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Smoking-Related Fires in Residential Buildings (2008–2010)

These topical reports are designed to explore facets of the U.S. fire problem as depicted through data collected in the U.S. Fire Administration's (USFA's) National Fire Incident Reporting System (NFIRS). Each topical report briefly addresses the nature of the specific fire or fire-related topic, highlights important findings from the data, and may suggest other resources to consider for further information. Also included are recent examples of fire incidents that demonstrate some of the issues addressed in the report or that put the report topic in context.

Findings

- An estimated 7,600 smoking-related fires in residential buildings occur each year in the United States.
- While smoking-related fires accounted for only 2 percent of all residential building fires, they were a leading cause of civilian fire deaths, accounting for 14 percent of fire deaths in residential buildings.
- Nonconfined fires accounted for 93 percent of residential building smoking-related fires.
- Sixty-seven percent of the nonconfined residential building smoking-related fires occurred because of abandoned or discarded smoking materials or products, primarily cigarettes.
- The bedroom was the leading area of fire origin for nonconfined residential building smoking-related fires at 24 percent.
- Residential building smoking-related fires occurred most often from noon to 8 p.m., peaking from 2 to 3 p.m. at 6 percent.

Between 2008 and 2010, an estimated annual average of 7,600 smoking-related fires occurred in residential buildings in the United States. These smoking-related fires accounted for 2 percent of residential building fires responded to by fire departments across the Nation and resulted in an average of approximately 365 deaths, 925 injuries, and $326 million in property loss each year.[1, 2, 3]

The term "smoking-related fires" applies to those fires that are caused by cigarettes, cigars, pipes, and heat from undetermined smoking materials.[4] The U.S. Fire Administration (USFA) differentiates between smoking as a cause of fires and fires ignited by smoking materials. Smoking and smoking-related fires are considered a behavioral cause. Fires ignited by smoking materials are considered as a group of fires where smoking materials were the heat source. The two sets are similar but not identical. A deliberately set fire with smoking materials as the heat of ignition would be considered an "intentional" fire; a fire unintentionally set by someone smoking (cigarettes, cigars, or other smoking materials) would be considered a "smoking-related fire."[5] This report addresses the characteristics of residential building smoking-related fires as reported to the USFA's National Fire Incident Reporting System (NFIRS) between 2008 and 2010.

Annual estimates of residential building smoking-related fires and associated losses for 2008–2010 are presented in Table 1. Recent trends in residential building smoking-related fires and losses tend to be declining.[6] Prevention programs, usage of smoke alarms and residential sprinkler systems, and safer smoking materials such as fire-safe cigarettes have likely attributed to the decrease in the incidence of residential smoking-related fires.

Table 1. National Estimates of Residential Building Smoking-Related Fires and Losses by Year (2008–2010)

Year	Residential Building Smoking-Related Fires	Residential Building Smoking-Related Fire Deaths	Residential Building Smoking-Related Fire Injuries	Residential Building Smoking-Related Fire Dollar Loss
2008	8,300	390	950	$334,700,000
2009	7,000	360	900	$356,500,000
2010	7,600	350	950	$286,200,000

Sources: NFIRS 5.0, residential structure fire-loss estimates from the National Fire Protection Association's (NFPA's) annual surveys of fire loss, and USFA's residential building fire-loss estimates.
Notes: 1) Fires are rounded to the nearest 100, deaths to the nearest 5, injuries to the nearest 25, and loss to the nearest million dollars.
2) The 2008 and 2009 dollar-loss values were adjusted to their equivalent 2010 dollar-loss values to account for inflation.

While smoking-related fires only accounted for 2 percent of all residential building fires, they were one of the leading causes of fire deaths, accounting for 14 percent of fire deaths in residential buildings. The fatality rate per 1,000 fires was more than 7 times greater in smoking-related fires than in nonsmoking-related residential building fires. The injury rate per 1,000 fires was more than 3 times greater in smoking-related fires than in nonsmoking-related residential building fires. In addition, 13 percent of all smoking-related fires in residential buildings occurred in bedrooms when smoking materials ignited mattresses and bedding. The combination of cigarettes and mattress flammability has long been recognized as a serious issue. In 1973, the Federal Mattress Flammability Standard became effective, requiring that mattresses be resistant to ignition from smoldering cigarettes.[7]

Other important measures have been taken to promote fire safety and education about the dangers of smoking-related fires. For example, in the 1980s, grassroots organizations and Congress worked to pass bills that would require cigarettes to pass ignition tests. These efforts resulted in the 1984 Cigarette Safety Act and the Fire Safe Cigarette Act of 1990, both of which stimulated research to make cigarettes more "fire safe" and less likely to prevent future fire tragedies.[8] The years of legislative and research initiatives culminated in the first State-based legislation in New York to establish what are called "ignition propensity" standards cigarettes. Since the New York State legislation was enacted in 2003, all 50 States have adopted fire-safe cigarette regulations with the last State passing legislation in March 2010. By July 2011, all State-based fire-safe cigarette legislation was implemented.

For the purpose of this report, the term "residential smoking fires" is synonymous with "residential building smoking-related fires," and the term "residential nonsmoking fires" is synonymous with "residential building nonsmoking-related fires." "Residential smoking fires" and "residential nonsmoking fires" are used throughout the body of this report; the findings, tables, charts, headings, and footnotes reflect the full categories, "residential building smoking-related fires" and "residential building nonsmoking-related fires."

Type of Fire

Building fires are divided into two classes of severity in NFIRS: "confined fires," which are those fires confined to certain types of equipment or objects and "nonconfined fires," which are not. Confined building fires are small fire incidents that are limited in extent, staying within pots or fireplaces or certain other noncombustible containers.[9] Confined fires rarely result in serious injury or large content losses and are expected to have no significant accompanying property losses due to flame damage.[10]

The majority of residential smoking fires were generally larger, nonconfined fires (93 percent) as shown in Table 2. By comparison, 51 percent of all residential building fires were nonconfined fires.[11]

Table 2. Residential Building Smoking-Related Fires by Type of Incident (2008–2010)

Incident Type	Percent
Nonconfined fires	93.49
Confined fires	6.51
Trash or rubbish fire, contained	5.80
Cooking fire, confined to container	0.36
Commercial compactor fire, confined to rubbish	0.22
Chimney or flue fire, confined to chimney or flue	0.11
Fuel burner/boiler malfunction, fire confined	0.02
Total	100.00

Source: NFIRS 5.0.
Note: It is rare that confined smoking-related fires are associated with cooking and heating. Ninety-three percent of the confined smoking-related fires are from fires in trash or garbage bins.

