

# Civilian Fire Injuries in Residential Buildings (2010–2012)

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

- Civilian fire injuries that occurred in residential buildings accounted for 78 percent of all fire injuries.
- Residential building fires resulting in injuries occurred most frequently in the late afternoon and early evening hours.
- January, at 10 percent, had the highest incidence of residential building fires resulting in injuries.
- Cooking, by far, was the leading reported cause for residential building fires that resulted in injuries.
- Of the civilian fire injuries that occurred in residential buildings, 35 percent resulted from trying to control a fire; an additional 26 percent occurred while the victim was attempting to escape.
- Thermal burns and smoke inhalation were the primary symptoms resulting in injury, accounting for 79 percent of all injuries resulting from residential building fires.
- The leading human factor contributing to injuries in residential building fires was being “asleep” (64 percent).
- Bedrooms (34 percent) were the leading specific location where civilian injuries occurred in residential building fires.

Fires can strike 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 impact that fires inflict are often far more devastating. It is a sad fact, but each year, over 70 percent of all civilian fire injuries occur as a result of fires in residential buildings — our homes.<sup>1, 2</sup>

From 2010 to 2012, civilian fire injuries in residential buildings accounted for 78 percent of all fire injuries.<sup>3</sup> This topical fire report focuses on the characteristics of these injuries as reported to the National Fire Incident Reporting System (NFIRS) from 2010 to 2012.<sup>4</sup> NFIRS data is used for the analyses presented throughout this report.

Civilian fire injuries by definition involve people not on active duty with a firefighting organization who are injured as a result of a fire.<sup>5</sup> These injuries generally occur from activities of fire control, escaping from the dangers of fire, or sleeping. Fires resulting in injuries are those fires where one or more injuries occur.

Annually, from 2010 to 2012, an estimated 13,400 civilian fire injuries resulted from an estimated 8,300 residential

building fires resulting in injuries and 366,900 total residential building fires.<sup>6</sup> In fact, every 39 minutes, someone is injured in a residential building fire.

For the purpose of this report, the term “residential building fires resulting in injuries” is synonymous with “residential fires resulting in injuries,” and “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, charts, 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 all residential fires, the overall injury rate was three civilian injuries per 100 residential fires (Table 1).<sup>7</sup> Residential fires that resulted in injuries, however, had 130 injuries for every 100 fires. Of the residential fires resulting in injuries, 82 percent resulted in one civilian injury, 12 percent resulted in two civilian injuries, and 6 percent resulted in three or more civilian injuries.

**Table 1. Civilian Injury Rates for Residential Building Fires per 100 Fires (2010-2012)**

Injuries per 100 Injury-Producing Residential Building Fires	Injuries per 100 Residential Building Fires
129.8	2.9

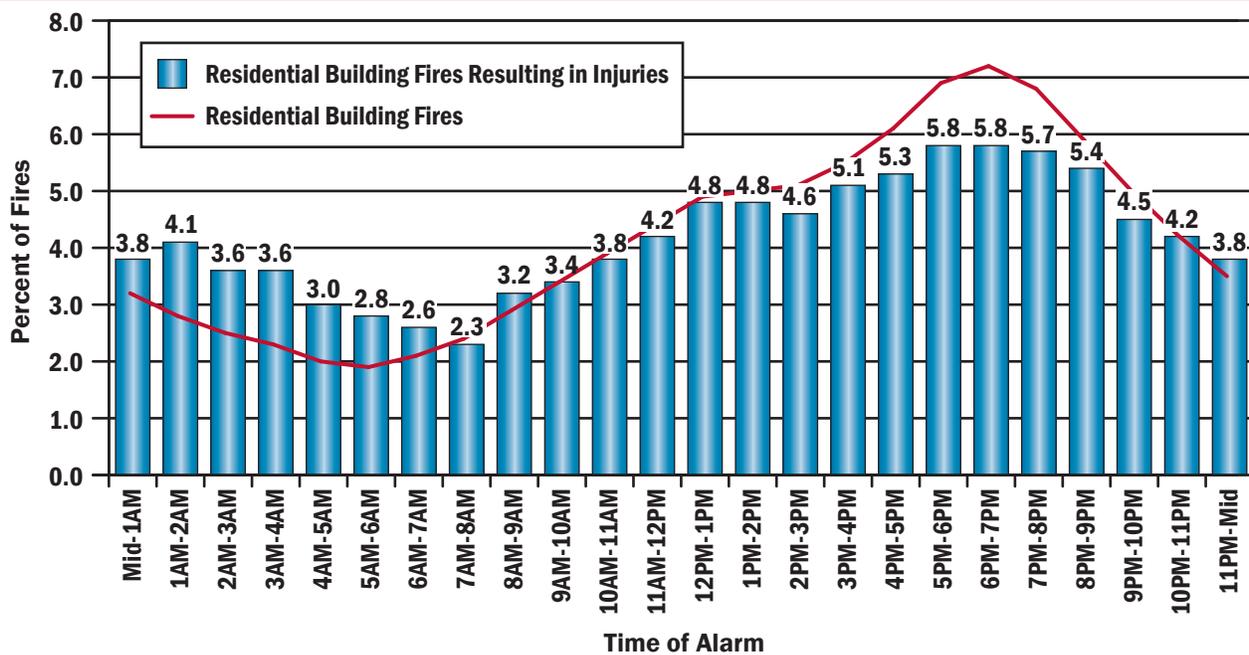
Source: NFIRS 5.0.

**When Residential Building Fires Resulting in Injuries Occur**

Residential fires resulting in injuries follow a daily pattern. In addition, unlike fatal residential fires, which occur more frequently in the late night and early morning hours,<sup>8</sup> residential fires resulting in civilian injuries follow a pattern similar to that of all residential fires. 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.<sup>9</sup> The time period from 5 to 8 p.m. accounted for 17 percent of the residential fires resulting in injuries. Cooking fires, discussed later in the Causes of Residential Building Fires Resulting in Injuries section, were the primary cause (32 percent) for residential fires that resulted in injuries. In general, fires resulting in injuries decreased to the lowest point of the day, between 7 and 8 a.m., and then steadily increased during the daytime hours until reaching the daily peak.

