



# **2016–2018 Residential Fire Loss Estimates\***

## **U.S. National Estimates of Fires, Deaths, Injuries, and Property Losses from Unintentional Fires**

David Miller  
Division of Hazard Analysis  
Directorate for Epidemiology  
U.S. Consumer Product Safety Commission  
Bethesda, MD 20814  
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\* This analysis was prepared by the CPSC staff. It has not been reviewed or approved by, and may not necessarily reflect the views of, the Commission.

CPSC Hotline: 1-800-638-CPSC (2772) CPSC's website: <http://www.cpsc.gov>.

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## Executive Summary

This report presents estimates of consumer product-related losses that occurred in U.S. residential structure fires attended by the fire service. The estimates were derived from data provided by the U.S. Fire Administration's (USFA) National Fire Incident Reporting System (NFIRS) and the National Fire Protection Association's (NFPA) Survey of Fire Departments for U.S. Fire Experience for 2016 through 2018.

The fire and fire loss estimates presented in this report pertain to unintentional residential structure fires and civilian casualties. The estimates are:

- 351,900 fires, 2,410 deaths, 10,370 injuries and \$6.36 billion in property losses in 2016;
- 362,600 fires, 2,230 deaths, 10,060 injuries, and \$7.07 billion in property losses in 2017;
- 371,600 fires, 2,460 deaths, 10,740 injuries, and \$7.56 billion in property losses in 2018; and
- an estimated annual average of 362,000 fires, 2,370 deaths, and 10,390 injuries and \$7.00 billion in property losses over the 3-year period from 2016 through 2018.

Consumer products involved in fires can be categorized as "sources of ignition" or "the materials first ignited." Sources of ignition can be small, such as candles, or large, like ranges, for example. The larger sources of ignition, *e.g.*, operating equipment, are identified in NFIRS as "equipment." Smaller sources of ignition that are not equipment, such as candles, matches, and lighters, are identified in NFIRS as "heat sources." Consumer products can also be involved as items or materials contributing to flame spread. For this report, CPSC staff produced estimates based on the sources of ignition and the materials first ignited, but not for the items or materials contributing to flame spread.

Because the fire losses are derived separately for sources of ignition and materials first ignited, estimates presented in this report can overlap in some cases. For example, a fire involving a candle igniting a mattress will count as a candle fire (Heat Source) and a mattress fire (Item First Ignited). Additionally, these estimates do not account for all of the involvement of materials because items that are neither the Heat Source, nor the Item **First Ignited**, can still be involved in (and in some cases be a significant factor in) residential fire losses. An example is a cigarette igniting newspapers and then the flaming newspapers igniting upholstered furniture. In this case, the upholstered furniture was neither the heat source, nor the first item ignited. However, the furniture represents a significant fuel load, and it increases the potential for life-threatening conditions to occupants.

The same products continue to contribute to the greatest estimated numbers of fire losses (as measured by Equipment Involved in Ignition, Heat Sources, and Items First Ignited). Tables 1a–5d, 6, and 7 show:

- Cooking equipment accounted for the largest percentage of fires. An estimated annual average of 168,600 cooking equipment-related fires from 2016 through 2018 accounted for 46.6 percent of the average annual estimate of total residential fires for the same period. The corresponding death estimates constitute an annual average of 230 deaths, which is 9.9 percent of the average annual estimate of total residential fire deaths. The annual average number of cooking fire injuries for 2016 through 2018 was estimated to be 3,210, which represents 30.9 percent of the total estimated annual average number of injuries for the same period. Much of these losses were associated with range and oven fires.

- Heating and cooling equipment fires constituted the second largest share of total residential fires. The estimated annual average of 41,000 fires for 2016 to 2018 was 11.3 percent of the annual average estimate of total residential fires during the same period. The corresponding death estimate is an annual average of 220 deaths, which is 9.2 percent of the average annual estimated number of total residential fire deaths. The corresponding injuries for the 3 years averaged to an annual estimate of 840. This accounts for 8.1 percent of the annual average estimate of total injuries during 2016 to 2018.
- An estimated annual average of 18,700 fires was attributable to electrical distribution equipment (*e.g.*, installed wiring, lighting). This is 5.2 percent of the estimated annual average number of residential fires for this period. The annual average death estimate is 190 (8.0 percent of average annual estimated residential fire deaths); and the injury estimates averaged 610, which is 5.8 percent of the estimated annual average of residential fire injuries.
- For Item First Ignited, upholstered furniture was involved in the greatest number of fire deaths. From 2016 through 2018, an estimated annual average of 350 deaths was associated with these fires. This constitutes 15.0 percent of the estimated annual average of total deaths (from an estimated 1.2 percent of the fires) associated with residential structure fires for the same period. During 2016 to 2018, mattress or bedding ignitions accounted for an annual average of 330 deaths, which is 14.1 percent of the average annual estimated number of total residential fire deaths (from an estimated 1.8 percent of the fires).

Note that for 2017, the estimated number of deaths where upholstered furniture was the item first ignited declined to 290 (from 510 in 2015 and 370 in 2016), but increased to 400 for 2018.

- For Heat Source, smoking materials were the largest contributor to deaths, associated with an annual average of 610 deaths from 2016 to 2018. This is 25.6 percent of the estimated annual average of total residential fire deaths. Smoking materials as the heat source in fires, however, comprised only 3.0 percent of the total estimated residential fires.
- Among products that are Heat Sources, candles had the second highest estimated number of deaths. The estimated annual average of deaths from candle fires is 80, which is 3.4 percent of the average estimated total number of residential fire deaths from 2016 to 2018. Candles account for an estimated 1.5 percent of the fires.
- There were also an estimated 50 deaths from cigarette lighter fires (2.1 percent of the estimated annual average of total residential fire deaths), although lighters are only involved in an estimated 0.4 percent of the fires.
- On average, matches were involved in an estimated 20 deaths, or 0.8 percent of total deaths annually. Matches were involved in an estimated 0.1 percent of residential fires.
- There was an increase in the estimates of total residential fires between 2016 and 2018, from an estimate of residential fires of 351,900 in 2016, to 362,600 in 2017, to 371,600 in 2018. This is an overall increase of 5.6 percent.
- There was a decline in both the total residential death and injury estimates from 2016 to 2017. The death estimate declined from 2,410 to 2,230 (7.3 percent), and the injury estimate declined from 10,370 to 10,060 (3.0 percent). There was an increase of both the total

residential death and injury estimates from 2017 to 2018. The 2018 total residential death estimate of 2,460 is a 10.1 percent increase from the 2017 estimate. The corresponding 2018 injury estimate of 10,740 is a 6.8 percent increase from 2017.

- By age of fire death victim, older people are the most likely age group to die from fires. The fire death rate, for 2016–2018, for people between the ages of 65 and 74 is 1.5 per hundred thousand population, which is more than twice the overall fire death rate (0.7 per hundred thousand). The fire death rate for people age 75 and over (2.3 per hundred thousand) is more than three times the overall rate.
- By race of fire death victim, African Americans have the highest rate of fire deaths (1.3 per hundred thousand population), nearly twice the overall rate of 0.7 per hundred thousand. For fire injuries, African Americans also have the highest rate – 5.7 per hundred thousand, which is more than twice the overall rate (2.8 per hundred thousand).

## Introduction

The fire loss estimates presented in this report are based on the National Fire Protection Association's (NFPA) national fire loss estimates<sup>1</sup> and the U.S. Fire Administration's (USFA) National Fire Incident Reporting System (NFIRS) data. The NFPA makes national estimates of fires, deaths, injuries, and property losses, based on a probability sample survey of U.S. fire departments. NFIRS compiles fire incident reports submitted voluntarily to the USFA by U.S. fire departments. Not all the states reporting include data from all fire departments in the state. Product-specific information, such as the equipment involved in the ignition of the fire, or the item that was first ignited in the fire, are among the wealth of information collected and available in NFIRS data. NFIRS product-specific frequency counts are weighted up to the NFPA estimates for total U.S. fire losses to derive the estimates that are presented in this report.

The estimated number of fires and associated fire losses pertain to fires in residential properties only. These include single-family and multifamily dwellings. Mobile and motor homes, when used as a structure, and not in transit, are also included. Injury and death estimates pertain to civilian<sup>2</sup> casualties only. The property losses include property and content losses, as estimated by fire departments. In this report, for convenience, property and content losses are referred to as "property losses."

CPSC staff has been producing estimates of residential fires and related deaths, injuries, and property losses since the early 1980s. However, over the years, NFIRS has undergone major changes. This, in turn, has necessitated changes in the way CPSC analysts produce the product-specific estimates. Beginning with 1999 data, a major revision was made to the NFIRS data coding system, and NFIRS implemented version 5.0. By 2009, 100 percent of fire departments were coding using this version.

NFIRS data were weighted up to the 2016, 2017, and 2018 NFPA estimates for total U.S. fires and fire losses to derive the product-specific estimates presented in this report. This was done separately for fires, deaths, injuries, and property loss.

Beginning with version 5.0, NFIRS introduced newly created codes to identify confined fires (those that do not spread beyond the originating item). To encourage the reporting of these fires, NFIRS requires only limited information. As the use of version 5.0 increased from 1999 forward, an increasingly large number of confined fires were reported. In 1999, about 2 percent of residential structure fires were reported as confined; by 2018, 50 percent of residential structure fires reported to NFIRS were identified as confined fires.

It is usually not possible to determine the type of equipment involved in the incidents coded as "confined fires" because the equipment is rarely coded. For example, when a fire is identified in NFIRS as a "confined cooking fire," it is rarely possible to distinguish a fire started by a range versus other cooking equipment, such as a microwave oven, or toaster. Consequently, confined cooking fire losses are only included as part of the "Total Cooking Equipment" fires, but they are not included in subcategories that define the equipment involved or the power source. Because

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<sup>1</sup> Hylton Haynes, "Fire Loss in the U.S. During 2014," National Fire Protection Association (NFPA), September 2015; Hylton Haynes, "Fire Loss in the U.S. During 2015," National Fire Protection Association (NFPA), September 2016; Ben Evarts, "Fire Loss in the U.S. During 2016," National Fire Protection Association (NFPA), September 2017.

