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Fatal Fires in Residential Buildings (2014-2016)

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 National Fire Incident Reporting System. 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

- From 2014 to 2016, an estimated 1,800 fatal fires in residential buildings were reported to United States fire departments each year, causing an estimated 2,700 deaths, 600 injuries and $173 million in property loss.
- Fatal fires in residential buildings were highest between 1 and 2 a.m. The eight-hour peak period (11 p.m. to 7 a.m.) accounted for 48 percent of the fatal fires in residential buildings.
- Fatal fires in residential buildings were more prevalent in the cooler months, peaking in January (14 percent).
- "Other unintentional, careless" actions (17 percent) and "smoking" (14 percent) were the leading causes of fatal fires in residential buildings.
- In 79 percent of fatal fires in residential buildings, the fire extended beyond the room of origin.
- The leading areas of fire origin in fatal fires in residential buildings were bedrooms (26 percent) and common areas, such as living and family rooms (24 percent).
- The leading human factor contributing to the ignition of fatal fires in residential buildings was being "asleep" (43 percent).

Although civilian fire death rates are declining, the annual estimates of civilian fire fatalities are still high.[1] Each year, from 2014 to 2016, an estimated 3,315 civilian fire deaths were reported to fire departments across the country.[2] Because 81 percent of all fire deaths occurred in residential buildings, the fatal fires in these types of buildings are the focus of this report.[3,4]

From 2014 to 2016, an estimated 1,800 fatal fires in residential buildings occurred annually in the U.S.[5] These fires resulted in an annual average of 2,700 deaths, 600 injuries and $173 million in property loss.[6]

This topical report, issued by the U.S. Fire Administration's (USFA) National Fire Data Center, addresses the characteristics of fatal fires in residential buildings as reported to the National Fire Incident Reporting System (NFIRS) from 2014 to 2016 — the most recent data available at the time of the analysis.[7] Some of the characteristics examined include fire spread, factors contributing to ignition, human factors contributing to ignition, and alerting/suppression systems.[8] The information in this report can be used not only to assess progress, but also to understand the nature of the fatal fire problem and its implications for the targeting of prevention programs. The NFIRS data from 2014 to 2016 are used for the analyses presented throughout the report.

For the purpose of this report, the terms "residential fires" and "residential fatal fires" are synonymous with "residential building fires" and "fatal fires in residential buildings," respectively. "Residential fatal fires" is used throughout the body of this report; the findings, tables, charts, headings and endnotes reflect the full category, "fatal fires in residential buildings."

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Loss measures

Although residential fatal fires accounted for less than 1 percent of the overall residential fire profile, they had tremendous and devastating outcomes. Table 1 presents losses averaged over the three-year period, from 2014 to 2016, for residential fatal and nonfatal fires.[9] In addition to resulting in fatalities, residential fatal fires reported to the NFIRS had nearly six times the dollar loss per fire and 11 times the injury rate of residential nonfatal fires. These statistics reflect the destructive nature of residential fatal fires.

Table 1. Loss measures for fatal and nonfatal fires in residential buildings (three-year average, 2014-2016)

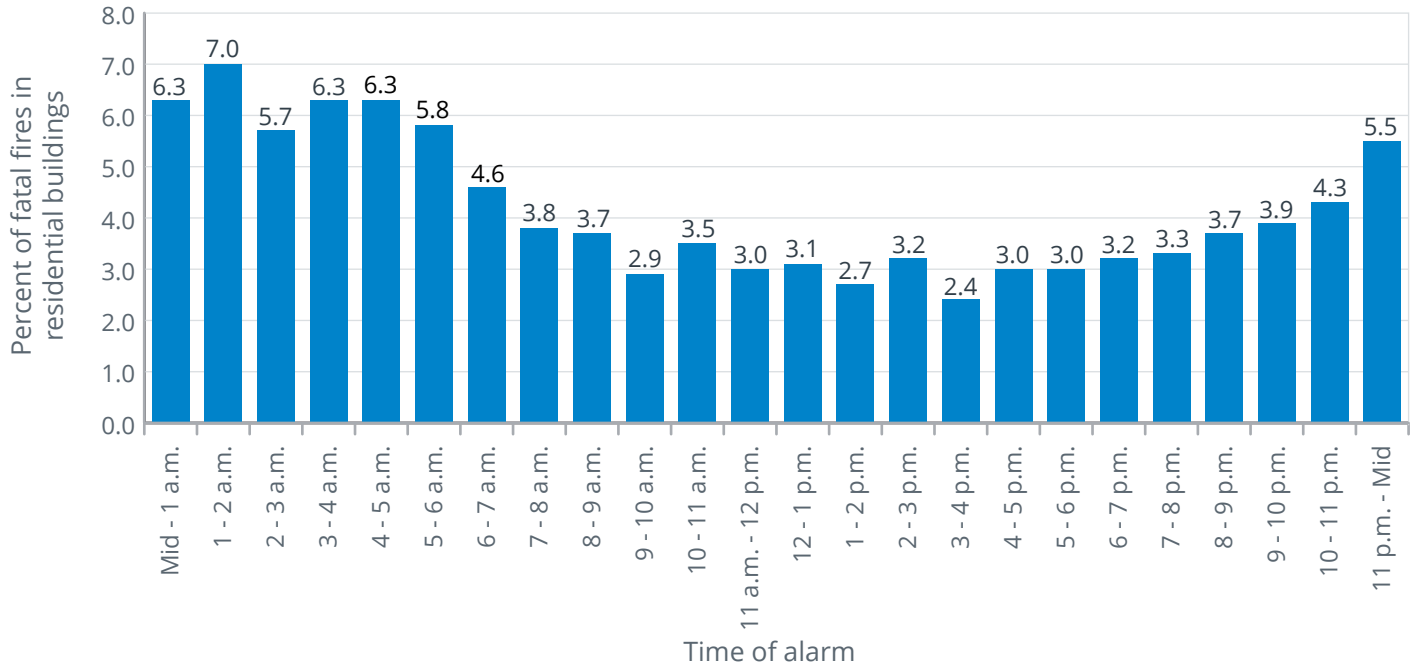
Measure	Fatal fires in residential buildings	Nonfatal fires in residential buildings
Average loss:		
Fatalities/1,000 fires	1,207.3	0.0
Injuries/1,000 fires	277.7	24.4
Dollar loss/fire	$94,940	$17,120

Source: NFIRS 5.0.
Notes: 1. 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.
2. The 2014 and 2015 dollar-loss values were adjusted to 2016 dollars.