**Figure 1. Time of Day of Occurrence for Residential Building Fires Resulting in Injuries (2010-2012)**

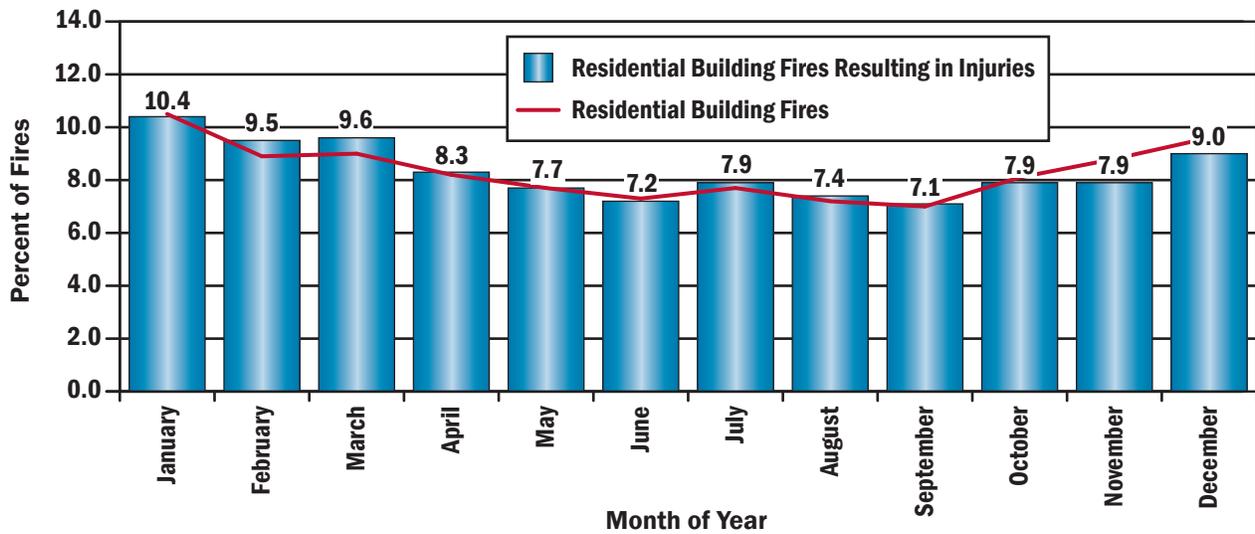


Source: NFIRS 5.0.  
 Note: Total does not add up to 100 percent due to rounding.

Residential fires resulting in injuries also follow a yearly pattern similar to that of all residential fires. In addition, residential fires resulting in injuries tended to follow a seasonal trend, with more fires taking place during the colder months than the warmer months (Figure 2). January, at 10

percent, had the highest incidence of residential fires resulting in injuries. September had the least amount of residential fires resulting in injuries at 7 percent. This drop may be explained by a decrease in residential heating fires and their associated injuries during the warmer months.<sup>10</sup>

**Figure 2. Residential Building Fires Resulting in Injuries by Month (2010-2012)**



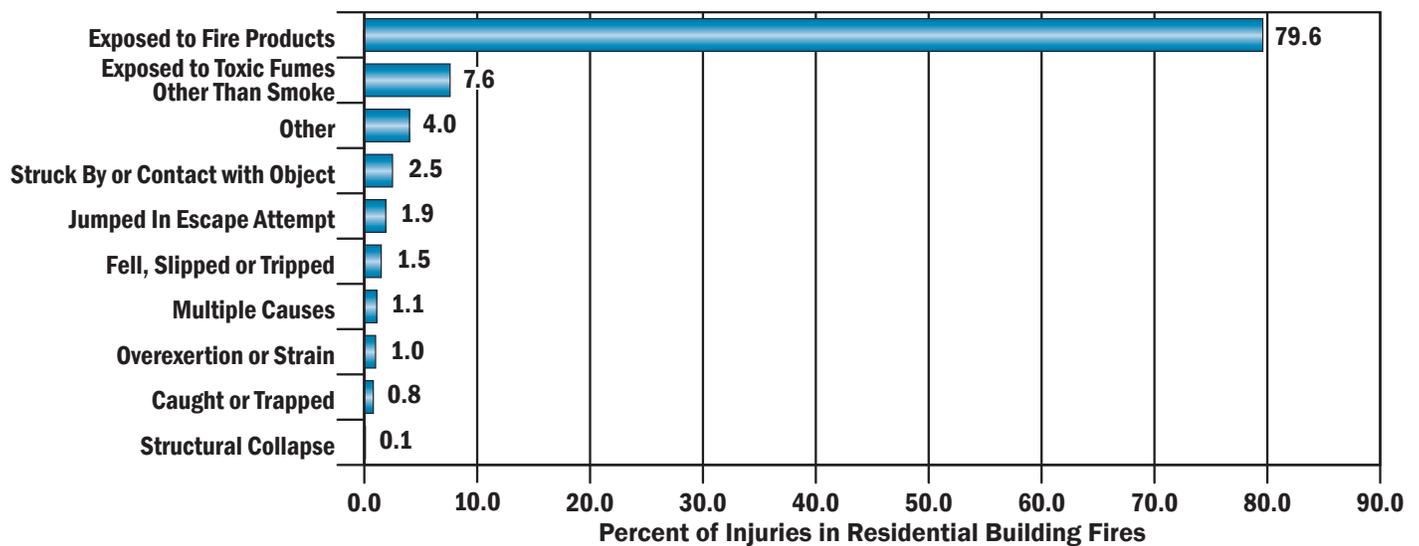
Source: NFIRS 5.0.  
 Note: Total does not add up to 100 percent due to rounding.

**Cause of Injury**

The predominant cause of injury, by far, involved exposure to fire products (80 percent), such as flame, heat, smoke or

gas (Figure 3). The next two leading causes were exposure to toxic fumes other than smoke (8 percent) and other, unspecified causes (4 percent).

**Figure 3. Cause of Injury for Residential Building Fires (2010-2012)**



Source: NFIRS 5.0.  
 Notes: 1. Percentages computed for only those injuries where causes were specified. The cause of injury was specified in 72 percent of reported injuries.  
 2. Total does not add up to 100 percent due to rounding.