<sup>2</sup> Injuries and deaths involving fire service, police, or emergency medical service personnel are not included in the estimates for this report.

ranges certainly are involved in some confined fires, this should be considered in evaluating the cooking fire hazard. The same is true for microwave ovens and other cooking equipment.

Consumer products, for which there are estimates of fires and fire losses in this report, are either ignition sources for fires, or materials ignited by fires. The larger ignition sources, such as ranges, clothes dryers, and space heaters, are considered equipment and are covered by the NFIRS variable called "Equipment Involved in Ignition." Smaller ignition sources, such as candles, matches, or lighters, are heat sources and fall under the NFIRS variable called "Heat Source." Some of the consumer products that are materials ignited in fires are upholstered furniture, mattresses and bedding, clothing, curtains and drapes, and more. There are codes for these products under the NFIRS variable called "Item First Ignited."

Fires can be associated with more than one product. For example, a fire can be a lighter fire and a curtain fire. Such a fire would contribute to the estimates for "Lighters," as well as the estimates for "Curtains, Drapes."

In some instances, consumer products ignited by the fire may contribute to the spread or severity of the fire, but not be included in the category, "Item First Ignited." An example would be where carpeting is the Item First Ignited in the fire, but upholstered furniture ignites next, and increases the severity of the fire. In that case, upholstered furniture plays a role in the fire, but the fire is not counted toward the estimates for upholstered furniture fires and losses. Some consumer products, such as mattresses and upholstered furniture, due to their larger fuel loads, tend to lead to bigger, more dangerous fires when they ignite.

For the estimates related to victim demographics, age and race, staff looked at total residential structure fire deaths and injuries, broken down by age of victim and race of victim categories. Staff used the NFIRS variables, "Age" and "Race" for identification of victim age and victim race.

## Results

Fire-loss data are presented using five main tables consistent with CPSC staff's previous reports. Each numbered table (1–5) has four associated sub-tables: Table “a” presents the fire estimates; “b” presents the death estimates; “c” presents the injury estimates; and “d” presents the property loss estimates. As in previous years, only selected product-specific estimates are included in these tables, so the details may not add up to the totals that appear in the headings. All of the product categories in the tables, with the exception of smoking materials, contain products within CPSC's jurisdiction. Intentionally set fires and their associated losses, which include the deliberate misuse of heat sources, or fires of an incendiary nature, are excluded from the estimates.

In Tables 1, 3, 4, and 5, Equipment Involved in Ignition codes were used to identify the types of products involved; meanwhile, in Table 2, either the Heat Source or the Item First Ignited was the primary means of identifying the product. Thus, some estimates provided in the different sections of the tables overlap. For example, in Table 2, estimates of fires involving cigarette ignition of upholstered furniture are included in the estimates for cigarettes (by Heat Source), as well as in the estimates for upholstered furniture-smoking material ignition (by Item First Ignited).

This is the first year that CPSC staff analyzed the fire loss data for victim's demographic characteristics such as age and race. Staff estimated total residential structure fire deaths and injuries, for 2016 through 2018, broken down by victim age and victim race categories and used U.S. Census Bureau population estimates to compute estimated death and injury rates. The results are shown in Table 6 and Table 7.

Additional details about the estimates and the data system are included in the Methodology section of this report.



**TABLE 1a**  
**ESTIMATED RESIDENTIAL STRUCTURE FIRES**  
**SELECTED EQUIPMENT, 2016–2018**

<b>Equipment</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2016–2018 Average</b>
<b>Total Residential<sup>3</sup></b>	<b>351,900</b>	<b>362,600</b>	<b>371,600</b>	<b>362,000</b>
<b>Total Heating and Cooling Equipment<sup>3</sup></b>	<b>41,300</b>	<b>39,600</b>	<b>42,200</b>	<b>41,000</b>
Local Fixed Heater	5,300	4,800	5,200	5,100
Portable Heater	1,700	1,500	2,000	1,700
Central Heating	1,000	800	1,000	900
Fireplace, Chimney, Chimney Connector <sup>3</sup>	16,500	15,900	16,200	16,200
Water Heater	2,000	1,600	1,500	1,700
Air Conditioning	1,700	1,400	1,600	1,600
Other <sup>3</sup>	14,400	13,600	14,800	14,300
<b>Total Cooking Equipment<sup>3</sup></b>	<b>165,400</b>	<b>170,400</b>	<b>170,100</b>	<b>168,600</b>
Range/Oven	17,400	16,200	15,400	16,300
<i>Gas</i>	2,200	2,300	2,000	2,200
<i>Electric</i>	15,100	13,700	13,300	14,000
<i>Other</i>	100	200	*	100
Microwave Oven	900	800	800	800
All Other Cooking	5,400	4,900	4,800	5,000
<i>Gas</i>	1,400	1,300	1,300	1,300
<i>Electric</i>	3,500	3,200	3,000	3,200
<i>Other</i>	500	400	500	500
<b>Total Electrical Distribution</b>	<b>20,000</b>	<b>18,100</b>	<b>18,100</b>	<b>18,700</b>
Installed Wiring	9,400	8,200	8,000	8,600
Cord, Plug	1,900	1,700	1,700	1,700
Receptacle, Switch	2,600	2,300	2,400	2,400
Lighting	2,600	2,300	2,300	2,400
Other	3,500	3,500	3,600	3,600
<b>Other Selected Equipment</b>	<b>11,200</b>	<b>10,700</b>	<b>10,300</b>	<b>10,700</b>
Audio/Visual Equipment	400	400	300	400
Clothes Dryer	7,300	6,900	6,500	6,900
Dishwasher	500	600	500	500
Washing Machine	400	400	400	400
Torch	600	700	600	600
Refrigerator/Freezer	900	800	800	800
Shop/Garden Tool	1,000	1,000	1,100	1,000

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Fire estimates are rounded to the nearest 100. Rounded estimates of fewer than 100 fires are denoted by an asterisk (\*). Subtotals do not necessarily add to heading totals. Estimates exclude intentionally set fires.

<sup>3</sup> There are confined fire estimates included in *Total Residential*, *Total Heating and Cooling Equipment*, *Fireplace, Chimney, Chimney Connector*, *Other*, and *Total Cooking Equipment* categories. These confined fire estimates could not be included in the detail lines because NFIRS does not provide information to determine the type of equipment and power source. See Table 10a on p. 33 for details.

**TABLE 1b**  
**ESTIMATED RESIDENTIAL STRUCTURE FIRE DEATHS**  
**SELECTED EQUIPMENT, 2016–2018**

<b>Equipment</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2016–2018 Average</b>
<b>Total Residential<sup>4</sup></b>	<b>2,410</b>	<b>2,230</b>	<b>2,460</b>	<b>2,370</b>
<b>Total Heating and Cooling Equipment</b>	<b>250</b>	<b>230</b>	<b>170</b>	<b>220</b>
Local Fixed Heater	70	80	30	60
Portable Heater	100	60	70	80
Central Heating	*	*	*	*
Fireplace, Chimney, Chimney Connector	40	30	20	30
Water Heater	10	10	10	10
Air Conditioning	20	20	20	20
Other	50	40	20	40
<b>Total Cooking Equipment</b>	<b>240</b>	<b>250</b>	<b>210</b>	<b>230</b>
Range/Oven	160	190	140	170
<i>Gas</i>	20	40	10	20
<i>Electric</i>	140	160	130	140
<i>Other</i>	*	*	*	*
Microwave Oven	*	*	10	*
All Other Cooking	50	20	40	30
<i>Gas</i>	*	10	*	*
<i>Electric</i>	40	10	30	30
<i>Other</i>	*	*	10	*
<b>Total Electrical Distribution</b>	<b>220</b>	<b>180</b>	<b>170</b>	<b>190</b>
Installed Wiring	60	60	60	60
Cord, Plug	110	70	60	80
Receptacle, Switch	20	*	10	10
Lighting	10	*	10	10
Other	20	40	30	30
<b>Other Selected Equipment</b>	<b>20</b>	<b>20</b>	<b>30</b>	<b>20</b>
Audio/Visual Equipment	*	10	*	*
Clothes Dryer	*	*	*	*
Dishwasher	*	*	*	*
Washing Machine	*	*	*	*
Torch	*	*	10	10
Refrigerator/Freezer	20	*	20	10
Shop/Garden Tool	*	*	*	*

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Death estimates are rounded to the nearest 10. Rounded estimates less than 10 are denoted by an asterisk (\*). Subtotals do not necessarily add to heading totals. Estimates exclude deaths from intentionally set fires.

<sup>4</sup> There were no NFIRS confined fire deaths in 2016, 2017, or 2018.

**TABLE 1c**  
**ESTIMATED RESIDENTIAL STRUCTURE FIRE INJURIES**  
**SELECTED EQUIPMENT, 2016–2018**

<b>Equipment</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2016–2018 Average</b>
<b>Total Residential<sup>5</sup></b>	<b>10,370</b>	<b>10,060</b>	<b>10,740</b>	<b>10,390</b>
<b>Total Heating and Cooling Equipment<sup>5</sup></b>	<b>830</b>	<b>820</b>	<b>860</b>	<b>840</b>
Local Fixed Heater	390	350	290	340
Portable Heater	150	140	190	160
Central Heating	40	20	30	30
Fireplace, Chimney, Chimney Connector <sup>6</sup>	40	40	50	40
Water Heater	50	60	50	50
Air Conditioning	50	60	70	60
Other <sup>5</sup>	170	150	180	160
<b>Total Cooking Equipment<sup>5</sup></b>	<b>3,370</b>	<b>3,150</b>	<b>3,090</b>	<b>3,210</b>
Range/Oven	1,550	1,460	1,420	1,470
<i>Gas</i>	120	160	160	150
<i>Electric</i>	1,430	1,290	1,260	1,320
<i>Other</i>	*	10	*	10
Microwave Oven	50	70	50	60
All Other Cooking	310	290	320	310
<i>Gas</i>	70	60	60	60
<i>Electric</i>	210	210	230	220
<i>Other</i>	30	20	30	30
<b>Total Electrical Distribution</b>	<b>670</b>	<b>510</b>	<b>640</b>	<b>610</b>
Installed Wiring	220	200	170	200
Cord, Plug	110	80	90	90
Receptacle, Switch	90	40	100	80
Lighting	100	50	60	70
Other	150	140	230	170
<b>Other Selected Equipment</b>	<b>380</b>	<b>340</b>	<b>360</b>	<b>360</b>
Audio/Visual Equipment	20	20	*	10
Clothes Dryer	210	180	190	190
Dishwasher	20	10	10	10
Washing Machine	10	10	10	10
Torch	20	50	20	30
Refrigerator/Freezer	80	20	90	60
Shop/Garden Tool	30	40	40	40

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Injury estimates are rounded to the nearest 10. Rounded estimates less than 10 are denoted by an asterisk (\*). Subtotals do not necessarily add to heading totals. Estimates exclude injuries from intentionally set fires.

