

Fire Risk to Older Adults

These short topical reports are designed to explore facets of the U.S. fire problem as depicted through data collected in USFA's National Fire Incident Reporting System (NFIRS). Each topical report briefly addresses the nature of the specific fire or fire-related topic, highlights important findings from the data, and may suggest other resources to consider for further information.

Findings

- The elderly continue to experience a disproportionate share of fire deaths: In 2004, older adults (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 and over dying in a fire is 2.6 times greater than that of the general population. The risk worsens as age increases: the risk is 1.7 for adults aged 65 to 74, but soars to 4.7 for those over age 84.
- Older American Indians/Alaska Natives and African-Americans are at much greater risk of dying in a fire than their Asian/Pacific Islander or white fellow citizens. Older Asian/Pacific Islanders have nearly the same relative risk as the general population.
- Older males are over 50% more likely to die in fires than older women.
- The elderly are more vulnerable in a fire than the general population due to a combination of factors including mental and physical frailties, greater use of medications, 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. This Topical Fire Report explores the risk of fire death in the older adult population and is an update to *The Fire Risk to Older Adults*, Volume 4, Issue 9.

According to the National Center for Health Statistics (NCHS) data, nearly 4,000 deaths were caused by fire in 2004.¹ Older adults were disproportionately the victims—fire fatalities among persons aged 65 years or older in 2004 were 1,265, accounting for nearly 32% of all fire casualties that year.

Older adults comprise 12% of the U.S. population,² 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. By 2030, the Department of Health and Human Services' Administration on Aging estimates adults aged 65

and over will comprise 20% of the U.S. population.³ 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 19 years.⁴

At close to one-third of total fire deaths, the number of older Americans who die in fires across the Nation clearly is 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.

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,

continued on next page

proportions are used to compare the relative size of the problem. Yet these proportions do not convey the magnitude of the problem, as do the absolute numbers 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.⁵ 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 Fire Report Series report, *Fire Risk in 2004* (Volume 7, Issue 5, February 2008).

Elevated Risk for Older Adults

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 2.6 times higher than that 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 (Table 1 and Figure 1). Individuals aged 85 or older are 4.7 times more likely to die in a fire than the general population, while those adults aged 65 to 74 are only 1.7 times more likely to suffer fire-related deaths.

Table 1. Relative Risk of Older Adult Fire Deaths by Age, Race, and Gender, 2004.

Gender/Race	Population	Fire Deaths	Death Rate per Million Population	Relative Risk
All Older Adults (Aged 65 and older)				
Total	36,309,400	1,263	34.8	2.6
Male	15,157,782	664	43.8	3.2
Female	21,151,618	599	28.3	2.1
White	31,786,451	970	30.5	2.2
African-American	3,046,789	266	87.3	6.4
American Indian/ Alaska Native	181,260	12	66.2	4.9
Asian/Pacific	1,076,331	15	13.9	1.0
White Male	13,358,167	515	38.6	2.8
African-American Male	1,167,494	139	119.1	8.8
American Indian/ Alaska Native Male	79,090	5	63.2	4.6
Asian/Pacific Male	460,426	5	10.9	0.8
White Female	18,428,284	455	24.7	1.8
African-American Female	1,879,295	127	67.6	5.0
American Indian/ Alaska Native Female	102,170	7	68.5	5.0
Asian/Pacific Female	615,905	10	16.2	1.2
Aged 65 to 74				
Total	18,479,964	428	23.2	1.7
Male	8,436,282	266	31.5	2.3

continued on next page

Gender/Race	Population	Fire Deaths	Death Rate per Million Population	Relative Risk
Female	10,043,682	162	16.1	1.2
White	15,896,497	323	20.3	1.5
African-American	1,713,716	90	52.5	3.9
American Indian/ Alaska Native	109,077	7	64.2	4.7
Asian/Pacific	635,544	8	12.6	0.9
White Male	7,332,993	202	27.5	2.0
African-American Male	713,435	58	81.3	6.0
American Indian/ Alaska Native Male	50,457	4	79.3	5.8
Asian/Pacific Male	282,426	2	7.1	0.5
White Female	8,563,504	121	14.1	1.0
African-American Female	1,000,281	32	32.0	2.4
American Indian/ Alaska Native Female	58,620	3	51.2	3.8
Asian/Pacific Female	353,118	6	17.0	1.2
Aged 75 to 84				
Total	12,980,959	528	40.7	3.0
Male	5,221,909	272	52.1	3.8
Female	7,759,050	256	33.0	2.4
White	11,532,236	409	35.5	2.6
African-American	983,827	111	112.8	8.3
American Indian/ Alaska Native	53,985	4	74.1	5.4
Asian/Pacific	341,632	4	11.7	0.9
White Male	4,675,622	213	45.6	3.4
African-American Male	355,284	57	160.4	11.8
American Indian/ Alaska Native Male	22,679	1	44.1	3.2
Asian/Pacific Male	140,382	1	7.1	0.5
White Female	6,856,614	196	28.6	2.1
African-American Female	628,543	54	85.9	6.3
American Indian/ Alaska Native Female	31,306	3	95.8	7.0
Asian/Pacific Female	201,250	3	14.9	1.1

