

**PHYSICAL DISABILITY
AS A FACTOR IN HOME FIRE DEATHS**

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Abstract

According to incident reports filed by local fire departments, physical disability was a factor in an average of 380, or 14%, of home fire deaths per year between 2004 and 2008. Half of the victims were involved in ignition and in the area of origin when the fire started. When physical disability contributed to the fatal injury, the victims were more likely to have been killed by a fire involving oxygen administration equipment or that started in the bedroom, or where mattresses or bedding was the item first ignited, than were home fire victims in general.

These estimates are based on data from the U.S. Fire Administration's (USFA's) National Fire Incident Reporting System (NFIRS) and the National Fire Protection Association's (NFPA's) annual fire department experience survey.

Keywords: fire statistics, home fires, physical disability, residential fires

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We are also grateful to the U.S. Fire Administration for its work in developing, coordinating, and maintaining NFIRS.

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Executive Summary

The American Community Survey found that 9% of U.S. residents who lived in the community in 2005-2007 and were at least five years old had some type of long lasting physical disability that restricted mobility, reaching, lifting, or carrying. These disabilities can make it difficult or impossible for an individual to escape a fire independently. Twenty-one percent of the people with physical disabilities had incomes below the poverty line. This lack of income makes it less likely they will be able to afford specialized safety equipment or pay attendants. Four percent of the surveyed population had some type of sensory impairment, including vision and hearing impairments. These individuals may not hear a smoke alarm or oral communication or be able to read printed instructions.

During 2004-2008, physical disability was identified as a contributing factor in an estimated average of 380, or 14%, of U.S. home fire deaths per year. If all the people with physical disabilities in the general population and among fire victims (aged 5 and older) were identified and the definitions of physical disability used were comparable, then people with physical disabilities had a home fire death rate in 2004-2008 of 15 deaths per million. This rate is 1.6 times the nine deaths per million population from all home fires and assumes the 2005-2007 population with disabilities would be comparable to the population in 2004-2008. It is very likely that some victims with physical disabilities were missed because those disabilities were not readily observable (e.g., no wheelchair or other device as evidence of disability). If the estimated number of victims was

missing a larger share of people who actually had a physical disability than the American Community Survey's estimate of the disabled population missed, as this logic would suggest, then the 15 deaths per million population would be an *underestimate*. It stands to reason that the true death rate for physically disabled exceeds the general population death rate by an even larger margin. It is unclear whether fire victims with sensory disabilities were coded as having a physical disability as sensory disability was not mentioned specifically.

Providing adequate fire safety for individuals with physical disabilities can be challenging, particularly in cases of severe mobility limitations. Detection requirements consider the time a typical person needs to leave the building. If an individual cannot move out of danger, a working smoke alarm provides less benefit. In some cases, particularly when an individual is already in poor health and in the immediate area of the fire origin, fatal injury may occur before a sprinkler operates.

In many cases, however, sprinklers can provide more time even when an individual cannot fully evacuate. In 2005, Kenneth Tremblay described a Nevada fire in which an operating sprinkler saved the life of an elderly woman who used a wheelchair. Her bedding caught fire when she smoked in bed. She got into her wheelchair but was unable to exit the unit. When firefighters arrived, they saw smoke and flame coming from a fourth floor apartment window and the woman under the sprinkler's spray just inside the door of her apartment. The

sprinkler controlled the fire and protected her from most of the smoke and heat.

In this analysis, national estimates derived from the U.S. Fire Administration's National Fire Incident Reporting System (NFIRS) and NFPA's annual fire department experience survey are used to show the causes and circumstances of home fire deaths of victims when physical disability was a factor and highlight differences from overall home fire deaths. Although the overall numbers are likely an undercount, as mentioned above, this information can help people with disabilities and those who work with or care for them to develop and communicate ways to better protect this community from fire.

Compared to all home fire victims, victims with physical disabilities were more likely to be female and at least 65 years of age. More than half (52%) of these victims were female, but this percentage was still lower than the 57% female share of the population with physical disabilities. When physical disability was a factor, three of every five victims were at least 65 years old.

While home fire deaths in general are much more common between midnight and 6:00 a.m., time patterns were less pronounced when physical disability was a factor. Fifteen percent of these deaths resulted from fires occurring during the peak period of 3:00 and 6:00 p.m.

More than half (55%) of these deaths resulted from home fires with operating smoke alarms compared to only 38% of home fire deaths overall.

When physical disability was a factor, half (51%) of the victims were involved in ignition and in the area of origin at the time the incident began. Including those who were not involved in ignition, two-thirds were in the area of origin when the fire

started. Almost one-third (30%) of the victims were unable to act to save themselves. Fifty-nine percent of the victims suffered both burns and smoke inhalation as their primary apparent symptom.

One-third (31%) of these victims died as a result of fires that started in a bedroom or sleeping area; One-quarter (23%) died from fires that began in the living room, family room, or den; and 14% from fires that started in the kitchen. Only one-quarter (25%) of home fire victims overall died from fires beginning in the bedroom or sleeping area. The percentages for the other leading areas were similar.

When physical disability was a factor, two of every five (41%) of the victims were killed by a fire started by smoking materials, compared to one-quarter (25%) of total home fire victims. Only 4% of the physical disability-related deaths resulted from intentionally set fires, compared to 12% of overall home fire victims.