Loss Measures

Table 3 presents losses, averaged over this 3-year period, for reported residential smoking and nonsmoking fires.[12]

Overall, the fire death rate for residential smoking fires was substantially higher than that for residential nonsmoking fires—24.2 deaths per 1,000 fires versus 3.1 deaths per 1,000 fires. The rate of fire injuries from smoking in residences was more than triple that of residential nonsmoking fires. Dollar loss from residential smoking fires was also higher than residential nonsmoking fires at more than twice the loss per fire.

Table 3. Loss Measures for Residential Building Smoking-Related and Nonsmoking-Related Fires (3-year average, 2008–2010)

Measure	Residential Building Smoking-Related Fires	**Confined** Residential Building Smoking-Related Fires	**Nonconfined** Residential Building Smoking-Related Fires	Residential Building Nonsmoking-Related Fires
Average Loss:				
Fatalities/1,000 Fires	24.2	0.0	25.9	3.1
Injuries/1,000 Fires	91.0	8.1	96.8	25.0
Dollar Loss/Fire	$25,820	$230	$27,600	$11,940

Source: NFIRS 5.0.

Notes: 1) No deaths in a confined fire were reported to NFIRS during 2008–2010; the resulting loss of 0.0 fatalities per 1,000 fires reflects only data reported to NFIRS.
2) Average loss for fatalities and injuries is computed per 1,000 fires; average dollar loss is computed ***per fire*** and is rounded to the nearest $10.
3) When calculating the average dollar loss per fire for 2008–2010, the 2008 and 2009 dollar-loss values were adjusted to their equivalent 2010 dollar-loss values to account for inflation.
4) Nonsmoking-related residential building fires do not include fires of unknown cause.

Type of Smoking Material Involved in Residential Building Smoking-Related Fires

Cigarettes were, by far, the leading type of smoking material involved in residential smoking fires and accounted for 86 percent of these fires (Table 4). Pipes or cigars were involved in the ignition of very few residential smoking fires (2 percent). The type of smoking material was undetermined in 12 percent of residential smoking fires.

Table 4. Sources of Heat in Residential Building Smoking-Related Fires (3-year average, 2008–2010)

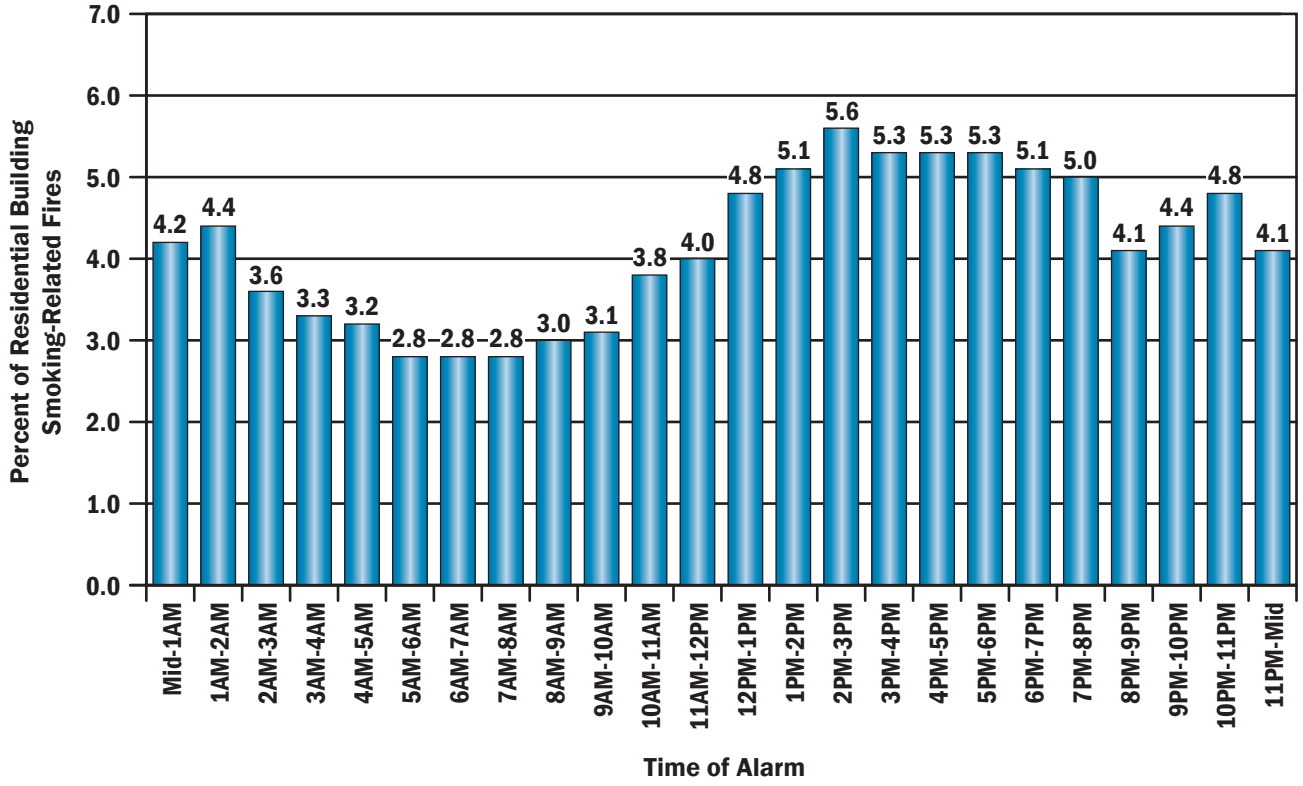
Heat Source	Percent of Residential Building Smoking-Related Fires
Cigarette	86.3
Heat from undetermined smoking material	12.0
Pipe or cigar	1.7
Total	100.0

Source: NFIRS 5.0.