When fatal fires in residential buildings occur

As shown in Figure 1, residential fatal fires occurred most frequently late at night or in the early morning.[10] From 2014 to 2016, residential fatal fires were highest from 1 to 2 a.m. (7 percent). The eight-hour peak period (11 p.m. to 7 a.m.) accounted for 48 percent of residential fatal fires. Fatal fires then declined throughout the day, reaching the lowest point from 3 to 4 p.m. (2 percent). There are several possible reasons for this: First, many people are sleeping and less vigilant in the middle of the night. If smoke alarms are not present, these individuals may die before waking up during a fire. Second, cigarette and other smoldering fires started by careless actions before people retire for the night may go unnoticed and grow to rapidly progressing fires while they are sleeping.

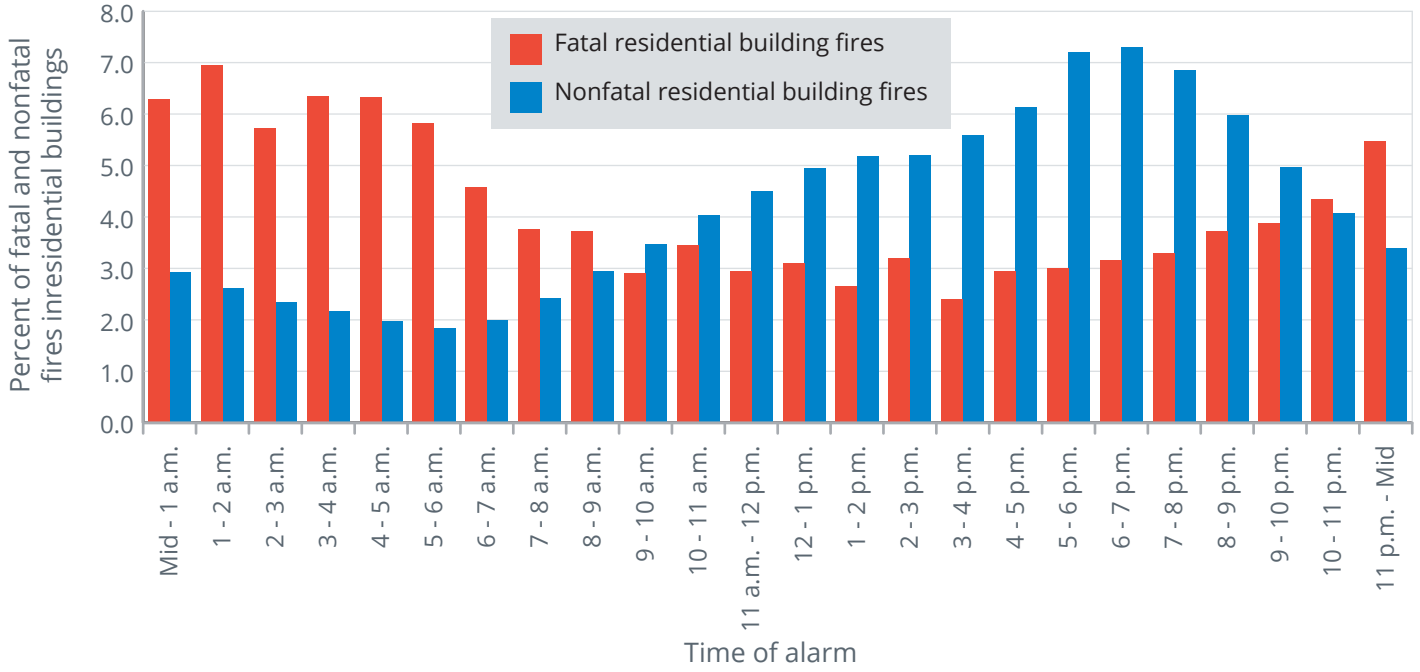
Figure 1. Fatal fires in residential buildings by time of alarm (2014-2016)



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

The time of alarm profile for residential fatal fires was in contrast to the alarm time profile for residential nonfatal fires, as shown in Figure 2. Nonfatal fires had the reverse daily cycle, with fires predominantly caused by cooking occurring during the late afternoon and evening.

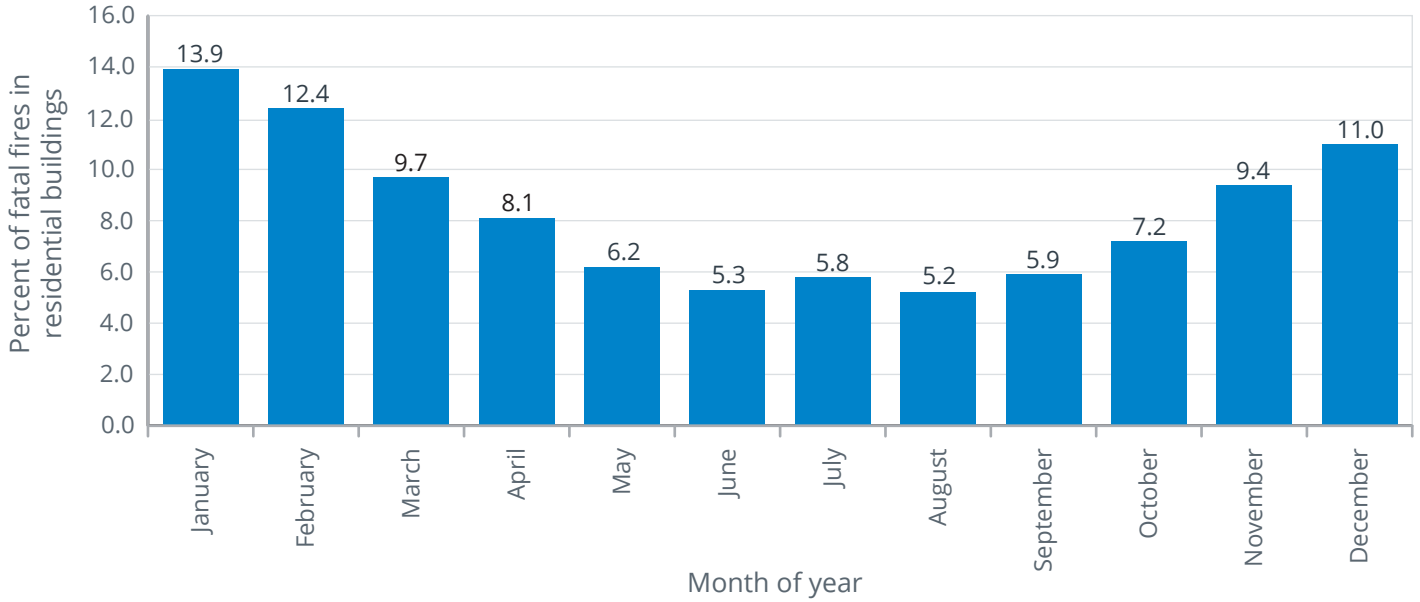
Figure 2. Time of alarm for fatal and nonfatal fires in residential buildings (2014-2016)



