

# Civilian Fire Injuries in Residential Buildings (2017-2019)

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

- Annually, from 2017 to 2019, an estimated 11,650 civilian fire injuries resulted from 7,200 residential building fires resulting in injuries.
- From 2017 to 2019, civilian fire injuries in residential buildings accounted for 75% of all estimated fire injuries.
- On average, someone is injured in a residential building fire every 45 minutes.
- Residential building fires resulting in injuries occurred most frequently in the late afternoon and early evening hours. The peak period from 5 to 8 p.m. accounted for 17% of the residential fires resulting in injuries.
- January (10%) and March (10%) had the highest incidence of residential building fires resulting in injuries.
- Cooking (31%) was the leading cause of residential building fires that resulted in injuries.
- Of the civilian fire injuries that occurred in residential buildings, 33% resulted from trying to control a fire; an additional 29% occurred while the victim was attempting to escape.
- Smoke inhalation and thermal burns were the primary symptoms resulting in injury, accounting for 79% of all injuries resulting from residential building fires.
- The leading human factor contributing to injuries in residential building fires was being "asleep" (49%).
- Males accounted for 54% of civilian fire injuries in residential buildings; females accounted for 46% of civilian fire injuries in residential buildings.
- Bedrooms (33%) were the leading specific location where civilian injuries occurred in residential building fires.

Fires can occur anywhere — in structures, buildings, automobiles and the outdoors. Fires that affect our homes are often the most tragic and the most preventable. While the loss of our possessions can be upsetting, the physical injuries and psychological impacts that fires can inflict on our lives are often far more devastating. It is a sad fact that each year, over 70% of all civilian fire injuries occurred as a result of fires in residential buildings — our homes.<sup>1,2</sup>

Annually, from 2017 to 2019, an estimated 11,650 civilian fire injuries resulted from 7,200 residential building fires resulting in injuries and an estimated 368,500 residential building fires.<sup>3</sup> National estimates for 2017 to 2019 show that 75% of all civilian fire injuries occurred in residential buildings.<sup>4,5</sup> On average, someone is injured in a residential building fire every 45 minutes.

By definition, civilian fire injuries involved people who were non-fatally injured as a result of a fire and were not on active duty with a firefighting organization.<sup>6</sup> These injuries generally occurred from activities of fire control, escaping from the dangers of fire, or sleeping. Fires resulting in injuries were those where 1 or more injuries occurred. Although this report focuses on fire injuries and fires resulting in injuries, a fatal fire may be included if it also resulted in non-fatal civilian fire injuries.

This topical fire report focuses on the characteristics of these injuries as reported to NFIRS from 2017 to 2019.<sup>7,8</sup> NFIRS data are used for the analyses presented throughout this report.

For this report, the term “residential building fires resulting in injuries” is synonymous with “residential fires resulting in injuries,” and the term “residential building fires” is synonymous with “residential fires.” The term “residential fires resulting in injuries” is used throughout the body of this report; the findings, tables, figures, headings and endnotes reflect the full category, “residential building fires resulting in injuries.”

### Civilian injury rates for residential building fires

Not all fires produce injuries. When civilian fire injuries were averaged over reported residential fires, the overall injury rate was nearly 3 civilian injuries per 100 residential fires (Table 1).<sup>9</sup> Residential fires that resulted in injuries, however, had 131 injuries for every 100 fires. Of the residential fires resulting in injuries, 82% resulted in 1 civilian injury, 12% resulted in 2 civilian injuries, and 6% resulted in 3 or more civilian injuries.

**Table 1. Civilian injury rates for residential building fires per 100 fires (2017-2019)**

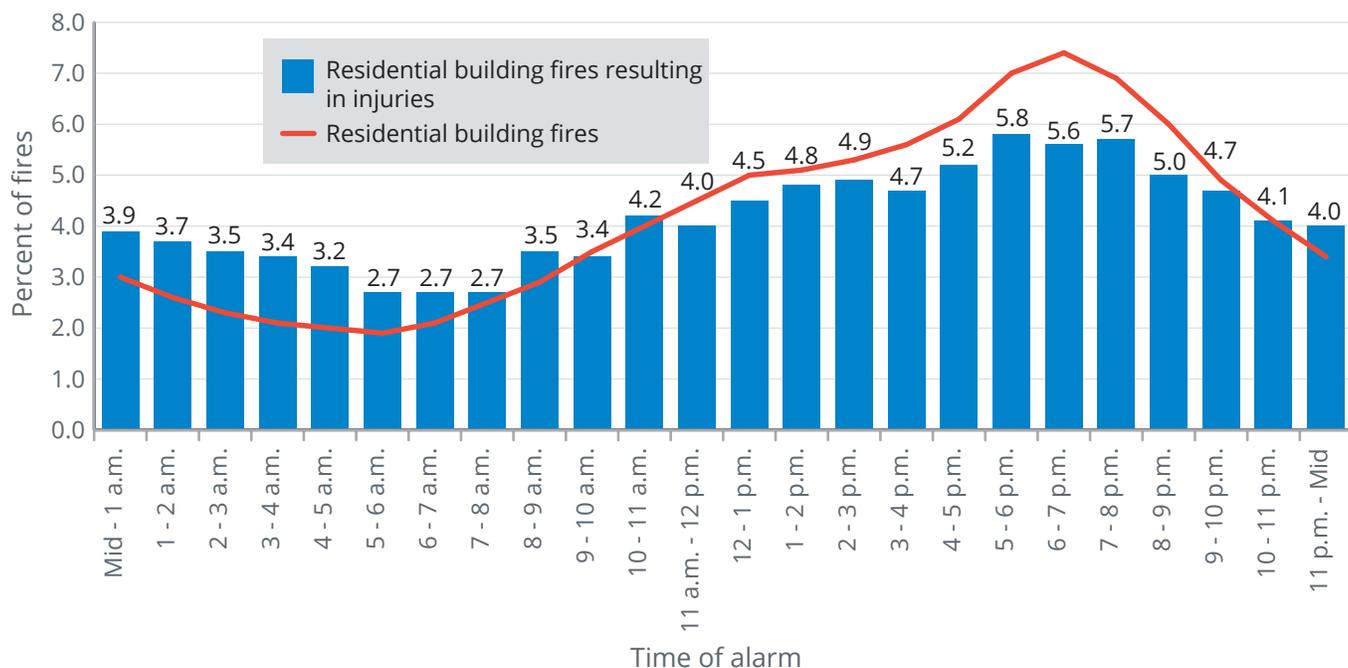
Injuries per 100 injury-producing residential building fires	Injuries per 100 residential building fires
130.6	2.5

Source: NFIRS 5.0.

