

HOME STRUCTURE FIRES

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Abstract

NFPA estimates that U.S. fire departments responded to an average of 373,900 reported home structure fires per year during the five-year-period of 2005-2009. These fires caused an estimated average of 2,650 civilian deaths, 12,890 civilian injuries, and \$7.1 billion in direct property damage per year. Almost three-quarters (71%) of the reported home structure fires and 84% of the fatal home fire injuries occurred in one- or two-family homes, including manufactured homes. The remainder occurred in apartments or similar properties.

Cooking equipment is the leading cause of home structure fires and home fire injuries, while smoking materials remain the leading causes of home fire deaths. Half of all home fire deaths result from incidents reported between 11:00 p.m. and 7:00 a.m. One-quarter (25%) of all home fire deaths were caused by fires that started in the bedroom; 24% resulted from fires originating in the living room, family room, or den; and 15% were caused by fires starting in the kitchen. Almost two-thirds of home fire deaths resulted from fires in which no smoke alarms were present or in which smoke alarms were present but failed to operate.

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, residential fires, apartment fires

Acknowledgements

The National Fire Protection Association thanks all the fire departments and state fire authorities who participate in the National Fire Incident Reporting System (NFIRS) and the annual NFPA fire experience survey. These firefighters are the original sources of the detailed data that make this analysis possible. Their contributions allow us to estimate the size of the fire problem.

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

During the five-year period of 2005-2009, U.S. fire departments responded to an estimated average of 373,900 home structure fires per year. These fires caused an annual average of 2,650 civilian deaths, 12,890 civilian fire injuries, and \$7.1 billion in direct property damage. Home fires accounted for 73% of all reported structure fires, 92% of civilian structure fire deaths, 86% of the civilian structure fire injuries, and 68% of direct structure fire property loss. Homes include one- and two-family homes, manufactured homes, and apartments or other multi-family housing, regardless of ownership. In general, any fire in or on a structure is considered a structure fire, even if the damage was to contents only.

The statistics about fires and associated losses in this analysis are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. These national estimates are projections based on the detailed information collected in Version 5.0 of the U.S. Fire Administration's National Fire Incident Reporting System (NFIRS 5.0) and the National Fire Protection Association's (NFPA's) annual fire department experience survey.

During 2005-2009, roughly one of every 310 households had a reported home fire per year.

Substantial progress has been made since 1980, the first year in which national estimates of specific fire problems were available. Reported home fires fell 51% from 734,000 in 1980 to 362,500 in 2009. Home structure fire deaths fell 51% from 5,200 in 1980 to 2,565 in 2009. The declines in deaths alternated with plateaus, with such plateaus seen in the mid to late 1980s's, a second in the mid 1990s, and a third occurring since 1999. In 2009, reported home fires and home fire deaths were both at their lowest point since 1980.

In 2005-2009, almost half (47%) of reported home structure fires and more than half (54%) of

home structure fire deaths occurred in the cooler months of November through March. This reflects the influence of heating equipment fires. Reported home fires peaked around the dinner hours of 5:00 to 8:00 p.m. Only one-fifth (20%) of the reported home fires occurred between 11:00 p.m. and 7:00 a.m., but half (50%) of the home fire deaths resulted from fires reported during these hours.

Cooking equipment continues to be the leading cause of reported home structure fires and civilian fire injuries. It is also the leading cause of unreported fires. The Consumer Product Safety Commission found that in 2004-2005, for every household cooking fire reported to the fire department, U.S. households experienced 50 cooking equipment fires that they did not report.

Smoking materials have historically caused the largest number of fire deaths, and this was the case in 2005-2009. Heating equipment was the second leading cause of home fires and home fire deaths but the leading cause of deaths resulting from fires in one- or two-family homes.

Most reported home fires were small. Flame damage spread beyond the room of origin in only one-quarter (24%) of the reported fires. Reported fires originating in the kitchen spread beyond the room of origin only 6% of the time.

Two of every five (41%) reported home fires started in the kitchen or cooking area. These fires caused 15% of the home fire deaths and more than one-third (37%) of the reported fire injuries. Apartment fires were more likely to start in the kitchen than were fires in one- or two-family homes. The 8% of home structure fires originating in the bedroom caused one-quarter (25%) of the civilian deaths and one-fifth (21%) of the civilian injuries. Six percent of home fires originated in and were confined to the chimney or flue. These fires resulted in less than 1% of civilian fire deaths, injuries or associated property damage. The 4% of home

structure fires originating in the living room, family room, or den caused one-quarter (24%) of the civilian fire deaths and 11% of the civilian injuries.