continued on next page

Gender/Race	Population	Fire Deaths	Death Rate per Million Population	Relative Risk
Aged 85 and older				
Total	4,848,477	307	63.3	4.7
Male	1,499,591	126	84.0	6.2
Female	3,348,886	181	54.0	4.0
White	4,357,718	238	54.6	4.0
African-American	349,246	65	186.1	13.7
American Indian/ Alaska Native	18,198	1	55.0	4.0
Asian/Pacific	99,155	3	30.3	2.2
White Male	1,349,552	100	74.1	5.4
African-American Male	98,775	24	243.0	17.9
American Indian/ Alaska Native Male	5,954	0	0.0	0.0
Asian/Pacific Male	37,618	2	53.2	3.9
White Female	3,008,166	138	45.9	3.4
African-American Female	250,471	41	163.7	12.0
American Indian/ Alaska Native Female	12,244	1	81.7	6.0
Asian/Pacific Female	61,537	1	16.3	1.2

Source: National Center for Health Statistics, 2004 Mortality Data; and Population Division, U.S. Census Bureau (Release Date: May 17, 2007)

Table 1: Annual Estimates of the Population for the United States, Regions, and States and for Puerto Rico: April 1, 2000 to July 1, 2006 (NST-EST2006-01);

Table 1: Annual Estimates of the Population by Five-Year Age Groups and Sex for the United States: April 1, 2000 to July 1, 2006 (NC-EST2006-01);

Table 3: Annual Estimates of the Population by Sex, Race, and Hispanic or Latino Origin for the United States: April 1, 2000 to July 1, 2006 (NC-EST2006-03);

Table 4: Annual Estimates of the White Alone Population by Age and Sex for the United States: April 1, 2000 to July 1, 2006 (NC-EST2006-04-WA);

Table 4: Annual Estimates of the Black or African-American Alone Population by Age and Sex for the United States: April 1, 2000 to July 1, 2006 (NC-EST2006-04-BA);

Table 4: Annual Estimates of the American Indian and Alaska Native Alone Population by Age and Sex for the United States: April 1, 2000 to July 1, 2006 (NC-EST2006-04-IA);

Table 4: Annual Estimates of the Asian Alone Population by Age and Sex for the United States: April 1, 2000 to July 1, 2006 (NC-EST2006-04-AA); and

Table 4: Annual Estimates of the Native Hawaiian and Other Pacific Islander Alone Population by Age and Sex for the United States: April 1, 2000 to July 1, 2006 (NC-EST2006-04-NA).

Note: Relative risk may not compute due to rounding.