Compared to overall home fire deaths, physical disability was a more common factor in deaths resulting from fires that began with either mattresses or bedding (20% of the deaths associated with physical disability vs. 13% overall), or clothing (11% of victims with physical disability contributing vs. 5% overall). An analysis by the type or composition of the material first ignited shows that when physical disability contributed to fatal injury, 53% of the deaths resulted from fires in which a fabric, fiber, cotton, blends, rayon or wool was first ignited compared to 40% of home fire deaths overall.

NFPA has safety information for and about people with disabilities on our website, www.nfpa.org/disabilities, including an Emergency Evacuation Planning Guide and

guides for schools and the workplace to help plan with and for students or employees who may need assistance. NFPA also produces e-ACCESS, a quarterly newsletter focusing on safety for people with disabilities.

NFPA's former Center for High Risk Outreach, now part of NFPA's Public Education Division, has hosted, sponsored, or participated in a number of symposia and meetings that examined various aspects of the issue. Reports from several of these meetings are also on the website.

Additional steps must be taken to provide maximum safety for people with physical or sensory disabilities. This may be especially challenging for people living in one-or two family homes, the majority of fire victims. Many of the victims might have been saved had home fire sprinklers been present. Working and audible smoke alarms are important but one-half of the victims with physical disabilities were fatally injured in fires with working smoke alarms. A new provision of the 2010 edition of NFPA 72, *National Fire Alarm and Signaling Code* requires low frequency signals for bedrooms used by individuals with mild to severe hearing loss. Tactile notification appliances will be required in addition to strobes for individuals with profound hearing loss. Improved notification, however, will only help those who can act.

With 30% of the victims unable to act after the fire started, and 51% involved in ignition and in the area of origin, it is clear that prevention is the best strategy. Mattresses and bedding, upholstered furniture, clothing, and other furnishings that are harder to ignite could be helpful.

Many people want to stay in the same home as they age, in fact, 86% of these victims died as a result of fires in one-or two-family homes. While age by itself does not cause disability, disability becomes more likely with increasing age. Plans should be made for a time when mobility might be impaired. Plans should also be made for short-term disability due to injury or illness that may limit movement.

According to a study published in *Archives of Physical medicine and rehabilitation* there was a disparity in the percentage of full-time wheelchair users with spinal cord injury who reported that they could evacuate their residence in an emergency, and those who have a plan for evacuation.¹

¹ McClure, Laura, et al., "Emergency Evacuation Readiness of Full-Time Wheelchair Users With Spinal Cord Injury", *Archives of Physical Medicine and Rehabilitation*. 92 (2011) pp. 491-498



Physical Disability as a Factor in Home Fire Deaths

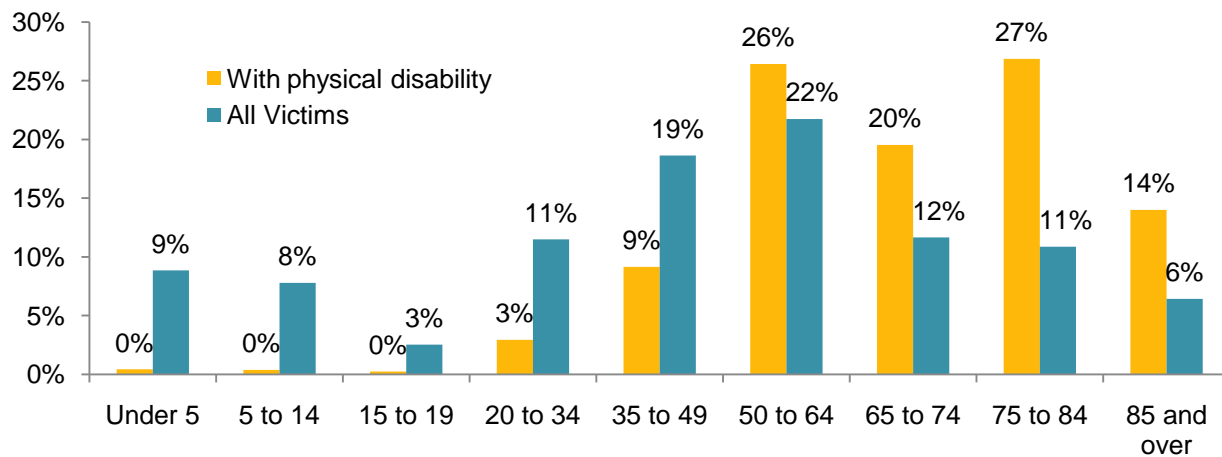
During 2004-2008, physical disability was a contributing factor in an estimated average of 380 (14%) home fire deaths per year according to reports by local fire departments. The American Community Survey reported that 9% of community residents who were at least five years old in 2005-2007 had some type of physical disability while 4% had a sensory disability.

Causes and Circumstances of Home Fires Deaths With Physical Disability a Factor in 2004-2008

When physical disability contributed to the fatal injury:

- More than half, (55%) of the victims died as a result of home fires with working smoke alarms compared to only 38% of home fire victims overall.
- Almost one-third (30%) of victims with physical disabilities were unable to act to save themselves.
- 51% of the victims were involved in ignition and in the area of origin when the incident began.
- Victims were more likely to die from a fire that began with either mattresses or bedding (20% vs. 13% of all home fire victims), or clothing (11% vs. 5% of all home victims).

Home Structure Fire Deaths with Physical Disability a Factor by Age of Victim: 2004-2008



- Three of every five victims when physical disability was a factor were over the age 65 or older
- Two of every five (41%) victims were killed by a fire started by smoking materials, compared to one-quarter (25%) of total home fire victims.
- 86% of the victims were killed in fires in one- or two-family homes. Apartment fires killed 14% of the victims.

Additional resources can be found at www.nfpa.org/disabilities