When Residential Building Smoking-Related Fires Occur

As shown in Figure 1, residential smoking fires occurred most often from noon to 8 p.m., peaking from 2 to 3 p.m. at 6 percent.[13] They declined throughout the evening and early morning and reached their lowest point during the morning hours (5 to 8 a.m.). While the period from noon to 8 p.m. accounted for 42 percent of residential smoking fires, the smoking fires that occurred in the late evening and early morning hours tended to be the most deadly.

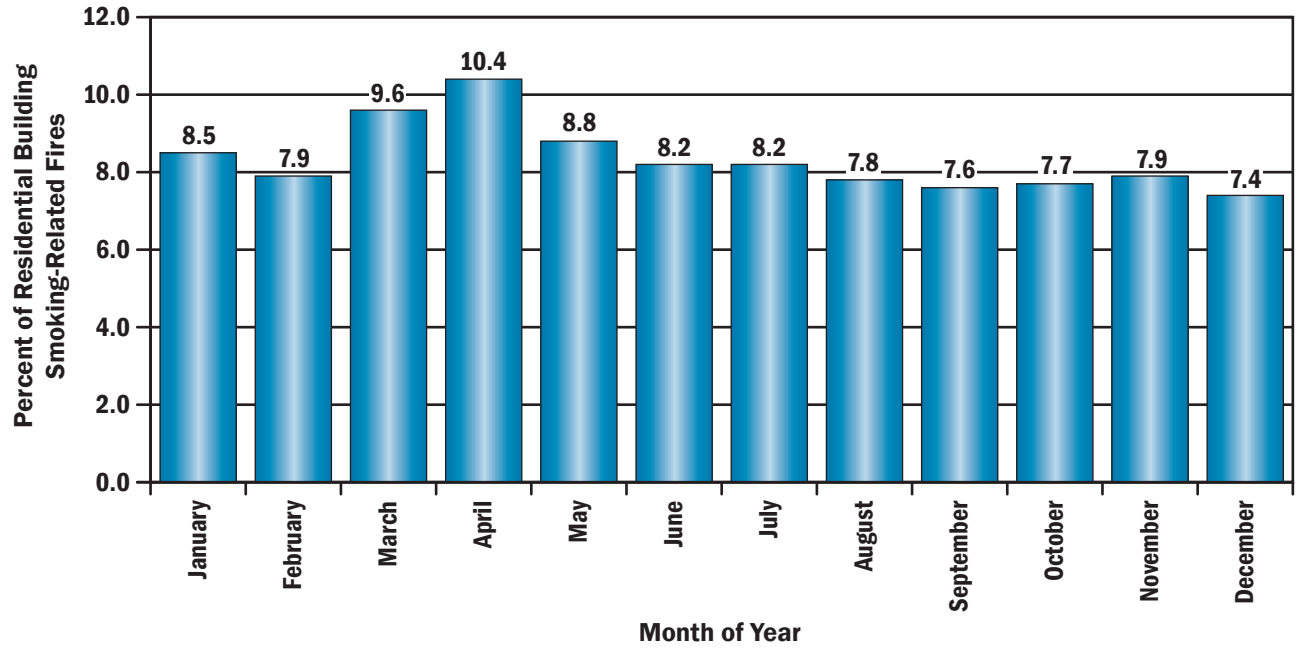
Figure 1. Residential Building Smoking-Related Fires by Time of Alarm (2008–2010)



Source: NFIRS 5.0.
Note: Total does not add up to 100 percent due to rounding.

The incidence of residential smoking fires peaked in April at 10 percent and declined throughout the remainder of the year (Figure 2). The percent of fires declined to the lowest point in December. Despite fewer numbers of residential smoking fires in the winter months as compared to the spring peak, more people died in residential smoking fires in the months of January, February, and March—37 percent of residential smoking fire deaths occurred during these months.

Figure 2. Residential Building Smoking-Related Fires by Month (2008–2010)

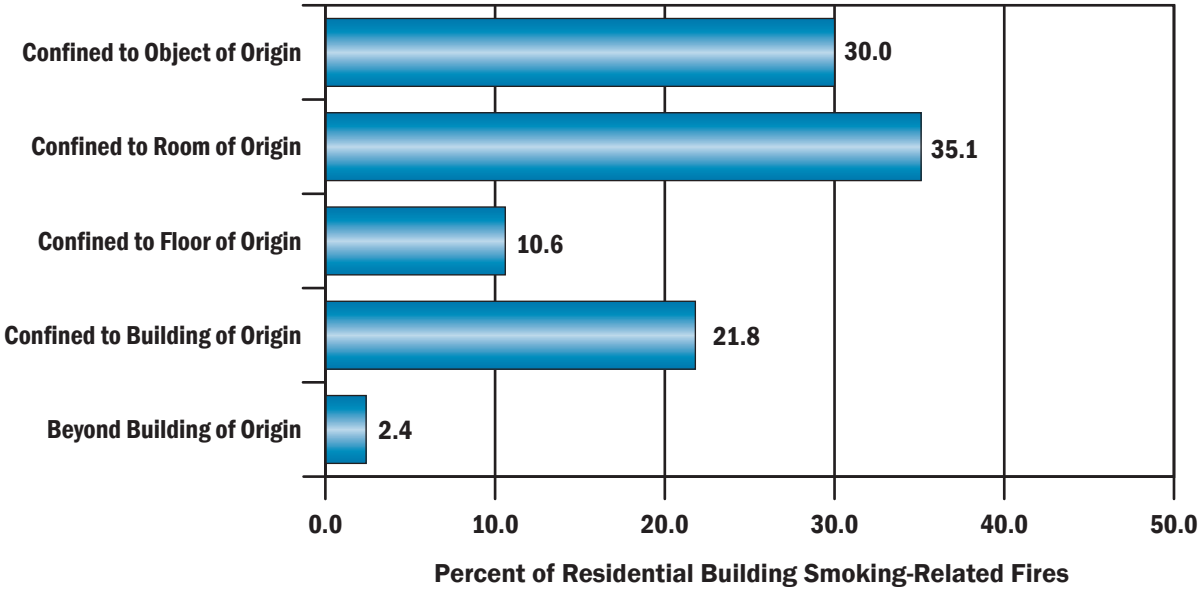


Source: NFIRS 5.0.