Almost two-thirds (64%) of home fire deaths resulted from fires in one of three areas: the bedroom; the living room, family room or den; or the kitchen. These areas were examined in greater detail. Almost three-quarters (73%) of the victims of bedroom fires were in the area or origin at the time of the incident, as were almost half (47%) of the victims of fires originating in the living room, family room or den, and two out of five (41%) of the fatalities from kitchen fires.

While two-thirds to three-quarters of the deaths from fires starting in these three areas resulted from fires with flame damage beyond the room of origin, four out of five (81%) injuries from kitchen fires were caused by fires that were confined to the kitchen.

In fires originating in these three areas and spreading beyond the rooms of origin, two categories of items: 1) structural members or framing, and 2) interior wall coverings, were in the top four items contributing to flame spread for both fires and deaths resulting from these fires.

In almost three-quarters of the fires that started in the bedroom, flame damage spread beyond the room. However, only one-quarter (28%) of the victims were outside of the bedroom when the fire started. This suggests that in most of these incidents, much of the fire growth occurred after the victims were incapacitated.

The leading items first ignited vary predictably by area of origin. Not surprisingly, cooking materials, including food, were first ignited in almost two-thirds of the kitchen fires and kitchen fire injuries and in almost one-third of the associated deaths. Upholstered furniture was the item first ignited in one of every five fires starting in a living room, family room or den, and in almost half of the associated deaths. Mattresses or bedding were first ignited in almost one-third of the fires originating in the

bedroom and almost half of the associated deaths and injuries. Some overlap does occur. Upholstered furniture was first ignited in 7% of fire deaths resulting from fires starting in the bedroom and 3% of deaths from fires originating in the kitchen. Mattresses or bedding were first ignited in 7% of the deaths from fires starting in the living room.

Properly installed and maintained fire protection can prevent most fire deaths. More than one-third (38%) of fatal home fire injuries resulted from fires in properties with no smoke alarms at all. One-quarter (24%) were caused by fires in which smoke alarms were present but failed to operate. Roughly one-third (37%) of home fire deaths resulted from fires with operating smoke alarms.

John Hall of NFPA reported that fire sprinklers were present in only 6% of reported home fires. The death rate per 1,000 reported home fires was 83% lower when wet pipe sprinkler systems were present compared to reported home fires without any automatic extinguishing systems.

More progress has been made in some areas than in others. Almost all homes today have at least one smoke alarm. However, only a minority have interconnected smoke alarms. When smoke alarms are interconnected, all alarms will sound when one is activated. This means that the warning will sound throughout the home.

Historically, the largest number of fire deaths resulted from fires starting in living rooms, family rooms, or dens. In four of the last five years for which data is available, the number of fire deaths from fires starting in the bedroom was higher than the number of deaths from fires starting in the living room, family room, or den.

Compared to home fire deaths in 1980-1984, the average number of deaths in 2005-2009 resulting from fires starting in the

- living room, family room, or den fell 67%;
- bedroom fell 44%; and
- kitchen fell 38%.

The two leading items in home fire deaths remain 1) upholstered furniture, first ignited in 19% of home fire deaths in 2005-2009, and 2) mattresses and bedding, first ignited in 14% of the deaths. However, the average number of deaths from fires starting with these items decreased 59% and 52%, respectively, from the 1980-1984 averages to the 2005-2009 average.

The annual average death toll from fires started by smoking materials was 61% lower in 2005-2009 than it was in 1980-1984. The average number of deaths from fires started by lighters, candles, or matches was 49% lower in the more recent period than the earlier years. The death toll from fires started by some type of operating equipment was 45% lower in the more recent period than in 1980-1984.

Almost all home fires and associated losses result from fires in homes that are normally occupied. The poor economy has led to an increase in housing units that are vacant for a period of time and those that were vacant year round. While 10% of housing units were vacant year-round in 2005-2009, only 6% of home structure fires occurred in vacant properties. Vacant properties do pose some special concerns. Roughly half (48%) of the fires in vacant homes were intentionally set, compared to only 8% of home structure fires overall.