### When residential building fires resulting in injuries occur

Residential fires resulting in injuries followed a daily pattern.<sup>10</sup> In addition, unlike fatal residential fires, which occurred most frequently late at night or in the very early morning hours,<sup>11</sup> residential fires resulting in civilian injuries followed a pattern similar to that of all residential fires with a less pronounced peak. As shown in Figure 1, residential fires resulting in injuries occurred most frequently in the late afternoon and early evening hours, when many people are expected to be cooking dinner. The peak period from 5 to 8 p.m. accounted for 17% of the residential fires resulting in injuries. Cooking — discussed later in the “Causes of residential building fires resulting in injuries” section — was the primary cause (31%) for residential fires that resulted in injuries. In general, residential fires resulting in injuries decreased to the lowest point of the day, between 5 and 8 a.m., and then steadily increased during the daytime hours until reaching the daily peak.

**Figure 1. Residential building fires resulting in injuries by time of alarm (2017-2019)**

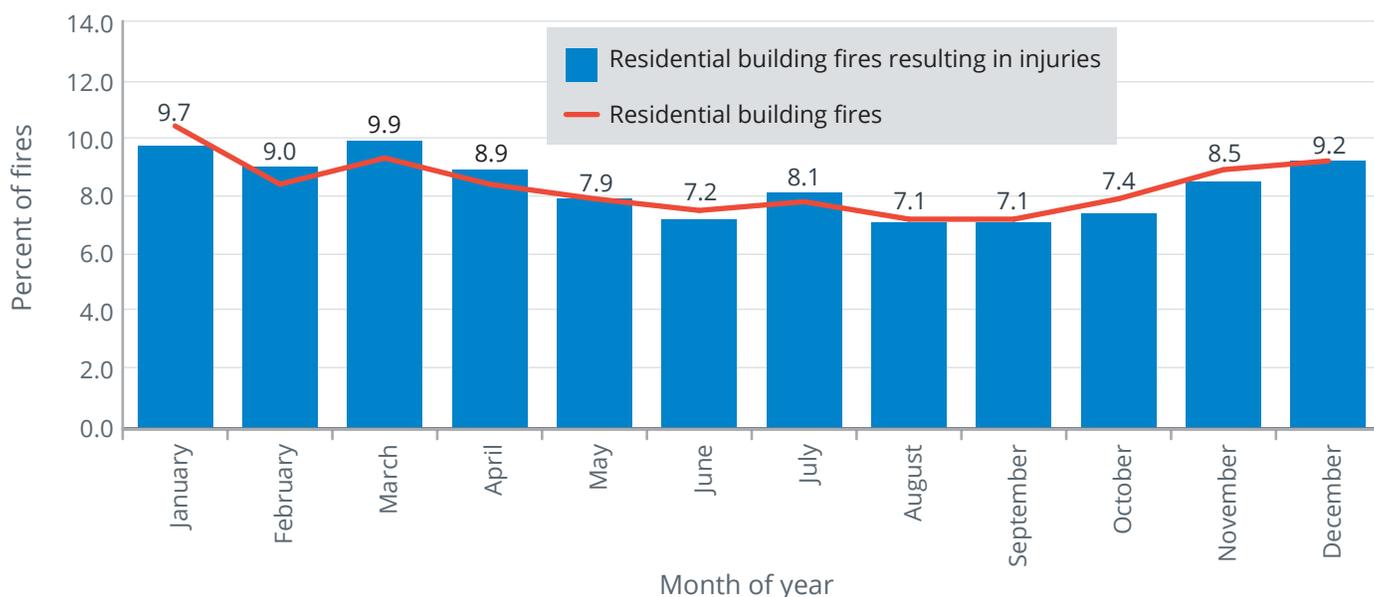


Source: NFIRS 5.0.

Note: Total does not add up to 100% due to rounding.

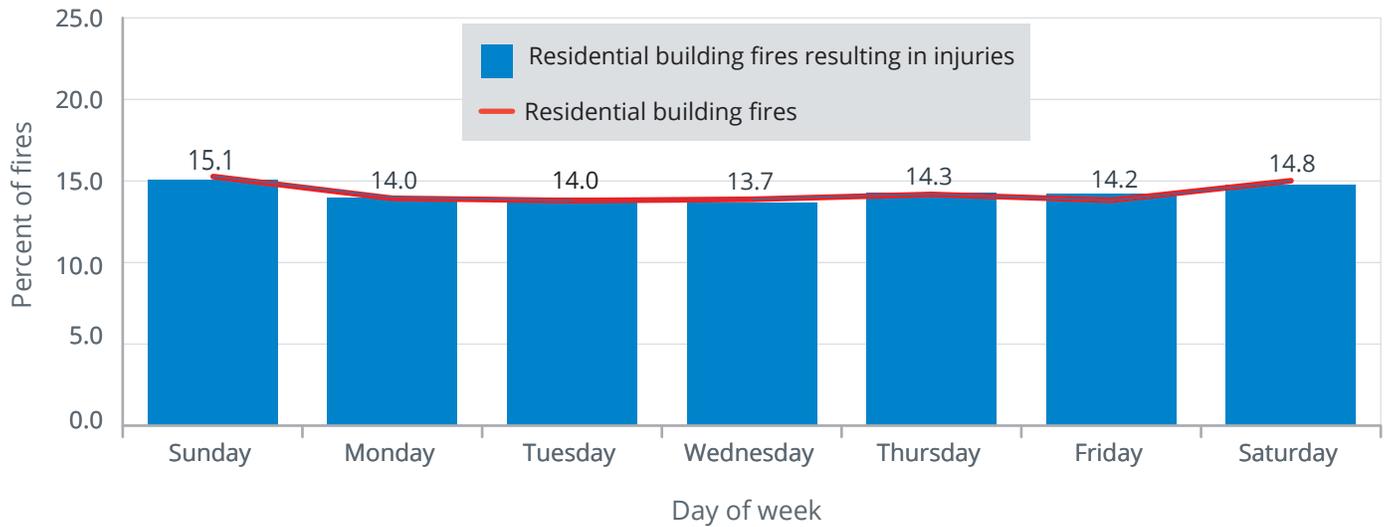
Residential fires resulting in injuries also follow a yearly pattern like that of all residential fires. In addition, residential fires resulting in injuries tend to follow a seasonal trend, with more fires taking place during the colder months than the warmer months (Figure 2). January (10%) and March (10%) had the highest incidence of residential fires resulting in injuries. August and September resulted in the least amount of residential fires resulting in injuries. This drop may be explained by a decrease in residential heating fires and their associated injuries during the warmer months.<sup>12</sup> Also, similar to all fires in residential buildings, residential fires resulting in injuries occurred most often on the weekend (Figure 3).

**Figure 2. Residential building fires resulting in injuries by month (2017-2019)**



Source: NFIRS 5.0.