Source: NFIRS 5.0.

There was a much higher incidence of residential fatal fires in the cooler months — twice that of the summer months, perhaps as a result of increased activities indoors. Residential fatal fires peaked in January at 14 percent (Figure 3). Fire incidence declined steadily after January, reaching the lowest incidence during the summer months.

Figure 3. Fatal fires in residential buildings by month (2014-2016)



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

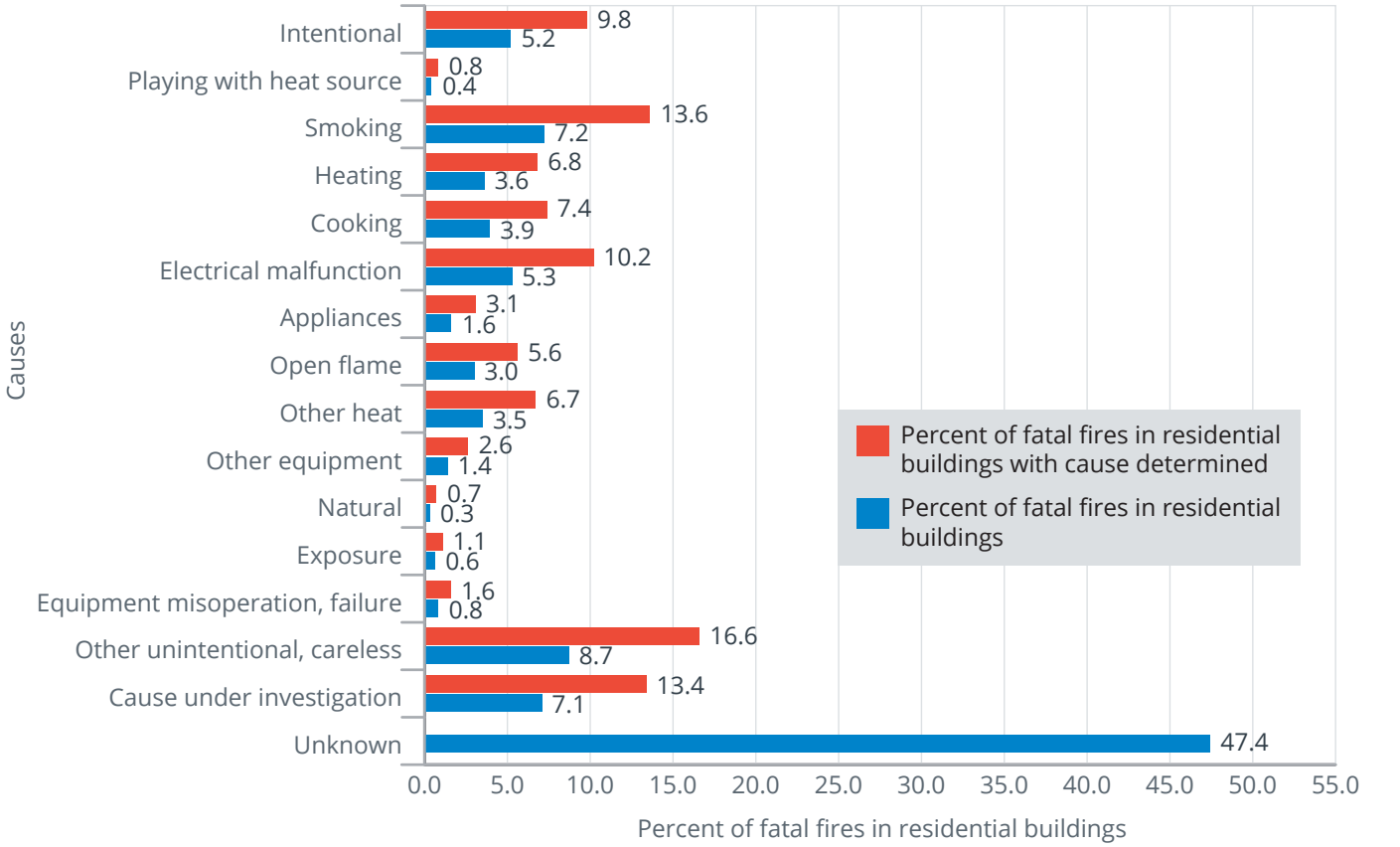
Causes of fatal fires in residential buildings

The causes of fires are often a complex chain of events. To determine the cause of a fire, analysts rely on the data collected. Heat source, equipment involved, factors (human or otherwise) contributing to the ignition, incident type, and the cause of ignition are the primary data elements used. A large percent of residential fatal fire incidents reported to the NFIRS (47 percent) did not have sufficient information to determine the cause of the fire (Figure 4). The cause analyses that follow reflect only the 53 percent of incidents where enough information and detail were reported to determine the cause of the fatal fire.[11]

"Other unintentional, careless" actions was the leading cause of residential fatal fires at 17 percent. "Other unintentional, careless" actions include misuse of a material or product, abandoned or discarded materials or products, heat source placed too close to combustibles, and miscellaneous unintentional actions. As shown in Figure 4, 14 percent of residential fatal fires were smoking-related.[12] Although not as prominent as it once was, "smoking" has been a leading cause of residential fatal fires since the inception of the NFIRS. "Cause under investigation" was the next leading cause at 13 percent.