**Primary Symptoms of Civilian Fire Injuries**

Thermal burns and smoke inhalation were the primary symptoms resulting in injury, accounting for 79 percent of all injuries resulting from residential building fires (Figure 4). Smoke inhalation alone accounted for 43 percent of residential fire injuries. Thermal burns (as opposed to scalds or chemical or electrical burns) accounted for another 24 percent, and burns combined with smoke inhalation accounted

for an additional 13 percent.<sup>11</sup> Breathing difficulty only accounted for 6 percent of injuries. Scalds (4 percent) and cuts or lacerations (3 percent) were an even smaller proportion of civilian fire injuries.

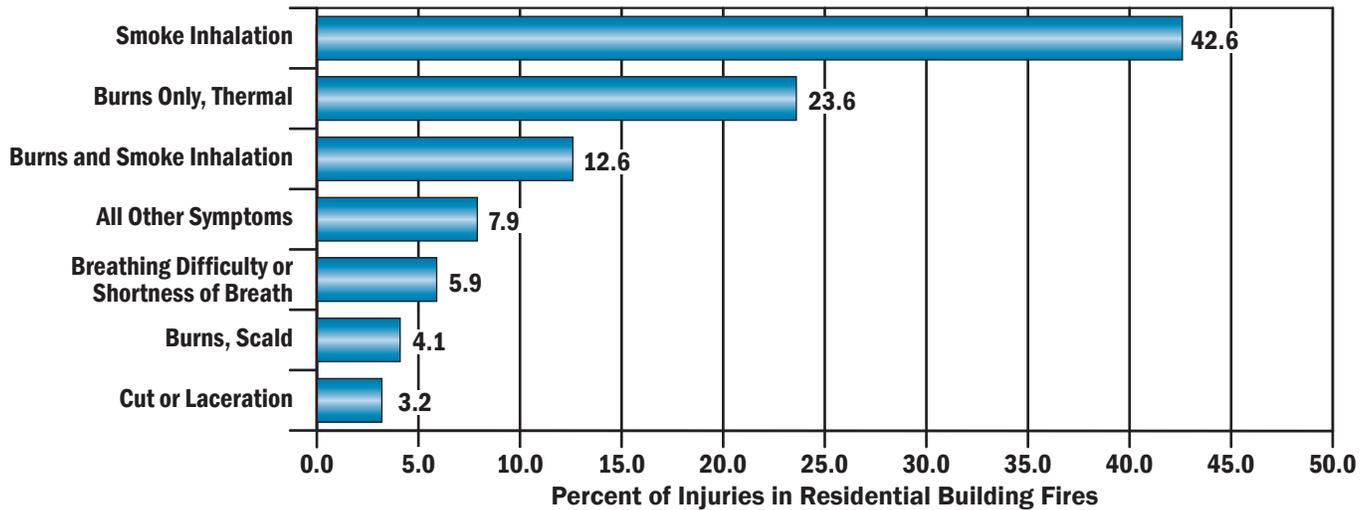
Thermal burns are caused by contact with flames, hot liquids, hot surfaces, and other sources of high heat. Of the thermal burns to the body, 73 percent were to the upper and lower extremities (59 percent and 14 percent, respectively).

Of the smoke inhalation injuries, 72 percent 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 two later,

however, the victim can suddenly take a turn for the worse as the lungs become unable to exchange oxygen properly.<sup>12</sup>

Based on the severity of the injury, 60 percent of the civilian fire injuries in residential fires were deemed minor. Only 13 percent of these injuries were considered serious or life-threatening.

**Figure 4. Primary Symptoms of Civilian Fire Injuries in Residential Buildings (2010-2012)**



Source: NFIRS 5.0.

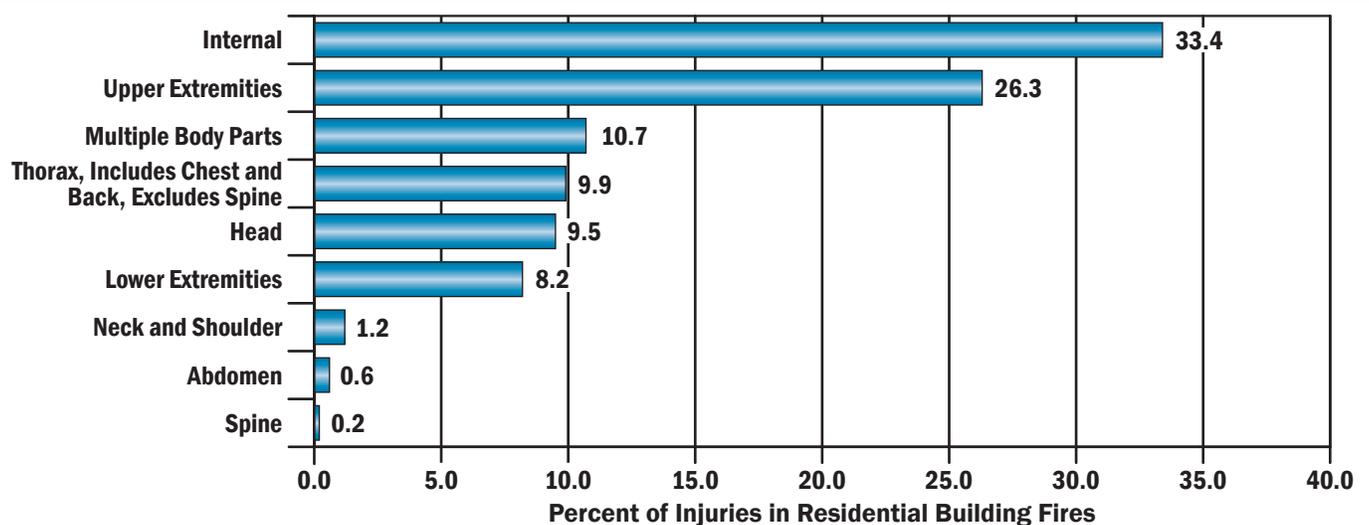
Notes: 1. Percentages computed for only those injuries where symptoms were specified. The primary symptoms were specified in 66 percent of reported injuries.  
2. Total does not add up to 100 percent due to rounding.

### Areas of the Body Affected

The body parts affected the most by injury (Figure 5) included internal parts (33 percent) and the upper

extremities (26 percent). 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 5. Part of Body Injured in Residential Building Fires (2010-2012)**



Source: NFIRS 5.0.

