

U.S. Fire Administration/National Fire Data Center

# Fatal Fires

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Homeland  
Security



## Fatal Fires

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### Findings

- An estimated 3,300 fatal fires claimed the lives of 3,380 civilians: 86% involved a single fatality, 10% involved two fatalities, and 4% involved three or more fatalities.
- Injuries were 32 times as great and property losses were 8 times as great in fatal fires as in nonfatal fires.
- 74% of fatal fires occurred in structures, 94% of these on residential properties.
- 94% of fatal fires occurred either in structures or in cars.
- The leading cause of fires that resulted in fatalities was arson (27%), followed by smoking (18%).
- The leading areas of fire origin in fatal residential structure fires were sleeping (29%) and lounge (21%) areas.
- Fatal fires were most common in the winter.
- Smoke alarms either were not present in 42% of residential fatal fires or alarms were present but did not operate in 21% of residential fatal fires.
- 65% of deaths were males; 23% were older adults (over 64); 14% were children under 10.

Of the nearly 1.7 million estimated fires reported annually to fire departments in 2002, an estimated 3,300 claimed the lives of 3,380 civilians. These fatal fires also injured 1,100 civilians and caused more than \$159 million in property damage.<sup>1,2</sup> Of the fatal fires reported in 2002, 86% involved a single fatality, and 10% involved two fatalities. The remaining 4% of fatal fires involved between three and eight fatalities. This report summarizes some of the major characteristics of these fatal fires, with an emphasis on fatal fires in residential structures.

### LOSS MEASURES

Fatal fires are relatively few in number, but they are devastating in outcome. Losses from fatal fires are generally much higher than losses associated with nonfatal fires. Dollar losses in 2002 associated with fatal fires were nearly eight times that of all other fires. The injury rate for fatal fires was 32 times that of all nonfatal fires. Fatal fires in residential structures had more than 4 times the dollar loss and nearly 12 times the injury rate as nonfatal residential structure fires. In more than half of the fatal residential structure fires (57%), flame damage extended throughout the structure whereas flame damage extended throughout the structure in only 19% of nonfatal residential structures. Figure 1 shows the loss measures for fatal and nonfatal fires in all properties and in residential properties alone.

**FIGURE 1. LOSS MEASURES IN FATAL AND NONFATAL FIRES**

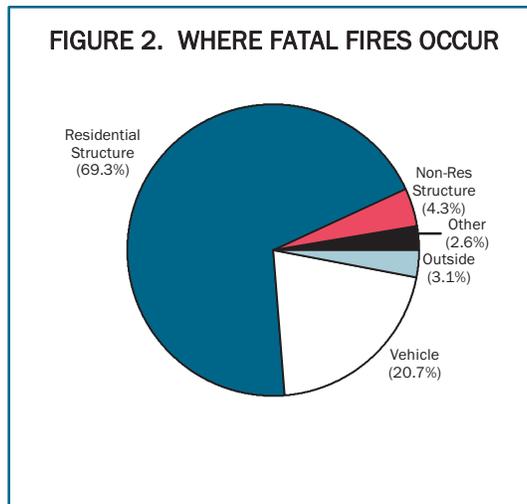
| Loss Measure           | All Fires |           |              | Residential Structure Fires Only |           |              |
|------------------------|-----------|-----------|--------------|----------------------------------|-----------|--------------|
|                        | All       | All Fatal | All Nonfatal | All                              | All Fatal | All Nonfatal |
| \$ Loss/Fire           | \$5,832   | \$45,368  | \$5,754      | \$11,832                         | \$51,795  | \$11,618     |
| Injuries/1,000 Fires   | 12.5      | 375.3     | 11.8         | 35.9                             | 402.9     | 33.9         |
| Fatalities/1,000 Fires | 2.4       | 1216.0    | —            | 6.5                              | 1,221.0   | —            |

Source: NFIRS 5.0

**WHERE FATAL FIRES OCCUR**

Although most fires occur outdoors, fatal fires occur most frequently in structures. The 2002 fire experience follows this pattern: outdoor fires accounted for 40% of all fires but only 3% of fatal fires.