Flame damage spread beyond the building of origin in 10% of vacant home fires compared to

only 3% of home fires overall.

This analysis shows that considerable progress has been made but more is left to be done. Human error is a factor in many fires. However, equipment and other product redesign, such as the “fire-safe” cigarette which stops burning if not actively smoked, or automatic shut-offs on heating equipment, cooking equipment, or irons can improve safety. Such changes may be the most effective and inexpensive approach to fire prevention. The U.S. Consumer Product Safety Commission issues safety standards and recalls of unsafe consumer products.

The vast majority of homes have at least one smoke alarm, but almost two-thirds of the deaths resulted from fires in homes without working smoke alarms. Public education with respect to fire safety is clearly needed to address all types of home fires. More information is available at www.nfpa.org/smokealarms.

People who are in the room of fire origin may be intimately involved with ignition. Traditional means of fire protection may not save them. Even if they are not intimately involved, their proximity to the fire dramatically reduces the time they would have to escape.

Home fire sprinklers can control a fire until help arrives even when the occupants are unable to act. For more information on how sprinklers can help, see <http://www.firesprinklerinitiative.org/>.

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U.S. Home Structure Fires

U.S. fire departments responded to an estimated average of 373,900 home structure¹ fires per year during 2005-2009. These fires caused an annual average of

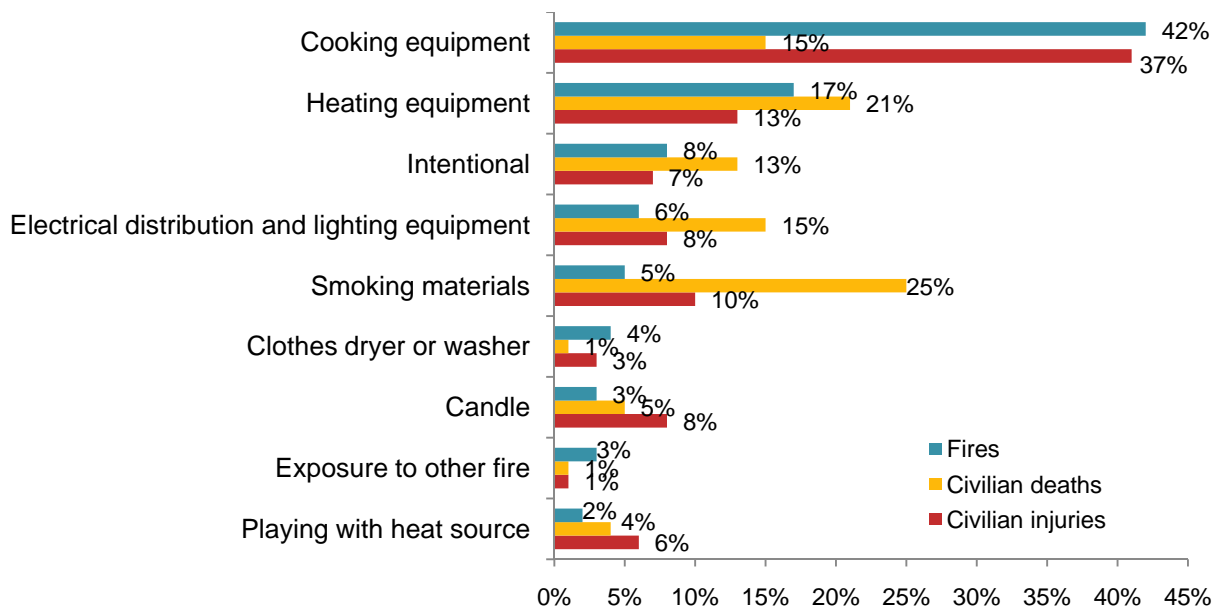
- 2,650 civilian fire deaths,
 - 12,890 civilian fire injuries, and
 - \$7.1 billion in direct damage.
- 92% of all structure fire deaths resulted from home fires.
 - On average, seven people died in U.S. home fires every day.

Causes and Circumstances of Home Fires

Details from the U.S. Fire Administration's National Fire Incident Reporting System show that in 2005-2009:

- Cooking equipment was the leading cause of home structure fires and home fire injuries.
- Smoking was the leading cause of civilian home fire deaths. Heating equipment was the second most common cause of home fire fatalities.