<sup>5</sup> There are confined fire injury estimates included in *Total Residential*, *Total Heating and Cooling Equipment*, *Fireplace, Chimney, Chimney Connector*, *Other*, and *Total Cooking Equipment* categories. These confined fire injury estimates could not be included in the detail lines because NFIRS does not provide information to determine the type of equipment. See Table 10b on p. 33 for details.

**TABLE 1d**  
**ESTIMATED RESIDENTIAL STRUCTURE FIRE PROPERTY LOSS**  
**(In \$Millions<sup>6</sup>) SELECTED EQUIPMENT, 2016–2018**

<b>Equipment</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2016 – 2018 Average</b>
<b>Total Residential<sup>7</sup></b>	<b>\$6,364.9</b>	<b>\$7,074.0</b>	<b>\$7,559.3</b>	<b>\$6,999.4</b>
<b>Total Heating and Cooling Equipment<sup>7</sup></b>	<b>\$619.8</b>	<b>\$539.8</b>	<b>\$648.2</b>	<b>\$602.6</b>
Local Fixed Heater	\$132.5	\$123.2	\$124.3	\$126.7
Portable Heater	\$64.1	\$44.4	\$79.2	\$62.6
Central Heating	\$38.3	\$23.1	\$37.9	\$33.1
Fireplace, Chimney, Chimney Connector <sup>7</sup>	\$120.9	\$110.9	\$114.0	\$115.3
Water Heater	\$37.4	\$33.0	\$32.1	\$34.2
Air Conditioning	\$61.5	\$67.3	\$77.0	\$68.6
Other <sup>7</sup>	\$200.0	\$137.9	\$183.7	\$173.9
<b>Total Cooking Equipment<sup>7</sup></b>	<b>\$628.3</b>	<b>\$600.7</b>	<b>\$618.9</b>	<b>\$616.0</b>
Range/Oven	\$346.2	\$327.9	\$334.9	\$336.3
<i>Gas</i>	\$40.0	\$42.1	\$35.2	\$39.1
<i>Electric</i>	\$305.3	\$282.8	\$298.5	\$295.5
<i>Other</i>	\$0.9	\$3.0	\$1.2	\$1.7
Microwave Oven	\$20.2	\$11.7	\$18.5	\$16.8
All Other Cooking	\$170.9	\$157.7	\$163.6	\$164.1
<i>Gas</i>	\$53.8	\$55.7	\$56.4	\$55.3
<i>Electric</i>	\$84.2	\$85.7	\$89.0	\$86.3
<i>Other</i>	\$32.9	\$16.3	\$18.2	\$22.5
<b>Total Electrical Distribution</b>	<b>\$636.0</b>	<b>\$697.8</b>	<b>\$572.8</b>	<b>\$635.6</b>
Installed Wiring	\$306.9	\$234.3	\$265.4	\$268.9
Cord, Plug	\$67.8	\$53.3	\$50.0	\$57.0
Receptacle, Switch	\$53.7	\$59.3	\$53.4	\$55.5
Lighting	\$82.0	\$71.0	\$61.3	\$71.4
Other	\$125.6	\$280.0	\$142.7	\$182.8
<b>Other Selected Equipment</b>	<b>\$203.8</b>	<b>\$317.8</b>	<b>\$232.0</b>	<b>\$251.2</b>
Audio/Visual Equipment	\$7.7	\$8.3	\$8.2	\$8.0
Clothes Dryer	\$95.0	\$123.2	\$106.9	\$108.4
Dishwasher	\$9.3	\$17.0	\$14.2	\$13.5
Washing Machine	\$7.2	\$4.6	\$2.0	\$4.6
Torch	\$22.6	\$88.4	\$35.8	\$48.9
Refrigerator/Freezer	\$30.7	\$33.5	\$37.4	\$33.9
Shop/Garden Tool	\$31.2	\$42.8	\$62.9	\$45.6

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Property loss estimates are rounded to the nearest tenth of a million dollars. Subtotals do not necessarily add to heading totals. Estimates exclude property loss from intentionally set fires.

<sup>6</sup> The dollar values are not adjusted for inflation.

<sup>7</sup> There are confined fire property loss estimates included in *Total Residential*, *Total Heating and Cooling Equipment*, *Fireplace*, *Chimney*, *Chimney Connector*, *Other*, and *Total Cooking Equipment* categories. These confined fire property loss estimates could not be included in the detail lines because NFIRS does not provide information to determine the type of equipment. See Table 10c on p. 34 for details.

**TABLE 2a**  
**ESTIMATED RESIDENTIAL STRUCTURE FIRES**  
**SELECTED PRODUCTS, 2016–2018**

<b>Product</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2016–2018 Average</b>
<b>Total Residential<sup>8</sup></b>	<b>351,900</b>	<b>362,600</b>	<b>371,600</b>	<b>362,200</b>
<b>By Heat Source</b>				
<b>Cigarette, Other Tobacco Products</b>	<b>10,800</b>	<b>10,800</b>	<b>10,600</b>	<b>10,700</b>
<b>Candle</b>	<b>5,300</b>	<b>5,600</b>	<b>5,600</b>	<b>5,500</b>
<b>Lighter</b>	<b>1,600</b>	<b>1,600</b>	<b>1,500</b>	<b>1,600</b>
<b>Match</b>	<b>300</b>	<b>400</b>	<b>300</b>	<b>400</b>
<b>By Item First Ignited</b>				
<b>Upholstered Furniture</b>	<b>4,200</b>	<b>4,000</b>	<b>4,400</b>	<b>4,200</b>
Smoking Material Ignition	1,100	900	1,000	1,000
Open-Flame Ignition	500	500	500	500
Other <sup>9</sup>	2,700	2,600	2,800	2,700
<b>Mattress, Bedding</b>	<b>6,500</b>	<b>6,500</b>	<b>7,000</b>	<b>6,700</b>
Smoking Material Ignition	1,400	1,400	1,400	1,400
Open-Flame Ignition	1,100	1,100	1,200	1,100
Other <sup>9</sup>	4,100	4,000	4,300	4,100
<b>Other Materials</b>				
Cooking Materials <sup>8</sup>	159,700	166,100	167,300	164,400
Electric Cable Insulation	16,700	17,100	18,500	17,400
Interior Wall Covering	5,800	5,800	5,900	5,800
Wearing Apparel-Worn	300	300	300	300
Wearing Apparel-Not Worn	4,500	4,400	4,600	4,500
Floor Covering	3,300	3,300	3,300	3,300
Curtains, Drapes	1,100	1,100	1,100	1,100
Magazines, Newspaper	1,300	1,400	1,500	1,400
Thermal Insulation	5,300	5,200	5,700	5,400
Cabinet, Desk	4,300	4,300	4,500	4,400
Trash, Rubbish <sup>8</sup>	22,300	25,300	25,400	24,300
Toy, Game	200	300	300	300
Box, Carton, Bag, Basket, Barrel	2,700	2,900	3,200	2,900

Source: U. S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Fire estimates are rounded to the nearest 100. Subtotals do not necessarily add up to heading totals.

Estimates exclude intentionally set fires.

<sup>8</sup> There are confined fire estimates included in *Total Residential*, *Cooking Materials*, and *Trash, Rubbish* categories. Estimates for confined cooking fires are included in the *Cooking Materials* fire losses because cooking materials are most likely the item first ignited. See Table 10a on p. 33 for details.

<sup>9</sup> The Other category for “Upholstered Furniture” and “Mattress, Bedding” includes all fires where the heat source was neither smoking material, nor open flame. These other heat sources include electrical arcing fires, space heater fires, and more.

**TABLE 2b**  
**ESTIMATED RESIDENTIAL STRUCTURE FIRE DEATHS**  
**SELECTED PRODUCTS, 2016–2018**

<b>Product</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2016–2018 Average</b>
<b>Total Residential<sup>10</sup></b>	<b>2,410</b>	<b>2,230</b>	<b>2,460</b>	<b>2,370</b>
<b>By Heat Source</b>				
<b>Cigarette, Other Tobacco Products</b>	<b>670</b>	<b>550</b>	<b>600</b>	<b>610</b>
<b>Candle</b>	<b>70</b>	<b>110</b>	<b>70</b>	<b>80</b>
<b>Lighter</b>	<b>80</b>	<b>30</b>	<b>40</b>	<b>50</b>
<b>Match</b>	<b>*</b>	<b>40</b>	<b>10</b>	<b>20</b>
<b>By Item First Ignited</b>				
<b>Upholstered Furniture</b>	<b>370</b>	<b>290</b>	<b>400</b>	<b>350</b>
Smoking Material Ignition	220	130	210	190
Open-Flame Ignition	40	20	10	20
Other	120	140	190	150
<b>Mattress, Bedding</b>	<b>360</b>	<b>340</b>	<b>310</b>	<b>330</b>
Smoking Material Ignition	250	180	170	200
Open-Flame Ignition	20	30	30	30
Other	90	120	110	110
<b>Other Materials</b>				
Cooking Materials	210	200	150	190
Electric Cable Insulation	90	100	150	120
Interior Wall Covering	90	80	70	80
Wearing Apparel-Worn	90	90	90	90
Wearing Apparel-Not Worn	80	50	60	60
Floor Covering	130	50	60	80
Curtains, Drapes	10	20	20	20
Magazines, Newspaper	40	50	40	40
Thermal Insulation	*	10	20	10
Cabinet, Desk	20	40	80	50
Trash, Rubbish	60	70	50	60
Toy, Game	*	10	*	*
Box, Carton, Bag, Basket, Barrel	30	20	20	20

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Death estimates are rounded to the nearest 10. Rounded estimates less than 10 are denoted by an asterisk (\*). Subtotals do not necessarily add to heading totals. Estimates exclude deaths from intentionally set fires.

