

U.S. Fire Administration/National Fire Data Center

Residential Structure Fires in 2000

Topical Fire Research Series, Volume 3 – Issue 9

June 2004



FEMA



Residential Structure Fires in 2000

June 2004

Volume 3, Issue 9

Findings

- In 2000, 379,500 residential structure fires resulted in 3,445 fatalities, 17,400 injuries, and \$5.7 billion in property loss. The majority of fires (and losses) occurred in one- and two-family dwellings.
- Kitchens were the area of the home where the highest percentage of fires started.
- The three leading causes of residential fires were cooking, heating, and incendiary/suspicious (arson) fires.
- Residential structure fires in winter outnumbered those in the other seasons; summer was the season with the fewest fires. The peak period for residential fires was between 5 and 7 p.m.
- No smoke alarm was present in more than half of all residential structure fires. When an alarm was present, it operated in only 32% of these fires.

Americans rely on their homes for safety, comfort, protection, and enjoyment. Most people sleep in their homes, dine, watch television, and receive guests. American homes—whether they are freestanding single family houses, apartments, condominiums, or townhouses—are the veritable bases of operations for millions of people. Generally, residential structures account for only one-quarter of all fires, but result in three-quarters of fire fatalities and injuries and half of all dollar loss. In 2000, 23% of all fires were in residential structures,¹ resulting in 68% of all fire deaths, 70% of all fire injuries, and 46% of all dollar loss. There were an estimated 379,500 residential structure fires in 2000, resulting in 3,445 fatalities, 17,400 injuries, and \$5.7 billion in property loss.³

LOSS MEASURES

As Figure 1 shows, residential structure fires are more deadly and injurious than all structure fires and all fires generally. On average, they result in double the property loss of fires generally and almost three times the rate of fatalities and injuries.⁴

FIGURE 1. LOSS MEASURES FOR RESIDENTIAL STRUCTURE FIRES

Loss Measure	All Fires	All Structure Fires	Residential Fires
\$ Loss/Fire	\$6,601	\$16,219	\$13,507
Fatalities/1,000 Fires	2.4	5.7	7.4
Injuries/1,000 Fires	15.2	39.9	46.9

Source: NFIRS only

WHERE FIRES OCCUR

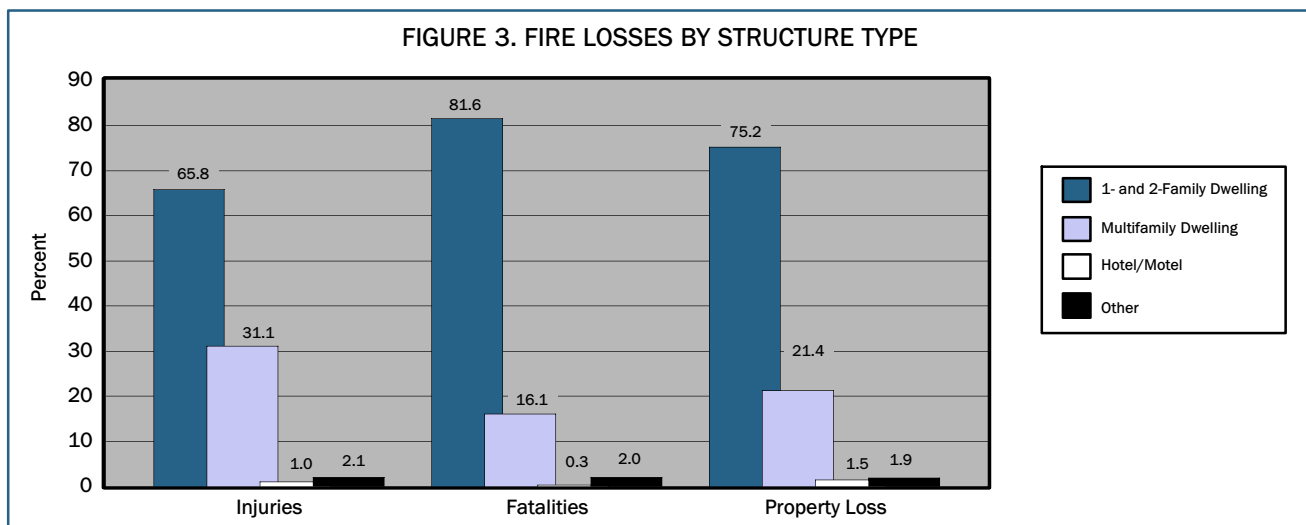
Approximately 72% of residential structure fires occur in single-family homes or duplexes (one- and two-family homes). One-quarter occur in multifamily dwellings, with a much smaller number taking place in hotels/motels and other residential-type structures. Within residential structures, the leading area of fire origin is cooking areas/kitchens, followed by bedrooms and common rooms/living rooms (Figure 2).