**Figure 3. Residential building fires resulting in injuries by day of week (2017-2019)**



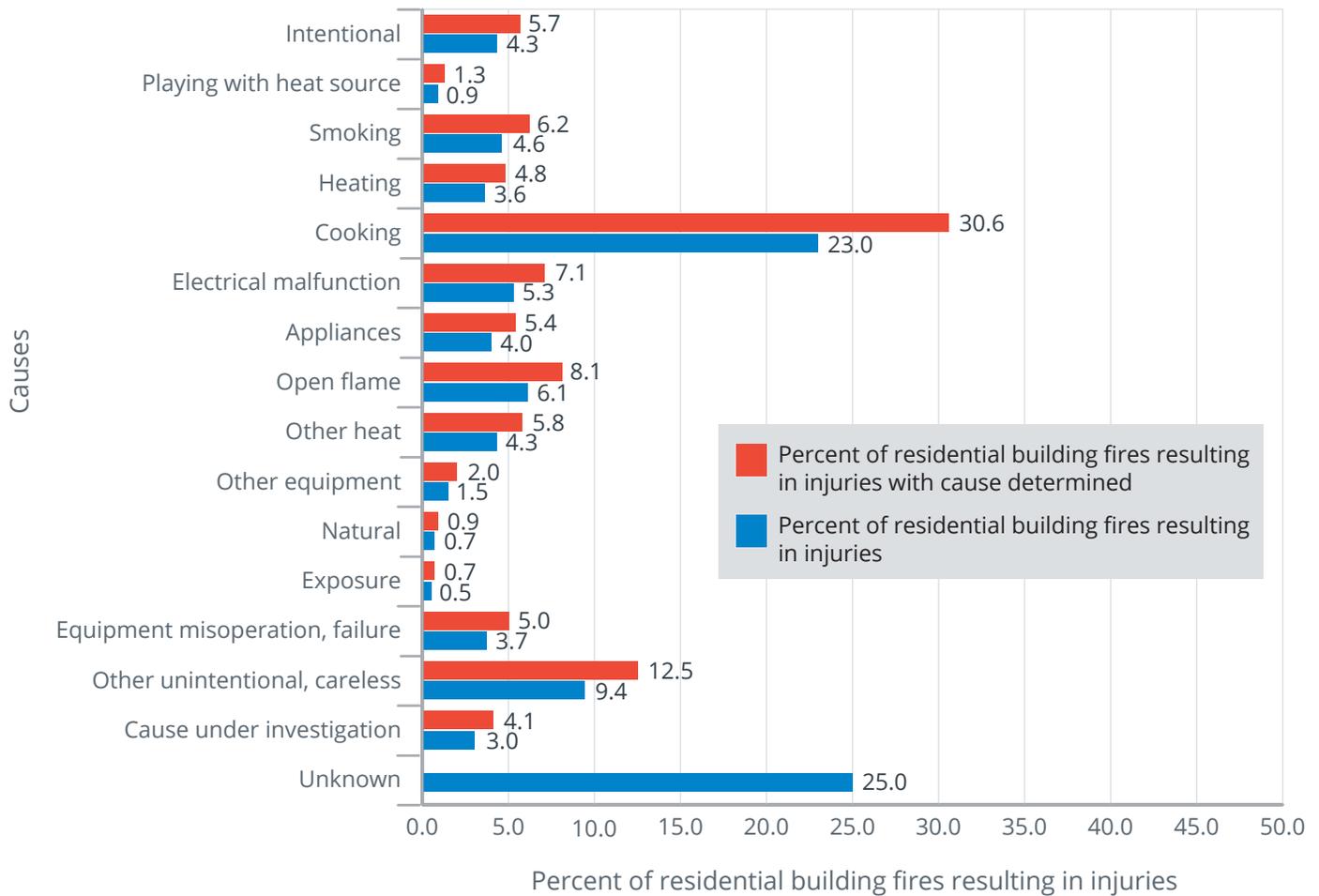
Source: NFIRS 5.0.

Note: Total does not add up to 100% due to rounding.

### Causes of residential building fires resulting in injuries

As shown in Figure 4, “cooking” (31%) was the leading cause of residential fires that resulted in injuries.<sup>13</sup> “Other unintentional, careless” actions (13%) and “open flame” (8%) were the next leading causes. “Other unintentional, careless” actions include misuse of material or product, abandoned or discarded materials or products, and heat source too close to combustibles. “Open flame” includes torches, candles, matches, lighters, embers and the like.

**Figure 4. Causes of residential building fires resulting in injuries (2017-2019)**



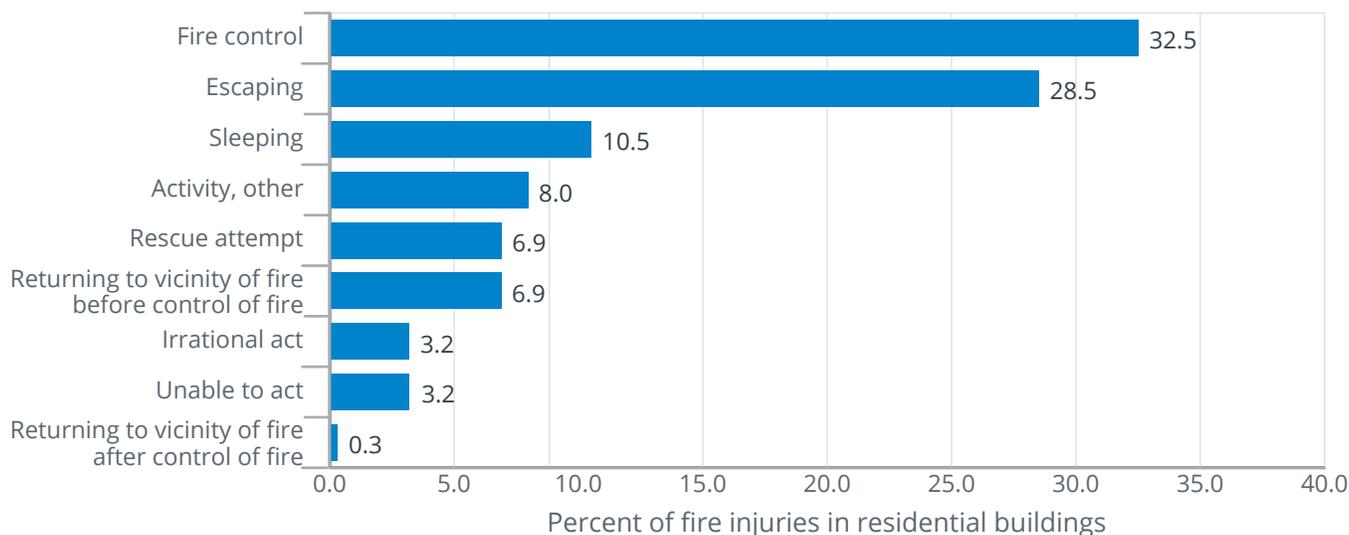
Source: NFIRS 5.0.

- Notes:
1. 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 1 of 16 cause groupings using a hierarchy of definitions, as shown in the 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.
  2. 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, <http://www.fbi.gov/about-us/cjis/ucr/ucr>.
  3. Totals do not add up to 100% due to rounding.