<sup>10</sup> There were no NFIRS confined fire deaths in 2016, 2017, or 2018.

**TABLE 2c**  
**ESTIMATED RESIDENTIAL STRUCTURE FIRE INJURIES**  
**SELECTED PRODUCTS, 2016–2018**

<b>Product</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2016–2018 Average</b>
<b>Total Residential<sup>11</sup></b>	<b>10,370</b>	<b>10,060</b>	<b>10,740</b>	<b>10,390</b>
<b>By Heat Source</b>				
<b>Cigarette, Other Tobacco Products</b>	<b>920</b>	<b>880</b>	<b>880</b>	<b>890</b>
<b>Candle</b>	<b>600</b>	<b>470</b>	<b>510</b>	<b>530</b>
<b>Lighter</b>	<b>220</b>	<b>240</b>	<b>280</b>	<b>250</b>
<b>Match</b>	<b>30</b>	<b>50</b>	<b>40</b>	<b>40</b>
<b>By Item First Ignited</b>				
<b>Upholstered Furniture</b>	<b>570</b>	<b>490</b>	<b>600</b>	<b>550</b>
Smoking Material Ignition	260	130	180	190
Open-Flame Ignition	50	90	80	70
Other	270	270	340	290
<b>Mattress, Bedding</b>	<b>860</b>	<b>950</b>	<b>940</b>	<b>920</b>
Smoking Material Ignition	310	340	220	290
Open-Flame Ignition	180	160	260	200
Other	370	450	460	430
<b>Other Materials</b>				
Cooking Materials <sup>11</sup>	3,440	3,210	3,220	3,290
Electric Cable Insulation	330	360	490	390
Interior Wall Covering	260	190	190	190
Wearing Apparel-Worn	160	90	110	120
Wearing Apparel-Not Worn	290	240	210	250
Floor Covering	140	150	190	160
Curtains, Drapes	90	50	60	60
Magazines, Newspaper	70	100	120	100
Thermal Insulation	40	80	60	60
Cabinet, Desk	220	270	310	260
Trash, Rubbish <sup>11</sup>	270	210	290	260
Toy, Game	30	20	*	10
Box, Carton, Bag, Basket, Barrel	140	110	110	120

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Injury estimates are rounded to the nearest 10. Rounded estimates less than 10 are denoted by an asterisk (\*). Subtotals do not necessarily add to heading totals. Estimates exclude injuries from intentionally set fires.

<sup>11</sup> There are confined fire injury estimates included in *Total Residential*, *Cooking Materials*, and *Trash, Rubbish* categories. Estimates for confined cooking fire injuries are included in the *Cooking Materials* fire losses because cooking materials are most likely the item first ignited. See Table 10b on p. 33 for details.

**TABLE 2d**  
**ESTIMATED RESIDENTIAL STRUCTURE FIRE PROPERTY LOSS**  
**(In \$Millions<sup>12</sup>) SELECTED PRODUCTS, 2016–2018**

<b>Product</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2016-2018 Average</b>
<b>Total Residential<sup>13</sup></b>	<b>\$6,364.9</b>	<b>\$7,074.0</b>	<b>\$7,559.3</b>	<b>\$6,999.4</b>
<b>By Heat Source</b>				
<b>Cigarette, Other Tobacco Products</b>	<b>\$410.5</b>	<b>\$421.3</b>	<b>\$425.4</b>	<b>\$419.1</b>
<b>Candle</b>	<b>\$170.1</b>	<b>\$227.9</b>	<b>\$254.7</b>	<b>\$217.6</b>
<b>Lighter</b>	<b>\$57.1</b>	<b>\$93.6</b>	<b>\$102.4</b>	<b>\$84.4</b>
<b>Match</b>	<b>\$15.5</b>	<b>\$22.7</b>	<b>\$16.2</b>	<b>\$18.1</b>
<b>By Item First Ignited</b>				
<b>Upholstered Furniture</b>	<b>\$204.7</b>	<b>\$202.6</b>	<b>\$247.5</b>	<b>\$218.3</b>
Smoking Material Ignition	\$52.6	\$48.2	\$60.5	\$53.7
Open-Flame Ignition	\$26.2	\$39.1	\$21.1	\$28.8
Other	\$125.9	\$115.2	\$166.0	\$135.7
<b>Mattress, Bedding</b>	<b>\$235.5</b>	<b>\$252.7</b>	<b>\$286.0</b>	<b>\$258.1</b>
Smoking Material Ignition	\$54.3	\$52.5	\$42.7	\$49.8
Open-Flame Ignition	\$41.8	\$44.0	\$49.8	\$45.2
Other	\$139.3	\$156.2	\$193.6	\$163.1
<b>Other Materials</b>				
Cooking Materials <sup>13</sup>	\$478.2	\$551.1	\$549.9	\$526.4
Electric Cable Insulation	\$463.9	\$490.7	\$571.1	\$508.6
Interior Wall Covering	\$259.7	\$273.8	\$315.1	\$282.8
Wearing Apparel-Worn	\$14.5	\$7.6	\$8.1	\$10.1
Wearing Apparel-Not Worn	\$107.3	\$111.3	\$105.0	\$107.9
Floor Covering	\$122.5	\$113.8	\$111.1	\$115.8
Curtains, Drapes	\$40.7	\$40.3	\$71.2	\$50.7
Magazines, Newspaper	\$43.4	\$44.7	\$64.2	\$50.8
Thermal Insulation	\$179.4	\$144.0	\$229.4	\$184.3
Cabinet, Desk	\$155.6	\$150.6	\$184.0	\$163.4
Trash, Rubbish <sup>13</sup>	\$156.3	\$359.7	\$196.3	\$237.4
Toy, Game	\$8.2	\$12.5	\$7.0	\$9.2
Box, Carton, Bag, Basket, Barrel	\$84.6	\$98.7	\$127.1	\$103.4

Source: U. S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Property loss estimates are rounded to the nearest tenth of a million dollars. Subtotals do not necessarily add to heading totals. Estimates exclude property loss from intentionally set fires.

<sup>12</sup> Dollar values are not adjusted for inflation.

<sup>13</sup> There are confined fire property loss estimates included in *Total Residential*, *Cooking Materials*, and *Trash, Rubbish* categories. Estimates for confined cooking fire property losses are included in the *Cooking Materials* fire losses because cooking materials are most likely the item first ignited. See Table 10c on p. 34 for details.



**TABLE 3a**  
**ESTIMATED RESIDENTIAL STRUCTURE FIRES**  
**HEATING AND COOLING EQUIPMENT, 2016–2018**

<b>Equipment</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2016–2018 Average</b>
<b>Total Residential<sup>14</sup></b>	<b>351,900</b>	<b>362,600</b>	<b>371,600</b>	<b>362,000</b>
<b>Total Heating and Cooling Equipment<sup>14</sup></b>	<b>41,300</b>	<b>39,600</b>	<b>42,200</b>	<b>41,000</b>
<b>Solid Fuel</b>	<b>2,200</b>	<b>2,200</b>	<b>2,100</b>	<b>2,200</b>
Fixed Heater	500	500	500	500
Portable Heater	*	*	*	*
Fireplace, Chimney, Chimney Connector	1,600	1,600	1,500	1,600
Central Heating	*	*	*	*
Water Heater	*	*	*	*
Other	100	*	*	*
<b>Gas-Fired</b>	<b>2,600</b>	<b>2,600</b>	<b>2,600</b>	<b>2,600</b>
Fixed Heater	800	900	900	900
Portable Heater	200	200	200	200
Fireplace, Chimney, Chimney Connector	200	200	200	200
Central Heating	400	300	400	400
Water Heater	800	800	600	700
Fixed, Central Air Conditioning	*	*	*	*
Other	200	200	300	200
<b>Electric</b>	<b>13,900</b>	<b>12,700</b>	<b>14,500</b>	<b>13,700</b>
Fixed Heater	3,500	3,400	3,600	3,500
Portable Heater	1,300	1,100	1,600	1,400
Central Heating	400	400	500	400
Water Heater	900	800	800	900
Fixed, Central Air Conditioning	1,200	1,000	1,000	1,100
Portable Air Conditioner	500	400	500	500
Other	6,000	5,600	6,400	6,000
<b>Liquid Fuel</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>
Fixed Heater	*	*	*	*
Portable Heater	200	200	200	200
Fireplace, Chimney, Chimney Connector	*	*	*	*
Central Heating	100	100	100	100
Water Heater	*	*	*	*
Other	*	*	*	*
<b>All Other Fuel</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Fire estimates are rounded to the nearest 100. Rounded estimates less than 100 are denoted by an asterisk (\*). Subtotals do not necessarily add to heading totals. Estimates exclude intentionally set fires.

<sup>14</sup> There are confined fire estimates included in *Total Residential*, and *Total Heating and Cooling Equipment* categories. These confined fire estimates could not be included in the detail lines because NFIRS does not provide information to determine the type of equipment or the power source of the equipment. See Table 10a on p. 33 for details.

