooking fires are the leading cause of injuries.
- Older American Indians and African Americans are at much greater risk of dying in a fire than the older white population.
- Older males are 50% more likely to die in fires than women.
- The elderly are more vulnerable in a fire than the general population due to a combination of factors: mental and physical frailties, higher alcohol usage, greater use of medications, higher smoking incidence, and elevated likelihood of living in a poverty situation.

Older Americans are burdened with the gravest fire risk in the United States and are consistently more threatened with injury or death by fire than any other segment of society. While admirable strides have been made in lowering the overall U.S. fire death rate in the last decade, fewer gains have been realized among the oldest age groups.

Fire caused 4,007 deaths in 2001 according to the National Center for Health Statistics (NCHS) data. Older adults were disproportionately the victims—fire fatalities among persons aged 65 years or older in 2001 was 1,250, accounting for more than 30% of all fire casualties that year.

Currently, older adults comprise 12% of the U.S. population,¹ and their ranks are growing. It is estimated that the older population will rise sharply between 2010 and 2030, the years when the baby-boom generation will be in retirement. Better health care and new developments in medicine continue to increase American life expectancy. By their 65th birthday, on average, Americans can expect to live another 17 years.² At this rate, older adults would comprise 20% of the U.S. population by 2050 (Figure 1). The oldest of these mature adults—those persons 85 years and older—are members of the fastest growing population group.

At close to one-third of total fire deaths, the number of older Americans who die in fires across the nation is clearly high. The issue becomes even more concerning when the relative risk of fire death encountered by older Americans is compared to the rest of the adult population.



Source: Population estimates 1990–2000 from Appendix A, Detailed Tables, Tables 1 and 5, Demographic Trends in the 20th Century, Census 2000 Special Reports, November 2002, Series CENSR-4, <http://www.census.gov/prod/2002pubs/censr-4.pdf>; and Population estimates 2010–2050 from U.S. Census Bureau, 2004, “U.S. Interim Projections by Age, Sex, Race, and Hispanic Origin,” <http://www.census.gov/ipc/www/usinterimproj/>, file natprojtab02a.xls.

DEFINING RISK

There are several ways to address the concept of risk with respect to fire casualties: absolute numbers of deaths and injuries, proportions (percent) of these casualties, rates (per unit, usually fires or population), and relative risk. Each measure is useful but in different ways and each has its drawbacks. The absolute number of casualties is an important consideration—it is a concrete measure of the size or magnitude of the problem, but does not address the magnitude relative to other aspects of the problem. In this case, proportions are used to compare the relative size of the problem. Yet, these proportions do not convey the magnitude of the problem, as does the absolute number of casualties. Neither of these two measures is useful for comparisons across different groups. For comparison across groups, a common basis is used to determine rates. These rates then account for any differences in group sizes that might affect the size of the problem.³ In comparing fire rates, the relative risk of dying or being injured is a helpful measure. The relative risk of a group is calculated by comparing its rate to the rate of the overall population. The result is a measure of how likely a particular group is to be affected. A detailed discussion of per capita rates and relative risk can be found in the Topical Series report, *Fire Risk* (Vol. 4, Issue 7, December 2004).