Multiple fatality fires, those fires resulting in two or more deaths, in residential buildings were most often caused by "other unintentional, careless" actions (20 percent) followed by "electrical malfunction" (14 percent), "cause under investigation" (13 percent), and "intentional" actions (9 percent).[13] "Other unintentional, careless" actions and "smoking" were the leading causes of single fatality fires in residential buildings at 16 percent and 15 percent, respectively. Fires caused by "other unintentional, careless" actions played a larger role in residential fatal fires (17 percent) than in residential nonfatal fires (6 percent).

Figure 4. Causes of fatal fires in residential buildings (2014-2016)



Source: NFIRS 5.0.

Note: Causes are listed in order of the USFA Structure Fire Cause Hierarchy for ease of comparison of fire causes across different aspects of the fire problem. Fires are assigned to one of 16 cause groupings using a hierarchy of definitions, as shown in this figure. A fire is included in the highest category into which it fits. If it does not fit the top category, then the second one is considered, and if not that one, the third, and so on. For example, if the fire is judged to be intentionally set and a match was used to ignite it, it is classified as intentional and not open flame because intentional is higher in the hierarchy.

Causes of winter and summer fatal fires in residential buildings

Residential fatal fires had much higher incidence in the cooler months as shown in Figure 3. While the addition of heating contributed to the increase in overall residential fires in the cooler winter months, heating was not a primary cause of these winter residential fatal fires. As shown in Table 2, four causes accounted for 53 percent of all residential fatal fires in December through March: "other unintentional, careless" actions (16 percent), "cause under investigation" (14 percent), "smoking" (13 percent), and "electrical malfunction" (11 percent). "Heating," the next leading cause, was the cause of 10 percent of these winter fatal fires.

Half as many residential fatal fires occurred in the warmer months of June through September (Figure 3). As shown in Table 2, three of the four leading causes of summer fatal fires were the same as those for winter fatal fires: "other unintentional, careless" actions (17 percent), "cause under investigation" (16 percent), and "smoking" (16 percent). The increase in fatal fires in the winter months is more likely to be related to the increase in indoor activities, as noted earlier, rather than the type of fire.

Table 2. Relative proportion of leading causes of fatal fires in residential buildings: winter and summer (three-year average, 2014-2016)

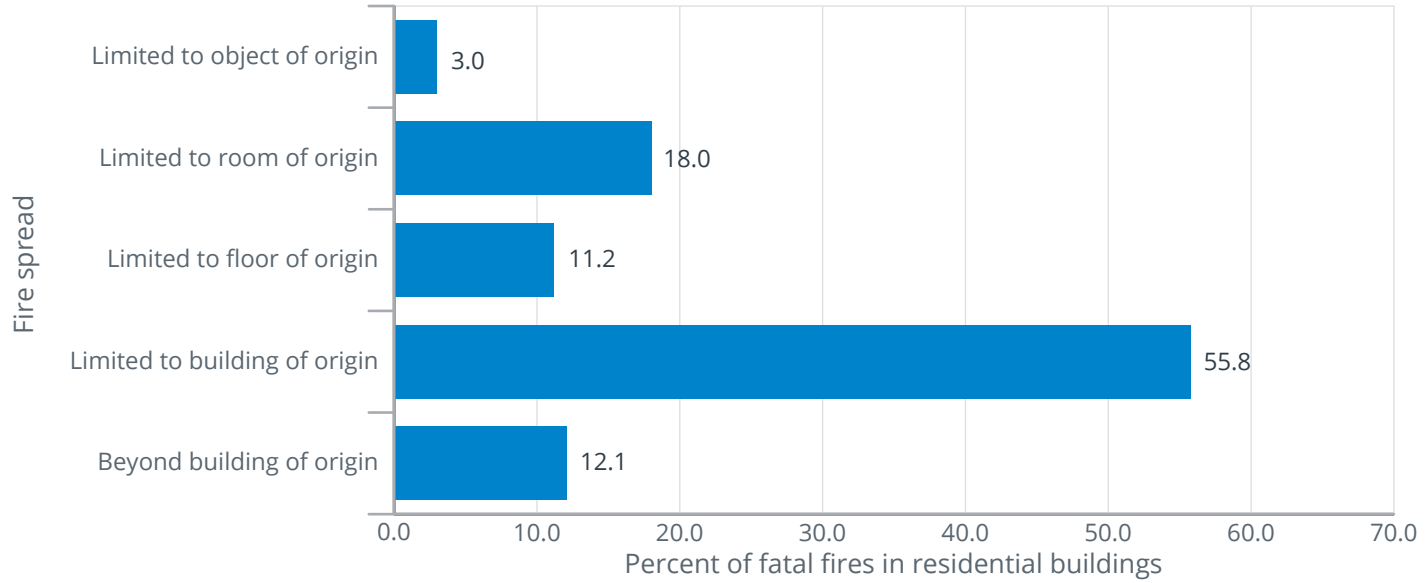
Leading cause of fatal fire	Percent (unknowns apportioned)	
	December to March	June to September
Other unintentional, careless	15.9	17.2
Cause under investigation	13.6	15.6
Smoking	12.7	15.6
Intentional		11.5
Electrical malfunction	10.8	

Source: NFIRS 5.0.

Fire spread in fatal fires in residential buildings

As shown in Figure 5, 79 percent of residential fatal fires extended beyond the room of origin. These fires often occurred in the middle of the night when occupants were more likely to be asleep and unaware of the fire. In addition, 21 percent of residential fatal fires were confined to the room or object of origin. These smaller spreading fires are evidence that a fire does not have to be large to be deadly.

Figure 5. Extent of fire spread in fatal fires in residential buildings (2014-2016)



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

Where fatal fires in residential buildings start (area of fire origin)

Table 3 shows the leading areas of fire origin in residential fatal fires. These fires started most frequently in bedrooms (26 percent) and common rooms, including dens, family rooms, living rooms and lounges (24 percent). Fires starting in cooking areas or kitchens accounted for an additional 16 percent of residential fatal fires.