Figure 2 shows the graphical breakdown of where fatal fires occur. Structure fires accounted for the majority (74%) of fatal fires in 2002. Of these fatal structure fires, 94% occurred in residences. The overall result is that the overwhelming majority of fatal fires (69%) are residential structure fires. Twenty-one percent of fatal fires occurred in vehicles; the remaining 6% were divided between outside and other types of fires.

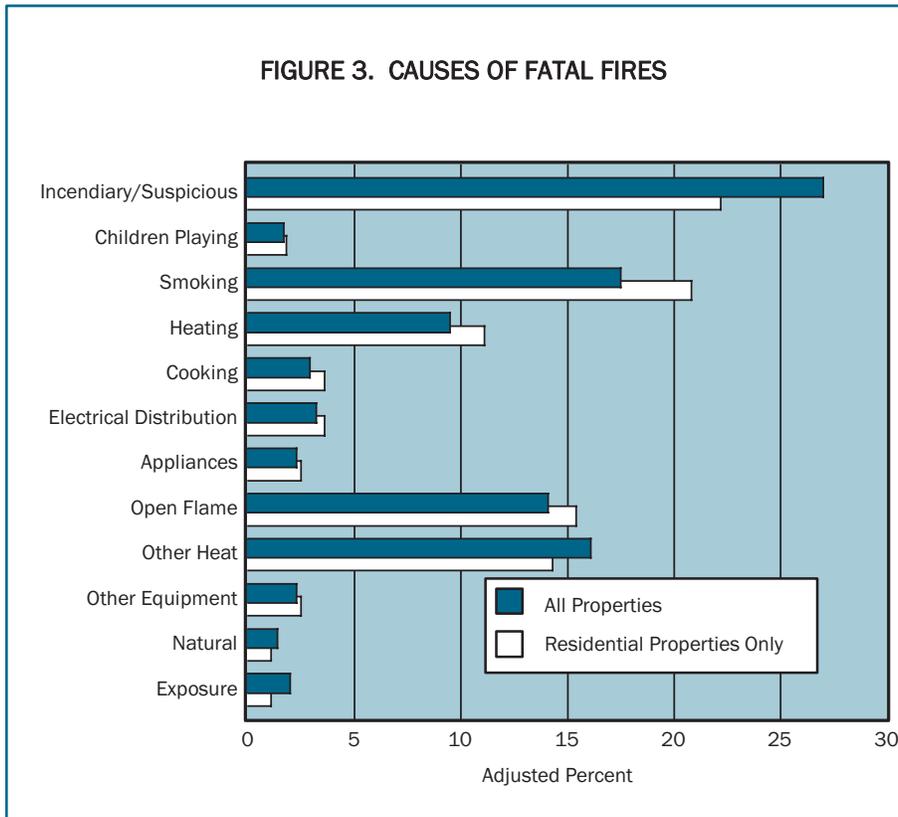


Source: NFIRS 5.0

**CAUSES OF FATAL FIRES**

The leading cause of fatal fires in 2002 was incendiary/suspicious (arson), which accounted for 27% of fatal fires. Figure 3 compares the causes of fatal fires in all properties and in residential properties. Smoking, long the leading cause of fatal fires, trailed as the second leading cause of all fatal fires at 18%. Arson was also the leading cause of the fatal residential structure fires (22%), but by a small margin over smoking (21%). This again is a departure from years past as smoking has long been the leading cause (by a wide margin) of fatal residential fires.

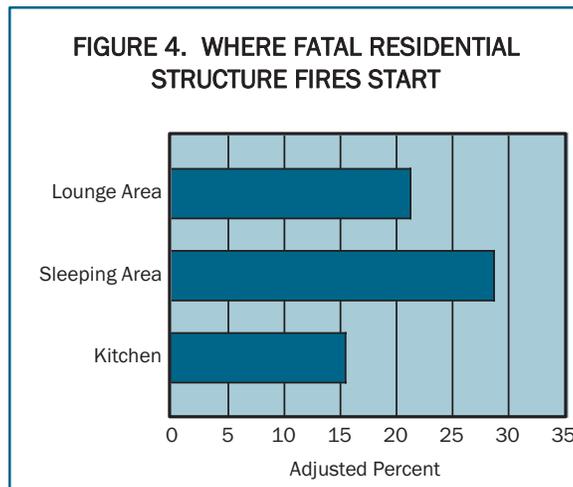
Multiple fatality fires in residential structures were most often caused by heating (26%), followed by arson (23%). By contrast, arson and smoking (each 22%) cause most single fatality residential structure fires.