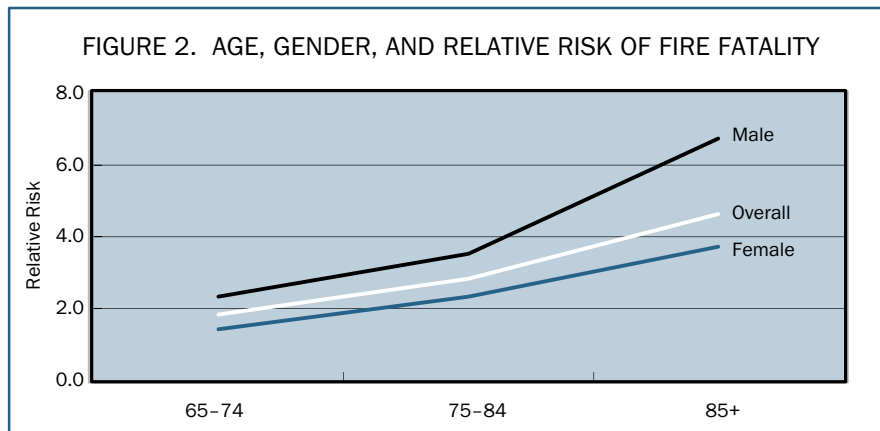
ELEVATED RISK

To be old is in itself a disadvantage in terms of fire risk. A disproportionate number of mature adults, aged 65 years and older, die in fires each year. Mature adults can expect a relative risk of dying—that is, the per capita deaths per population of mature adults—in a fire that is 2.5 times higher than for the population as a whole. This statistic alone is troublesome, but when some subcategories of mature adults are more closely evaluated, the situation worsens. The relative risk of dying in a fire rises substantially for the oldest segment (Figure 2). Individuals aged 85 or older are 4.6 times more likely to die in a fire than the general population, while those adults aged 65–74 are only 1.8 times more likely to suffer fire-related deaths.

PHYSICAL AND MENTAL LIMITATIONS

With advancing age, physical and mental capabilities decline, making it more difficult for older adults to see, smell, and hear clearly. Lessened senses increase the risk from fire; and when two or more senses are diminished, the fire risk for an individual increases dramatically. To make matters worse, older adults are more inclined to accidentally start a fire than younger adults. Often the elderly are close to the source of a fire—a cooking fire or a cigarette fire—and their clothes or bedding ignites. Because the aging process affects many of the senses, elderly persons typically have diminished sensation to pain and thus often do not seek timely treatment. All of these factors combine to severely increase the risk of death from fire for the elderly.

Older persons also tend to have physical disabilities or ailments that hinder their mobility. Many are confined to wheelchairs. Such infirmities make it difficult for the elderly to react to a fire threat the way a younger adult could, and thus exacerbating the fire risk to this segment of the population. Alzheimer’s, dementia, or other disorders that affect mental functions (rational thought and actions) can further increase the fire risk through erratic or even dangerous behavior and the inability to recognize a hazard.



Source: NCHS 2001 Mortality data; Table NA-EST2002-ASRO-03 - "Annual Resident Population Estimates of the United States by Age, Race, and Hispanic or Latino Origin: April 1, 2000 to July 1, 2002," Population Division, U.S. Census Bureau, Release Date: June 18, 2003, http://www.census.gov/popest/archives/2000s/vintage_2002/NA-EST2002-ASRO-03.html; and Population Division, U.S. Census Bureau, detail files for Monthly Population Estimates, 2000 to 2002, http://www.census.gov/popest/archives/2000s/vintage_2002/files/2002RESIDENT2001MONTHS07_12.txt.

Adults 65 years of age and older receive 35% of all prescribed medications in this country.⁴ Some medications cause drowsiness or affect judgment; others do not combine well with alcohol. This latter observation is important, as alcohol use is prevalent among elderly adults. According to NCHS data, more than 23% of adults 65 years and older report drinking alcohol 21 to 31 days per month. In comparison, only 6% of adults under age 35, 9% age 35 to 44, and 13% age 45 to 54 drink alcohol as frequently. Alcohol alone can impair mental acuity, and older adults who combine medications and alcohol, or who abuse alcohol, face an even higher risk of starting a fire, not responding quickly enough to extinguish one, or not escaping the premises where a fire is in progress.

Home healthcare for the elderly is accompanied by an elevated fire risk. Older adults often elect to remain at home, rather than confront long-term stays in healthcare facilities. Three-fourths of all home healthcare patients are over the age of 65.⁵ Only 4% of all Americans 65 years and over live in nursing homes and these tend to be the very elderly.⁶ Census data for 2000 support this—Americans are increasingly more likely to live in assisted living and nursing facilities as they age. For example, 18% of Americans 85 years and over live in nursing homes.⁷ While no one factor is solely responsible for the increased fire risk to elderly persons receiving home healthcare, smoking in the presence of oxygen is recognized as one important problem.