### Civilian activity when injured

Most civilian fire injuries occurred when the victim was attempting to control the fire (33%), followed by attempting to escape (29%) and sleeping (11%), as shown in Figure 5. The USFA recommends leaving fighting a fire to trained firefighters and instead focusing efforts on following a preset escape plan. To escape a fire, many civilians make the mistake of trying to flee through the area where the fire is located. This area has tremendous heat, smoke and a toxic atmosphere that can render a person unconscious. As a result, it is imperative that residents create and practice a home fire escape plan. A home fire escape plan includes multiple escape options and is created around the abilities of everyone in the home. In addition, studies show that people may not wake up from the smell of smoke while sleeping.<sup>14</sup> Therefore, it is also vital to have smoke alarms inside and outside of each bedroom and on every level of the home. This will help alert sleeping people to the presence of fire.<sup>15</sup>

**Figure 5. Civilian fire injuries in residential buildings by activity when injured (2017-2019)**



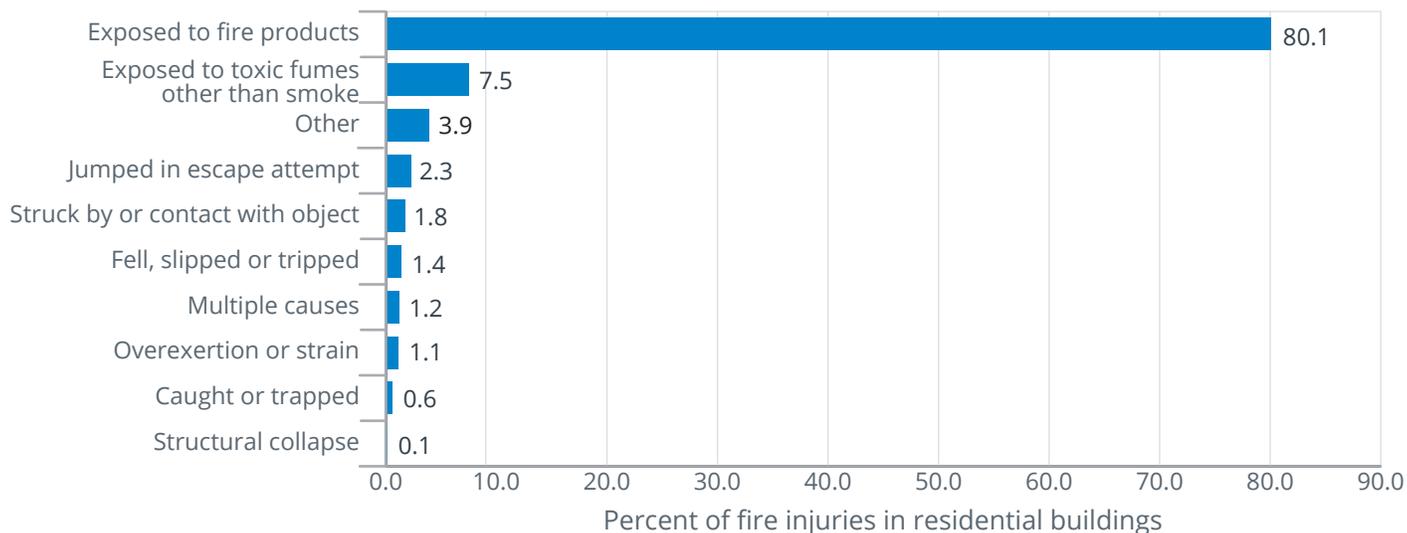
Source: NFIRS 5.0.

Note: Percentages computed for only those injuries where activity information was available. The activity when injured was specified in 52% of reported injuries.

### Cause of injury

The predominant cause of residential fire injuries, by far, involved exposure to fire products (80%), such as flame, heat, smoke or gas (Figure 6). The next 2 leading causes were exposure to toxic fumes other than smoke (8%) and other, unspecified causes (4%).

**Figure 6. Civilian fire injuries in residential buildings by cause of injury (2017-2019)**



Source: NFIRS 5.0.

Note: Percentages computed for only those injuries where causes were specified. The cause of injury was specified in 69% of reported injuries.

## Primary symptoms of civilian fire injuries

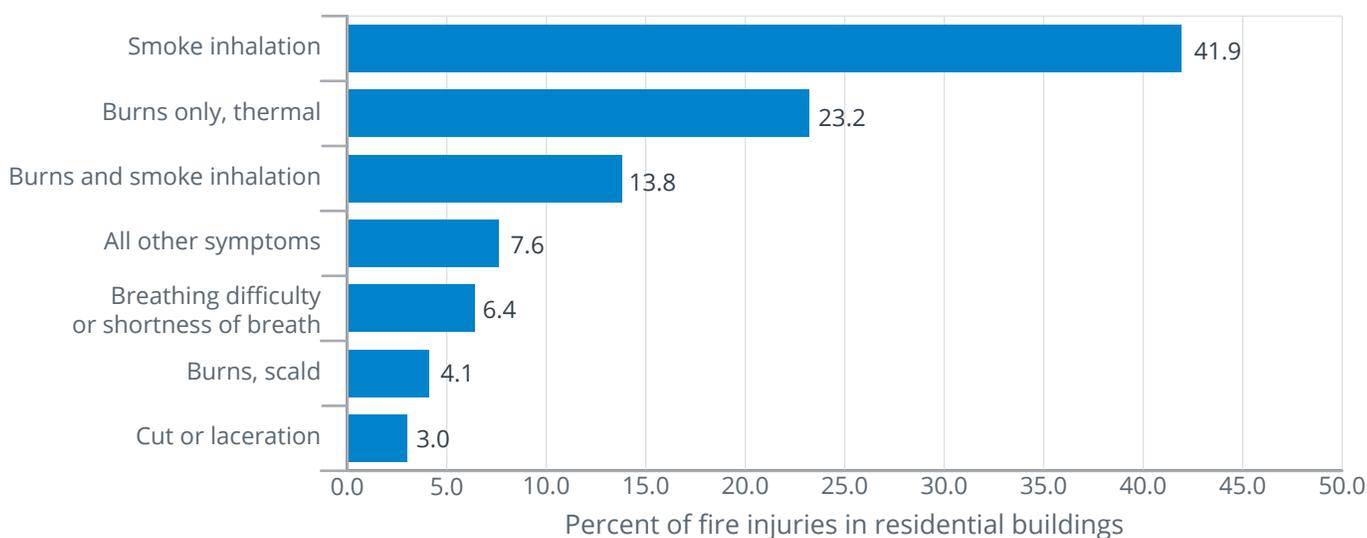
Smoke inhalation and thermal burns were the primary symptoms of reported injuries, accounting for 79% of all injuries resulting from residential fires (Figure 7). Smoke inhalation alone accounted for 42% of residential fire injuries. Thermal burns (as opposed to scalds or chemical or electrical burns) accounted for another 23%, and burns combined with smoke inhalation accounted for an additional 14%. Breathing difficulty or shortness of breath was reported for only 6% of injuries. Scalds (4%) and cuts or lacerations (3%) accounted for an even smaller proportion of the injuries.