Source: NFIRS 5.0

### WHERE FATAL RESIDENTIAL STRUCTURE FIRES START

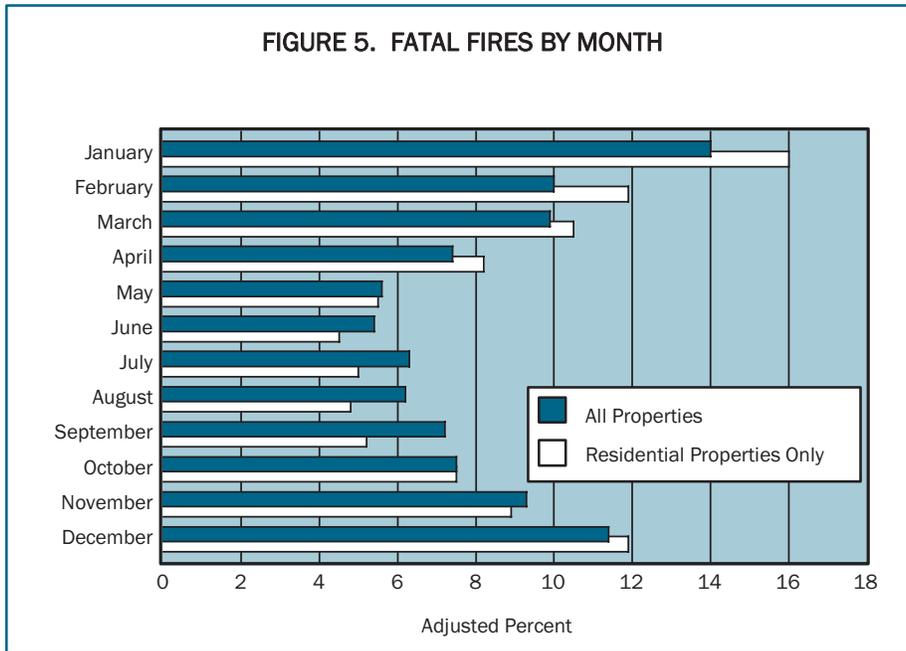
Figure 4 shows the leading areas of fire origin in fatal residential structure fires. They started most frequently in sleeping (29%) and lounge areas (21%).<sup>3</sup> Fires starting in kitchens account for another 15%.



Source: NFIRS 5.0

## WHEN FATAL FIRES OCCUR

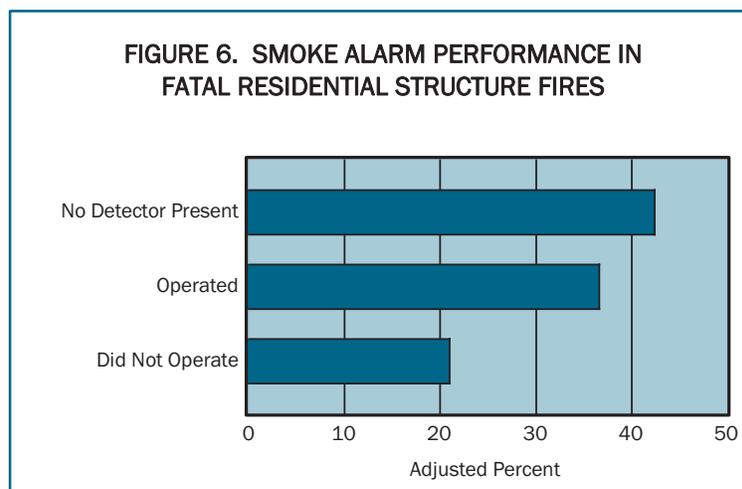
Figure 5 shows the monthly breakdown of all reported fatal fires in 2002. January has the most fatal fires with 14% of the annual total; December is second at 11% and February third at 10%. The frequency of fatal fires follows a seasonal trend, with fewer in the summer and considerably more in the winter. This pattern is repeated in residential structure fires but with a more pronounced winter peak. Fatal fires peak between 1 a.m. and 4 a.m.