CAUSES

Fire and burns were the fifth leading cause of unintentional deaths among adults aged 65 and older in 2002.⁸ Of these deaths, smoking is the most common cause of fire deaths and the second leading cause of injury. Cooking is the most likely cause of fire injuries in older adults. Smoking, suspicious acts, and heating fires resulted in 59% of the fire deaths of older persons (Table 1). As also shown in the table, cooking, smoking, and open flame (including lighters, matches, and candles) fires caused 52% of the injuries.

Smoking is common among the elderly. Smokers age 65 and older face a greater risk of fire injury and fatality than nonsmokers. Some elderly smoke in bed or while sitting in upholstered furniture and then fall asleep. Diminished sensory capabilities can result in longer response times for recognizing a danger. Diminished physical abilities can result in problems that are not an issue for more agile persons, such as knocking over an ashtray and not responding quickly enough to prevent a fire. Cooking is also a concern. The elderly may leave food cooking unattended or their clothing may catch on fire from a cooktop's burner. They may also be incapable of extinguishing a cooking fire due to physical limitations or a confused mental state.

WHERE OLDER ADULT FIRE DEATHS OCCUR

Data from the National Fire Incident Reporting System (NFIRS) for 2001 indicate that 83% of fire injuries and deaths among individuals age 65 or older occur in residential structures. Of the 1,053 residential fire fatalities reported by NFIRS in 2001, 259 of them (25%) were adults 65 years and over. Of the 5,158 residential structure fire injuries reported that year, 578 (11%) were among adults 65 years and over.

TABLE 1. CAUSE OF FIRE DEATHS AND INJURIES IN ADULTS (percent)

Fire Cause	18-64	65+	65-74	75-84	85+
DEATHS					
Incendiary/Suspicious	26.6	14.0	17.2	13.0	9.7
Children Playing	0.9	0.0	0.0	0.0	0.0
Smoking	24.2	33.5	35.9	31.9	32.3
Heating	4.2	11.0	7.8	10.1	19.4
Cooking	11.2	9.8	9.4	11.6	6.5
Electrical Distribution	5.4	7.3	3.1	10.1	9.7
Appliances, A/C	3.6	1.8	1.6	0.0	6.5
Open Flame, Ember, Torch	8.8	7.9	9.4	5.8	9.7
Other Heat, Flame, Spark	10.9	7.3	9.4	8.7	0.0
Other Equipment	1.8	4.3	3.1	5.8	3.2
Natural	0.9	0.0	0.0	0.0	0.0
Exposure	1.5	3.0	3.1	2.9	3.2
INJURIES					
Incendiary/Suspicious	12.7	8.2	8.4	8.6	6.9
Children Playing	3.3	1.0	1.5	0.0	2.0
Smoking	9.9	16.3	18.2	14.0	16.8
Heating	6.9	8.6	9.4	8.1	7.9
Cooking	24.6	24.7	22.2	26.3	26.7
Electrical Distribution	5.4	9.6	8.9	11.3	7.9
Appliances, A/C	6.2	8.4	7.4	8.1	10.9
Open Flame, Ember, Torch	15.8	10.8	9.4	12.9	9.9
Other Heat, Flame, Spark	7.0	6.3	5.9	6.5	6.9
Other Equipment	4.5	2.4	3.9	1.6	1.0
Natural	1.4	1.4	2.0	1.1	1.0
Exposure	2.3	2.2	3.0	1.6	2.0

Source: NFIRS 2001 data

POVERTY

When poverty and infirmity accompany old age, the fire risk is compounded. Elderly persons often live on fixed incomes. Old people who live alone live in poverty more frequently than those who live with a spouse or other persons. Many in this category are women who have outlived their husbands. One in ten older adults lives at or below the poverty level.⁹

Housing for the poor is often substandard. Typically, such housing has not been well maintained. Building structures can be compromised, and building systems such as electrical and mechanical are often outdated, inadequate, or not operational. The result is a higher likelihood of damaged or fraying electrical wiring, faulty heating, and worn out household appliances. Heating in particular represents an elevated fire danger to the elderly, who frequently feel cold. When the central heating plant of a home does not work properly, the elderly will often rely on temporary sources of heat, such as portable space heaters, fireplaces, or even cooking ovens. This problem is especially severe in southern locales, which experience only intermittent demands for heating. Indeed, many residences in the South do not have central heating, and occupants are forced to rely solely on alternative heating.