Thermal burns are caused by contact with flames, hot liquids, hot surfaces and other sources of high heat. Of the thermal burns to the body, 70% were to the upper and lower extremities (56% and 14%, respectively).

Of the smoke inhalation injuries, 69% were internal injuries, which are particularly critical, as they can lead to lung damage. The inflammation and damage caused by smoke inhalation to delicate breathing sacs in the lungs actually grow worse in the hours after the incident. A chest X-ray can look clear, and oxygen levels in the blood may appear normal in the first few hours after a fire. A day or 2 later, however, the victim can suddenly take a turn for the worse as the lungs become unable to properly exchange oxygen.<sup>16</sup>

Based on the severity of the injury, 55% of the civilian fire injuries in residential fires were deemed minor. Only 16% of the injuries were considered serious or life-threatening. The remaining 29% of civilian fire injuries in residential buildings were moderate.

**Figure 7. Civilian fire injuries in residential buildings by primary symptoms (2017-2019)**



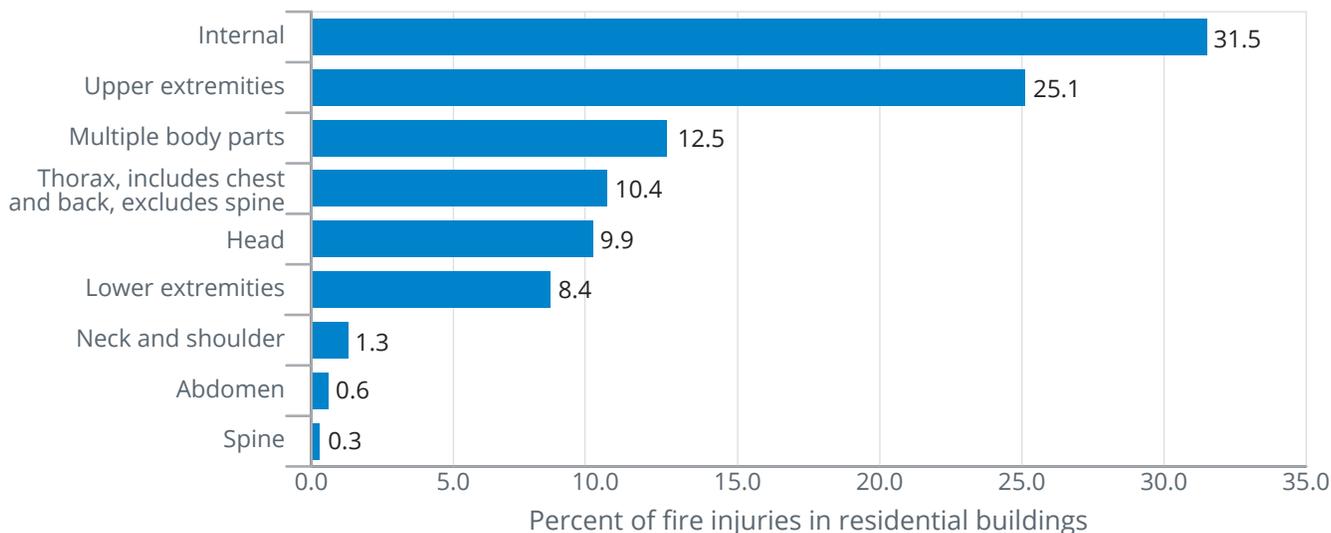
Source: NFIRS 5.0.

Note: Percentages computed for only those injuries where symptoms were specified. The primary symptoms were specified in 60% of reported injuries.

## Areas of the body affected

The body parts affected most by residential fire injuries (Figure 8) included internal parts (32%) and the upper extremities (25%). As discussed, the types of injuries that affected most areas of the body consisted of smoke inhalation, thermal burns or a combination of both.

**Figure 8. Civilian fire injuries in residential buildings by part of body injured (2017-2019)**



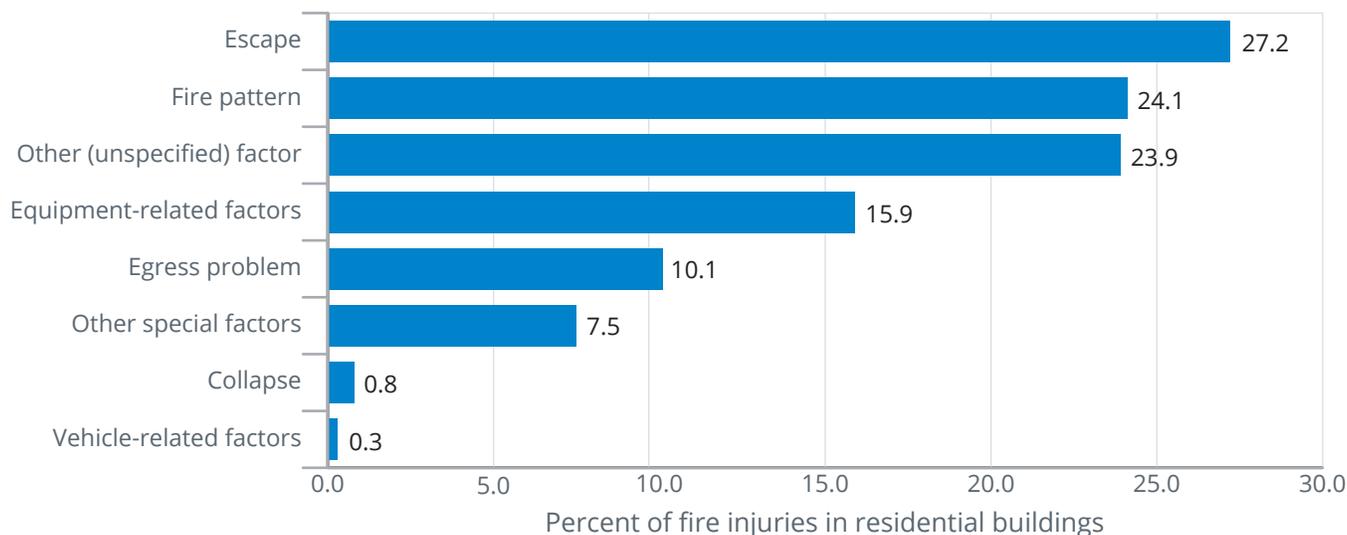
Source: NFIRS 5.0.

Notes: Percentages computed for only those injuries where part of body injured was specified. The part of body injured was specified in 53% of reported injuries.

### Factors contributing to civilian fire injuries

As shown in Figure 9, the most notable factors contributing to civilian fire injuries (outside of “other (unspecified) factor” at 24%) involved escape (27%), fire pattern (24%) and equipment-related factors (16%). Escape factors include unfamiliarity with exits, excessive travel distance to the nearest clear exit, a choice of an inappropriate exit route, re-entering the building, and clothing catching fire while escaping. Fire pattern factors involve such situations as exits are blocked by smoke and flame, vision is blocked or impaired by smoke, and civilians are trapped above or below the fire. Equipment-related problems include such factors as the improper use of cooking or heating equipment and the use of unvented heating equipment.