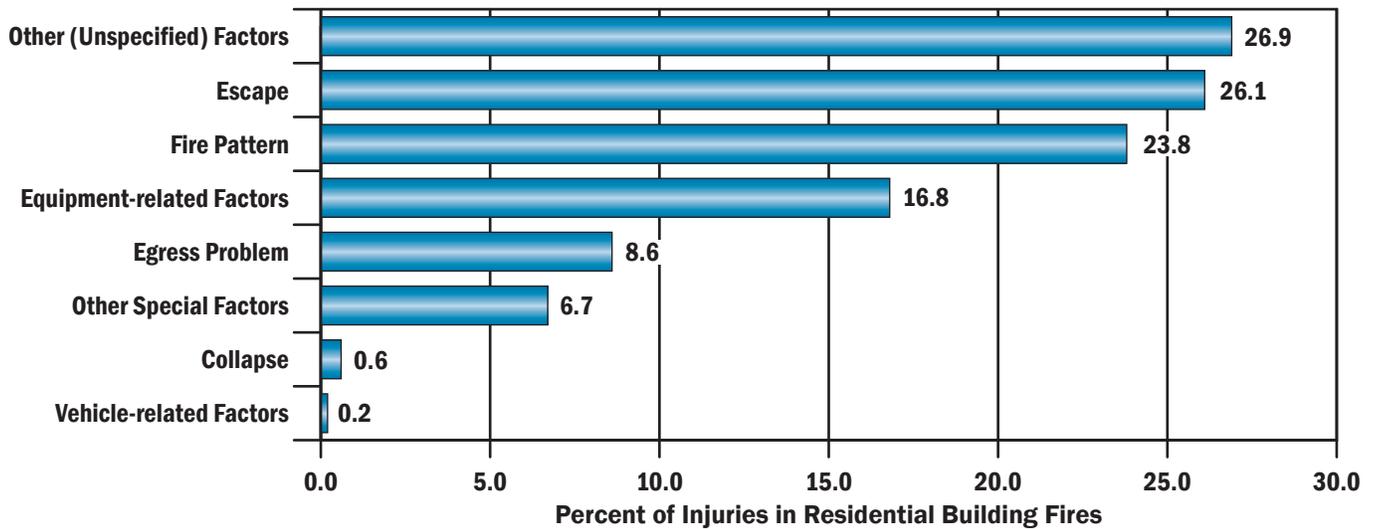
Note: Percentages computed for only those injuries where part of body injured was specified. The part of body injured was specified in 59 percent of reported injuries.

### Factors Contributing to Civilian Fire Injuries

The most notable factors contributing to civilian injuries (outside of “other (unspecified) factors”) involved escape (26 percent), fire pattern (24 percent), and equipment-related factors (17 percent) (Figure 6). 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 6. Factors Contributing to Civilian Fire Injuries in Residential Buildings (2010-2012)**



Source: NFIRS 5.0.

Notes: 1. Includes incidents where factors contributing to injury were specified. Factors contributing to the injury were specified in 32 percent of reported injuries.  
 2. As multiple factors contributing to injury may be noted for each injury, the total sums to more than 100 percent.

### Human Factors Contributing to Civilian Fire Injuries

Human factors also play an important role in residential fire injuries. Table 2 shows that the leading human factor contributing to injuries was being “asleep” (64 percent).

This is not unexpected, as the largest number of injuries occurred in bedrooms (34 percent). “Possibly impaired by alcohol” (18 percent) was the second leading human factor contributing to injuries. This was followed by “unattended or unsupervised” individuals (13 percent) and people with “physical disabilities” (also 13 percent).

**Table 2. Human Factors Contributing to Civilian Fire Injuries in Residential Buildings (2010-2012)**

Human Factors Contributing to Injury	Percent of Fire Injuries in Residential Buildings (Unknowns Apportioned)
Asleep	63.9
Possibly impaired by alcohol	18.4
Unattended or unsupervised	13.3
Physical disabilities	12.5
Possibly impaired by other drug or chemical	9.2
Possible intellectual disabilities	8.6
Unconscious	6.1
Physically restrained	0.9

Source: NFIRS 5.0.

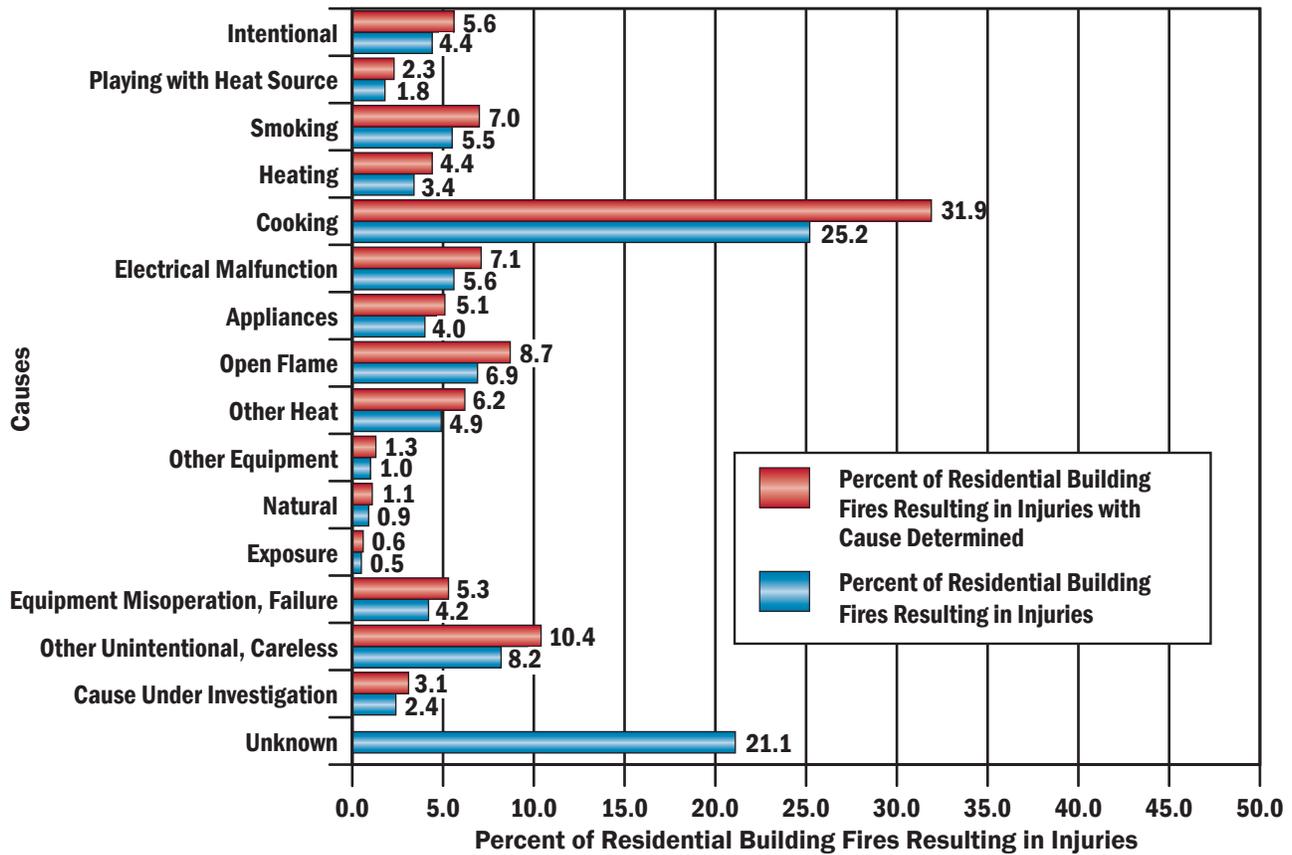
Notes: 1. Includes only incidents where human factors that contributed to the injury were specified. A human factor contributing to the injury was specified in 17 percent of reported injuries.  
 2. Multiple human factors contributing to the fire injury may be noted for each incident; total will exceed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