Smoke alarms have saved many lives since the mid-1970s when their use was widely encouraged for the first time. But many elderly persons live in housing without smoke alarms, or with alarms that do not work. Even in homes with operable smoke alarms, an elderly person with impaired hearing is at an elevated risk of not responding in time.

RACE AS A RISK FACTOR

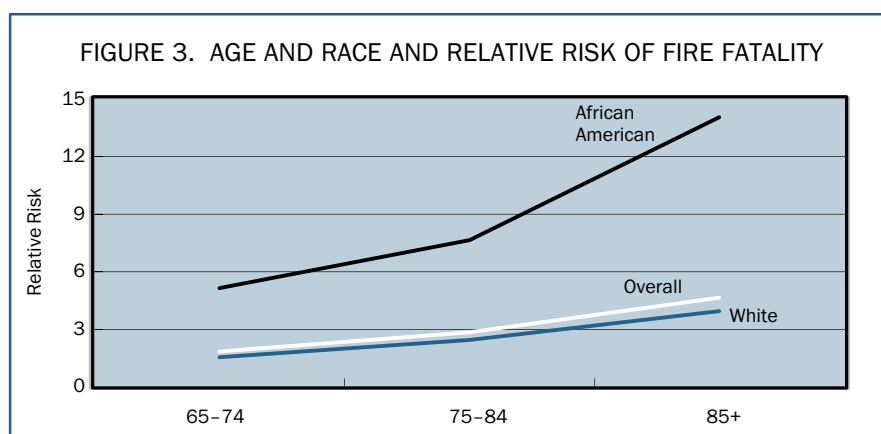
The risk of death or injury from fire is not uniform among the U.S. population, and in some ways the distribution of casualties and injuries among the elderly reflect this disparity. The disadvantages of age are compounded for some races, and both race and gender affect an older adult's fire risk. The problem is substantially more severe for African Americans and American Indians (Table 2).

TABLE 2. FIRE RISK

Gender/Race	2001 Population	2001 Fire Deaths	Death Rate (per million)	Relative Risk
TOTAL POPULATION				
Total	285,317,559	4,007	14.0	1.0
Male	140,075,610	2,455	17.5	1.2
Female	145,241,949	1,552	10.7	0.8
White	230,664,347	2,908	12.6	0.9
African American	36,283,895	1,006	27.7	2.0
American Indian	2,713,047	49	18.1	1.3
Asian/Pacific	11,602,700	44	3.8	0.3
White Male	113,863,214	1,777	15.6	1.1
African American Male	17,256,399	616	35.7	2.5
American Indian Male	1,357,962	33	24.3	1.7
Asian/Pacific Male	5,609,267	29	5.2	0.4
White Female	116,801,133	1,131	9.7	0.7
African American Female	19,027,496	390	20.5	1.5
American Indian Female	1,355,085	16	11.8	0.8
Asian/Pacific Female	5,993,433	15	2.5	0.2

Source: NCHS 2001 Mortality data; Table NA-EST2002-ASRO-03 - "Annual Resident Population Estimates of the United States by Age, Race, and Hispanic or Latino Origin: April 1, 2000 to July 1, 2002," Population Division, U.S. Census Bureau, Release Date: June 18, 2003, http://www.census.gov/popest/archives/2000s/vintage_2002/NA-EST2002-ASRO-03.html; and Population Division, U.S. Census Bureau, detail files for Monthly Population Estimates, 2000 to 2002, http://www.census.gov/popest/archives/2000s/vintage_2002/files/2002RESIDENT2001MONTHS07_12.txt.

Note: Relative risk may not compute due to rounding.