**Figure 9. Factors contributing to civilian fire injuries in residential buildings (2017-2019)**



Source: NFIRS 5.0.

Notes: 1. Includes incidents where factors contributing to injury were specified. Factors contributing to injury were specified in 26% of reported injuries.

2. As multiple factors contributing to injury may be noted for each injury, the total sums to more than 100%.

## Human factors contributing to civilian fire injuries

Human factors also contribute to residential fire injuries. Table 2 shows that the leading human factor contributing to injuries was being “asleep” (49%). This is not unexpected, as the largest number of injuries occurred in bedrooms (33%). “Possibly impaired by alcohol” (17%) was the second leading human factor contributing to injuries. This was followed by people with “physical disabilities” (14%) and “unattended or unsupervised” individuals (12%).

**Table 2. Human factors contributing to civilian fire injuries in residential buildings (2017-2019)**

Human factors contributing to injury	Percent of fire injuries in residential buildings (unknowns apportioned)
Asleep	48.8
Possibly impaired by alcohol	16.5
Physical disabilities	13.9
Unattended or unsupervised	11.9
Possibly impaired by other drug or chemical	9.8
Possible intellectual disabilities	8.6
Unconscious	3.4
Physically restrained	0.6

Source: NFIRS 5.0.

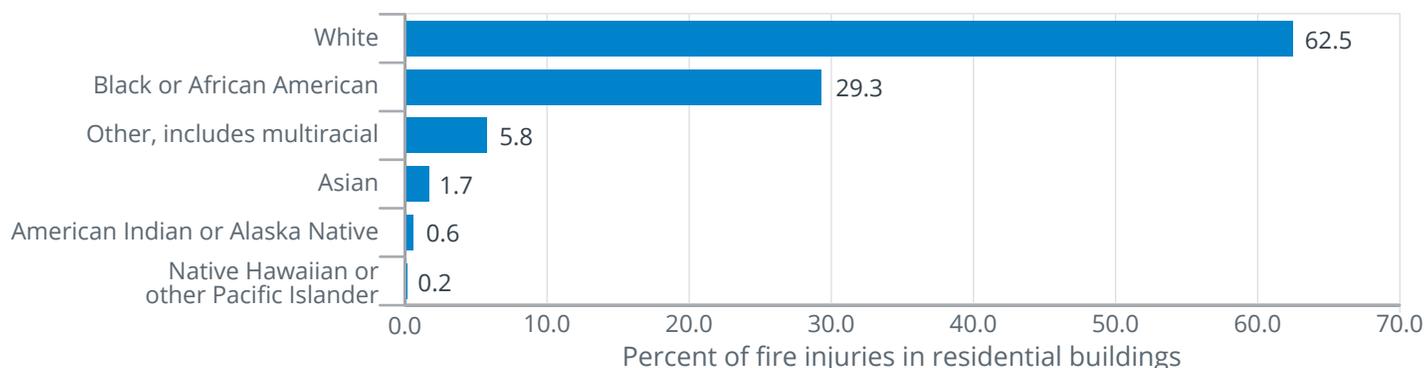
- Notes: 1. Includes only incidents where human factors that contributed to the injury were specified. A human factor contributing to the injury was specified in 17% of reported injuries.  
 2. Multiple human factors contributing to the fire injury may be noted for each incident; total will exceed 100%.

## Gender, race and ethnicity of civilian fire injuries

Males accounted for 54% and females accounted for 46% of residential fire injuries. Figure 10 shows the percentage distribution of civilian fire injuries by race. Where racial information was provided, whites constituted 63% of the injuries, followed by Blacks or African Americans (29%); other, including multiracial (6%); Asians (2%); American Indians or Alaska Natives (less than 1%); and Native Hawaiians or other Pacific Islanders (also less than 1%).

The ethnicity element shows that 85% of the injuries occurred to non-Hispanics or non-Latinos, compared to Hispanics or Latinos (15%). Ethnicity was specified for 34% of reported injuries.

**Figure 10. Civilian fire injuries in residential buildings by race (2017-2019)**



Source: NFIRS 5.0.

- Notes: 1. Percentages computed for only those injuries where race information was available. Race was specified in 50% of reported injuries.  
 2. Total does not add up to 100% due to rounding.

## Age of civilians injured and activity when injured

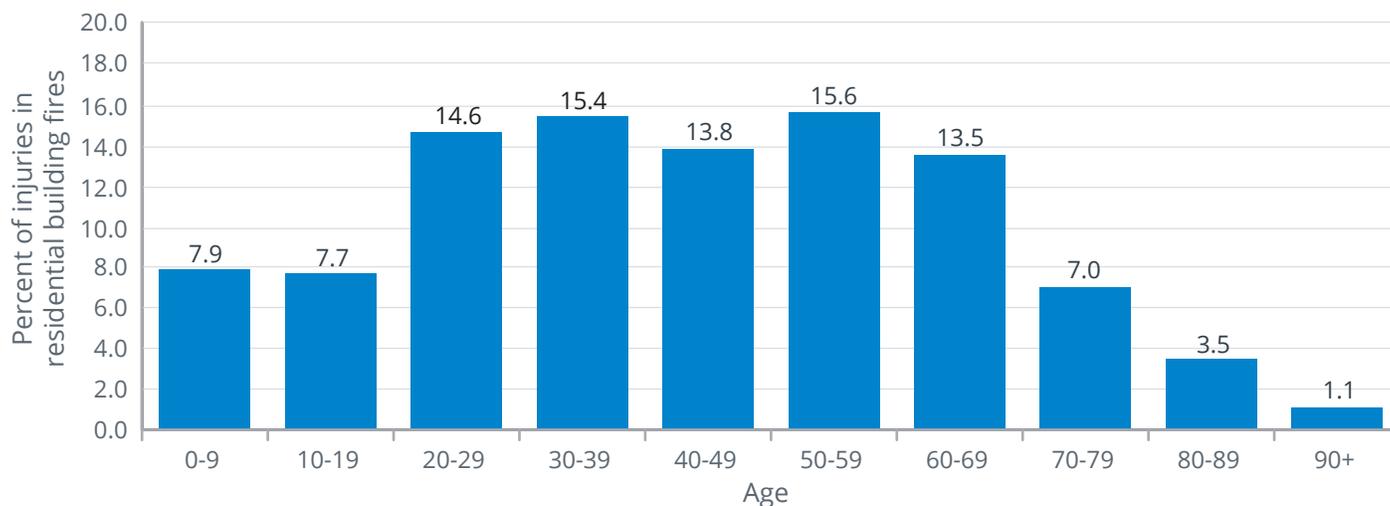
Civilians between the ages of 20 and 49 accounted for 44% of injuries in residential fires (Figure 11). An additional 16% of those with injuries were less than 20 years old. Adults aged 50 and over accounted for 41% of those with injuries.<sup>17</sup>

With the exception of children aged 9 or younger and adults aged 90 and over, the first reaction of civilians is either to try to control or escape the fire (Table 3). At the time of injury, for those aged 10 to 89, trying to control the fire and escaping were the 2 leading activities that resulted in injuries. Those aged 20 to 59 primarily got injured trying to control the fire (38%), followed by trying to escape the fire (25%). Those aged 10 to 19 and 60 to 89 primarily got injured trying to escape the fire (33%), followed by trying to control the fire (27%).