## Causes of Residential Building Fires Resulting in Injuries

As shown in Figure 7, “cooking” (32 percent) was the leading reported cause for residential fires that resulted in injuries.<sup>13</sup> “Other unintentional, careless” actions (10 percent) and “open flame” (9 percent) 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. These two causes were followed by “electrical malfunction” (7 percent) and “smoking” (also 7 percent).

**Figure 7. Cause of Residential Building Fires Resulting in Injuries (2010-2012)**



Source: NFIRS 5.0.

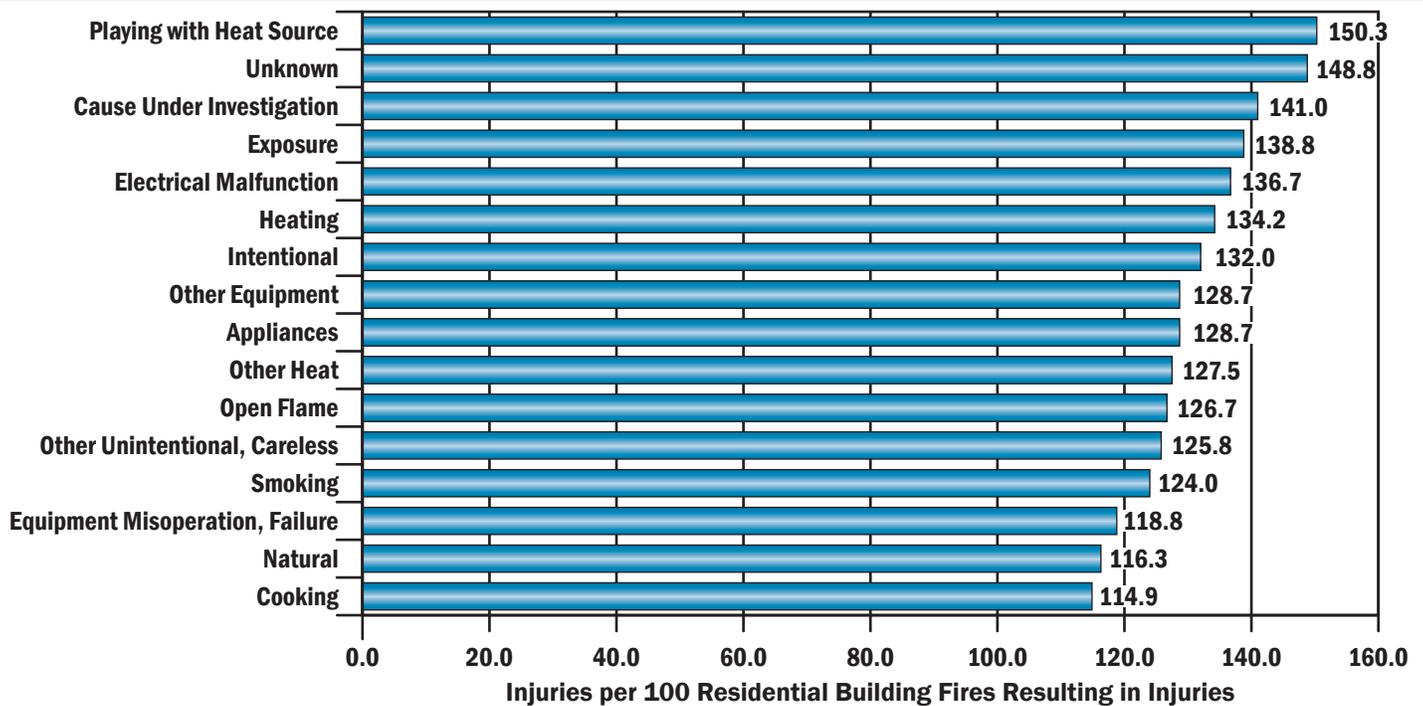
- Notes: 1. Causes are listed in order of the U.S. Fire Administration (USFA) Structure Fire Cause Hierarchy for ease of comparison of fire causes across different aspects of the fire problem. Fires are assigned to one of 16 cause groupings using a hierarchy of definitions, approximately as shown in the chart above. 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. Total percent of residential building fires resulting in injuries with cause determined does not add up to 100 percent due to rounding.

## Cause of Injuries per 100 Residential Building Fires Resulting in Injuries

Fires caused by playing with a heat source produced the largest number of injuries per 100 residential fires resulting

in injuries — 150 injuries per 100 residential fires resulting in injuries (Figure 8). The least number of injuries — 115 injuries per 100 residential fires resulting in injuries — was caused by cooking fires.