Table 3. Leading areas of origin for fatal fires in residential buildings (2014-2016)

Area of origin	Percent (unknowns apportioned)
Bedrooms	25.7
Common room, den, family room, living room, lounge	23.5
Cooking area, kitchen	16.3

Source: NFIRS 5.0.
Note: Only includes fatal fires where the area of origin was specified. The area of origin was specified in 78 percent of reported fatal fires in residential buildings.

As shown in Table 4, 80 percent of residential fatal fires occurred in one- and two-family dwellings. This is not surprising since the majority of the population lives in these types of residences.[14] Multifamily dwellings accounted for 15 percent of all residential fatal fires. Other residential occupancies, including boarding and rooming houses, hotels and motels, were a very small portion, accounting for only 5 percent of residential fatal fires.[15]

Table 4. Property use for fatal fires in residential buildings (2014-2016)

Property use	Percent
One- and two-family dwellings	80.2
Multifamily dwellings	15.4
Other residential buildings	3.5
Hotels and motels	0.6
Boarding, rooming houses	0.4
Total	100.0

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

Factors contributing to ignition of fatal fires in residential buildings

Table 5 shows the categories of factors contributing to ignition for residential fatal fires. "Misuse of material or product" (60 percent) was, by far, the leading category contributing to the ignition of residential fatal fires. Factors in the "electrical failure, malfunction" category contributed to ignition in 17 percent of residential fatal fires. The "operational deficiency" and "other factors contributing to ignition" categories accounted for 12 percent and 11 percent, respectively, of residential fatal fires. These four categories played a role in nearly all residential fatal fires where a contributing factor was reported.

Placing a heat source too close to combustible objects, part of the "misuse of material or product" category, was the leading specific contributing factor (21 percent). Also a part of the "misuse of material or product" category, abandoned or discarded materials — primarily cigarettes — was the second leading specific contributing factor in 15 percent of residential fatal fires.

Table 5. Factors contributing to ignition of fatal fires in residential buildings by major category (where contributing factor specified, 2014-2016)

Factor contributing to ignition category	Percent of fatal fires in residential buildings (unknowns apportioned)
Misuse of material or product	60.1
Electrical failure, malfunction	16.6
Operational deficiency	12.4
Other factors contributing to ignition	11.1
Fire spread or control	2.8
Mechanical failure, malfunction	2.7
Natural condition	1.5
Design, manufacture, installation deficiency	0.5

Source: NFIRS 5.0.
Notes: 1. Only includes fatal fires where factors that contributed to the ignition were specified. At least one factor contributing to the ignition was specified in 31 percent of reported fatal fires in residential buildings.
2. Multiple factors contributing to fire ignition may be noted for each incident; the total will exceed 100 percent.

Human factors contributing to ignition of fatal fires in residential buildings

Human factors — the human condition or situation that allowed the heat source and combustible material to combine to ignite the fire — played an important role in residential fatal fires. As shown in Table 6, the leading human factor contributing to the ignition of the fire was "being asleep" (43 percent). This finding is not unexpected, as 48 percent of residential fatal fires occurred during the eight-hour period from 11 p.m. to 7 a.m. (Figure 1). When "being asleep" was reported as a contributing factor to the fire, smoking and other unintentional, careless actions were the leading causes of these residential fatal fires.

"Possibly impaired by alcohol or drugs" and "physical disabilities" were the next leading human factors contributing to the ignition of fire at 25 percent and 18 percent, respectively. When these human factors were specified as contributing to the ignition of the fire, smoking, by far, was noted to be the leading cause of these residential fatal fires.

Where "age was a factor" (13 percent) was cited as a human factor contributing to ignition, smoking and heating were reported as leading causes of these residential fatal fires. Not surprisingly, playing with a heat source was the third leading cause of residential fatal fires, where "age was a factor." Typically, playing with a heat source is associated with fires caused by children playing.

It is not unexpected that smoking was the first or second leading fire cause for all human factors (where sufficient data were available to determine cause), as smoking was a leading cause of residential fatal fires.

Table 6. Human factors contributing to ignition of fatal fires in residential buildings (where contributing human factor specified, 2014-2016)

Human factors contributing to ignition	Percent of fatal fires in residential buildings (unknowns apportioned)	Primary leading fire causes - percent (unknowns apportioned)	
Asleep	43.0	Smoking Other unintentional, careless	20.7 18.7
Possibly impaired by alcohol or drugs	24.8	Smoking Intentional	25.8 15.2
Physical disabilities	17.7	Smoking Other unintentional, careless	31.9 14.5
Age was a factor	12.6	Smoking Heating	15.9 13.1
Unattended or unsupervised person	8.9	Smoking Cooking	18.1 16.9
Possible intellectual disabilities	8.3	Intentional Smoking	47.3 13.5
Multiple persons involved	4.6		-------- --------

Source: NFIRS 5.0.

Notes:
1. Only includes fatal fires where human factors that contributed to the ignition of the fire were specified. At least one human factor contributing to ignition was specified in 32 percent of reported fatal fires in residential buildings.
2. Multiple human factors contributing to fire ignition may be noted for each incident; total will exceed 100 percent.
3. "Multiple persons involved" was cited as a human factor contributing to ignition in too few fatal fires to determine the primary leading fire causes.

Alerting/Suppression systems in fatal fires in residential buildings

Fire fatalities and injuries have declined over the last 35 years, partly due to new technologies to detect and extinguish fires. Smoke alarms are present in most homes. In addition, the use of residential sprinklers is widely supported by the fire service and is gaining support within residential communities.

Smoke alarms were reported as present in 36 percent of residential fatal fires. By comparison, smoke alarms were present in 43 percent of residential nonfatal fires.[16] In 24 percent of residential fatal fires, there were no smoke alarms present.[17] Nationally, only 3 percent of households do not have a smoke alarm installed.[18] This lack of early warning is a considerable factor in residential fatal fires. Lastly, in 40 percent of these fires, firefighters were unable to determine if a smoke alarm was present (Table 7).

Table 7. Presence of smoke alarms in fatal fires in residential buildings (2014-2016)

Presence of smoke alarms	Percent
Present	35.8
None present	23.8
Undetermined	40.4
Total	100.0

Source: NFIRS 5.0.

Where the existence of a smoke alarm was not determined, 84 percent of the fires spread beyond the floor of fire origin. Because these fires were so expansive, it may be impossible to determine the presence of smoke alarms.