For children aged 0 to 9 and those aged 90 and over, escaping and sleeping were the 2 leading activities that resulted in injuries. Children aged 0 to 9 primarily got injured when trying to escape the fire (46%), followed by sleeping (24%). Older adults aged 90 and over primarily got injured when trying to escape (33%), followed by sleeping (18%).

The young and the very old are less likely to be as mobile or ready to act in a fire situation. Of the reported injuries to children aged 0 to 9, 11% of the children were unable to act at the time of the fire. Of the reported injuries to those aged 90 and over, 15% of the older adults were unable to act at the time of the fire. Infants, young children and older adults may require special provisions in a fire or emergency situation. Therefore, it is not surprising that these individuals are less likely to attempt to control the fire.

**Figure 11. Civilian fire injuries in residential buildings by age group (2017-2019)**



Source: NFIRS 5.0.

- Notes:
1. Percentages computed for only those injuries where age was valid. A valid age was provided for nearly all (99.8%) reported injuries.
  2. Total does not add up to 100% due to rounding.

**Table 3. Leading activities resulting in civilian fire injuries in residential buildings by age group (2017-2019)**

Age group	Percent of fire injuries where age and activity reported (2017-2019)		
	Fire control	Escaping	Sleeping
0-9	6.9	45.6	24.0
10-19	29.5	37.9	8.5
20-29	39.6	24.8	7.6
30-39	40.0	25.4	7.3
40-49	39.0	23.0	7.6
50-59	34.2	25.2	12.7
60-69	27.2	28.0	12.5
70-79	24.5	35.1	11.5
80-89	22.2	37.1	9.7
90+	15.3	32.9	17.6
Overall	32.5	28.5	10.5

Source: NFIRS 5.0.

Note: Percentages computed for only those injuries where age was valid and activity was reported.

## Specific location at time of fire injury

Bedrooms (33%) were the leading specific location where civilian fire injuries occurred in residential buildings (Table 4). Family rooms and living rooms (11%) and kitchens and cooking areas (10%) were the next leading specific locations.

While not specific rooms in the home, egress areas were the specific locations where 19% of fire injuries occurred. Exits (such as corridors, stairways and doors) can get filled with smoke, fire or extreme heat, making escape routes treacherous.

**Table 4. Leading specific location of civilian fire injuries in residential buildings (2017-2019)**

Specific location at time of injury	Percent (unknowns apportioned)
Bedrooms	33.2
Common room, den, family room, living room, lounge	10.8
Kitchens and cooking areas	9.6

Source: NFIRS 5.0.

Note: Percentages computed for only those injuries where the specific location at the time of injury was specified. The location was specified for 19% of reported injuries.

## Examples

The following are some recent examples of civilian fire injuries reported by the media:

- February 2021: A 61-year-old man suffered minor burns and cuts to his arms and hands as a result of a mobile home fire on a Monday night near Garfield, Minnesota. Firefighters arrived on scene and were able to extinguish the blaze. The injured man was found on the ground, and he was transported to a local hospital for treatment of his injuries. The front of the mobile home sustained fire damage, and smoke damage was evident throughout the home. The cause of the fire was under investigation.<sup>18</sup>
- April 2021: A woman was severely injured in a house fire in north Harris County, Texas, on a Saturday morning. The blaze happened about 2 a.m. Once on scene, firefighters found smoke and flames coming from the right side of the home. Through their search efforts, firefighters found the unconscious woman on the floor with burns to her head and torso. She was transported to a local hospital where she was reported to be in critical condition. The origin and cause of the fire were under investigation.<sup>19</sup>

- April 2021: A house fire in Roanoke, Virginia, caused life-threatening injuries for 1 resident. The fire was reported around 6:15 p.m. on a Tuesday. The injured person, who was unidentified, tried to extinguish the fire before firefighters arrived. Upon arrival, fire crews found the resident outside while smoke and flames were coming from the home. The victim was transported to a local hospital for treatment. The fire was reported to have started by improperly discarded smoking material and resulted in an estimated \$42,000 in property damage. No other injuries were reported.<sup>20</sup>
- April 2021: An explosion and subsequent fire that destroyed an apartment building in Choteau, Montana, injured 2 occupants on a Tuesday. The 2 residents suffered smoke inhalation injuries and were transported to a hospital for treatment. The explosion happened just before noon in 1 of the 8 apartments. The building was deemed a total loss, and 24 residents were displaced by the fire. The cause of the explosion and blaze was unknown.<sup>21</sup>

## Escape planning for residential buildings

Everyone should know how to escape from a burning home. The USFA recommends leaving fighting a fire to trained firefighters. Instead, efforts should focus 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.

Working smoke alarms should be installed on every level of the home, as well as inside and outside sleeping areas. Everyone should create a home escape plan, know 2 safe ways out of each room, and 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. Everyone in the home should practice the plan at least 2 times a year. For more information on preparing and practicing a fire escape plan, visit <http://www.usfa.fema.gov/prevention/outreach/escape.html>.

## Alerting/suppression systems in residential buildings

Fire fatalities and injuries have declined over the last 40 years, partly due to new technologies to detect and extinguish fires. Residential sprinklers have gained support from the fire service and many residential communities.

Properly installed and maintained smoke alarms provide an early warning signal to everyone in a home if a fire occurs. 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, training bulletins, and public education and outreach materials is available at [http://www.usfa.fema.gov/prevention/technology/smoke\\_fire\\_alarms.html](http://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](https://www.usfa.fema.gov/about/smoke_alarms_position.html).

Residential sprinkler systems help to reduce the risk of deaths and injuries, homeowners insurance premiums, and uninsured property losses. Despite these advantages, many homes do not have automatic extinguishing systems, 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.<sup>22</sup>

The 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 [http://www.usfa.fema.gov/prevention/technology/home\\_fire\\_sprinklers.html](http://www.usfa.fema.gov/prevention/technology/home_fire_sprinklers.html). Additionally, the USFA's position statement on residential sprinklers is available at [http://www.usfa.fema.gov/about/sprinklers\\_position.html](http://www.usfa.fema.gov/about/sprinklers_position.html).

## NFIRS data specifications for civilian fire injuries in residential buildings

Data for this report were extracted from the NFIRS annual Public Data Release files for 2017, 2018 and 2019. Only Version 5.0 data were extracted.

Civilian injuries in residential building fires are defined using the following criteria:

- Incidents with 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 (excluding 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
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 casualty severity: 1 (minor), 2 (moderate), 3 (severe), 4 (life-threatening) and U (undetermined).
- Other civilian injuries: greater than 0.