FIGURE 2. RESIDENTIAL STRUCTURE FIRES BY LEADING AREAS OF ORIGIN

Area of Origin	Fires (%)
Cooking Area, Kitchen	30.6
Bedroom <5 People	13.1
Common Room, Living Room	7.0
Laundry Area, Wash House	4.8

Source: NFIRS

Consistent with the fact that the majority of residential structure fires take place in one- and two-family homes, the overwhelming percentage of property loss, deaths, and injuries occur in these structures (Figure 3). One reason for the higher percentage of fires in one- and two-family homes (and the subsequent higher percentage of losses) may be that more stringent policies, codes, and restrictions are imposed on multifamily residential structures than on single-family and duplex homes. In these structures, the actions of one individual with regards to fire can have a serious impact on the lives of others. Thus, building and fire codes for apartment buildings and condominium complexes may mandate the installation of sprinklers and smoke alarms and require regular fire inspections.



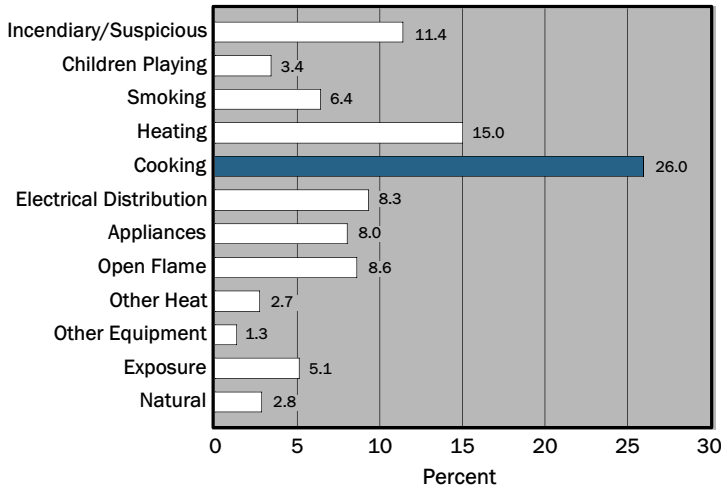
Source: NFIRS

CAUSES AND HEAT SOURCES

Cooking is the cause of more than one-fourth of all residential structure fires (Figure 4); other leading causes are heating and incendiary/suspicious. The predominance of cooking is consistent with the leading area of origin for residential structure fires, which is kitchens. As shown in Figure 5, the leading heat source for residential structure fires is radiated or conducted heat from operating equipment, followed by electrical arcing from equipment, other forms of heat from equipment, and cigarettes.

Although the causes and heat sources offer insight into residential structure fires, it may be difficult to gauge the level of human interaction in the ignition of the fires. It can be assumed that cooking and incendiary/

FIGURE 4. CAUSES OF RESIDENTIAL STRUCTURE FIRES
(unknowns apportioned)



Source: NFIRS

FIGURE 5. RESIDENTIAL STRUCTURE FIRES BY LEADING HEAT SOURCES

Heat Source	Fires (%)
Radiated or conducted heat from equipment	33.5
Electrical arcing	12.6
Heat from powered equipment, other	7.5
Cigarette	5.9

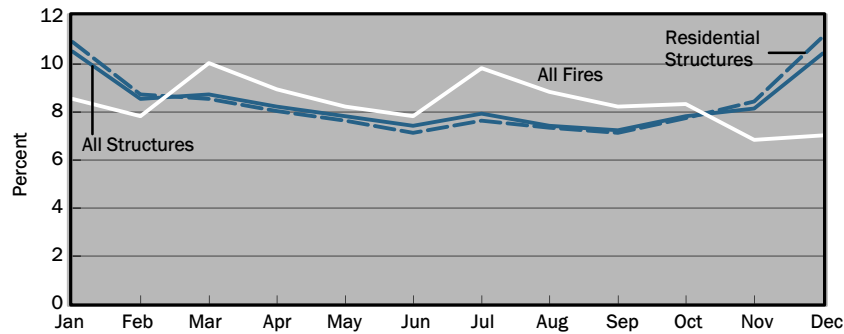
Source: NFIRS

suspicious fires require human involvement, but heating fires often do not. The leading factors contributing to ignition—equipment left unattended (15%), short circuit arc (14%), abandoned or discarded materials (7%), and a heat source left too close to combustibles (7%)—indicate that the incidence of residential fires might be reduced with greater awareness and more positive actions by residents.