Fire Spread in Residential Building Smoking-Related Fires

Thirty percent of residential smoking fires were confined to the object of origin, either because the incident was an NFIRS-defined confined fire[14] or because the fire was confined to the object, such as an upholstered chair or sofa. Thirty-five percent of residential smoking fires extended beyond the room of origin (Figure 3).

Figure 3. Extent of Fire Spread in Residential Building Smoking-Related Fires (2008–2010)



Source: NFIRS 5.0.

Notes: 1) The percent of fires that are confined to the object of origin is not the same as the percent that are defined as "confined fires." The NFIRS definition of "confined fires" is fires confined to a fire-resistant container such as a pot, fireplace, or waste container.
2) Total does not add up to 100 percent due to rounding.

Confined Fires

NFIRS allows abbreviated reporting for confined fires, and many reporting details of these fires are not required. As a result, data are often not reported on these fires. Because confined residential smoking fires accounted for only 7 percent of residential smoking fire incidents, they represent a small portion of the time-of-alarm profile. Confined residential smoking fires were greatest during the hours of 7 to 8 p.m. when they accounted for 10 percent of all smoking residential fires that occurred during this period. Between 2008 and 2010, confined residential smoking fires were most prevalent in March and November and varied throughout the remainder of the year.

Nonconfined Fires

Nonconfined residential smoking fires accounted for 93 percent of all residential smoking fire incidents. The next sections of this Topical Report address nonconfined residential smoking fires, where detailed fire data were available.

Where Nonconfined Residential Building Smoking-Related Fires Start (Area of Fire Origin)

Approximately one quarter of nonconfined residential smoking fires (24 percent) originated in bedrooms. Bedrooms were also the leading area of origin in fatal residential smoking fires (40 percent).

Exterior balconies and unenclosed porches were the second leading areas of origin of nonconfined residential smoking fires, at 15 percent. Common rooms, including living rooms, family rooms, dens or lounge areas (11 percent), exterior wall surfaces (6 percent), and courtyards, patios, and terraces (6 percent) accounted for 22 percent of all nonconfined residential smoking fires (Table 5).[15]

Table 5. Leading Areas of Fire Origin in Nonconfined Residential Building Smoking-Related Fires (2008–2010)

Area of Origin	Percent of Nonconfined Residential Building Smoking-Related Fires (Unknowns Apportioned)
Bedrooms	23.7
Exterior balconies, unenclosed porches	14.7
Common room, den, family room, living room, lounge	10.7
Exterior wall surfaces	5.8
Courtyards, patios, terraces	5.6

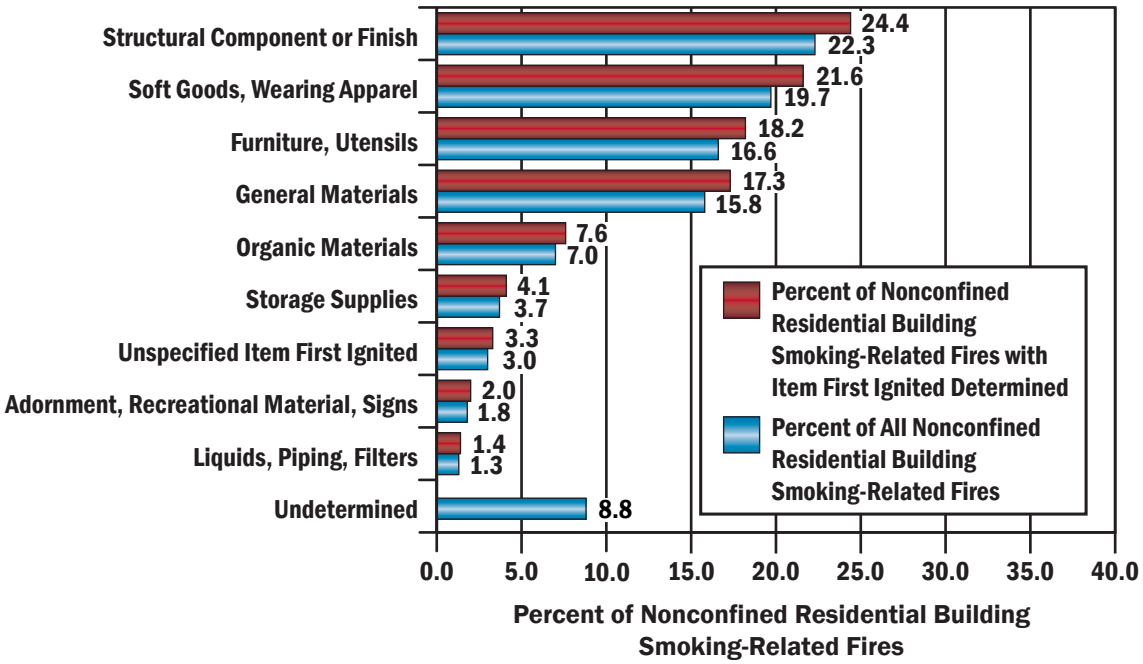
Source: NFIRS 5.0.

What Ignites First in Nonconfined Residential Building Smoking-Related Fires

Twenty-four percent of the items first ignited in nonconfined residential smoking fires fell under the "structural component or finish" category (Figure 4). This category includes exterior sidewall coverings, surfaces, and finishes, as well as structural members or framing. At 22 percent, the second leading category of items first ignited, "soft goods, wearing apparel," includes clothing, mattresses, pillows, and bedding—sheets, blankets, and comforters. "Furniture, utensils" was the third leading category (18 percent).

Upholstered sofas and chairs (13 percent) and rubbish, trash, and waste (12 percent) were the specific items most often first ignited in nonconfined residential smoking fires. In bedrooms, the leading area of fire origin for nonconfined residential smoking fires, mattresses and pillows (29 percent) and bedding (27 percent) were the items most often first ignited.