Source: NFIRS 5.0

## SMOKE ALARM PERFORMANCE

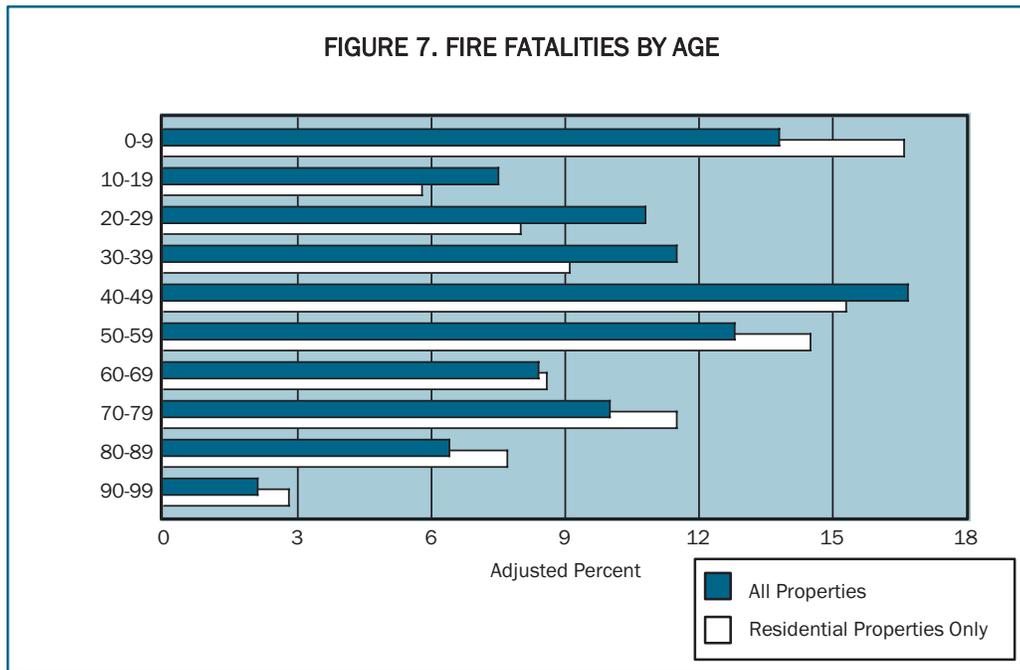
Smoke alarm performance in fatal residential structure fires is shown in Figure 6. Although more than 90% of homes have smoke alarms today,<sup>4,5</sup> no smoke alarms were present in 42% of residential structure fires where fatalities occurred. Smoke alarms were present in 58% of fatal residential structure fires, but only operational in 37% of those fatal fires.



Source: NFIRS 5.0

## PROFILE OF FATALITIES

Males died more frequently in fires (65%) than females, as has been the case for many years. Children under 10 years accounted for 14% of fire fatalities (Figure 7). The older population (65 and over) was the single largest group of fatalities and accounted for 23% of all fire deaths.



Source: NFIRS 5.0

The same general profile applied for residential structure fires: 59% of the fatalities were male; children under 10 years accounted for 17% of fire fatalities; and the older population accounted for 27% of the fatalities.

Thirty-five percent of those killed in fires were asleep at the time of injury. Twenty-five percent died trying to escape from the fire. Where a human factor was noted to contribute to residential fatalities, possible impairment by alcohol (14%) and physically disabled (12%) were noted as important factors.<sup>6</sup> More than half of residential fatalities were in the area of fire origin (57%) when fatal injury occurred, and 63% were involved in some manner in starting the fire.