WHEN FIRES OCCUR

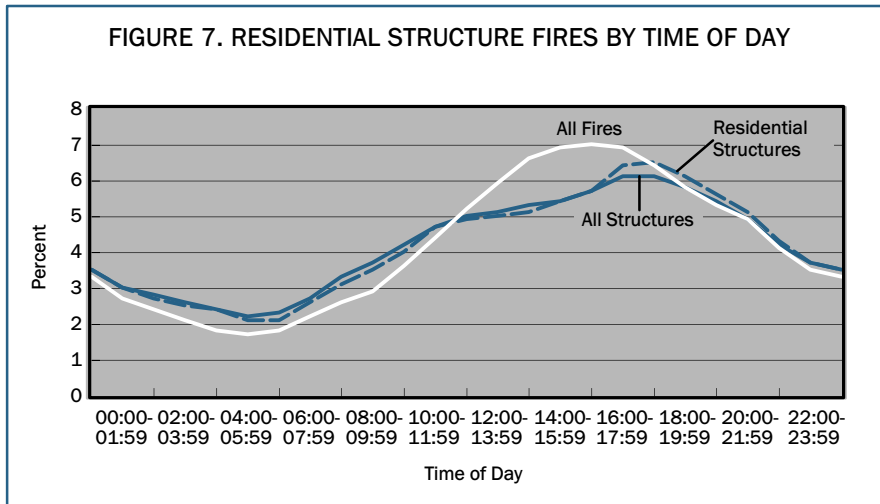
Although there is no discernable seasonal pattern for fires generally, more residential structure fires occur in the winter months than during any other season (Figure 6). Statistics for all structure fires closely mirror this trend,⁵ likely because three-quarters of all structure fires are in residential structures. The higher percentage of fires in the winter may be linked to the increased use of heating and the fact that people may be more likely to cook indoors (as opposed to grilling or barbecuing) during the winter.

FIGURE 6. RESIDENTIAL STRUCTURE FIRES BY MONTH



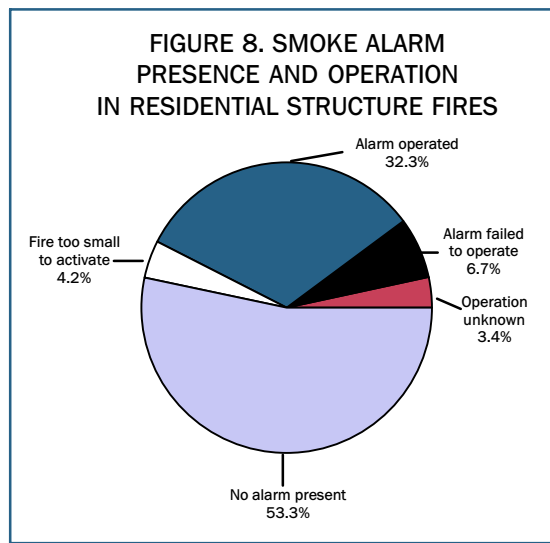
Source: NFIRS

When analyzed by time of day, as illustrated in Figure 7, the highest number of residential structure fires occurs in the early evening, similar to the trend for fires generally. This trend may be related to cooking—the leading cause of structure fires—since many people prepare dinner in their homes during the early evening. The lowest percentage of fires occurs in the late night and early morning hours when most people are sleeping.



SMOKE ALARMS

No smoke alarm was present in the majority (53%) of residential structure fires; alarms were present and operated in 32% of residential structure fires (Figure 8). A number of fires may go unreported because a smoke alarm alerted the occupant, who then successfully suppressed the fire.



EXAMPLES

January 3, 2002: A fire in a southern Louisiana duplex killed eight members of a family, five of whom were children. The fire was caused by an electric space heater that was too close to a sofa in the living room.⁶

December 27, 2001: A fire caused by arson roared through an Oklahoma City apartment complex causing \$200,000 in damages. Eight apartments were destroyed during the fire and six others sustained smoke and water damage. The apartment complex had working smoke alarms.⁷

February 11, 2001: An apartment fire caused by food left unattended on the stove killed three Detroit men and injured two others.⁸

CONCLUSION

Like many fires, residential structure fires are often caused by the actions of people and, therefore, can be prevented. For those living in single-family homes especially, individuals must educate themselves about fire risks and

actively seek to mitigate such dangers in their own homes. Checking appliances for fraying wires, properly turning off equipment, providing periodic maintenance to heating systems and fireplaces, and keeping a fire extinguisher in the kitchen to ward off out-of-control cooking fires are simple steps that can mean the difference between life and death.

Additionally, smoke alarms should be installed throughout the home, and their batteries replaced every 6 months. Some fire departments or other municipal service even provide smoke alarms for free—and people should avail themselves of such preventive opportunities.

To request additional information, comment on this report, or review the detailed methodology used in this analysis, visit <http://www.usfa.fema.gov/feedback/>.

Notes:

1. Structure fire statistics in this report do not include mobile structures.
2. Distribution statistics are based on data from the National Fire Incident Reporting System (NFIRS 2000). At the time of this report, NFIRS is transitioning from version 4.1 to 5.0. Approximately 79% of the fire incident data for 2000 was reported to the USFA in NFIRS 4.1 format and converted to 5.0.
3. Estimates of the U.S. fire problem are taken from the National Fire Protection Association's (NFPA's) annual survey, *Fire Loss in the United States*.
4. Loss measures are based on NFIRS data.
5. *All Structure Fires in 2000*, Topical Fire Research Series, Volume 3, Issue 8, June 2004.
6. "House where eight died was renovated recently: Neighborhood was making a comeback from crime, blight," *The Daily Advertiser*, January 4, 2002.
7. "Arson suspected in early morning blaze," *The Daily Ardmoreite*, December 28, 2001.
8. "Detroit boarding house fire kills three: Unattended cooking in kitchen may have led to blaze," *The Detroit News*, February 12, 2001.