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Residential Smoking Fires and Casualties

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Findings

- Only 4% of all residential fires were reportedly caused by smoking materials in 2002. These fires, however, were responsible for 19% of residential fire fatalities and 9% of injuries.
- The fatality rate due to smoking is nearly four times higher than the overall residential fire rate; injuries are more than twice as likely.
- Forty percent of all smoking fires start in the bedroom or living room/family room; in 35% of these fires, bedding or upholstered furniture are the items first ignited.
- Smoking fire fatalities spike in the early morning hours when victims are asleep.
- Smoke alarms operated in only 43% of fires in which a fatality occurred. This is of concern since more than 90% of all residences are equipped with smoke alarms.
- Fire-safe cigarettes (self-extinguishing when not actively smoked) are becoming available, and they may soon be mandated by Congress or state legislatures.

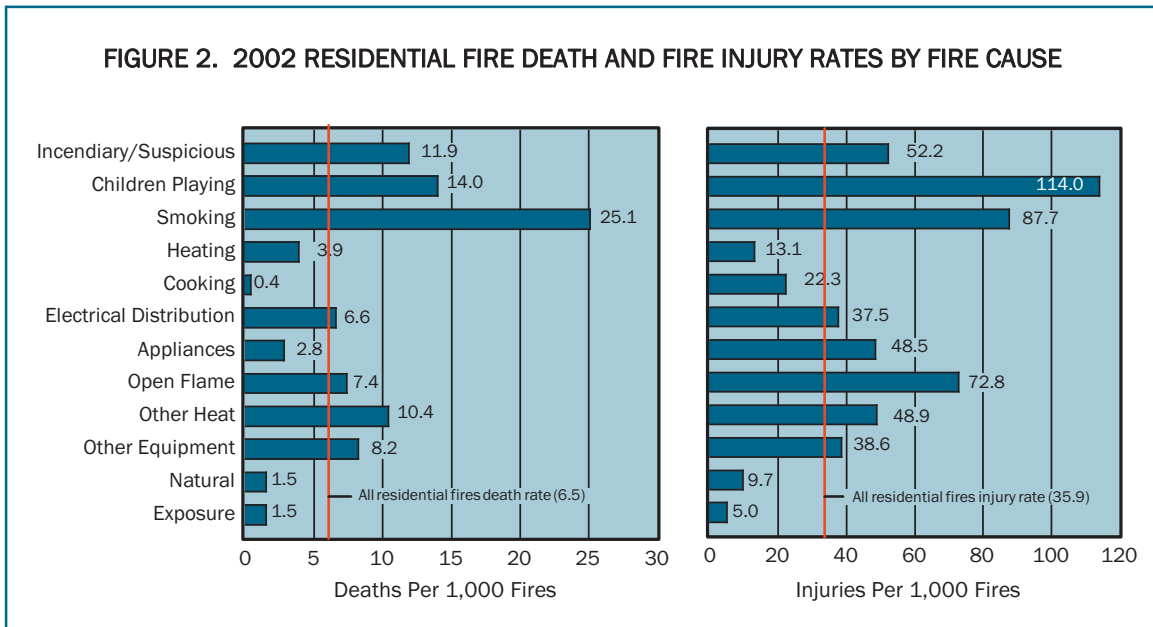
Smoking fires in residential properties are often local news media stories. The losses from smoking-caused fires have been consistently high over the past 25 years—the period in which fire cause trends have been tracked. Although one of the less frequent causes of fires, when smoking fires do occur they are the most deadly. They have consistently been the first or the second leading cause of fire deaths each and every year. This topical report examines the characteristics of smoking fires in residential buildings in 2002. In 2002 alone, lighted tobacco products caused an estimated 14,450 residential fires, 520 deaths, 1,330 injuries, and \$371 million in residential property damage.^{1,2}

Residential smoking fires are characterized by high levels of loss compared to other types of residential structure fires. While property loss per fire for residential smoking fires was 22% higher than for residential fires generally in 2002, it is the injury and death rates that were considerably higher than the residential average. As Figure 1 indicates, in 2002, the fire death rate was nearly four times higher than the overall residential fire rate. Likewise, residential smoking fires were more than twice as likely to result in injuries. Each year, smoking fires generally result in the highest fatality rate and among the highest injury rates for residential fires (Figure 2).

FIGURE 1. 2002 LOSS MEASURES FOR RESIDENTIAL SMOKING FIRES

Loss Measure	All Residential Structure Fires	Residential Smoking Fires
\$ Loss/Fire	\$11,832	\$14,478
Injuries/1,000 Fires	35.9	87.7
Fatalities/1,000 Fires	6.5	25.1

Source: NFIRS 5.0 data only



The higher death and injury rates of residential smoking fires are likely related to when and where smoking fires tend to occur. Many smoking fires originate in the bedroom, late in the night when the victims are sleeping. More often than not, the victims were involved with starting the fire itself.