Figure 4. Item First Ignited in Nonconfined Residential Building Smoking-Related Fires by Major Category (2008–2010)



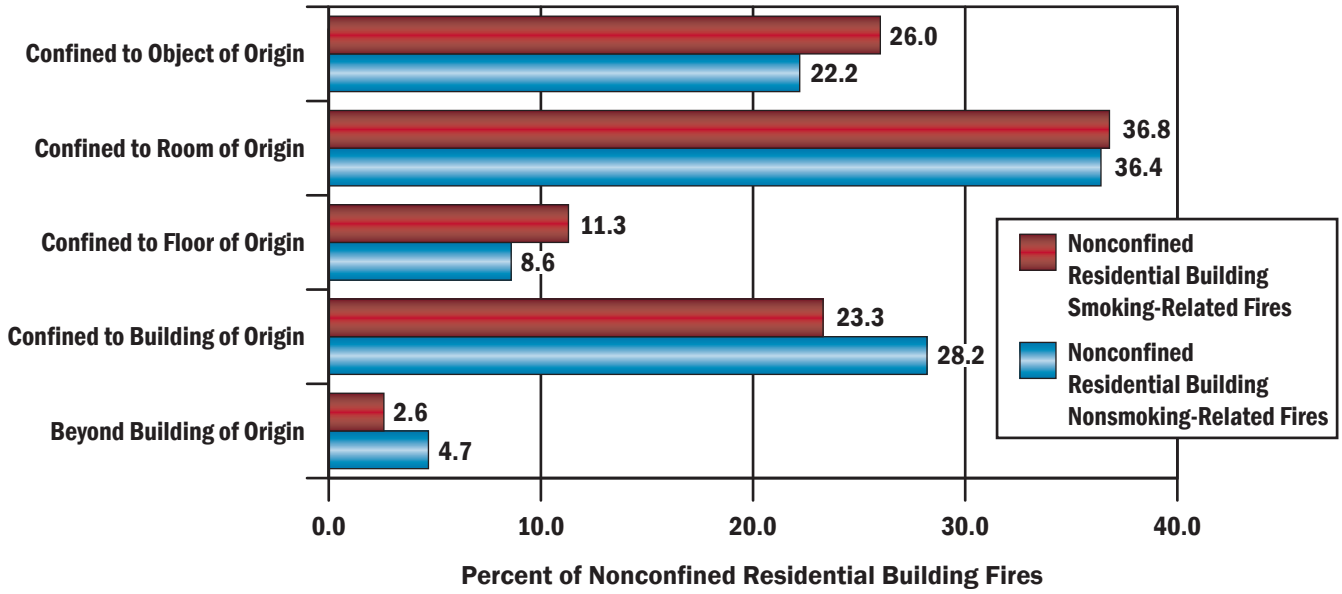
Source: NFIRS 5.0.
Note: Total of nonconfined residential building smoking-related fires with item first ignited determined does not add up to 100 percent due to rounding.

Fire Spread in Nonconfined Residential Building Smoking-Related Fires

Nonconfined residential smoking fires tended to remain within the confines of the room of origin, either confined to the object itself or spreading, but staying within the room of origin. The majority of nonconfined residential smoking fires, 63 percent, were limited to the object or room of fire origin (Figure 5). Nonconfined residential nonsmoking fires, by contrast, were limited to the object or room of fire origin less often (59 percent) and tended to be larger spreading—33 percent of nonconfined residential nonsmoking fires spread to the building of origin or beyond while only 26 percent of nonconfined residential smoking fires spread to this extent.

While smoking fires tended to be smaller than other causes of residential fires, they were still dangerous. Case in point: 43 percent of fatal nonconfined residential smoking fires never spread beyond the room of origin; only 23 percent of fatal nonconfined residential nonsmoking fires remained contained to the object or room of origin.

Figure 5. Extent of Fire Spread in Nonconfined Residential Building Smoking-Related Fires and Nonconfined Residential Building Nonsmoking-Related Fires (2008–2010)



Source: NFIRS 5.0.
Notes: 1) Total of nonconfined residential building nonsmoking-related fires does not add up to 100 percent due to rounding.
2) Nonconfined residential building nonsmoking-related fires do not include fires of unknown cause.

Factors Contributing to Ignition in Nonconfined Residential Building Smoking-Related Fires

Table 6 shows the leading factors contributing to ignition for nonconfined residential smoking fires. These three factors were cited in 93 percent of nonconfined residential smoking fires. "Abandoned or discarded materials or products" was the leading factor contributing to ignition (67 percent) and was cited as a contributing factor more than four times the second leading factor, "unspecified misuse of material or product" (16 percent). The "heat source too close to combustibles" contributed to the ignition of the fire in 11 percent of nonconfined residential smoking fires.[16] Cigarettes were the primary smoking material cited as the heat source in all three factors.

Table 6. Leading Factors Contributing to Ignition for Nonconfined Residential Building Smoking-Related Fires (Where Factor Contributing to Ignition is Specified, 2008–2010)

Factor Contributing to Ignition	Percent of Nonconfined Residential Building Smoking-Related Fires Where Contributing Factor Specified
Abandoned or discarded materials or products	66.6
Unspecified misuse of material or product	15.5
Heat source too close to combustibles	10.9

Source: NFIRS 5.0.
Notes: 1) Includes only incidents where factors that contributed to the ignition of the fire were specified.
2) Multiple factors contributing to fire ignition may be noted for each incident.

Alerting/Suppression Systems in Residential Building Smoking-Related Fires

Smoke Alarms

Smoke alarm data are available for both confined and nonconfined fires although for confined fires, the data are very limited in scope. Note that the data presented in Tables 7 to 9 are the raw counts from the NFIRS data set and are not scaled to national estimates of smoke alarms in residential smoking fires. In addition, NFIRS does not allow for the determination of the type of smoke alarm—that is, if the smoke alarm was photoelectric or ionization, or the location of the smoke alarm with respect to the area of fire origin.

Smoke Alarms in Nonconfined Fires

Overall, smoke alarms were reported as present in 52 percent of nonconfined residential smoking fires (Table 7). By comparison, smoke alarms were present in 47 percent of nonconfined residential nonsmoking fires. Smoke alarms were known to be absent in 25 percent of nonconfined residential smoking fires, and firefighters were unable to determine if a smoke alarm was present in another 24 percent of these fires. Thus, smoke alarms were potentially missing in between 25 to 49 percent of fires with the ability to spread or result in fatalities.