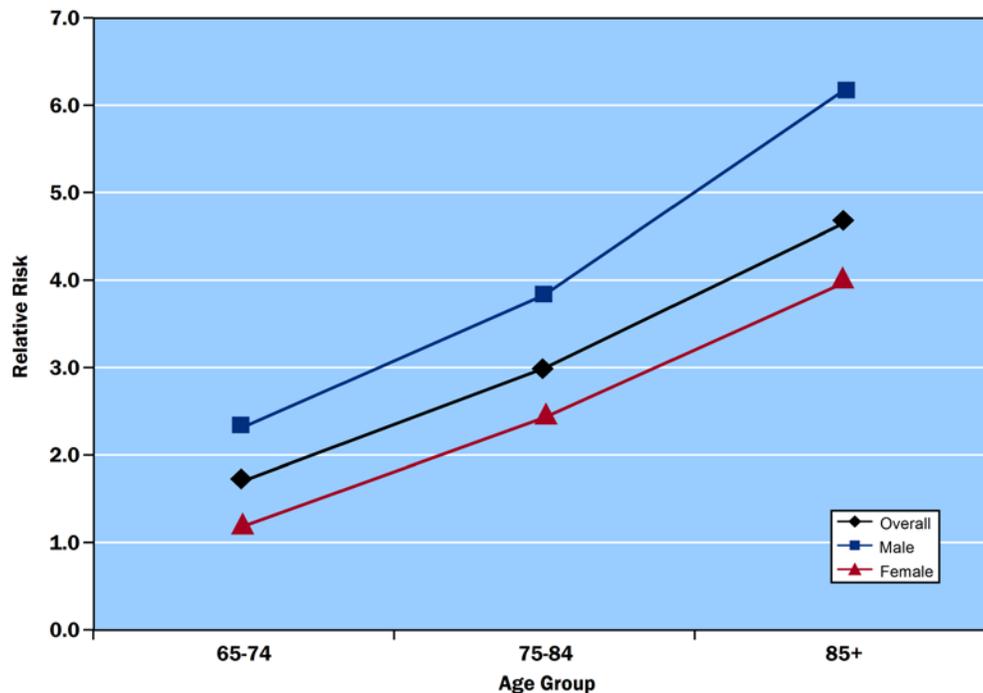
Physical and Mental Limitations

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 start a fire accidentally than are 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 increase the risk for the elderly of death from fire.

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 exacerbate the fire risk to this segment of the population. Alzheimer’s, dementia, or other disorders that affect mental functions (rational thought and actions) can increase

continued on next page

Figure 1. Age, Gender, and Relative Risk of Fire Fatality.

Source: Derived from Table 1.

the fire risk further through erratic or even dangerous behavior and the inability to recognize a hazard.

Adults 65 years of age and older receive 35% of all prescribed medications in this country.⁶ 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 the National Survey on Drug Use and Health, 38% of adults 65 years and older report current use of alcohol (at least one drink in the past 30 days).⁷ Previous studies suggest more than 23% of adults 65 years and older report drinking alcohol 21 to 31 days per month.⁸ 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.

Older adults often elect to remain at home, rather than confront long-term stays in healthcare facilities. Seventy percent of home healthcare patients are over the age of 65.⁹ Home healthcare for the elderly is accompanied by an elevated fire risk. 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.

Americans are more likely to live in assisted living facilities as they age than in nursing homes. About 2% of all Americans 65 years and over live in nursing homes, and these tend to be the very elderly. In 2004, only 14% of Americans 85 years and over live in nursing homes. The numbers of older residents living in nursing homes have remained relatively constant, but the older population is increasing, resulting in a slight decline in the percent of the older population in nursing homes.¹⁰

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 10 older adults lives below the poverty level.¹¹

Often housing for the poor is 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

continued on next page

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 often will 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. The number of elderly persons living in housing without smoke alarms, or with alarms that do not work is not well documented. Nonetheless, even in homes with operable smoke alarms, an elderly person with impaired hearing is at an elevated risk of not responding in a timely manner.

Race as a Risk Factor

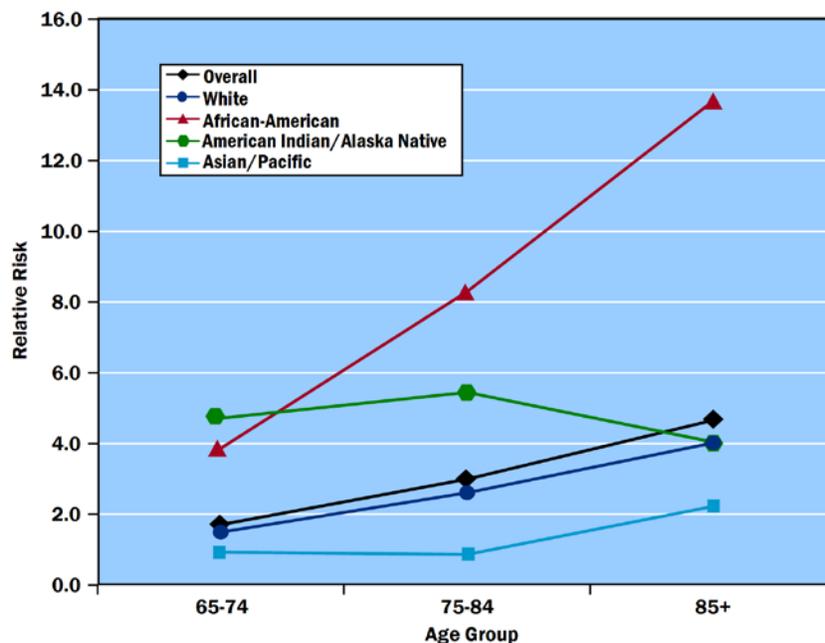
The risk of death or injury from fire is not uniform across the U.S. population and, in some ways, the distribution of casualties and injuries among the elderly reflect this disparity. The disadvantages of age are compounded for some races, and both race and gender affect an older adult's fire risk.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