Source: NCHS 2001 Mortality data; Table NA-EST2002-ASRO-03 - "Annual Resident Population Estimates of the United States by Age, Race, and Hispanic or Latino Origin: April 1, 2000 to July 1, 2002," Population Division, U.S. Census Bureau, Release Date: June 18, 2003, http://www.census.gov/popest/archives/2000s/vintage_2002/NA-EST2002-ASRO-03.html; and Population Division, U.S. Census Bureau, detail files for Monthly Population Estimates, 2000 to 2002, http://www.census.gov/popest/archives/2000s/vintage_2002/files/2002RESIDENT2001MONTHS07_12.txt.

American Indians have a 30% elevated risk for fire death and their older populations are even more vulnerable. Older American Indians have 3.7 times the risk of fire death as the overall population (Table 3). But it is the African American elderly, over age 85, who are most at risk—elderly African American males had over 21 times the risk of the general population and over 4 times the risk of all elderly in this age group; elderly African American females have 11 times the risk of the general population and over twice the risk of all elderly in this age group. As a group, older African American’s risk of death from fire rises at a much higher rate than the older white population (Figure 3). Although it is not likely that race itself predetermines a person’s fire risk, poverty, access to adequate health care, and subsequent poorer health are recognized risk factors.¹⁰ But whatever the reason, African American elderly face a higher relative fire fatality risk than the white population, and that risk rises with age.

GENDER AS A RISK FACTOR

The risk of fire is not even across the genders as well. For the population as a whole, men are 50% more likely than women to be victims of fires (Table 2). This disparity holds for older adults as well, and increases slightly as the population ages.

TABLE 3. FIRE RISK FOR OLDER ADULTS (AGES 65 AND OLDER)

Gender/Race	2001 Population	2001 Fire Deaths	Death Rate (per million)	Relative Risk
ALL OLDER ADULTS (AGE 65+)				
Total	35,353,266	1,250	35.4	2.5
Male	14,619,070	638	43.6	3.1
Female	20,734,196	612	29.5	2.1
White	31,182,858	942	30.2	2.2
African American	2,915,629	283	97.1	6.9
American Indian	154,885	8	51.7	3.7
Asian/Pacific	904,344	17	18.8	1.3
White Male	12,972,922	473	36.5	2.6
African American Male	1,112,495	151	135.7	9.7
American Indian Male	66,748	5	74.9	5.3
Asian/Pacific Male	384,994	9	23.4	1.7
White Female	18,209,936	469	25.8	1.8
African American Female	1,803,134	132	73.2	5.2
American Indian Female	88,137	3	34.0	2.4
Asian/Pacific Female	519,350	8	15.4	1.1
AGE 65-74				
Total	18,322,480	471	25.7	1.8
Male	8,301,935	271	32.6	2.3
Female	10,020,545	200	20.0	1.4
White	15,908,293	342	21.5	1.5
African American	1,655,175	119	71.9	5.1
American Indian	95,278	5	52.5	3.7
Asian/Pacific	549,906	5	9.1	0.6
White Male	7,283,120	190	26.1	1.9
African American Male	685,757	75	109.4	7.8
American Indian Male	43,615	3	68.8	4.9
Asian/Pacific Male	238,155	3	12.6	0.9
White Female	8,625,173	152	17.6	1.3
African American Female	969,418	44	45.4	3.2
American Indian Female	51,663	2	38.7	2.8
Asian/Pacific Female	311,751	2	6.4	0.5
AGE 75-84				
Total	12,582,484	493	39.2	2.8
Male	4,996,556	243	48.6	3.5
Female	7,585,928	250	33.0	2.3
White	11,261,249	381	33.8	2.4
African American	934,936	100	107.0	7.6
American Indian	45,354	2	44.1	3.1
Asian/Pacific	279,498	10	35.8	2.5
White Male	4,498,839	188	41.8	3.0
African American Male	337,353	49	145.2	10.3
American Indian Male	18,504	1	54.0	3.8
Asian/Pacific Male	117,658	5	42.5	3.0
White Female	6,762,410	193	28.5	2.0
African American Female	597,583	51	85.3	6.1
American Indian Female	26,850	1	37.2	2.7
Asian/Pacific Female	161,840	5	30.9	2.2