Smoking fires represented only 4% of all known causes for residential property fires, but they were the second leading cause of residential fires that resulted in deaths in 2002 (19%). Deaths resulting from smoking fires were second only to arson (22% of all fire deaths). And smoking fires were the fourth leading cause of fire injury that year, responsible for 9% of all fire injuries.

WHERE SMOKING FIRES START

Many of the fires caused by lit tobacco products start in the bedroom or living room/family room areas of a home. When all the known causes of residential smoking fires are considered together, 28% of those fires originated in a bedroom of less than five occupants; 12% in the living/family room. Together, they account for 40% of all smoking fires.

ITEMS FIRST IGNITED

Upholstered furniture and trash were the two items most often ignited in 2002 residential smoking fires (Figure 3). When taken together, these two items accounted for 29% of all residential smoking fires. The leading four items first ignited (upholstered furniture, trash, mattresses, pillows, and bedding) accounted for nearly half (49%) of residential smoking fires. The high incidence (35%) of smoking fires where the item first ignited was upholstered furniture, mattresses, pillows, or bedding corresponds with bedrooms and living/family rooms as the area of fire origin.

FIGURE 3. LEADING ITEM FIRST IGNITED IN RESIDENTIAL SMOKING FIRES (2002)

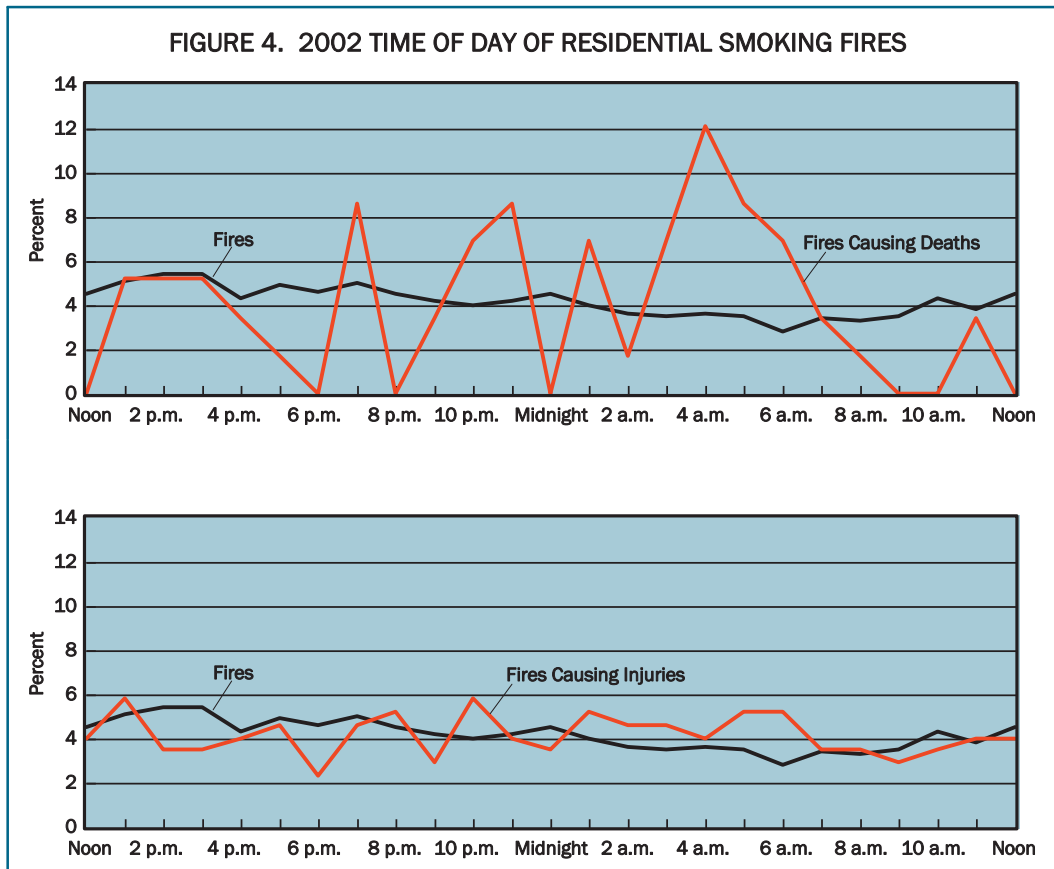
Item First Ignited	Percent of Fires
Upholstered Furniture	15.2
Trash	14.1
Mattress, pillow	10.7
Bedding	8.6

Source: NFIRS 5.0 data only

WHEN SMOKING FIRES OCCUR

Smoking fires occurred with a relatively even distribution across the 12 months of the year, with a slightly lower incidence in the late fall and early winter. As smoking tobacco products is not a seasonal activity, this distribution is not surprising.