**TABLE 3b**  
**ESTIMATED RESIDENTIAL STRUCTURE FIRE DEATHS**  
**HEATING AND COOLING EQUIPMENT, 2016–2018**

<b>Equipment</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2016–2018Average</b>
<b>Total Residential<sup>15</sup></b>	<b>2,410</b>	<b>2,230</b>	<b>2,460</b>	<b>2,370</b>
<b>Total Heating and Cooling Equipment</b>	<b>250</b>	<b>230</b>	<b>170</b>	<b>220</b>
<b>Solid Fuel</b>	<b>60</b>	<b>60</b>	<b>20</b>	<b>50</b>
Fixed Heater	10	50	*	20
Portable Heater	10	*	*	*
Fireplace, Chimney, Chimney Connector	20	10	20	20
Central Heating	*	*	*	*
Water Heater	*	*	*	*
Other	*	*	*	*
<b>Gas-Fired</b>	<b>30</b>	<b>50</b>	<b>30</b>	<b>40</b>
Fixed Heater	20	20	10	20
Portable Heater	*	*	10	10
Fireplace, Chimney, Chimney Connector	10	20	*	10
Central Heating	*	*	*	*
Water Heater	10	*	*	*
Fixed, Central Air Conditioning	*	*	*	*
Other	*	*	10	*
<b>Electric</b>	<b>140</b>	<b>110</b>	<b>120</b>	<b>120</b>
Fixed Heater	10	10	10	10
Portable Heater	90	50	60	70
Central Heating	*	*	*	*
Water Heater	*	*	10	10
Fixed, Central Air Conditioning	10	*	*	10
Portable Air Conditioner	*	10	20	10
Other	20	30	20	20
<b>Liquid Fuel</b>	<b>20</b>	<b>10</b>	<b>*</b>	<b>10</b>
Fixed Heater	10	*	*	*
Portable Heater	*	10	*	*
Fireplace, Chimney, Chimney Connector	*	*	*	*
Central Heating	*	*	*	*
Water Heater	*	*	*	*
Other	10	*	*	*
<b>All Other Fuel</b>	<b>*</b>	<b>*</b>	<b>*</b>	<b>*</b>

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Death estimates are rounded to the nearest 10. Rounded estimates less than 10 are denoted by an asterisk (\*). Subtotals do not necessarily add to heading totals. Estimates exclude deaths from intentionally set fires.

<sup>15</sup> There were no NFIRS confined fire deaths in 2016, 2017, or 2018.

**TABLE 3c**  
**ESTIMATED RESIDENTIAL STRUCTURE FIRE INJURIES**  
**HEATING AND COOLING EQUIPMENT, 2016–2018**

<b>Equipment</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2016–2018 Average</b>
<b>Total Residential<sup>16</sup></b>	<b>10,370</b>	<b>10,060</b>	<b>10,740</b>	<b>10,390</b>
<b>Total Heating and Cooling Equipment<sup>16</sup></b>	<b>830</b>	<b>820</b>	<b>860</b>	<b>840</b>
<b>Solid Fuel</b>	<b>40</b>	<b>50</b>	<b>20</b>	<b>40</b>
Fixed Heater	30	20	10	20
Portable Heater	*	*	*	*
Fireplace, Chimney, Chimney Connector	20	20	20	20
Central Heating	*	*	*	*
Water Heater	*	*	*	*
Other	*	*	*	*
<b>Gas-Fired</b>	<b>120</b>	<b>120</b>	<b>150</b>	<b>130</b>
Fixed Heater	60	40	40	50
Portable Heater	*	10	20	10
Fireplace, Chimney, Chimney Connector	10	10	20	10
Central Heating	20	10	10	10
Water Heater	30	40	50	40
Fixed, Central Air Conditioning	*	*	*	*
Other	10	10	10	10
<b>Electric</b>	<b>600</b>	<b>500</b>	<b>630</b>	<b>580</b>
Fixed Heater	260	250	240	250
Portable Heater	110	90	140	120
Central Heating	10	10	10	10
Water Heater	10	10	10	10
Fixed, Central Air Conditioning	40	40	40	40
Portable Air Conditioner	10	20	30	20
Other	150	90	150	130
<b>Liquid Fuel</b>	<b>50</b>	<b>30</b>	<b>30</b>	<b>40</b>
Fixed Heater	10	*	10	10
Portable Heater	30	30	20	30
Fireplace, Chimney, Chimney Connector	*	*	*	*
Central Heating	10	*	*	*
Water Heater	*	*	*	*
Other	*	*	*	*
<b>All Other Fuel</b>	<b>*</b>	<b>*</b>	<b>*</b>	<b>*</b>

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Injury estimates are rounded to the nearest 10. Rounded estimates less than 10 are denoted by an asterisk (\*). Subtotals do not necessarily add to heading totals. Estimates exclude injuries from intentionally set fires.

<sup>16</sup> There are confined fire injury estimates included in *Total Residential*, and *Total Heating and Cooling Equipment* categories. These confined fire injury estimates could not be included in the detail lines because NFIRS does not provide information to determine the type of equipment or the power source of the equipment. See Table 10b on p. 33 for details.

**TABLE 3d**  
**ESTIMATED RESIDENTIAL STRUCTURE FIRE PROPERTY LOSS**  
**(In \$Millions<sup>17</sup>) HEATING AND COOLING EQUIPMENT, 2016–2018**

<b>Equipment</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2016–2018 Average</b>
<b>Total Residential<sup>18</sup></b>	<b>\$6,364.9</b>	<b>\$7,074.0</b>	<b>\$7,559.3</b>	<b>\$6,999.4</b>
<b>Total Heating and Cooling Equipment<sup>18</sup></b>	<b>\$619.8</b>	<b>\$539.8</b>	<b>\$648.2</b>	<b>\$602.6</b>
<b>Solid Fuel</b>	<b>\$110.1</b>	<b>\$108.4</b>	<b>\$112.1</b>	<b>\$110.2</b>
Fixed Heater	\$23.8	\$25.9	\$26.1	\$25.3
Portable Heater	\$0.3	\$0.3	*	\$0.2
Fireplace, Chimney, Chimney Connector	\$81.3	\$78.9	\$83.5	\$81.2
Central Heating	\$1.2	\$1.7	\$0.4	\$1.1
Water Heater	*	*	*	*
Other	\$3.5	\$1.6	\$2.1	\$2.4
<b>Gas-Fired</b>	<b>\$93.5</b>	<b>\$100.9</b>	<b>\$95.7</b>	<b>\$96.7</b>
Fixed Heater	\$22.3	\$26.8	\$21.7	\$23.6
Portable Heater	\$5.3	\$3.8	\$8.9	\$6.0
Fireplace, Chimney, Chimney Connector	\$15.7	\$25.3	\$22.7	\$21.2
Central Heating	\$21.2	\$8.2	\$16.5	\$15.3
Water Heater	\$21.1	\$22.9	\$17.8	\$20.6
Fixed, Central Air Conditioning	*	\$0.3	*	\$0.1
Other	\$7.8	\$13.4	\$8.0	\$9.7
<b>Electric</b>	<b>\$392.4</b>	<b>\$306.2</b>	<b>\$413.4</b>	<b>\$370.7</b>
Fixed Heater	\$63.7	\$68.2	\$72.0	\$68.0
Portable Heater	\$50.4	\$35.1	\$61.4	\$48.9
Central Heating	\$9.5	\$8.1	\$18.4	\$12.0
Water Heater	\$11.9	\$9.9	\$14.3	\$12.0
Fixed, Central Air Conditioning	\$29.7	\$26.2	\$32.8	\$29.6
Portable Air Conditioner	\$61.5	\$40.2	\$44.2	\$48.6
Other	\$165.7	\$118.6	\$170.3	\$151.5
<b>Liquid Fuel</b>	<b>\$8.4</b>	<b>\$12.0</b>	<b>\$13.4</b>	<b>\$11.3</b>
Fixed Heater	\$0.8	\$1.5	\$1.8	\$1.4
Portable Heater	\$5.1	\$5.0	\$7.5	\$5.9
Fireplace, Chimney, Chimney Connector	\$0.5	\$0.5	\$0.7	\$0.6
Central Heating	\$1.7	\$4.9	\$2.6	\$3.1
Water Heater	*	*	*	*
Other	\$0.3	*	\$0.9	\$0.4
<b>All Other Fuel</b>	<b>\$7.4</b>	<b>\$1.1</b>	<b>\$5.4</b>	<b>\$4.6</b>

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Property loss estimates are rounded to the nearest tenth of a million dollars. Rounded estimates less than \$0.1m are denoted by an asterisk (\*). Subtotals do not necessarily add to heading totals. Estimates exclude property loss from intentionally set fires.

<sup>17</sup> Dollar values are not adjusted for inflation.

<sup>18</sup> There are confined fire property loss estimates included in *Total Residential*, and *Total Heating and Cooling Equipment* categories. These confined fire property loss estimates could not be included in the detail lines because NFIRS does not provide information to determine the type of equipment or the power source of the equipment. See Table 10c on p. 34 for details.

**TABLE 4a**  
**ESTIMATED RESIDENTIAL STRUCTURE FIRES**  
**SELECTED ELECTRICAL EQUIPMENT, 2016–2018**

<b>Equipment</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2016–2018 Average</b>
<b>Total Residential<sup>19</sup></b>	<b>351,900</b>	<b>362,600</b>	<b>371,600</b>	<b>362,000</b>
<b>Total Electrical</b>	<b>67,800</b>	<b>61,900</b>	<b>62,900</b>	<b>64,200</b>
<b>Electric Heating and Cooling</b>	<b>13,900</b>	<b>12,700</b>	<b>14,500</b>	<b>13,700</b>
Central Heating	400	400	500	400
Local Fixed Heater	3,500	3,400	3,600	3,500
Portable Heater	1,300	1,100	1,600	1,400
Water Heater	900	800	800	900
Fixed, Central Air Conditioning	1,200	1,000	1,000	1,100
Portable Air Conditioner	500	400	500	500
Other	6,000	5,600	6,400	6,000
<b>Electric Cooking Equipment</b>	<b>19,400</b>	<b>17,700</b>	<b>17,100</b>	<b>18,100</b>
Range/Oven	15,100	13,700	13,300	14,000
Range/Oven Hood	200	200	200	200
Deep Fat Fryer	100	100	100	100
Grill	*	*	*	*
Microwave Oven	900	800	800	800
Small Heat-Producing Appliance	900	800	900	900
Other	2,200	2,000	1,800	2,000
<b>Electrical Distribution</b>	<b>24,000</b>	<b>18,400</b>	<b>18,500</b>	<b>20,300</b>
Installed Wiring	9,400	8,200	8,000	8,600
Light Fixture	1,800	1,600	1,600	1,700
Receptacle, Switch	2,600	2,300	2,400	2,400
Cord, Plug	1,900	1,700	1,700	1,700
Lamp, Light Bulb	800	700	700	700
Panel Board	800	700	700	700
Meter	600	500	500	500
Transformer	100	100	100	100
Other	2,500	2,600	2,700	2,600
<b>Other Selected Electrical Appliances</b>	<b>8,100</b>	<b>7,700</b>	<b>7,300</b>	<b>7,700</b>
Clothes Dryer	5,400	5,100	4,800	5,100
Dishwasher	500	600	500	500
Audio/Visual Equipment	400	400	300	400
Washing Machine	400	400	400	400
Refrigerator/Freezer	900	800	800	800
Shop/Garden Tools	400	300	400	400
Torch	100	100	100	100

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Fire estimates are rounded to the nearest 100. Rounded estimates less than 100 are denoted by an asterisk (\*). Subtotals do not necessarily add to heading totals. Estimates exclude intentionally set fires.