**Figure 8. Cause of Civilian Fire Injuries per 100 Residential Building Fires Resulting in Injuries (2010-2012)**



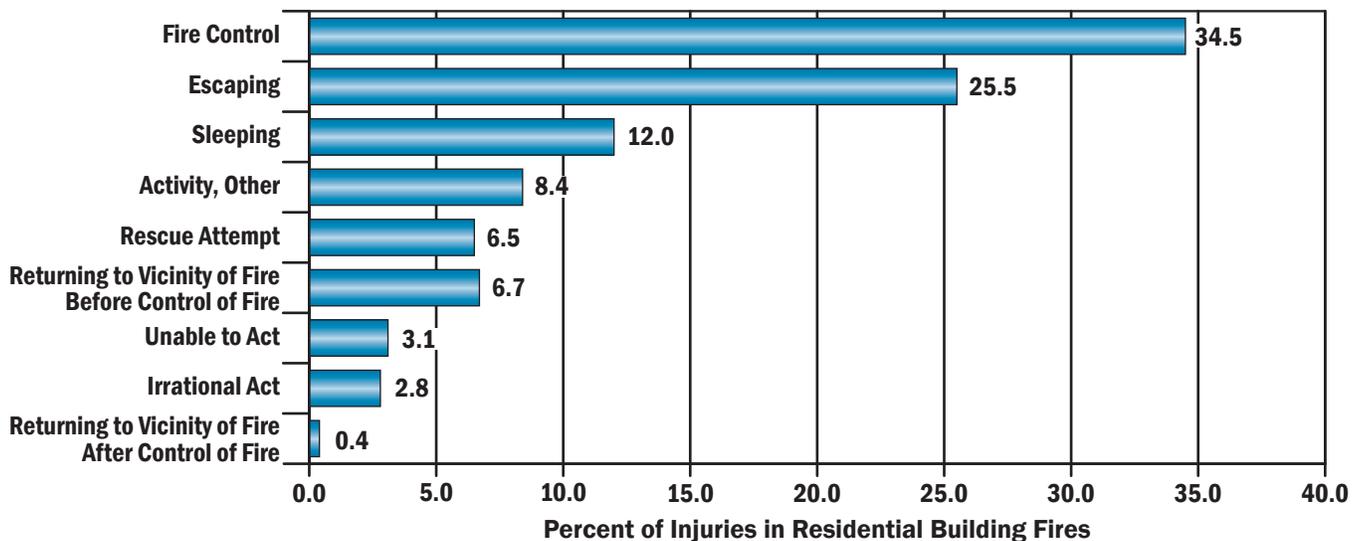
Source: NFIRS 5.0.

**Civilian Activity When Injured**

Most civilian fire injuries occurred when the victim was attempting to control the fire (35 percent), followed by attempting to escape (26 percent) and sleeping (12 percent), as shown in Figure 9. USFA recommends leaving fighting a fire to trained firefighters. In addition, USFA recommends that efforts be focused on following a preset escape plan. To escape a fire, many civilians make the mistake of fleeing through the area where the fire is located. The area of a fire

has tremendous heat, smoke and a toxic atmosphere that can render a person unconscious. As a result, it is imperative that an escape plan be prepared and practiced. With a well-thought-out plan that includes multiple escape options, the chances of survival and escaping without injuries greatly increase. In addition, it has been demonstrated that people may not wake up from the smell of smoke while sleeping. Therefore, it is also vital that smoke alarms are installed in homes to alert sleeping people to the presence of fire.<sup>14</sup>

**Figure 9. Civilian Activity When Injured in Residential Building Fires (2010-2012)**



Source: NFIRS 5.0.

Notes: 1. Percentages computed for only those injuries where activity information was available. The activity when injured was specified in 59 percent of reported injuries.  
 2. Total does not add up to 100 percent due to rounding.

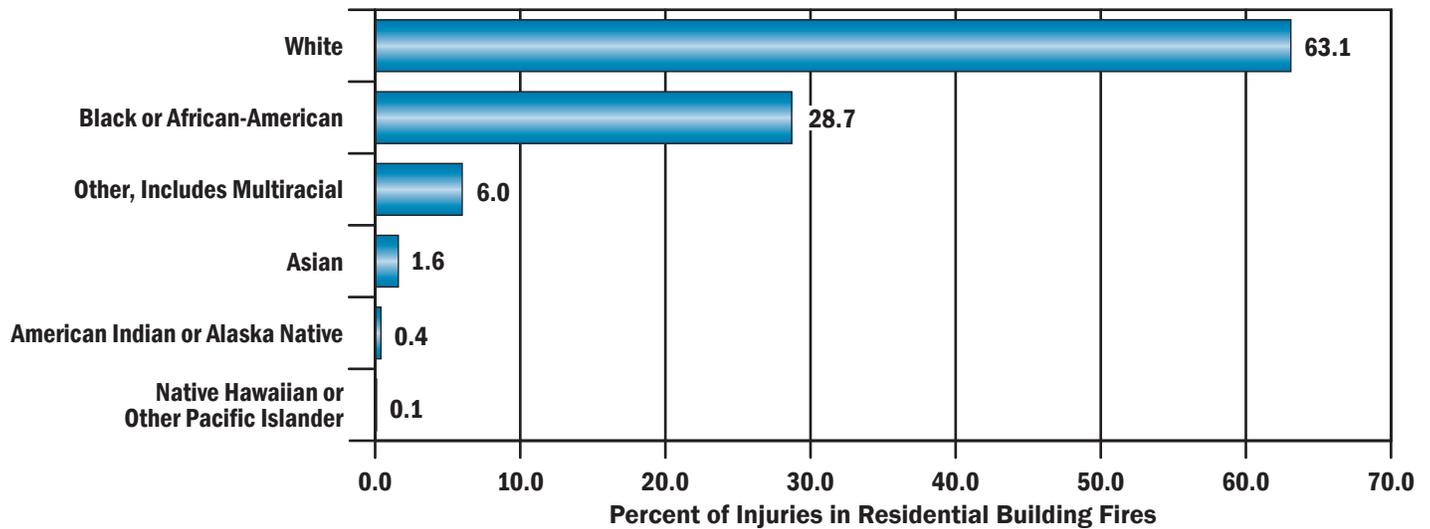
## Gender, Race and Ethnicity of Civilian Fire Injuries

Males accounted for 53 percent of injuries, and females accounted for 47 percent of injuries. Civilian fire injuries sorted by race (Figure 10) showed that whites were injured 63 percent of the time, followed by blacks or African-Americans (29 percent); other, including multiracial (6

percent); Asians (2 percent); American Indians or Alaska Natives (less than 1 percent); and Native Hawaiians or other Pacific Islanders (also less than 1 percent).