Time of day of residential smoking fires, however, followed a distinct pattern. Smoking fire incidence in 2002 was lowest in the very early to mid morning hours and highest mid day and again in the early evening. Although residential smoking fire incidence dropped in early hours of the day, fires that resulted in fatalities, however, were at their highest during the very early hours of the morning when the victims were asleep. Smoking fires that result in injuries generally followed fire incidence, with a slight increase during sleeping hours (Figure 4).



Source: NFIRS 5.0 data only

PROPERTY TYPE

Smoking fires, like residential structure fires overall, occur predominantly in one- and two-family homes. One- and two-family homes along with multifamily dwellings (apartments) account for over 90% of both smoking fires and residential fires in general. Apartments, however, account for a larger share of smoking-related fires than for residential fires overall (Figure 5).

FIGURE 5. 2002 RESIDENTIAL SMOKING FIRES
BY MAJOR PROPERTY TYPE (percent)

Property Type	Residential Smoking Fires	All Residential Fires
One- and two-family	66.1	73.7
Multifamily	26.4	19.8
All other residential properties	7.6	6.6
Total	100.0	100.0

Total may not add due to rounding

Source: NFIRS 5.0 data only

HUMAN FACTORS CONTRIBUTING TO SMOKING FIRES

Among the human factors that contribute most to the occurrence of smoking fires is falling asleep. Where a human factor was noted as contributing to fire ignition, the majority of all lighted tobacco fires were caused when the smoker (or other responsible party) fell asleep (36%). Unattended or unsupervised individuals and alcohol and other substance abuse play important roles in smoking fires as well. Unattended or unsupervised individuals accounted for 24% of residential smoking fires, followed closely by alcohol and other substance abuse at 23%.

SMOKE ALARM PERFORMANCE

Smoke alarm performance in residential smoking fires and fatal residential smoking structure fires is shown in Figure 6. Although more than 90% of homes have smoke alarms today, no smoke alarms were present in 36% of residential smoking fires and in 32% of residential smoking fires where fatalities occurred. Smoke alarms were present in 64% of residential smoking fires, but only operated in 39% of those fires. For residential smoking fires resulting in fatalities, smoke alarms were present in 68% of the fires, but operated in 43% of those fires. It is a continuing concern that fire fatalities occur with operating alarms.

FIGURE 6. 2002 SMOKE ALARM PERFORMANCE
IN RESIDENTIAL SMOKING FIRES (percent)

Smoke Alarm Performance	Residential Smoking Fires	Residential Smoking Fatal Fires
Present and operated	39.2	43.4
Present and did not operate	24.7	24.8
No alarm present	36.0	31.8
Total	100.0	100.0

Source: NFIRS 5.0 data only

FIRE CASUALTIES

Fires resulting from smoking materials were responsible for a large portion of the fire deaths reported to NFIRS in 2002. In years past, smoking was the primary cause of fire death. However, 2002 saw a slight decline in deaths caused by smoking fires and smoking fires were the second leading cause of fire deaths (following arson). Of all residential fire deaths in 2002, 19 percent were from fires caused by smoking materials. Nine percent of all fire injuries were caused by smoking fires that year.

Age. Middle-aged and older adults are most often killed or injured in residential smoking fires. NFIRS data indicate that 77% of smoking fire fatalities were age 40 or above. This same age group accounts for 60% of all residential fire fatalities. Children are not often victims of smoking fires—only 5% of all residential fire fatalities in 2002 were among children aged 0 to 14. Likewise, 5% of the residential smoking fire injuries were children in this age group.

Smoking fire-related injuries peaked at ages 40 to 49 and accounted for approximately one quarter (26%) of all smoking fire-related injuries. By contrast, residential fire-related injuries peaked at ages 30 to 39. This age group accounted for approximately 20% of all fire injuries.

Location at Time of Injury. Smoking material fires are the most injurious to the individual smokers. Nearly three-quarters of residential smoking fire fatalities were involved in starting the fire. The vast majority of these fatalities (90% of those involved with the fire ignition or 67% of smoking fire fatalities) were in the area of ignition when the fire started. In addition, well over half of residential smoking fire injuries (63%) happened to the person ostensibly smoking and responsible for starting the fire. Half of those injured were in the area of ignition when the fire started.