<sup>19</sup> There are confined fire estimates included in the *Total Residential* category. These confined fire estimates could not be included in the detail lines because NFIRS does not provide information to determine the type of equipment or the power source of the equipment. See Table 10a on p. 33 for details.

**TABLE 4b**  
**ESTIMATED RESIDENTIAL STRUCTURE FIRE DEATHS**  
**SELECTED ELECTRICAL EQUIPMENT, 2016–2018**

<b>Equipment</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2016–2018 Average</b>
<b>Total Residential<sup>20</sup></b>	<b>2,410</b>	<b>2,230</b>	<b>2,460</b>	<b>2,370</b>
<b>Total Electrical</b>	<b>700</b>	<b>610</b>	<b>540</b>	<b>620</b>
<b>Electric Heating and Cooling</b>	<b>140</b>	<b>110</b>	<b>120</b>	<b>120</b>
Central Heating	*	*	*	*
Local Fixed Heater	10	10	10	10
Portable Heater	90	50	60	70
Water Heater	*	*	10	10
Fixed, Central Air Conditioning	10	*	*	10
Portable Air Conditioner	*	10	20	10
Other	20	30	20	20
<b>Electric Cooking Equipment</b>	<b>180</b>	<b>170</b>	<b>170</b>	<b>170</b>
Range/Oven	140	160	130	140
Range/Oven Hood	*	*	*	*
Deep Fat Fryer	*	*	*	*
Grill	*	*	*	*
Microwave Oven	*	*	*	*
Small Heat-Producing Appliance	10	10	20	10
Other	30	*	10	10
<b>Electrical Distribution</b>	<b>240</b>	<b>160</b>	<b>170</b>	<b>190</b>
Installed Wiring	60	60	60	60
Light Fixture	10	*	10	10
Receptacle, Switch	20	*	10	10
Cord, Plug	110	70	60	80
Lamp, Light Bulb	*	*	*	*
Panel Board	10	*	*	10
Meter	*	*	*	*
Transformer	*	*	*	*
Other	20	30	20	20
<b>Other Selected Electrical Appliances</b>	<b>20</b>	<b>10</b>	<b>20</b>	<b>10</b>
Clothes Dryer	*	*	*	*
Dishwasher	*	*	*	*
Audio/Visual Equipment	*	10	*	*
Washing Machine	*	*	*	*
Refrigerator/Freezer	20	*	20	10
Shop/Garden Tool	*	*	*	*
Torch	*	*	*	*

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Death estimates are rounded to the nearest 10. Rounded estimates less than 10 are denoted by an asterisk (\*).

Subtotals do not necessarily add to heading totals. Estimates exclude deaths from intentionally set fires.

<sup>20</sup> There were no NFIRS confined fire deaths in 2016, 2017, or 2018.

**TABLE 4c**  
**ESTIMATED RESIDENTIAL STRUCTURE FIRE INJURIES**  
**SELECTED ELECTRICAL EQUIPMENT, 2016–2018**

<b>Equipment</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2016–2018 Average</b>
<b>Total Residential<sup>21</sup></b>	<b>10,370</b>	<b>10,060</b>	<b>10,740</b>	<b>10,390</b>
<b>Total Electrical</b>	<b>3,570</b>	<b>2,940</b>	<b>3,470</b>	<b>3,320</b>
<b>Electric Heating and Cooling</b>	<b>600</b>	<b>500</b>	<b>630</b>	<b>580</b>
Central Heating	10	10	10	10
Local Fixed Heater	260	250	240	250
Portable Heater	110	90	140	120
Water Heater	10	10	10	10
Fixed, Central Air Conditioning	40	40	40	40
Portable Air Conditioner	10	20	30	20
Other	150	90	150	130
<b>Electric Cooking Equipment</b>	<b>1,690</b>	<b>1,390</b>	<b>1,540</b>	<b>1,540</b>
Range/Oven	1,430	1,150	1,260	1,280
Range/Oven Hood	20	*	10	10
Deep Fat Fryer	*	10	*	*
Grill	*	*	*	*
Microwave Oven	50	60	50	50
Small Heat-Producing Appliance	60	70	30	50
Other	130	100	190	140
<b>Electrical Distribution</b>	<b>830</b>	<b>440</b>	<b>620</b>	<b>630</b>
Installed Wiring	220	180	170	190
Light Fixture	50	30	20	30
Receptacle, Switch	90	40	100	80
Cord, Plug	110	70	90	90
Lamp, Light Bulb	50	10	40	30
Panel Board	30	*	10	20
Meter	10	10	40	20
Transformer	10	*	*	*
Other	100	90	160	120
<b>Other Selected Electrical Appliances</b>	<b>260</b>	<b>200</b>	<b>280</b>	<b>250</b>
Clothes Dryer	130	110	150	130
Dishwasher	20	10	10	10
Audio/Visual Equipment	20	20	*	10
Washing Machine	10	10	10	10
Refrigerator/Freezer	80	20	90	60
Shop/Garden Tool	*	10	10	10
Torch	*	10	*	10

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Injury estimates are rounded to the nearest 10. Rounded estimates less than 10 are denoted by an asterisk (\*).

Subtotals do not necessarily add to heading totals. Estimates exclude injuries from intentionally set fires.

<sup>21</sup> There are confined fire injury estimates included in the *Total Residential* category. These confined fire injury estimates could not be included in the detail lines because NFIRS does not provide information to determine the type of equipment or the power source of the equipment. See Table 10b on p. 33 for details.

**TABLE 4d**  
**ESTIMATED RESIDENTIAL STRUCTURE FIRE PROPERTY LOSS**  
**(In \$Millions<sup>22</sup>) SELECTED ELECTRICAL EQUIPMENT, 2016–2018**

<b>Equipment</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2016–2018 Average</b>
<b>Total Residential<sup>23</sup></b>	<b>\$6,364.9</b>	<b>\$7,074.0</b>	<b>\$7,559.3</b>	<b>\$6,999.4</b>
<b>Total Electrical</b>	<b>\$1,790.7</b>	<b>\$1,582.9</b>	<b>\$1,848.2</b>	<b>\$1,740.6</b>
<b>Electric Heating and Cooling</b>	<b>\$392.4</b>	<b>\$306.2</b>	<b>\$413.4</b>	<b>\$370.7</b>
Central Heating	\$9.5	\$8.1	\$18.4	\$12.0
Local Fixed Heater	\$63.7	\$68.2	\$72.0	\$68.0
Portable Heater	\$50.4	\$35.1	\$61.4	\$48.9
Water Heater	\$11.9	\$9.9	\$14.3	\$12.0
Fixed, Central Air Conditioning	\$29.7	\$26.2	\$32.8	\$29.6
Portable Air Conditioner	\$61.5	\$40.2	\$44.2	\$48.6
Other	\$165.7	\$118.6	\$170.3	\$151.5
<b>Electric Cooking Equipment</b>	<b>\$409.3</b>	<b>\$374.4</b>	<b>\$396.0</b>	<b>\$393.3</b>
Range/Oven	\$305.3	\$281.1	\$298.5	\$295.0
Range/Oven Hood	\$1.9	\$2.9	\$1.4	\$2.1
Deep Fat Fryer	\$5.4	\$2.4	\$5.6	\$4.5
Grill	\$1.2	\$1.4	\$2.5	\$1.7
Microwave Oven	\$20.3	\$11.5	\$18.1	\$16.6
Small Heat-Producing Appliance	\$20.9	\$29.3	\$30.2	\$26.8
Other	\$54.4	\$45.9	\$39.8	\$46.7
<b>Electrical Distribution</b>	<b>\$643.6</b>	<b>\$533.0</b>	<b>\$582.6</b>	<b>\$586.4</b>
Installed Wiring	\$306.9	\$232.9	\$265.4	\$268.4
Light Fixture	\$54.5	\$55.1	\$40.1	\$49.9
Receptacle, Switch	\$53.7	\$58.9	\$53.4	\$55.4
Cord, Plug	\$67.8	\$53.0	\$50.0	\$56.9
Lamp, Light Bulb	\$27.3	\$15.4	\$21.2	\$21.3
Panel Board	\$23.9	\$15.4	\$23.7	\$21.0
Meter	\$14.9	\$14.3	\$13.7	\$14.3
Transformer	\$1.5	\$1.3	\$4.7	\$2.5
Other	\$93.0	\$86.7	\$110.4	\$96.7
<b>Other Selected Electrical Appliances</b>	<b>\$134.3</b>	<b>\$174.9</b>	<b>\$174.5</b>	<b>\$161.2</b>
Clothes Dryer	\$70.7	\$100.4	\$84.1	\$85.1
Dishwasher	\$9.3	\$16.9	\$14.2	\$13.5
Audio/Visual Equipment	\$7.7	\$8.2	\$8.2	\$8.0
Washing Machine	\$7.0	\$4.5	\$1.9	\$4.4
Refrigerator/Freezer	\$30.7	\$33.1	\$37.1	\$33.6
Shop/Garden Tool	\$6.2	\$9.4	\$16.5	\$10.7
Torch	\$2.6	\$2.4	\$12.7	\$5.9

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Estimates are rounded to the \$0.1m. Rounded estimates less than \$0.1m are denoted by an asterisk (\*).

Subtotals do not necessarily add to heading totals. Estimates exclude property loss from intentionally set fires.

<sup>22</sup> Dollar values were not adjusted for inflation.

<sup>23</sup> There are confined fire property loss estimates included in the *Total Residential* category. These confined fire property loss estimates could not be included in the detail lines because NFIRS does not provide information to determine the type of equipment or the power source of the equipment. See Table 10c on p. 34 for details.