Table 7. Presence of Smoke Alarms in Nonconfined Residential Building Smoking-Related and Nonsmoking-Related Fires (2008–2010)

Presence of Smoke Alarms	Nonconfined Residential Building Smoking-Related Fires (Percent)	Nonconfined Residential Building Nonsmoking-Related Fires (Percent)
Present	51.5	46.6
None present	24.9	26.1
Undetermined	23.6	27.3
Total	100.0	100.0

Source: NFIRS 5.0.

Of concern are fires in residential buildings that are **not** currently or routinely occupied. While these fires are a small portion of residential smoking fires (5 percent), these occupancies—buildings under construction, undergoing major renovation, vacant, and the like—are also unlikely to have alerting and suppression systems that are in place and, if in place, that operate. Only 9 percent of smoking fires in residential buildings that are not routinely occupied were reported as having operating smoke alarms.

Smoke Alarms in Occupied Housing

One of the most important values of smoke alarms is detecting smoldering fires before they break into open flame or produce large volumes of smoke. Smoke alarms are especially useful in early detection of fires caused by cigarettes, which fit this pattern and produce sufficient smoke to be detected before they become deadly. For fatal residential smoking fires that occur at night, often after a smoker has dropped a cigarette onto upholstered furniture or bedding, having a working smoke alarm can be the difference between life and death.

Smoke alarms were reported as present in 53 percent of nonconfined residential smoking fires in occupied housing (Table 8). Smoke alarms were known to have operated in 28 percent of nonconfined smoking fires in occupied housing and were known to be absent in 23 percent. Firefighters were unable to determine if a smoke alarm was present in another 24 percent of these fires. Thus, smoke alarms were potentially missing in between 23 to 47 percent of nonconfined residential smoking fires in occupied housing with the ability to spread or result in fatalities.

When operational status is considered for nonconfined residential smoking fires in occupied housing, the percentage of smoke alarms reported as present (53 percent) consisted of:

- smoke alarms present and operated—28 percent;
- present, but did not operate—18 percent (fire too small, 11 percent; alarm did not operate, 8 percent);[17] and
- present, but operational status unknown—7 percent.

When the subset of incidents where smoke alarms were reported as present is analyzed separately, smoke alarms were reported to have operated in 53 percent of the incidents. The alarms failed to operate, however, in 14 percent of the incidents. In 20 percent of the incidents, the fire was too small to activate the alarm. The operational status of the alarm was undetermined in an additional 14 percent of the incidents.[18]

Because smoking is a leading cause of civilian fire deaths in residential buildings, these statistics suggest the need to pay special attention to smoke alarm maintenance in households with smokers. For this reason, in several prevention initiatives involving door-to-door checks on smoke alarm presence and maintenance, a smoker living in the residence is noted.[19, 20]

Table 8. NFIRS Smoke Alarm Data for Nonconfined Residential Building Smoking-Related Fires in Occupied Housing (2008–2010)

Presence of Smoke Alarms	Smoke Alarm Operational Status	Smoke Alarm Effectiveness	Count	Percent
Present	Fire too small to activate smoke alarm		1,205	10.5
	Smoke alarm operated	Smoke alarm alerted occupants, occupants responded	2,283	19.9
		Smoke alarm alerted occupants, occupants failed to respond	164	1.4
		No occupants	285	2.5
		Smoke alarm failed to alert occupants	133	1.2
		Undetermined	333	2.9
	Smoke alarm failed to operate		864	7.5
	Undetermined		823	7.2
None present			2,658	23.2
Undetermined			2,725	23.8
Total incidents			11,473	100.0

Source: NFIRS 5.0.

Notes: 1) The data presented in this table are raw data counts from the NFIRS data set. They do not represent national estimates of smoke alarms in nonconfined residential building smoking-related fires in occupied housing. They are presented for informational purposes.
2) Total does not add up to 100 percent due to rounding.

Smoke Alarms in Confined Fires

Less information about smoke alarm status is collected for confined fires, but the data still give important insights. Smoke alarms operated and alerted occupants in 32 percent of confined residential smoking fires (Table 9). The analyses presented here do not differentiate between occupied and nonoccupied housing, as this data detail is not part of the confined fires reporting requirement. (This additional data detail was reported for only 30 percent of confined residential smoking fire incidents.) In addition, the analyses assume that confined fires are fires in occupied structures—by definition, confined fires (small fires confined to a noncombustible container) appear to imply an occupied structure as they are unlikely to be reported otherwise.

Occupants were not alerted by the smoke alarm in 31 percent of confined residential smoking fires.[21] Smoke alarm effectiveness was unknown in 36 percent of confined residential smoking fires.

Table 9. NFIRS Smoke Alarm Data for Confined Residential Building Smoking-Related Fires (2008–2010)

Smoke Alarm Effectiveness	Count	Percent
Smoke alarm alerted occupants	280	32.4
Smoke alarm did not alert occupants	270	31.3
Unknown	313	36.3
Total incidents	863	100.0

Source: NFIRS 5.0.

Note: The data presented in this table are raw data counts from the NFIRS data set. They do not represent national estimates of smoke alarms in confined residential building smoking-related fires. They are presented for informational purposes.

Automatic Extinguishment Systems

The analyses presented do not differentiate between occupied and nonoccupied housing, as few reported fires in nonoccupied housing have automatic extinguishment systems (AESs) present. (Occupied housing accounted for 98 percent of reported nonconfined residential smoking incidents with AESs.) AESs were reported as present in only 3 percent of nonconfined residential smoking fires in buildings not routinely occupied.

Full or partial AESs were present in 6 percent of nonconfined residential smoking fires (Table 10). The lack of an AES is not unexpected as only 3 percent of all nonconfined residential building fires have an AES present.[22] Eighty percent of nonconfined residential smoking fires with a full AES present were confined to the object or the room of origin—an important consideration for containing smoking fires as they are a leading cause of residential fatal fires. Sixty-nine percent of AESs in nonconfined residential smoking fires were in multifamily occupancies.

Note that the data presented in Table 10 are the raw counts from the NFIRS data set and are not scaled to national estimates of AESs in residential smoking fires.