Activity at Time of Injury. As those residential smoking fires that injure are more prevalent at night, it is not surprising that casualties of residential smoking fires were sleeping at the time they sustained the injury. Forty percent of those killed in residential smoking fires were asleep, as were 35% of those injured.

A SAFER APPROACH TO SMOKING

Because lighted tobacco materials fires are severe in terms of the injury and property loss they cause, significant attention has been given to finding a safer cigarette in terms of the fire risk. Traditional cigarettes burn continuously, even when unattended. Efforts have been made to design a fire-safe cigarette, one that is designed to extinguish itself when not being actively smoked. Changes in the cigarette dimensions, density of tobacco, paper porosity, and additives may reduce the likelihood that a safe cigarette will ignite bedding or soft furnishings, typical items first ignited in lighted tobacco materials fires.

Legislative measures undertaken in Congress in the 1990s mandated fire-safe cigarette test methods. New York was the first state to investigate making fire-safe cigarettes available to its residents, and in 2004 New York passed a law requiring the sale of fire-safe cigarettes. Meanwhile, the Cigarette Fire Safety Act of 2004 was introduced to both houses of the U.S. Congress, and then again to the U.S. Senate in 2005.³

EXAMPLES

- March 2005: An unattended cigarette ignited living room furniture, causing the smoking fire in Maryland that killed three members of the same family—a 91-year-old woman, a 49-year-old man, and a 9-year-old child.⁴
- March 2005: In the State of Washington, a man and woman in their 80s were found dead in a fire that broke out around 8:00 a.m. and was confined to their bedroom. One of the older adults had been smoking in bed.⁵
- August 2004: A 72-year-old man died in a Washington, D.C. fire that was apparently started when smoking materials ignited a couch. The presence of smoke alarms in the apartment was not confirmed, but the general building fire alarm was out of service.⁶
- August 2004: An elderly man was critically injured and his 60-year-old daughter was killed in a fire in their Ohio home. The woman had been smoking on a couch when the 1 a.m. fire broke out. There was an oxygen tank next to her. A second woman was able to escape while attempting to rescue the victim.⁷

CONCLUSION

With only 4% of residential fires resulting in such high proportions of fire casualties, more attention needs to be given to preventing fires caused by lighted tobacco materials.

Fires attributed to smoking materials tend to lead the list of causes in fire fatalities each year. The risk of dying in fires caused by lit tobacco products increases with increasing age. Children are the least likely to be injured in smoking fires, even though some studies show an increase in teen smoking activities.^{8,9} Meanwhile, older adults face an elevated risk of fire death in the presence of smoking materials. Additional public fire safety education programs, along with strict government mandates for safer cigarettes, could help improve the situation.

To request additional information or comment on this report, visit
<http://www.usfa.fema.gov/applications/feedback>

Notes:

1. Loss estimates are based on 2002 National Fire Incident Reporting System (NFIRS) data and national residential structure fire loss estimates from the National Fire Protection Association's (NFPA's) *Fire Loss in the United States During 2002*.
2. Distribution statistics are based on data from the NFIRS 2002. At the time of this report, NFIRS continues to transition from version 4.1 to 5.0. Due to issues related to accurately converting version 4.1 data to version 5.0, this report is based on data reported only in version 5.0.
3. "Fire-Safe Cigarette—Legislative Update, American Burn Association, <http://ameriburn.org/advocacy/fireSafeCig.htm>.
4. "Four Killed in Area House Fire," WTOP Radio News, March 31, 2005, <http://wtop.com/index.php?sid+352359&nid=25>.
5. "Elderly Lakewood Couple Killed in Smoky House Fire," March 12, 2005, http://seattlepi.nwsource.com/local/215687_lakewood12.html.
6. Alan Etter, "Apartment Fire Kills Northwest Man," August 13, 2004, <http://www.dcfld.com/fg476.htm>.
7. Fire in Oakley Kills Woman, Burns Father," *The Enquirer*, August 13, 2004, http://www.enquirer.com/editions/2004/08/13/loc_oakleyfire13.html.
8. "Teens Report Being More Susceptible to Smoking After Minnesota Ends Anti-Tobacco Campaign," Centers for Disease Control Tobacco Information and Prevention Source (TIPS), Press Release, April 16, 2004, http://cdc.gov/tobacco/research_data/youth/mm5314a1_PressRelease.htm.
9. "Teens and Tobacco: What's Really In?," Centers for Disease Control Tobacco Information and Prevention Source (TIPS), May 3, 2002, <http://cdc.gov/tobacco/christy/TeensandTobacco.htm>.