**TABLE 5a**  
**ESTIMATED RESIDENTIAL STRUCTURE FIRES**  
**SELECTED GAS-FIRED EQUIPMENT, 2016–2018**

<b>Equipment</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2016–2018 Average</b>
<b>Total Residential<sup>24</sup></b>	<b>351,900</b>	<b>362,200</b>	<b>371,600</b>	<b>362,000</b>
<b>Total Gas-Fired Equipment</b>	<b>10,000</b>	<b>9,900</b>	<b>9,500</b>	<b>9,800</b>
<b>Gas Heating Equipment</b>	<b>2,600</b>	<b>2,600</b>	<b>2,600</b>	<b>2,600</b>
Fixed Heater	800	900	900	900
Portable Heater	200	200	200	200
Central Heating	400	300	400	400
Fireplace, Chimney, Connector	200	200	200	200
Water Heater	800	800	600	700
Fixed, Central Air Conditioning	*	*	*	*
Other	200	200	300	200
<b>Gas Cooking Equipment</b>	<b>3,500</b>	<b>3,600</b>	<b>3,200</b>	<b>3,400</b>
Range/Oven	2,200	2,300	2,000	2,200
Open Gas Grill	800	700	700	700
Other	500	500	500	500
<b>Other Selected Gas Equipment</b>	<b>2,300</b>	<b>2,200</b>	<b>2,100</b>	<b>2,200</b>
Clothes Dryer	1,500	1,400	1,300	1,400
Torch	400	500	400	500
Shop/Garden Tool	400	400	400	400

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Fire estimates are rounded to the nearest 100. Rounded estimates less than 100 are denoted by an asterisk (\*). Subtotals do not necessarily add to heading totals. Estimates exclude losses from intentionally set fires.

<sup>24</sup> There are confined fire estimates included in the *Total Residential* category. These confined fire estimates could not be included in the detail lines because NFIRS does not provide information to determine the type of equipment or the power source of the equipment. See Table 10a on p. 33 for details.

**TABLE 5b**  
**ESTIMATED RESIDENTIAL STRUCTURE FIRE DEATHS**  
**SELECTED GAS-FIRED EQUIPMENT, 2016–2018**

<b>Equipment</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2016–2018 Average</b>
<b>Total Residential<sup>25</sup></b>	<b>2,410</b>	<b>2,230</b>	<b>2,460</b>	<b>2,370</b>
<b>Total Gas-Fired Equipment</b>	<b>70</b>	<b>130</b>	<b>60</b>	<b>90</b>
<b>Gas Heating Equipment</b>	<b>30</b>	<b>50</b>	<b>30</b>	<b>40</b>
Fixed Heater	20	20	10	20
Portable Heater	*	*	10	10
Central Heating	*	*	*	*
Fireplace, Chimney, Connector	10	20	*	10
Water Heater	10	*	*	*
Fixed, Central Air Conditioning	*	*	*	*
Other	*	*	10	*
<b>Gas Cooking Equipment</b>	<b>20</b>	<b>40</b>	<b>10</b>	<b>20</b>
Range/Oven	20	40	10	20
Open Gas Grill	*	*	*	*
Other	*	*	*	*
<b>Other Selected Gas Equipment</b>	<b>*</b>	<b>*</b>	<b>10</b>	<b>10</b>
Clothes Dryer	*	*	*	*
Torch	*	*	10	10
Shop/Garden Tool	*	*	*	*

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Death estimates are rounded to the nearest 10. Rounded estimates less than 10 are denoted by an asterisk (\*). Subtotals do not necessarily add to heading totals. Estimates exclude deaths from intentionally set fires.

<sup>25</sup>There were no NFIRS confined fire deaths in 2016, 2017, or 2018.

**TABLE 5c**  
**ESTIMATED RESIDENTIAL STRUCTURE FIRE INJURIES**  
**SELECTED GAS-FIRED EQUIPMENT, 2016–2018**

<b>Equipment</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2016–2018 Average</b>
<b>Total Residential<sup>26</sup></b>	<b>10,370</b>	<b>10,060</b>	<b>10,740</b>	<b>10,390</b>
<b>Total Gas-Fired Equipment</b>	<b>500</b>	<b>490</b>	<b>540</b>	<b>510</b>
<b>Gas Heating Equipment</b>	<b>120</b>	<b>120</b>	<b>150</b>	<b>130</b>
Fixed Heater	60	40	40	50
Portable Heater	*	10	20	10
Central Heating	20	10	10	10
Fireplace, Chimney, Connector	10	10	20	10
Water Heater	30	40	50	40
Fixed, Central Air Conditioning	*	*	*	*
Other	10	10	10	10
<b>Gas Cooking Equipment</b>	<b>180</b>	<b>190</b>	<b>200</b>	<b>190</b>
Range/Oven	120	140	160	140
Open Gas Grill	40	20	30	30
Other	20	20	20	20
<b>Other Selected Gas Equipment</b>	<b>80</b>	<b>60</b>	<b>60</b>	<b>70</b>
Clothes Dryer	50	30	20	40
Torch	10	30	20	20
Shop/Garden Tool	20	10	10	10

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Injury estimates are rounded to the nearest 10. Rounded estimates less than 10 are denoted by an asterisk (\*). Subtotals do not necessarily add to heading totals. Estimates exclude injuries from intentionally set fires.

<sup>26</sup> There are confined fire injury estimates included in the *Total Residential* category. These confined fire injury estimates could not be included in the detail lines because NFIRS does not provide information to determine the type of equipment or the power source of the equipment. See Table 10b on p. 33 for details.

**TABLE 5d**  
**ESTIMATED RESIDENTIAL STRUCTURE FIRE PROPERTY LOSS**  
**(In \$Millions<sup>27</sup>) SELECTED GAS-FIRED EQUIPMENT, 2016–2018**

<b>Equipment</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2016–2018 Average</b>
<b>Total Residential<sup>28</sup></b>	<b>\$6,364.9</b>	<b>\$7,074.0</b>	<b>\$7,559.3</b>	<b>\$6,999.4</b>
<b>Total Gas-Fired Equipment</b>	<b>\$309.0</b>	<b>\$394.3</b>	<b>\$298.0</b>	<b>\$333.7</b>
<b>Gas Heating Equipment</b>	<b>\$93.5</b>	<b>\$100.9</b>	<b>\$95.7</b>	<b>\$96.7</b>
Fixed Heater	\$22.3	\$26.8	\$21.7	\$23.6
Portable Heater	\$5.3	\$3.8	\$8.9	\$6.0
Central Heating	\$21.2	\$8.2	\$16.5	\$15.3
Fireplace, Chimney, Connector	\$15.7	\$25.3	\$22.7	\$21.2
Water Heater	\$21.1	\$22.9	\$17.8	\$20.6
Fixed, Central Air Conditioning	*	\$0.3	*	\$0.1
Other	\$7.8	\$13.4	\$8.0	\$9.7
<b>Gas Cooking Equipment</b>	<b>\$90.2</b>	<b>\$93.6</b>	<b>\$91.9</b>	<b>\$91.9</b>
Range/Oven	\$40.0	\$41.8	\$35.2	\$39.0
Open Gas Grill	\$35.4	\$32.7	\$39.1	\$35.7
Other	\$14.8	\$19.0	\$17.7	\$17.2
<b>Other Selected Gas Equipment</b>	<b>\$44.3</b>	<b>\$119.7</b>	<b>\$53.1</b>	<b>\$72.4</b>
Clothes Dryer	\$16.6	\$14.6	\$15.6	\$15.6
Torch	\$18.5	\$83.8	\$17.5	\$39.9
Shop/Garden Tool	\$9.1	\$21.3	\$18.8	\$16.8

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Property loss estimates are rounded to the nearest tenth of a million dollars. Rounded estimates less than \$0.1m are denoted by an asterisk (\*). Subtotals do not necessarily add to heading totals. Estimates exclude property loss from intentionally set fires.

<sup>27</sup> Dollar values are not adjusted for inflation.

<sup>28</sup> There are confined fire property loss estimates included in the *Total Residential* category. These confined fire property loss estimates could not be included in the detail lines because NFIRS does not provide information to determine the type of equipment or the power source of the equipment. See Table 10c on p. 34 for details.

## Estimates of Fire Death and Injury Victims by Age and Race

Table 6 provides estimates of the rate of deaths and injuries by age categories. Note that people in the age categories of ‘Under 5’, ‘40 – 64’, ‘65 – 74’ and ‘75+’ have fire death rates higher than the overall rate of 0.7 per hundred thousand people. The death rate for people aged between 65 and 74 is more than twice as high as the overall death rate and the rate for people aged 75 and over is more than three times as high as the overall rate. The discrepancies by age are not as great in the fire injury rate, but the people in the age categories of ‘15 – 39’, ‘40 – 64’, ‘65 – 74’, and ‘75+’ all have injury rates as high or higher than the overall rate of 2.8 per hundred thousand. In general, for 2016 – 2018, older adults suffered higher rates of fire deaths and injuries than younger people.

**Table 6. Death and Injury Estimates by Age Category: 2016–2018**

Age Category	Fire Deaths per Hundred Thousand People <sup>29</sup>	Fire Injuries per Hundred Thousand People <sup>29</sup>
<b>Overall</b>	0.7	2.8
<b>Under 5 years</b>	0.8	2.3
<b>5 – 14 years</b>	0.4	1.2
<b>15 – 39 years</b>	0.3	2.8
<b>40 – 64 years</b>	0.8	3.3
<b>65 – 74 years</b>	1.5	3.2
<b>75+ years</b>	2.3	3.1

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA

Table 7 provides estimates of the rate of fire deaths and injuries by race. The estimated per capita fire death rate of African Americans, 1.3 per hundred thousand, is nearly twice the overall rate. The estimated rate of injuries per person for African Americans (5.7 per hundred thousand), and for ‘Other – Including multi-racial’ (4.9 per hundred thousand) are much higher than the overall rate (2.8 per hundred thousand).