Table 10. NFIRS Automatic Extinguishing System (AES) Data for Nonconfined Residential Building Smoking-Related Fires (2008–2010)

AES Presence	Count	Percent
AES present	705	5.7
Partial system present	38	0.3
AES not present	11,046	89.1
Unknown	613	4.9
Total incidents	12,402	100.0

Source: NFIRS 5.0.
Note: The data presented in this table are raw data counts from the NFIRS data set. They do not represent national estimates of AESs in nonconfined residential building smoking-related fires. They are presented for informational purposes.

Examples

The following are recent examples of residential smoking fires reported by the media:

- April 2012: A house fire resulting in $110,000 in total damages in Wichita, KS, displaced three adults and one child. The fire, which began on the back deck of the home, was reported at 8:24 a.m. and spread from the deck into the attic. The blaze caused $70,000 in structural damage and $40,000 in contents loss. Investigators determined the cause of the fire was a result of careless smoking.[23]
- April 2012: A 79-year-old man died following a midafternoon fire at his home in Cranston, RI. When firefighters arrived at the two-story home, heavy smoke and fire damage were found throughout the home. Firefighters located the man in the kitchen, and he was transported to the hospital where he later died. Fire officials believed the fire started on the first floor spreading to the second floor and later determined that the cause of the blaze was due to careless smoking.[24]
- April 2012: An early morning fire at a mobile home in Coos Bay, OR, left two women dead and one man in critical condition. Upon arrival at the fire scene, firefighters found the man in a bedroom. He was transported to an area hospital where he was treated for smoke inhalation. The women were found in a second bedroom where the fire originated and were believed to have died of smoke inhalation. It was reported that the home had working smoke alarms, and investigators believed the fire was caused by smoking in bed.[25]
- February 2012: A woman succumbed to burn injuries and smoke inhalation a day after a fire broke out in her home in Aurora, OH. The fire marshal's office previously reported the fire was contained to a bed. An off-duty firefighter and a police officer on patrol initially tried to get inside the house to help the injured woman; however, the men suffered smoke inhalation and were treated at a local hospital and released. Although smoke alarms activated during the incident, two other occupants of the home were alerted to the fire by the injured woman. The cause of the fire was ruled accidental and resulted from the careless use of smoking materials.[26]

Resources

Many local and State fire departments have created successful fire safety and prevention programs geared toward reducing smoking-related fires. It is likely that these prevention programs, the widespread use of smoke alarms, the use of residential sprinkler systems, and safer smoking materials such as fire-safe cigarettes have decreased the incidence of residential smoking fires. However, residential smoking-related fires are a leading cause of civilian fire fatalities. The USFA has addressed this important issue in its public education campaign, "Smoking and Home Fires—How You Can Prevent Home Fires Caused by Smoking." Details and information on this effort can be found at http://www.usfa.fema.gov/campaigns/smoking/.

For additional smoking fire safety information, please visit http://www.usfa.fema.gov/citizens/home_fire_prev/smoking.shtm.

NFIRS Data Specifications for Residential Building Smoking-Related Fires

Data for this report were extracted from the NFIRS annual Public Data Release (PDR) files for 2008, 2009, and 2010. Only version 5.0 data were extracted.

Residential building smoking-related fires were defined as:

- Incident Types 111–123 (excludes Incident Type 112):

Incident Type	Description
111	Building fire
113	Cooking fire, confined to container
114	Chimney or flue fire, confined to chimney or flue
115	Incinerator overload or malfunction, fire confined
116	Fuel burner/boiler malfunction, fire confined
117	Commercial compactor fire, confined to rubbish
118	Trash or rubbish fire, contained
120	Fire in mobile property used as a fixed structure, other
121	Fire in mobile home used as fixed residence
122	Fire in motor home, camper, recreational vehicle
123	Fire in portable building, fixed location

Notes: 1) Incident Types 113–118 do not specify if the structure is a building.
2) Incident Type 112 was included in data analyses prior to 2008 as previous analyses showed that Incident Types 111 and 112 were used interchangeably. As of 2008, Incident Type 112 is excluded.

- Structure Type:
  - For Incident Types 113–118:
    - 1—Enclosed building,
    - 2—Fixed portable or mobile structure, and
    - Structure Type not specified (null entry).
  - For Incident Types 111 and 120–123:
    - 1—Enclosed building and
    - 2—Fixed portable or mobile structure.
- Aid Types 3 (mutual aid given) and 4 (automatic aid given) were excluded to avoid double counting of incidents.
- Property Use 400–464:

Property Use	Description
400	Residential, other
419	One- or two-family dwelling
429	Multifamily dwelling
439	Boarding/Rooming house, residential hotels
449	Hotel/Motel, commercial
459	Residential board and care
460	Dormitory-type residence, other
462	Sorority house, fraternity house
464	Barracks, dormitory

- The USFA Structure Fire Cause Methodology was used to determine residential building smoking-related fire incidents.[27]

The analyses contained in this report reflect the current methodologies used by the USFA. The USFA is committed to providing the best information on the United States fire problem and continually examines its data and methodology to fulfill this goal. Because of this commitment, data collection strategies and methodological changes are possible and do occur. As a result, analyses and estimates of the fire problem may change slightly over time. Previous analyses and estimates on specific issues (or similar issues) may have used different methodologies or data definitions and may not be directly comparable to the current ones.

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Notes:

[1] National estimates are based on 2008–2010 native Version 5.0 data from the National Fire Incident Reporting System (NFIRS), residential structure fire-loss estimates from the National Fire Protection Association's (NFPA's) annual surveys of fire loss, and the U.S. Fire Administration's (USFA's) residential building fire-loss estimates. Fires are rounded to the nearest 100, deaths to the nearest 5, injuries to the nearest 25, and loss to the nearest million dollars.

[2] In NFIRS, Version 5.0, a structure is a constructed item of which a building is one type. In previous versions of NFIRS, the term "residential structure" commonly referred to buildings where people live. To coincide with this concept, the definition of a residential structure fire for NFIRS 5.0 has, therefore, changed to include only those fires where the NFIRS 5.0 Structure Type is 1 or 2 (enclosed building and fixed portable or mobile structure) with a residential property use. Such fires are referred to as "residential buildings" to distinguish these buildings from other structures on residential properties that may include fences, sheds, and other uninhabitable structures. In addition, confined fire incidents that have a residential property use but do not have a structure type specified are presumed to be buildings. Nonconfined fire incidents that have a residential property use without a structure type specified are considered to be invalid incidents (structure type is a required field) and are not included.