Leading Causes of Home Structure Fires: 2005-2009



Almost all homes have at least one smoke alarm, but almost two-thirds of reported home fire deaths in 2005-2009 resulted from fires in homes with no smoke alarms or no working smoke alarms

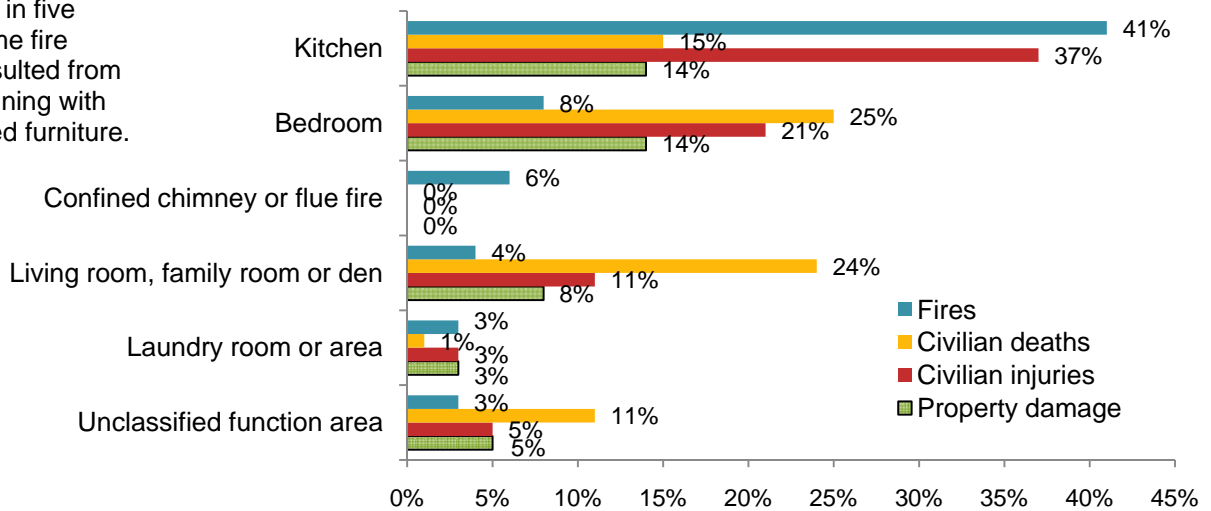
¹Homes include one- or two-family homes, manufactured homes, apartments, townhouses, and rowhouses, regardless of ownership. In general, any fire that occurs in or in a structure is considered a structure fire, even if the fire was limited to contents and the building itself was not damaged.

Kitchens were the leading area of fire origin.

- Two of every five (41%) reported home structure fires started in the kitchen. These fires caused more than one-third (37%) of civilian home fire injuries.
 - 15% of home fire deaths also resulted from kitchen fires.
- 8% of reported home fires started in the bedroom. These fires caused one-quarter (25%) of home fire deaths and one in five (21%) of home fire injuries.
- 4% of home fires started in the living room, family room, or den. These fires caused one-quarter (24%) of home fire deaths and 11% of the home fire injuries.
- Fires confined to chimneys or flues accounted for 6% of all reported home fires. These fires caused very few casualties.

Leading Areas of Origin in Home Structure Fires: 2005-2009

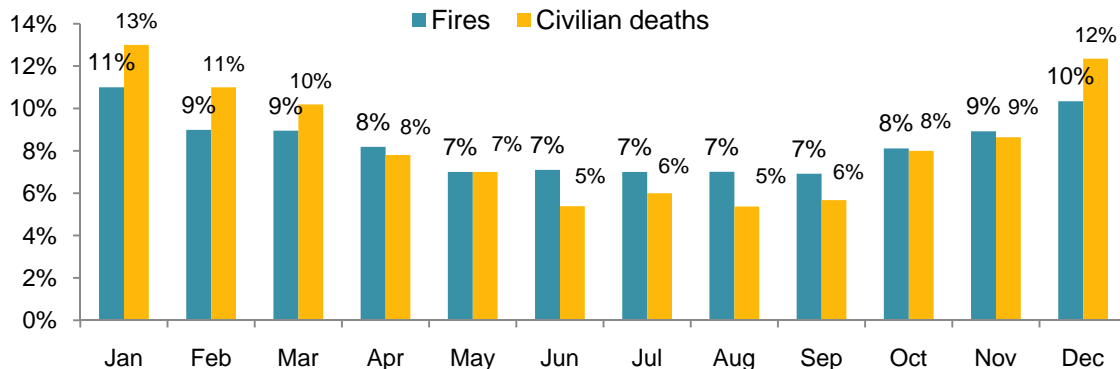
Fact: One in five (19%) home fire deaths resulted from fires beginning with upholstered furniture.