The ethnicity element shows that non-Hispanics or non-Latinos were injured 87 percent of the time, compared to Hispanics or Latinos (13 percent). Ethnicity was specified for 41 percent of reported injuries.

**Figure 10. Civilian Fire Injuries in Residential Buildings by Race (2010-2012)**



Source: NFIRS 5.0.

Notes: 1. Percentages computed for only those injuries where race information was available. Race was specified in 55 percent of reported injuries.  
2. Total does not add up to 100 percent due to rounding.

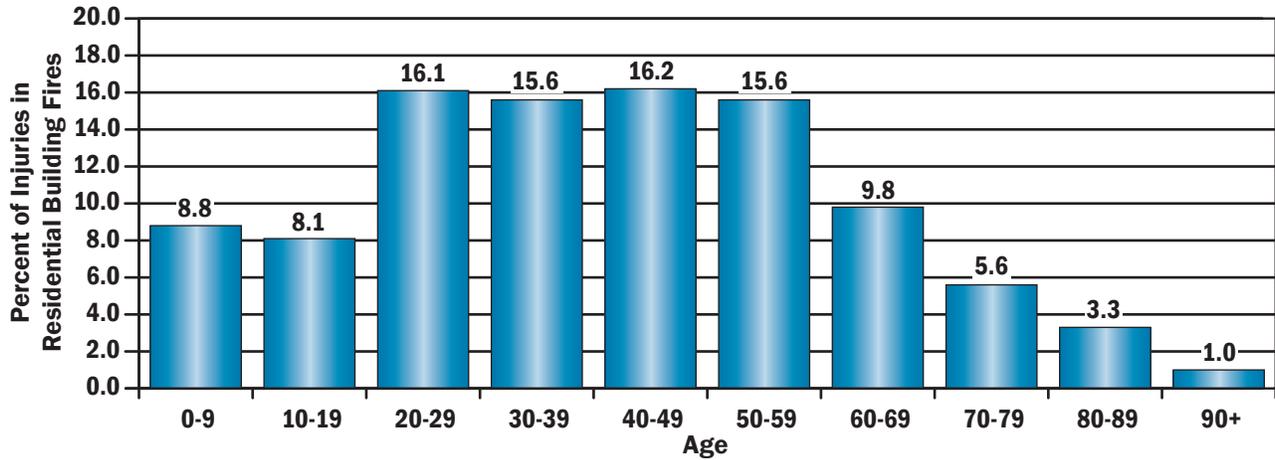
## Age of Civilians Injured and Activity While Injured

Civilians between the ages of 20 and 49 accounted for 48 percent of injuries in residential fires (Figure 11). An additional 17 percent of those with injuries were less than 20 years old. Adults aged 50 and over accounted for the remaining 35 percent of those with injuries.

The first reaction of civilians of all ages is either to try to control or escape the fire (Table 3). At the time of injury, for those aged 10-89, trying to control the fire and escaping were the two leading activities that resulted in injuries. Those aged 10-69 primarily got injured trying to control the fire (38 percent), followed by trying to escape the fire (24 percent). Those aged 70-89 primarily got injured trying to escape the fire (34 percent), followed by trying to control the fire (22 percent).

For children aged 0-9 and older adults aged 90 and over, escaping and sleeping were the two leading activities that resulted in injuries. Those aged 0-9 primarily got injured trying to escape the fire (39 percent), followed by when sleeping (25 percent). Those aged 90 and over also got injured primarily when trying to escape the fire (34 percent), followed by when sleeping (18 percent). The young and the very old are less likely to be as mobile or ready to act in a fire situation. Infants, young children and older adults may require special provisions in a fire or emergency situation. Thus, it is not surprising that those in these two age groups are less likely to attempt to control the fire.

**Figure 11. Civilian Fire Injuries in Residential Buildings by Age Group (2010-2012)**



Source: NFIRS 5.0.

Notes: 1. Percentages computed for only those injuries where age was valid. A valid age was provided for nearly all (99.9 percent) reported injuries.  
 2. Total does not add up to 100 percent due to rounding.

**Table 3. Leading Activities Resulting in Civilian Fire Injuries in Residential Buildings by Age Group (2010-2012)**

Percent of Injuries Where Age and Activity Reported (2010-2012)			
Age Group	Fire Control	Escaping	Sleeping
0-9	8.7	38.6	24.6
10-19	35.6	32.7	9.5
20-29	40.6	22.7	9.4
30-39	41.9	20.3	8.5
40-49	40.1	20.8	10.1
50-59	34.4	23.9	13.8
60-69	30.7	27.2	13.6
70-79	21.9	33.3	14.7
80-89	22.2	34.2	13.6
90+	14.2	33.6	17.7
Overall	34.5	25.5	12.0

Source: NFIRS 5.0.

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

**Specific Location of Fire Injury**

Bedrooms (34 percent) were the leading specific location where civilian injuries occurred in residential building fires (Table 4). Cooking areas, kitchens (11 percent) and common rooms such as dens, family rooms, living rooms or lounges (10 percent) were the next leading specific locations.

While not specific rooms in the home, egress areas accounted for 17 percent of injuries. 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 (2010-2012)**

Areas of Fire Origin	Percent (Unknowns Apportioned)
Bedrooms	33.5
Kitchen and cooking areas	10.5
Common room, den, family room, living room, lounge	10.1

Source: NFIRS 5.0.

Note: Percentages computed for only those injuries where the location of the injured subject was specified. The location was specified for 21 percent of reported injuries.