Fires in one- and two-family housing accounted for 87 percent of residential fatal fires in which no smoke alarm was present. Multifamily housing accounted for just 9 percent of these fires, perhaps because they are subject to more stringent codes and often require the landlord or manager to maintain the detection systems.

Fatal fires in residential buildings that were **not** currently or routinely occupied accounted for a small portion (5 percent) of all residential fatal fires. It is important to note, however, that these buildings — which are under construction, undergoing major renovations, vacant and the like — are unlikely to have alerting and suppression systems in place, and if in place, that are operational. In fact, only 6 percent of fatal fires in residential buildings that were unoccupied were reported as having smoke alarms that operated. In addition, in fatal fires in residential buildings that were unoccupied, automatic suppression systems were reported as present in less than 1 percent of the fires. As a result, the detailed smoke alarm analyses in the next section focus on fatal fires in occupied residential buildings only.

Occupied residential buildings

Smoke alarms were reported as present in 37 percent of fatal fires in occupied residential buildings. In 23 percent of fatal fires in occupied residential buildings, there were no smoke alarms present. Lastly, in 40 percent of fatal fires in occupied residential buildings, firefighters were unable to determine if a smoke alarm was present (Table 8).

When smoke alarms were present (37 percent) and the alarm's operational status was considered, the percentage of smoke alarms reported as present consisted of:

- Present and operated — 18 percent.
- Present, but did not operate — 7 percent (alarm failed to operate, 6 percent; fire too small, 1 percent).
- Present, but operational status unknown — 12 percent.

When the subset of incidents where smoke alarms were reported as present was analyzed separately as a whole, smoke alarms were reported to have operated in 48 percent of the incidents, and failed to operate in 17 percent of the incidents. In 2 percent of this subset, the fire was too small to activate the alarm. The operational status of the alarm was undetermined in 34 percent of these incidents.[19]

Note that the data presented in Table 8 are the raw counts from the NFIRS dataset and are not scaled to national estimates of smoke alarms in residential fatal fires. In addition, the NFIRS does not allow for the determination of the type of smoke alarm — i.e., if the smoke alarm was photoelectric or ionization — or the location of the smoke alarm with respect to the point of origin of the fire.

If a fire occurs, properly installed and maintained smoke alarms provide an early warning signal to everyone in a home. Smoke alarms help save lives and property. The USFA continues to partner with other government agencies and fire service organizations to improve and develop new smoke alarm technologies. More information on smoke alarm technologies, performance, disposal and storage, training bulletins, and public education and outreach materials can be found at https://www.usfa.fema.gov/prevention/technology/smoke_fire_alarms.html. Additionally, the USFA's position statement on smoke alarms is available at https://www.usfa.fema.gov/about/smoke_alarms_position.html.

Table 8. NFIRS smoke alarm data for fatal fires in occupied residential buildings (2014-2016)

Presence of smoke alarms	Smoke alarm operational status	Smoke alarm effectiveness	Count	Percent
Present	Fire too small to activate smoke alarm		23	0.6
	Smoke alarm operated	Smoke alarm alerted occupants, occupants responded	256	7.1
		Smoke alarm alerted occupants, occupants failed to respond	94	2.6
		No occupants	2	0.1
		Smoke alarm failed to alert occupants	45	1.2
		Undetermined	240	6.6
	Smoke alarm failed to operate		224	6.2
	Undetermined		448	12.4
None present			842	23.2
Undetermined			1,449	40.0
Total incidents			3,623	100.0

Source: NFIRS 5.0.
Note: The data presented in this table are raw data counts from the NFIRS dataset summed (not averaged) from 2014 to 2016. They do not represent national estimates of smoke alarms in fatal fires in occupied residential buildings. They are presented for informational purposes.

Overall, full or partial automatic extinguishing systems (AES) — mainly sprinklers — were present in only 2 percent of fatal fires in occupied residential buildings (Table 9).[20] The presence of suppression systems in nonfatal fires in occupied residential buildings was only 4 percent.[21]

Table 9. NFIRS automatic extinguishing system data for fatal fires in occupied residential buildings (2014-2016)

AES presence	Count	Percent
AES present	55	1.5
Partial system present	11	0.3
AES not present	3,292	90.9
Unknown	265	7.3
Total incidents	3,623	100.0

Source: NFIRS 5.0.
Note: The data presented in this table are raw data counts from the NFIRS dataset summed (not averaged) from 2014 to 2016. They do not represent national estimates of AESs in fatal fires in occupied residential buildings. They are presented for informational purposes.

Residential sprinkler systems help to reduce the risk of deaths and injuries, homeowner insurance premiums, and uninsured property losses. Yet many homes do not have AESs, although they are often found in hotels and businesses. Sprinklers are required by code in hotels and many multifamily residences. There are major movements in the U.S. fire service to require sprinklers in all new homes. At present, however, they are largely absent in residences nationwide.[22]

USFA and fire service officials across the nation are working to promote and advance residential fire sprinklers. More information on costs and benefits, performance, training bulletins, and public education and outreach materials regarding residential sprinklers is available at https://www.usfa.fema.gov/prevention/technology/home_fire_sprinklers.html. Additionally, the USFA's position statement on residential sprinklers is available at https://www.usfa.fema.gov/about/sprinklers_position.html.