[3] Residential buildings include, but are not limited to, one- or two-family dwellings, multifamily dwellings, manufactured housing, boarding houses or residential hotels, commercial hotels, college dormitories, sorority/fraternity houses, and assisted living facilities.

[4] For purposes of this analysis, residential building smoking-related fires are defined as those residential buildings for which the cause of the fire was determined to be smoking under the USFA Structure Fire Cause Methodology. It does not include intentional fires where the heat of ignition was smoking materials. The cause definitions can be found at http://www.usfa.fema.gov/fireservice/nfirs/tools/fire_cause_category_matrix.shtm.

[5] For comparison, USFA estimates that approximately 12,400 residential building fires with smoking materials as the heat source occurred annually between 2008 and 2010.

[6] USFA Fire Estimate Summary Series, "2010 Residential Building Smoking Fire Trends," http://www.usfa.fema.gov/downloads/pdf/statistics/res_bldg_smoking_fire_trends.pdf (released December 2011).

[7] There are two Federal flammability standards that apply to mattresses. The first, the Federal Mattress Flammability Standard (37 Fed. Reg. 11,363 (June 7, 1972)) that was effective in 1973 and codified as 16 Code of Federal Regulations (CFR) Part 1632, requires that a mattress resist ignition from a smoldering heat source, specifically a cigarette. The second, Standard for the Flammability (Open Flame) of Mattress Sets (71 Fed. Reg. 13,472 (March 15, 2006)) that was effective in 2007 and codified in 16 CFR Part 1633, requires that a mattress resist ignition from small-flame heat sources, such as a match, lighter, or candle.

[8] The 1984 Cigarette Safety Act funded a 3-year study under the auspices of the Consumer Product Safety Commission (CPSC). "The Final Report of the Technical Study Group on Cigarette and Little Cigar Fire Safety: Toward a Less Fire-Prone Cigarette" (1987) reported to the U.S. Congress in 1987 "it is technically feasible and may be commercially feasible to develop a cigarette that will have a significantly reduced propensity to ignite furniture and mattresses." The Fire Safe Cigarette Act of 1990 funded an additional 3-year research program and directed the CPSC and the Center for Fire Research at the National Institute of Standards and Technology (NIST) to assess the feasibility to develop a method for testing cigarette fire safety performance. In 1993, the Technical Advisory Group overseeing the research reported to Congress that such a performance standard could be developed. It further noted that the development of such a standard was beyond the jurisdiction and technical capability of the CPSC.

[9] In NFIRS, confined fires are defined by Incident Type codes 113–118.

[10] NFIRS distinguishes between "content" and "property" loss. Content loss includes loss to the contents of a structure due to damage by fire, smoke, water, and overhaul. Property loss includes losses to the structure itself or to the property itself. Total loss is the sum of the content loss and the property loss. For confined fires, the expectation is that the fire did not spread beyond the container (or rubbish for Incident Type 118), and hence, there was no property damage (damage to the structure itself) from the flames. There could be, however, property damage as a result of smoke, water, and overhaul.

[11] "Residential Building Fires (2008–2010)," USFA, April 2012, Volume 13, Issue 2, http://www.usfa.fema.gov/downloads/pdf/statistics/v13i2.pdf.

[12] The average fire death and fire injury loss rates computed from the national estimates do not agree with average fire death and fire injury loss rates computed from NFIRS data alone. The fire death rate computed from national estimates is (1,000*(365/7,600)) = 48.0 deaths per 1,000 residential building smoking-related fires, and the fire injury rate is (1,000*(925/7,600)) = 121.7 injuries per 1,000 residential building smoking-related fires.

[13] For the purposes of this report, the time of the fire alarm is used as an approximation for the general time the fire started. However, in NFIRS, it is the time the fire was reported to the fire department.

[14] NFIRS-defined confined fires are those incidents coded with Incident Type codes 113–118.

[15] Total does not sum to 22 percent due to rounding.

[16] Total does not sum to 93 percent due to rounding.

[17] Total does not sum to 18 percent due to rounding.

[18] Total does not sum to 100 percent due to rounding.

[19] Assistance to Firefighters Grants, Grant # EMW-2009-FP-0119, Institution of Fire Engineers, Alexandria, VA.

[20] Assistance to Firefighters Grants, Grant # EMW-2008-FP-01846, Washington State Association of Fire Marshals, Olympia, WA.

[21] In confined fires, the entry "smoke alarm did not alert occupants" can mean: no smoke alarm was present, the smoke alarm was present but did not operate, the smoke alarm was present and operated but the occupant was already aware of the fire, or there were no occupants present at the time of the fire.

[22] "Residential Building Fires (2008–2010)," USFA, April 2012, Volume 13, Issue 2, http://www.usfa.fema.gov/downloads/pdf/statistics/v13i2.pdf.

[23] Stan Finger, "East Wichita house fire blamed on careless smoking," kansas.com, April 24, 2012, http://www.kansas.com/2012/04/24/2309331/east-wichita-house-fire-blamed.html (accessed April 25, 2012).

[24] Brian Crandall, "Man dies in Cranston house fire," dailydispatch.com, April 13, 2012, http://www.dailydispatch.com/StateNews/RI/2012/April/13/Man.dies.in.Cranston.house.fire.aspx (accessed April 24, 2012).

[25] Lori Tobias, "Two Coos Bay-area women die in fire; man in critical condition," oregonlive.com, April 3, 2012, http://www.oregonlive.com/pacific-northwest-news/index.ssf/2012/04/two_coos_bay-area_women_die_in.html (accessed April 12, 2012).

[26] Bob Gaetjens, "Aurora woman dies after Parker Road blaze," thegatewaynews.com, February 9, 2012, http://www.thegatewaynews.com/news/article/5155560 (accessed April 12, 2012).

[27] The USFA Structure Fire Cause Methodology is designed for structure fires of which buildings are a subset. The cause definitions can be found at http://www.usfa.fema.gov/fireservice/nfirs/tools/fire_cause_category_matrix.shtm.