Risk in 2004, Volume 7, Issue 5, February 2008). American Indians/Alaska Natives, as a whole, have a 60% elevated risk for fire death, and their older populations are even more vulnerable. Older American Indians/Alaska Natives have nearly five times the risk of fire death as the overall population (Table 1). As a group, African-Americans have nearly twice the relative risk of dying from fire than the general population. But it is the African-American elderly, those over age 85, who are most at risk—elderly African-American males had nearly 18 times the risk of the general population, and nearly four times the risk of all elderly in this age group; elderly African-American females have 12 times the risk of the general population and two and a half times the risk of all elderly in this age group. 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.¹² African-American elderly face a higher fire fatality relative risk than other race-related groups, and that risk rises with age (Figure 2).

Gender as a Risk Factor

The risk of fire is not uniform across gender. For the population as a whole, men are approximately 57% more likely than women to be victims of fires (see Fire Risk in 2004, Vol. 7, Issue 5, February 2008). In 2004, this disparity holds for older adults as well (55%), increasing to nearly double in the 65 to 74 age group (95%).

Figure 2. Age, Race, and Relative Risk of Fire Fatality.



Source: Derived from Table 1.

continued on next page

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. 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 nearly a third of fire deaths and over 10% of fire injuries, the U.S. Fire Administration (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.dhs.gov/campaigns/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 to comment on this report, visit
<http://www.usfa.dhs.gov/applications/feedback/index.jsp>

References:

- ¹ Fire deaths are extracted from the 2004 NCHS mortality data using International Classification of Disease (ICD) codes F63.1, W39–W40, X00–X09, X75–76, X96–97, Y25–26, and Y35.1 where these codes were noted as either the underlying cause of death or a contributing factor in the chain of events leading to death. Under these criteria, 3,993 deaths were extracted. Only deaths where age was specified were used in the analyses in the relative risk tables.
- ² Population Division, U.S. Census Bureau, Table 1: Annual Estimates of the Population by Five-Year Age Groups and Sex for the United States: April 1, 2000 to July 1, 2006 (NC-EST2006-01), Release Date: May 17, 2007.
- ³ Department of Health and Human Services, Administration on Aging, http://www.aoa.gov/prof/Statistics/future_growth/State-5-yr-age-projections-2005-2030.xls
- ⁴ NCHS. *Health, United States 2007*, Table 27, <http://www.cdc.gov/nchs/data/hus/07.pdf#027>
- ⁵ 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.
- ⁶ National Institute on Drug Abuse. *Research Report Series—Prescription Drugs: Abuse and Addiction*, “Trends in prescription drug abuse,” <http://www.nida.nih.gov/ResearchReports/Prescription/prescription5.html#Trends>. Confirmed by calculations based on NCHS, *Health, United States*, 2006, Table 92. Selected prescription and nonprescription drugs recorded during physician office visits and hospital outpatient department visits, by sex and age: United States, 1995-1996 and 2003-2004 and Population Division, U.S. Census Bureau, Table 2 Annual Estimates of the Population by Selected Age Groups and Sex for the United States: April 1, 2000 to July 1, 2006 (NC-EST2006-02), Release Date: May 17, 2007.
- ⁷ Results from the 2006 National Survey on Drug Use and Health: National Findings, <http://www.oas.samhsa.gov/nsduh/2k6nsduh/2k6Results.cfm#3.1>
- ⁸ National Center for Chronic Disease Prevention and Health Promotion, Behavioral Risk Factor Surveillance System, Online Prevalence Data, 2002, as reported in *Fire and the Older Adult*, United States Fire Administration (USFA), January 2006.
- ⁹ NCHS. *Health, United States 2005*, Table 94. <http://www.cdc.gov/nchs/data/hus/05.pdf#094>
- ¹⁰ Houser, Ari. *Nursing Homes: Research Report*. American Association for Retired Persons (AARP), October 2007, http://www.aarp.org/research/longtermcare/nursinghomes/fs10r_homes.html
- ¹¹ U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplement, Table 15: Poverty Status of the Population Age 55 Years and Over by Sex and Age: 2005, Internet release date: July 27, 2007, http://www.census.gov/population/www/socdemo/age/age_2006.html
- ¹² *Socioeconomic Factors and the Incidence of Fire*. USFA, FA-170, June 1997.