Examples

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

- April 2018: A 46-year old man died as a result of an equipment malfunction fire in Terre Hill, Pennsylvania. The man was injured when a propane tank he was working on caught fire. Firefighters were dispatched to the single-family home around 5:45 p.m. Upon arrival, the emergency responders found the man trapped in the home's garage. The man was transported to a local hospital where he later died. A woman, who was also an occupant of the home, was transported to the hospital and treated for smoke inhalation. The fire spread to the first floor of the home and resulted in $225,000 in damages.[23]

- March 2018: On March 8, an 82-year old woman succumbed to second- and third-degree burn injuries she sustained as a result of a fire that broke out in her apartment in Cumberland, Maryland. The cause of the fire was determined to be an electric blanket failure that ignited the woman's clothing and her reclining chair. The fire was discovered when the apartment building's fire alarm system activated; however, the woman was unable to escape due to a medical condition that limited her mobility. The woman's husband, who returned home after the fire had started, rescued his wife from their apartment unit. The woman was transported to an area medical facility, and then later was transferred to Johns Hopkins Bayview Medical Center, where she passed several weeks later from complications due to her injuries. The apartment building's sprinkler system contained the fire to the chair in the couple's apartment, minimizing the damages to less than $5,000.[24]

- March 2018: A morning, mobile home fire in Milledgeville, Georgia, resulted in the death of a 43-year old man. The fire started in the bedroom of the home and was caused by the "misuse of smoking material." No other injuries were reported as a result of the blaze.[25]

- February 2018: A 67-year old man and a 55-year old man died as a result of a fire that broke out in a mobile home in Belleville, Illinois. Emergency responders arrived at the home around 12:25 a.m. to find the trailer on fire and the two men dead inside the home. According to the fire department, the fire started in a bedroom, and it did not appear to be suspicious in nature. No smoke alarms were reported to be present in the home.[26]

Escape planning for residential buildings

Everyone should know how to escape from a burning home. The USFA recommends leaving the job of fighting fire to trained firefighters. For everyone else, efforts should be focused on escaping.

Smoke is very dangerous. It blocks vision, and the poisonous gases can cause dizziness, disorientation and ultimately death. These conditions can result in becoming lost or trapped in a home. Because many people die trying to escape from a fire, everyone should practice a home escape plan.

Put working smoke alarms on every level of the home, as well as inside and outside of sleeping areas. Everyone should create a home escape plan and know two safe ways out of each room. Establish a family meeting place outside the home. In addition, because young children, older adults and individuals with disabilities may need help getting out of the home, the plan should include who will assist them in a fire. Practice the plan with everyone in the home at least two times a year. For more information on preparing and practicing a fire escape plan, visit https://www.usfa.fema.gov/prevention/outreach/escape.html.

NFIRS data specifications for fatal fires in residential buildings

Data for this report were extracted from the NFIRS annual Public Data Release files for 2014, 2015 and 2016. Only version 5.0 data were extracted.

Fatal fires in residential buildings were defined using the following criteria:

- Aid Types 3 (mutual aid given) and 4 (automatic aid given) were excluded to avoid counting a single incident more than once.
- Incident Types 111 to 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

Note: Incident Types 113 to 118 do not specify if the structure is a building.

- Property Use Series 400, which consists of the following:

Property Use	Description
400	Residential, other
419	One- or two-family dwelling, detached, manufactured home, mobile home not in transit, duplex
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

- Structure Type:
  - For Incident Types 113 to 118:
    - 1—Enclosed building, or
    - 2—Fixed portable or mobile structure, or
    - Structure Type not specified (null entry).
  - For Incident Types 111 and 120 to 123:
    - 1—Enclosed building, or
    - 2—Fixed portable or mobile structure.
- Civilian deaths greater than zero.

The analyses contained in this report reflect the current methodologies used by the USFA. The USFA is committed to providing the best and most current information on the U.S. 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.

Information regarding the USFA's national estimates for residential building fires, as well as the data sources used to derive the estimates, can be found in the document "Data Sources and National Estimates Methodology Overview for the U.S. Fire Administration's Topical Fire Report Series (Volume 19)," https://www.usfa.fema.gov/downloads/pdf/statistics/data_sources_and_national_estimates_methodology_vol19.pdf. This document also addresses the specific NFIRS data elements analyzed in the topical reports, as well as "unknown" data entries and missing data.

To request additional information, visit https://www.usfa.fema.gov/contact.html. To comment on this specific report, visit https://apps.usfa.fema.gov/contact/dataReportEval?reportTitle= Fatal%20Fires%20in%20Residential%20Buildings%20(2014-2016).

Notes:

[1]USFA, "Fire in the United States 2006-2015 (19th ed.)," p. 42, December 2017, https://www.usfa.fema.gov/downloads/pdf/publications/fius19th.pdf.
[2]The 2014 to 2016 annual average estimate of civilian fire deaths is based on data from the National Fire Protection Association's (NFPA) report, "Fire Loss in the United States During 2016," p. 39, September 2017, https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics/Overall-Fire-Statistics/osFireLoss.pdf.
[3]The term "residential buildings" includes what are commonly referred to as "homes," whether they are one- or two-family dwellings or multifamily buildings. It also includes manufactured housing, hotels and motels, residential hotels, dormitories, assisted living facilities, and halfway houses — residences for formerly institutionalized individuals (patients with mental disabilities, drug addictions, or those formerly incarcerated) that are designed to facilitate their re-adjustment to private life. The term "residential buildings" does not include institutions, such as prisons, nursing homes, juvenile care facilities, or hospitals, even though people may reside in these facilities for short or long periods of time.
[4]The percentage cited here is derived from the USFA's annual average estimate of residential building fire deaths and the NFPA's annual average estimate of civilian fire deaths from 2014 to 2016: ((2,700/3,315) x 100) = 81.4 percent.
[5]In NFIRS Version 5.0, a structure is a constructed item of which a building is one type. In previous versions of the 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 the NFIRS 5.0 includes 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 structures 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 occur in 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.
[6]National estimates are based on 2014 to 2016 native Version 5.0 data from the NFIRS, residential structure fire loss estimates from NFPA's annual surveys of fire loss, and the USFA's residential building fire loss estimates: https://www.usfa.fema.gov/downloads/pdf/statistics/res_bldg_fire_estimates.pdf. Further information on the USFA's residential building fire loss estimates can be found in the "National Estimates Methodology for Building Fires and Losses," August 2012, https://www.usfa.fema.gov/downloads/pdf/statistics/national_estimate_methodology.pdf. For information on the NFPA's survey methodology, see the NFPA's report "Fire Loss in the United States During 2016," September 2017, https://www.nfpa.org/news-and-research/fire-statistics-and-reports/fire-statistics/fires-in-the-us/overall-fire-problem/fire-loss-in-the-united-states. In this topical report, fires are rounded to the nearest 100, deaths to the nearest five, injuries to the nearest 25, and losses to the nearest million.