Home fires and home fire deaths peak in the cooler months. Patterns for time of day are different for fires than for deaths.

- Home structure fires peaked around the dinner hours between 5:00 and 8:00 p.m.
- Only one in five (20%) reported home structure fires occurred between 11:00 p.m. and 7:00 a.m. These fires caused half of all home fire deaths.

Home Structure Fires by Month: 2005-2009



NFPA's Fire Safety Resources

NFPA's wealth of fire-related research includes investigations of technically significant fire incidents, fire data analysis, and the Charles S. Morgan Technical Library, one of the most comprehensive fire literature collections in the world. In addition, NFPA's Fire Protection Research Foundation is a source of independent fire test data. Find out more at:

www.nfpa.org/research

NFPA also develops, publishes, and disseminates more than 300 consensus codes and standards intended to minimize the possibility and effects of fire and other risks. Among these are:

[NFPA1: Fire Code](#);

[NFPA 101: Life Safety Code®](#); and

[NFPA 13D: Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes](#);

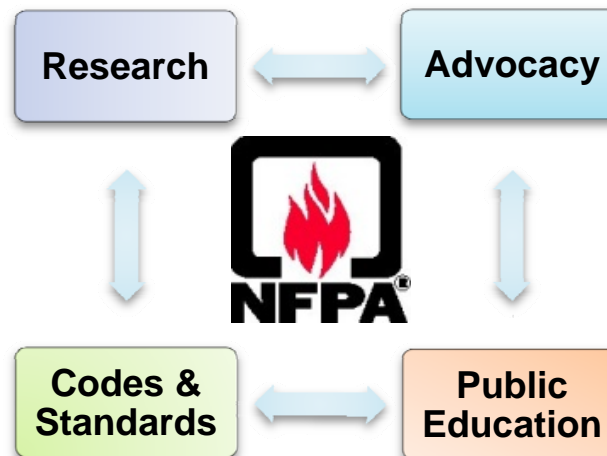
Properly installed and maintained smoke alarms are necessary to provide a warning of any fire to all occupants. You can find out more information about smoke alarms here:

[NFPA Smoke Alarm Information](#)

Home fire sprinkler systems provide even greater protection. These systems respond quickly to reduce the heat, flames, and smoke from a fire until help arrives. More information about home fire sprinklers may be found at

www.firesprinklerinitiative.org

Simply put, smoke alarms and fire sprinklers save lives.



[For consumers](#): NFPA has consumer safety information regarding causes, escape planning, fire & safety equipment, and many other topics.

[For Kids](#): Sparky.org has important information for kids delivered via fun games, activities, and cartoons.

[For public educators](#): Resources on childhood education programs, educational messaging, grants & awards, and many other topics.

Home Fires: How Often and How Likely?

Sometimes it is easier to think of the statistics in terms of time. The statistics below are based on home structure fires reported during 2005-2009.

Reported home fires by time

More than 1,000 home structure fires were reported on an average day. This translates to 43 fires every hour or one reported home fire every 84 seconds.

Home fires killed an average of seven people every day.

A civilian (non-firefighter) home fire injury is reported every 41 minutes.

Home fires cause roughly \$225 in damage every second.

The odds of a reported fire

According to the U.S Census Bureau, the U.S, resident population averaged 301 million people during 2005-2009 and roughly 115 million households. That means that, on average during this period:

- Roughly one of 800 people had a reported home fire each year.
- Roughly one of every 310 households had a reported home fire each year.
- On average, one of every 114,000 U.S. residents died in a home fire per year.

Any home fire, including those handled without the fire department

The Consumer Product Safety Commission's (CPSC's) 2004-2005 Residential Fire Survey found that U.S. households experience an average of 7.4 million home fires per year. Roughly 130,000 injuries or symptoms, usually minor, resulted from these fires. The fire department was called to only 3% of these fires.

Including unreported fires, one in 40 people has a home fire each year, as does one in 15 households. This means that over an average lifetime, an individual's household will experience five fires.