(continued)

TABLE 3. FIRE RISK FOR OLDER ADULTS (AGES 65 AND OLDER) (cont'd)

Gender/Race	2001 Population	2001 Fire Deaths	Death Rate (per million)	Relative Risk
AGE 85+				
Total	4,448,302	286	64.3	4.6
Male	1,320,579	124	93.9	6.7
Female	3,127,723	162	51.8	3.7
White	4,013,316	219	54.6	3.9
African American	325,518	64	196.6	14.0
American Indian	14,253	1	70.2	5.0
Asian/Pacific	74,940	2	26.7	1.9
White Male	1,190,963	95	79.8	5.7
African American Male	89,385	27	302.1	21.5
American Indian Male	4,629	1	216.0	15.4
Asian/Pacific Male	29,181	1	34.3	2.4
White Female	2,822,353	124	43.9	3.1
African American Female	236,133	37	156.7	11.2
American Indian Female	9,624	—	—	—
Asian/Pacific Female	45,759	1	21.9	1.6

Source: NCHS 2001 mortality data; Population Division, U.S. Census Bureau, Table NA-EST2002-ASRO-03—National Population Estimates—Characteristics, Release Date: June 18, 2003, http://www.census.gov/popest/archives/2000s/vintage_2002/NA-EST2002-ASRO-03.html and Population Division, U.S. Census Bureau, detail files for Monthly Population Estimates, 2000 to 2002, http://www.census.gov/popest/archives/2000s/vintage_2002/files/2002RESIDENT2001MONTHS07_12.txt

Note: Relative risk may not compute due to rounding.

CONCLUSION

With an aging population, the U.S. demographic profile is changing rapidly. The elderly population is expected to increase from its current 12% of the total population to nearly 20% within a few decades.¹¹ The assumption is that there will be a corresponding increase in fire deaths and injuries among older adults. Medical advances and improved healthcare could keep elderly persons vital for a longer time, but eventual physical and mental limitations are likely, and the increased risks of fire injury and death to this population merit special attention.

Because older adults account for more than 30% of fire deaths and over 10% of fire injuries, the USFA has been working toward the goal of reducing fire deaths and injuries to older adults. A number of resources to help address the fire problem for adults are available. A *Fire Safety Campaign for People 50-Plus* (<http://www.usfa.fema.gov/50plus>) addresses lifestyle strategies of safe smoking, safe cooking, and safe heating to reduce the incidence of fires that traditionally affect older adults.

To request additional information or comment on this report, visit
<http://www.usfa.fema.gov/applications/feedback>

Notes:

- U.S. Census Bureau population estimates for 2001.
- U.S. Department of Health and Human Services, Administration on Aging, *The Growth of America's Population*, Washington, DC, 1997.
- In the case of fire casualties, this common basis is a population of 1 million, which means that fire rates are measured by incidents, deaths, or injuries per million persons population.
- B.G. Pollock, "Psychotropic Drugs and the Aging Patient," *Geriatrics*, Volume 53, Supplement 1, September 1998.
- National Center for Health Statistics, Public Health Service, *Advance Data No. 297*, 1998.
- Nursing home estimate is computed from data from *Before the Boom: Trends in Long-Term Supportive Services for Older Americans With Disabilities*, AARP Public Policy Institute, 2002, http://research.aarp.org/health/2002_15_trends.pdf and 2000 census data.
- "The 65 Year and Over Population: 2000," *2000 Census Brief*, October 2001.
- Centers for Disease Control, National Center for Injury Prevention and Control, WISQARS™ (Web-Based Injury Statistics Query and Reporting System) interactive database system, <http://www.cdc.gov/ncipc/wisqars>.
- U.S. Census Bureau, *Poverty in the United States: 2002, Current Population Reports, Consumer Income*, September 2003.
- Socioeconomic Factors and the Incidence of Fire*, United States Fire Administration, June 1997.
- Older Adults and Fire*, United States Fire Administration, Topical Report Series Vol. 1, Issue 5, Jan 2001 (rev. Dec 2001).