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 21)" (<https://www.usfa.fema.gov/downloads/pdf/statistics/data-sources-and-national-estimates-methodology-vol21.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: <http://www.usfa.fema.gov/contact.html>. [Provide feedback on this report.](#)

## Notes:

<sup>1</sup>In NFIRS Version 5.0, a structure is a constructed item of which a building is 1 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.

<sup>2</sup>The percentage presented here is based on the analysis of residential building fire injuries since 2003, the first year for which residential building estimates are available ([http://www.usfa.fema.gov/data/statistics/order\\_download\\_data.html](http://www.usfa.fema.gov/data/statistics/order_download_data.html)) and the National Fire Protection Association's (NFPA's) annual estimates of fire injuries (<https://www.nfpa.org/News-and-Research/Data-research-and-tools/US-Fire-Problem/Fire-loss-in-the-United-States>). The consistency of the percentage of residential building fire injuries leads analysts to believe this proportion has most likely been stable for some time.

<sup>3</sup>In this topical report, fires are rounded to the nearest 100 and injuries to the nearest 25. National estimates are based on 2017 to 2019 native Version 5.0 data from the NFIRS, residential structure fire loss estimates from the NFPA's annual surveys of fire loss, and the USFA's residential building fire loss estimates: [http://www.usfa.fema.gov/data/statistics/order\\_download\\_data.html](http://www.usfa.fema.gov/data/statistics/order_download_data.html). 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, [http://www.usfa.fema.gov/downloads/pdf/statistics/national\\_estimate\\_methodology.pdf](http://www.usfa.fema.gov/downloads/pdf/statistics/national_estimate_methodology.pdf). For detailed information regarding the NFPA's survey methodology, see the NFPA's "Methodology used in calculating national estimates from NFPA's fire experience survey," August 2020, <https://www.nfpa.org/-/media/Files/News-and-Research/Fire-statistics-and-reports/US-Fire-Problem/Methodsfirelossandothers.ashx>.

<sup>4</sup>Residential buildings include, but are not limited to, one- or two-family dwellings, multifamily dwellings, manufactured housing, boarding houses or residential hotels, commercial hotels, dormitories, sorority/fraternity houses, and assisted living facilities.

<sup>5</sup>The percentage shown here is derived from the national estimates of residential building fire injuries as explained in Endnote 3 and the summary data resulting from the NFPA's annual fire loss surveys (Ahrens, Marty and Evarts, Ben, "Fire Loss in the United States During 2019," NFPA, September 2020; Evarts, Ben, "Fire Loss in the United States During 2018," NFPA, October 2019; Evarts, Ben, "Fire Loss in the United States During 2017," NFPA, October 2018).

<sup>6</sup>Civilians also include emergency personnel who are not members of the fire department, such as police officers or utility workers.

<sup>7</sup>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 2017 to 2019, 68% of the NFPA's annual average estimated 1,309,800 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% 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.

<sup>8</sup>A total of 19,699 civilian fire injuries was reported to the NFIRS from 2017 to 2019. These injuries occurred from a reported 15,089 residential building fires resulting in injuries.

<sup>9</sup>The average fire injury rates computed from national estimates do not agree with average fire injury rates computed from NFIRS data alone. The fire injury rate for fires with injuries computed from national estimates is  $100 \times (11,650/7,200) = 161.8$  injuries per 100 injury-producing residential building fires. The fire injury rate for all residential building fires computed from national estimates is  $100 \times (11,650/368,500) = 3.2$  injuries per 100 residential building fires.

<sup>10</sup>For 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.

- <sup>11</sup>USFA, "Civilian Fire Fatalities in Residential Buildings (2017-2019)," Volume 21, Issue 3, June 2021, <http://www.usfa.fema.gov/downloads/pdf/statistics/v21i3.pdf>.
- <sup>12</sup>USFA, "Heating Fires in Residential Buildings (2013-2015)," Volume 18, Issue 7, October 2017, <http://www.usfa.fema.gov/downloads/pdf/statistics/v18i7.pdf>.
- <sup>13</sup>The USFA Structure Fire Cause Methodology was used to determine the cause of residential building fires resulting in injuries. 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, [http://www.usfa.fema.gov/downloads/pdf/nfirs/nfirs\\_data\\_analysis\\_guidelines\\_issues.pdf](http://www.usfa.fema.gov/downloads/pdf/nfirs/nfirs_data_analysis_guidelines_issues.pdf).
- <sup>14</sup>Brown University, "Scents Will Not Rouse Us From Slumber, Says New Brown University Study," Science Daily, May 2004, (Providence, Rhode Island), <http://www.sciencedaily.com/releases/2004/05/040518075747.htm> (accessed April 20, 2021).
- <sup>15</sup>USFA, Smoke alarm outreach materials, [https://www.usfa.fema.gov/prevention/outreach/smoke\\_alarms.html](https://www.usfa.fema.gov/prevention/outreach/smoke_alarms.html).
- <sup>16</sup>Ubelacker, Sheryl, "Doctors: Smoke inhalation victim can seem fine, go into lung failure suddenly," EMS World, October 2004, (Toronto, Canada), <https://www.emsworld.com/news/10341024/doctors-smoke-inhalation-victim-can-seem-fine-go-lung-failure-suddenly> (accessed April 22, 2021).
- <sup>17</sup>Total does not add up to 100% due to rounding.
- <sup>18</sup>Edenloff, Al, "Update: Man injured in mobile home fire near Garfield Monday night," [www.echopress.com](http://www.echopress.com), February 1, 2021, <https://www.echopress.com/news/fires/6867518-Update-Man-injured-in-mobile-home-fire-near-Garfield-Monday-night> (accessed April 26, 2021).
- <sup>19</sup>Alexander, Chloe, "Woman critically injured in house fire in north Harris County," [www.khou.com](http://www.khou.com), April 10, 2021, <https://www.khou.com/article/news/local/woman-critically-injured-in-house-fire-in-north-harris-county/285-0fe02917-e980-428b-a4da-7c289ff244af> (accessed April 26, 2021).
- <sup>20</sup>Petska, Alicia, "House fire leaves 1 seriously injured in Roanoke," [roanoke.com](http://roanoke.com), April 13, 2021, [https://roanoke.com/news/local/house-fire-leaves-1-seriously-injured-in-roanoke/article\\_72fa0650-9cbc-11eb-9e40-6f278ac1d028.html](https://roanoke.com/news/local/house-fire-leaves-1-seriously-injured-in-roanoke/article_72fa0650-9cbc-11eb-9e40-6f278ac1d028.html) (accessed April 26, 2021).
- <sup>21</sup>"Explosion and fire at Choteau apartment building," [apnews.com](http://apnews.com), April 20, 2021, <https://apnews.com/article/fires-explosions-352d9f3df11415f0a22d822f2e9c2629> (accessed April 26, 2021).
- <sup>22</sup>U.S. Department of Housing and Urban Development 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/library/publications/2013/demo/h150-11.pdf> (accessed April 20, 2021).