## Examples

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

- July 2014: A Yakima, Washington, woman was sent to a local hospital where she was treated for minor injuries and released after her home caught on fire. Firefighters were called to the scene around 5 p.m. The woman and another occupant of the home were displaced by the fire. Damages to the home were estimated at \$8,000. The cause of the fire remains under investigation.<sup>15</sup>
- July 2014: As the result of an early afternoon apartment fire in Las Vegas, Nevada, a child suffered a cut and minor smoke inhalation injuries. Firefighters responded to the apartment to find that a mattress in the bedroom had caught fire; however, the fire was already out. The child was taken to the hospital to be treated for the injuries. The cause of the fire was being investigated.<sup>16</sup>
- May 2014: Two people sustained minor injuries after entering a burning house in Newport News, Virginia, as they attempted to rescue occupants they thought were still inside. Firefighters responded to the two-story house fire around 7 p.m. to find flames coming from the first floor that quickly progressed to the second floor and attic. Both of the people were treated at the scene for their injuries. It was reported that no one was at the home when the fire started; however, three occupants were displaced because of severe damage to the home. The cause of the fire was due to an electrical problem and ruled accidental.<sup>17</sup>

## Escape Planning for Residential Buildings

Everyone should know how to escape from his or her residence. USFA recommends leaving fighting a fire to trained firefighters. Instead, efforts should be focused on following a preset escape plan.

A home filled with smoke is a very dangerous situation. Smoke blocks vision, and the toxic gases can cause dizziness, disorientation and ultimately death. Under these conditions, one can easily become lost or trapped in the home. Unfamiliarity with exits, excessive distance to the nearest exit, or an inappropriate choice of exit can hinder a crucial escape. Many civilian fatalities and injuries occur as the victim is trying to escape. With a well-thought-out plan and multiple escape options, the chances of survival and escaping without injury greatly increase.

The first step in an escape plan is to make sure that smoke alarms are installed on every level of the home and are in good working order. Plan and practice at least two escape routes for every room, and have procedures in place for those who require additional help, such as infants, older adults, and individuals with disabilities. For more information on preparing and practicing a fire escape plan, visit <http://www.usfa.fema.gov/prevention/outreach/escape.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 2010, 2011 and 2012. Only Version 5.0 data were extracted.

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

- Aid Types 3 (mutual aid given) and 4 (automatic aid given) were excluded to avoid double counting of incidents.

- 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.
    - 2—Fixed portable or mobile structure, and Structure Type not specified (null entry).

- For Incident Types 111 and 120 to 123:
  - 1—Enclosed building.
  - 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 USFA. USFA is committed to providing the best and most currently available 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 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 15)," [http://www.usfa.fema.gov/downloads/pdf/statistics/data\\_sources\\_and\\_national\\_estimates\\_methodology.pdf](http://www.usfa.fema.gov/downloads/pdf/statistics/data_sources_and_national_estimates_methodology.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 or to comment on this report, visit <http://www.usfa.fema.gov/contact.html>.**

## Notes:

<sup>1</sup> 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 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 that 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 estimate of fire injuries (<http://www.nfpa.org/itemDetail.asp?categoryID=953&itemID=23033&URL=Research/Fire%20statistics/The%20U.S.%20fire%20problem>). 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> Residential buildings include, but are not limited to, one- or two-family dwellings, multifamily dwellings, boarding houses or residential hotels, commercial hotels, college dormitories, and sorority/fraternity houses.

<sup>4</sup> Fire department participation in 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 2010 to 2012, 70 percent of NFPA's annual average estimated 1,365,300 fires to which fire departments responded were captured in NFIRS. Thus, NFIRS is not representative of all fire incidents in the U.S. and is not a "complete" census of fire incidents. Although 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.

<sup>5</sup> Civilians also include emergency personnel who are not members of the fire department, such as police officers or utility workers.

<sup>6</sup> National estimates are based on 2010-2012 native Version 5.0 data from NFIRS, residential structure fire loss estimates from NFPA's annual surveys of fire loss, and 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 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 information on NFPA's survey methodology, see NFPA's report on fire loss in the U.S.: <http://www.nfpa.org/~media/Files/Research/NFPA%20reports/Overall%20Fire%20Statistics/osfireloss.pdf>. In this topical report, fires are rounded to the nearest 100 and injuries to the nearest 25.

<sup>7</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  $(100 * (13,400 / 8,300)) = 161.4$  injuries per 100 injury-producing residential building fires. The fire injury rate for all residential building fires computed from national estimates is  $(100 * (13,400 / 366,900)) = 3.7$  injuries per 100 residential building fires.

<sup>8</sup> U.S. Fire Administration, "Civilian Fire Fatalities in Residential Buildings (2010-2012)," Volume 15, Issue 2, August 2014, <http://www.usfa.fema.gov/downloads/pdf/statistics/v15i2.pdf>.

<sup>9</sup> 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 NFIRS, it is the time at which the fire was reported to the fire department.

<sup>10</sup> U.S. Fire Administration, "Heating Fires in Residential Buildings (2008-2010)," Volume 13, Issue 8, September 2012, <http://www.usfa.fema.gov/downloads/pdf/statistics/v13i8.pdf>.

<sup>11</sup> Total does not add up to 79 percent due to rounding.

<sup>12</sup> Sheryl Ubelacker, "Doctors: Smoke inhalation victim can seem fine, go into lung failure suddenly," "EMS Responder," October 2004, (Toronto, Canada), <http://www.emsworld.com/news/10341024/doctors-smoke-inhalation-victim-can-seem-fine-go-into-lung-failure-suddenly> (accessed July 29, 2014).

<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, RI), <http://www.sciencedaily.com/releases/2004/05/040518075747.htm> (accessed July 29, 2014).

<sup>15</sup> Donald W. Meyers, "House fire displaces two in Yakima," [www.yakimaherald.com](http://www.yakimaherald.com/news/latestnews/2372859-8/house-fire-displaces-two-in-yakima), July 29, 2014, <http://www.yakimaherald.com/news/latestnews/2372859-8/house-fire-displaces-two-in-yakima> (accessed July 29, 2014).

<sup>16</sup> Adwoa Fosu, "Child suffers minor injuries in an apartment fire," [www.lasvegassun.com](http://www.lasvegassun.com/news/2014/jul/28/child-suffers-minor-injuries-apartment-fire/), July 28, 2014, <http://www.lasvegassun.com/news/2014/jul/28/child-suffers-minor-injuries-apartment-fire/> (accessed July 29, 2014).

<sup>17</sup> Catherine Rogers, "Civilians hurt during fire rescue attempt," [wavy.com](http://wavy.com/2014/05/19/injuries-reported-in-newport-news-house-fire/), May 20, 2014, <http://wavy.com/2014/05/19/injuries-reported-in-newport-news-house-fire/> (accessed July 29, 2014).