[7]Fire department participation in the NFIRS is voluntary; however, some states do require their departments to participate in the state system. Additionally, if a fire department is a recipient of a Fire Act Grant, participation is required. From 2014 to 2016, 68 percent of the NFPA's annual average estimated 1,328,500 fires to which fire departments responded were captured in the NFIRS. Thus, the NFIRS is not representative of all fire incidents in the U.S. and is not a "complete" census of fire incidents. Although the NFIRS does not represent 100 percent of the incidents reported to fire departments each year, the enormous dataset exhibits stability from one year to the next without radical changes. Results based on the full dataset are generally similar to those based on part of the data.

[8]This report excludes analyses of the characteristics of the civilian fire fatalities (e.g., gender, race and age of the victim, activity prior to death, etc.) that resulted from these fatal fires.

[9]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 the NFIRS data alone. The national estimates are based on a sample of fire departments that report fatality totals. The NFIRS data are based on a large set of fires, with the data reported at the individual fire incident level. The fire death rate computed from national estimates is (1,000 x (2,700/1,800)) = 1,500.0 deaths per 1,000 fatal residential building fires and the fire injury rate is (1,000 x (600/1,800)) = 333.3 injuries per 1,000 fatal residential building fires.

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

[11]The USFA Structure Fire Cause Methodology was used to determine the cause of fatal fires in residential buildings. The cause methodology and definitions can be found in the document "National Fire Incident Reporting System Version 5.0 Fire Data Analysis Guidelines and Issues," July 2011, https://www.usfa.fema.gov/downloads/pdf/nfirs/nfirs_data_analysis_guidelines_issues.pdf.

[12]USFA differentiates between smoking as a cause of fires and fires ignited by smoking materials. Smoking (or smoking-related fires) are considered a behavioral cause. Fires ignited by smoking materials are considered to be 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 source 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" fire.

[13]Fires caused by intentional actions include, but are not limited to, fires that are deemed to be arson. Intentional fires are those fires that are deliberately set and include fires that result from the deliberate misuse of a heat source and fires of an incendiary nature (arson) that require fire service intervention. For information and statistics on arson fires only, refer to the Uniform Crime Reporting Program arson statistics from the U.S. Department of Justice, FBI, Criminal Justice Information Services Division, https://www.fbi.gov/about-us/cjis/ucr/ucr.

[14]The U.S. Census Bureau showed that, in 2015, 76.2 percent of occupied housing units were one-unit attached and detached structures or mobile homes (90.1 million), U.S. Department of Housing and Urban Development (HUD) and U.S. Census Bureau, 2015 American Housing Survey — Table Creator, select "2015 (Year) General Housing (Table); Units by Structure Type (Variable 1)," https://www.census.gov/programs-surveys/ahs/data/interactive/ahstablecreator.html#?s_areas=a00000&s_year=n2015&s_tableName=Table1&s_byGroup1=a3&s_byGroup2=a1&s_filterGroup1=t1&s_filterGroup2=g1 (accessed April 5, 2018). Household size was estimated at 2.65 people per household (https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_15_1YR_DP02&prodType= table, Selected Social Characteristics in the U.S., 2015 American Community Survey 1-Year Estimates). Thus, 90.1 million housing units x 2.65 people per household = 238.8 million people. With the 2015 U.S. population given as 321.0 million, (https://www.census.gov/data/tables/2017/demo/popest/nation-total.html, Table 1. Annual Estimates of the Resident Population for the U.S., Regions, States, and Puerto Rico: April 1, 2010, to July 1, 2017 (NST-EST2017-01)), approximately 74.4 percent of the population lived in what the NFIRS defines as one- and two-family housing.

[15]"One- and two-family residential buildings" include detached dwellings, manufactured homes, mobile homes not in transit, and duplexes. "Multifamily residential buildings" include apartments, town houses, row houses, condominiums, and other tenement properties. "Other residential buildings" include boarding/rooming houses, hotels/motels, residential board and care facilities, dormitory-type residences, sorority/fraternity houses, and barracks.

[16]Here, 43 percent reflects nonconfined residential nonfatal fires only. Nonconfined fires are generally large and more serious fires. Confined fires, defined in NFIRS as Incident Types 113 to 118, are excluded from this analysis as the NFIRS smoke alarm data elements are not required to be completed for these types of fires.

[17]Here, **at least** 24 percent of fatal residential building fires had no smoke alarms present — the 24 percent that were known to not have smoke alarms and some portion (or as many as all) of the fires where the smoke alarm presence was undetermined.

[18]Greene, Michael and Craig Andres, "2004-2005 National Sample Survey of Unreported Residential Fires," Division of Hazard Analysis, Directorate for Epidemiology, U.S. Consumer Product Safety Commission, July 2009.

[19]Total does not add up to 100 percent due to rounding.

[20]In this report, the analysis was performed for occupied residential buildings as 95 percent of fatal fires occurred in occupied residential buildings.

[21]The 4 percent reflects nonconfined residential nonfatal fires in occupied residential buildings.

[22]HUD and U.S. Census Bureau, American Housing Survey for the United States: 2011, September 2013, "Health and Safety Characteristics-All Occupied Units (National)," Table S-01-AO, https://www.census.gov/content/dam/Census/programs-surveys/ahs/data/2011/h150-11.pdf (accessed April 3, 2017).

[23]Blest, Lindsey, "Coroner: Man Dies After Terre Hill House Fire Monday Evening," lancasteronline.com, April 3, 2018, https://lancasteronline.com/news/local/coroner-man-dies-after-terre-hill-house-fire-monday-evening/article_5738f142-36c1-11e8-8660-b33237336ccc.html (accessed April 6, 2018).

[24]WCBC Radio, "Cumberland Woman Succumbs To Burn Injuries," www.wcbcradio.com, March 27, 2018, https://www.wcbcradio.com/?archiv=cumberland-woman-succumbs-to-burn-injuries (accessed April 6, 2018).

[25]WRCB staff, "Georgia Mobile Home Fire Fatality Due To 'Smoking Material'," www.wrcbtv.com, March 26, 2018, http://www.wrcbtv.com/story/37808948/georgia-mobile-home-fire-fatality-due-to-smoking-material (accessed April 6, 2018).

[26]Madaras, Michelle, "Victims Identified In Fatal Belleville Trailer Fire," kplr11.com, Feb. 5, 2018, http://kplr11.com/2018/02/05/ / (accessed April 6, 2018).