## EXAMPLES

A January 2005 fire that claimed the lives of a mother and her 4-year-old daughter in the Chicago area was caused by the careless use of smoking materials. High concentrations of both alcohol and tranquilizers were found in the mother's blood. Carbon monoxide poisoning was the cause of death for both victims.<sup>7</sup>

Two adults died in two separate fires over the course of two days in St. Paul, Minnesota, in February 2005. The St. Paul Fire Chief believed that both incidents were preventable. Smoke detectors with missing batteries or otherwise inoperable were found in both homes. Careless smoking played a role in one fire, and possibly the second as well.<sup>8</sup>

Arson is suspected in the fire that killed a family of four in Pendleton, Oregon, in July 2002. A husband and wife and their daughters, aged 3 and 4, perished in their mobile home 3 days after a car was set on fire outside their home following a dispute.<sup>9</sup>

A March 2005 townhouse fire in a New Orleans suburb resulted in the deaths of 11 members of a family. Four people were able to escape. The fire was caused by a candle igniting a mattress. Authorities said one of the family members tried to move the burning mattress down a flight of stairs, limiting vital escape time and contributing to the tragedy.<sup>10</sup>

## CONCLUSION

The increase in arson fires that cause fatalities is a troublesome statistic. Many other fatal fires, however, are preventable. Many smoking-related fires can be prevented by ensuring that all smoking materials are properly extinguished and by not smoking in bed or the bedroom, or when drowsy. Properly maintaining, routinely inspecting, and properly installing heating equipment can best prevent the fatal fires caused by heating. Cooking should never be left unattended, and the cook should remain alert to the possibility of grease-type fires and how to quickly extinguish them.

Efforts must be made to establish a fire-safe home, especially a safe sleeping environment. The presence of a properly installed and functioning smoke alarm can prevent many fire fatalities.

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## Notes:

- <sup>1</sup> National estimates are based on 2002 data from the National Fire Incident Reporting System (NFIRS) and the National Fire Protection Association's (NFPA's) annual report, *Fire Loss in the United States During 2002*.
- <sup>2</sup> Distribution statistics are based on data from NFIRS 2002. At the time of this report, NFIRS is continuing to transition from version 4.1 to 5.0. Due to issues related to accurate conversion of version 4.1 data to version 5.0, this report is based on version 5.0 data only.
- <sup>3</sup> Lounge areas include living rooms, common rooms, TV rooms, dens, recreation rooms, family rooms, sitting rooms, music rooms, and the like.
- <sup>4</sup> Charles L. Smith, *Smoke Detector Operability Survey, Report on Findings (revised)*, Consumer Product Safety Commission, October 1994. Smith reports that 88% of homes surveyed had at least one smoke alarm.
- <sup>5</sup> Marty Ahrens, *U.S. Experience with Smoke Alarms and Other Fire Detection/Alarm Equipment*, National Fire Protection Association, November 2003. Ahrens notes the rise in smoke alarm usage; by 1999, smoke alarms were placed in 19 of 20 homes.
- <sup>6</sup> More than one human factor could contribute to the fatality. The percentages cited reflect percentages of all factors noted.
- <sup>7</sup> Chris Brenner, "Two Fire Deaths in Gurnee Home Ruled Accidental," *The NewsSun Online*, March 7, 2005  
<http://surbanchicagonews.com/newssun/top/w04inquest.htm>.
- <sup>8</sup> Mara H. Gottfried, "2nd Fire Death Worries Chief," *TwinCities.com*, February 27, 2005  
<http://twincities.com/mld/twincities/2005/02/28/news/local/11002530.htm>.
- <sup>9</sup> Karen Zacharias, "2 Arrested in Pendleton Fire Deaths," *Tri-City Herald.com*, July 30, 2002  
<http://Tri-Cityherald.com/news/2002/0730/story1.html>.
- <sup>10</sup> Michelle Hunter and Susan Langenhennig, "Mattresses, candles a deadly mix," *The Times-Picayune*, March 12, 2005  
<http://www.nola.com/news/t-p/frontpage/index.ssf?/base/news-3/111061068999980.xml>.