**Table 7. Death and Injury Estimates by Race: 2016 - 2018**

Race	Fire Deaths per Hundred Thousand People <sup>30</sup>	Fire Injuries per Hundred Thousand People <sup>30</sup>
<b>Overall</b>	0.7	2.8
<b>White</b>	0.7	2.4
<b>Black/African American</b>	1.3	5.7
<b>Asian</b>	0.1	0.7
<b>American Indian, Eskimo, Aleut</b>	0.5	1.0
<b>Other – Including multi-racial</b>	0.7	4.9

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA

There is an NFIRS variable for ethnicity that has codes for ‘Hispanic’ and ‘Other’. However, the instructions for coding this variable say to leave it blank if the ethnicity is unknown or is not listed among the codes. CPSC staff is concerned that this causes confounding of the ‘others’ and ‘unknowns’ and

<sup>29</sup> Population estimates obtained from U.S. Census Bureau annual resident population estimates by age for the years 2016 – 2018. Estimates can be found at <https://www.census.gov/data/datasets/time-series/demo/pepest/2010s-national-detail.html>.

<sup>30</sup> Population estimates obtained from U.S. Census Bureau annual resident population estimates by race for the years 2016 – 2018. Estimates can be found at <https://www.census.gov/data/datasets/time-series/demo/pepest/2010s-national-detail.html>.

would cause estimates to be unreliable. For this reason, staff decided not to include estimates of fire deaths and injuries by Hispanic/Non-Hispanic origin.

## **Methodology**

The Methodology section is divided into three major sections. Section 1 describes the data from which fire loss estimates were derived. Section 2 describes the procedures for preparing the data and dealing with missing data. Section 3 describes how the fire loss estimates were made.

### **Data**

#### *Sources of Data for Fire Loss Estimates*

The estimates in this report are based on the National Fire Protection Association’s (NFPA) Survey of Fire Departments and the U.S. Fire Administration’s (USFA) National Fire Incident Reporting System (NFIRS) data.

The NFPA survey is a stratified random sample of fire departments in the United States.<sup>31</sup> The sample is stratified by the size of the community protected. The NFPA makes national estimates of aggregated fires, deaths, injuries, and property loss, by weighting sample results according to the proportion of the total U.S. population accounted for by communities of each size. The table below shows the NFPA estimates of residential structure fires and the associated losses for 2016 through 2018.

**Table 8. NFPA Estimates of Residential Structure Fires and Associated Losses 2016–2018**

	<b>2016</b>	<b>2017</b>	<b>2018</b>
<b>Structure Fires</b>	371,500	379,000	387,000
<b>Civilian Deaths</b>	2,800	2,710	2,820
<b>Civilian Injuries</b>	11,125	10,910	11,600
<b>Property Loss</b>	\$7.42 billion	\$7.90 billion	\$8.29 billion

Source: See first footnote below.

The table above contains the only data from the NFPA survey that CPSC staff use to make fire loss estimates.

NFIRS compiles incident reports submitted voluntarily to the U.S. Fire Administration (USFA) by U.S. fire departments. Thus, NFIRS is not a probability sample and is insufficient to support precision estimation. The reports come from all 50 states, the District of Columbia, and U.S. territories in each of 2016, 2017, and 2018. Not all the states reporting included data from every fire department in the state. The number of fire departments participating in NFIRS decreased from 23,120 in 2016 to 22,823 in 2017. The number of participating fire departments increased back up to a new high of 23,206 in 2018. Table 9 shows the number of residential structure fires and the corresponding losses reported to USFA from 2016 through 2018.

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<sup>31</sup> Hylton Haynes, “Fire Loss in the U.S. During 2014,” National Fire Protection Association (NFPA), September 2015; Hylton Haynes, “Fire Loss in the U.S. During 2015,” National Fire Protection Association (NFPA), September 2016; Ben Evarts, “Fire Loss in the U.S. During 2016,” National Fire Protection Association (NFPA), September 2017.

**Table 9. Residential Structure Fires and Associated Losses Reported to NFIRS 2016–2018**

	<b>2016</b>	<b>2017</b>	<b>2018</b>
<b>Structure Fires</b>	270,186	262,847	266,613
<b>Civilian Deaths</b>	1,607	1,590	1,628
<b>Civilian Injuries</b>	6,595	6,422	6,739
<b>Property Loss</b>	\$4.87 billion	\$4.80 billion	\$4.85 billion

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA.

According to NFPA, there was an estimated annual average of 379,200 residential structure fires in the United States during 2016 to 2018, and an annual average of 2,780 deaths, 11,210 injuries, and \$7.9 billion in property losses. NFIRS captured about 70 percent of these fires, 58 percent of the deaths, 59 percent of the injuries, and 61 percent of the property losses (Table 7).

### *NFIRS Variables*

The NFIRS version 5.0 coding system includes many variables, but CPSC staff used only a few for this report. The list of variables CPSC staff used for this report is shown below:

<u>Variable</u>	<u>Description</u>
<i>Civilian Deaths</i>	Number of people who died in connection with the fire Incident other than fire service personnel.
<i>Civilian Injuries</i>	Number of people who were injured (but did not die) in connection with the fire incident, other than fire service personnel.
<i>Property Loss</i>	Estimate of loss, in whole dollars, if structure sustained damage from flame, smoke, or suppression efforts. Property loss is not adjusted for inflation.
<i>Contents Loss</i>	Estimate of loss, in whole dollars for contents (which had value) that sustained damage from flame, smoke, suppression efforts, or otherwise. Content losses are not adjusted for inflation.
<i>Property Use</i>	Refers to the specific use of the property where the incident occurred. For residential structure fires, the properties that were deemed appropriate were single/multifamily dwellings, any type of boarding houses, dormitories, sorority/fraternity houses, hotels/motels, and mobile property not in transit.

<i>Incident Type</i>	Identifies the various types of incidents to which fire departments respond. It may include fires, rescue and emergency medical services, false alarms. For this report, the incident codes of interest included structure fires (which include confined fires) and fires in mobile and portable structures used as fixed residences.
<i>Equipment Involved</i>	Device that provided the heat that started the fire (e.g., heater, clothes dryer).
<i>Power Source</i>	The type of power for the equipment involved in the fire's ignition. These are grouped into electrical, gas-fueled, liquid-fueled, solid-fueled, and other.
<i>Equipment Portability</i>	Identifies the equipment involved as stationary or portable.
<i>Heat Source</i>	Source of heat that ignited the fire (e.g., candle, lighter, cigarette, heat from operating equipment, hot object).
<i>Item First Ignited</i>	The functional description or use of the item that was first ignited by the heat source (e.g., upholstered furniture, mattress, bedding, electric cable insulation, curtains or drapes).
<i>Cause of Ignition</i>	<p>The general causal factor that resulted in a heat source igniting a combustible material. The cause code values are:</p> <ul style="list-style-type: none"> <li>1: intentional</li> <li>2: unintentional</li> <li>3: failure of equipment or heat source</li> <li>4: act of nature</li> <li>5: cause under investigation</li> <li>0: cause, other</li> <li>U: cause undetermined after investigation.</li> </ul> <p>CPSC staff regrouped the codes as:</p> <ul style="list-style-type: none"> <li>1: intentional</li> <li>0, 2, 3, 4 or fire involving child play: unintentional</li> <li>5, U, missing information: unknown.</li> </ul>
<i>Age</i>	The age of the civilian fire casualty.



*Race*

The race of the civilian fire casualty. The race code values are:

- 1: White
- 2: Black
- 3: American Indian, Eskimo, or Aleut
- 4: Asian
- 0: Other, includes multi-racial
- U: Race undetermined

The NFIRS coding manual defines some variables as “required fields.” A “required field” means that, if known, a value must be supplied for that variable. Other variables may or may not be supplied at the discretion of the reporting department. In the list above, the categories Equipment Involved, Power Source, and Equipment Portability are not required fields. Variables that are not required are more likely to be missing from a given fire incident report in NFIRS than those that are required.<sup>32</sup>

### **Data Preparation—Addressing Different Types of Missing Data**

There are four general types of missing data in NFIRS: (1) data where the value of the missing variable can be inferred logically; (2) missing data from exposure fires; (3) missing data from confined fires; and (4) other missing data. Standard practice, in analysis of fire data over the last 20 years, has been to fill in the missing values whenever possible.

#### *Missing data that can be logically inferred*

As mentioned, only a few of the available fire incident characteristics were used to generate estimates in this report. Of these, only the variables Incident Type, Property Use, Cause of Ignition, Item First Ignited, Heat Source, and the Loss<sup>33</sup> variables are required to be filled out by the fire departments. Even fewer are required for confined fires, which will be discussed below. Tables 1, 3, 4, and 5 in this report rely heavily on the variables Equipment Involved and Equipment Power Source. To reduce the extent of missing data, CPSC staff has implemented some conventions, as necessary, after consulting with USFA technical staff. For example, if the heat source is known to be matches, lighters, or candles, and no equipment is reported, CPSC staff concludes that equipment was not involved, rather than equipment being unknown. Similarly, if the factor contributing to the ignition of a fire is reported to be an act of nature—such as an earthquake or a storm—and no equipment is reported, CPSC staff concludes that no equipment was involved.

In another scenario, the reported equipment code is electrical, but the Equipment Power Source is missing. The power source in this scenario should have been reported as electrical. Similarly, when known that no electrical equipment is involved, the power source should be reported as “none,” instead of “unknown.”

These edits are made before any other steps in data preparation.

#### *Exposure fires*

Some fires involved more than one residential structure. The initial structure is identified as “exposure zero” in the data file. Structure fires that spread from the initial fire are identified as “exposure fires” and

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<sup>32</sup> NFIRS Complete Reference Guide, January 2015.

<sup>33</sup> These are property loss and content loss which CPSC staff add together for what they call property loss.

are numbered from “zero,” up to as many structures as necessary. Typically, in exposure fires, most of the information on the variables listed above is not filled out for exposures beyond the initial home. Any residential structure exposure fire that originated from a different residential fire or a non-residential structure fire are in-scope for this report.

If the initial fire was a residential structure fire, CPSC staff transferred the fire cause values, such as Cause of Ignition, Equipment Involved, or Heat Source, from the initial fire to the exposure fire. For example, if a portable heater caused the initial fire, all exposures would be considered portable heater fires. All associated deaths, injuries, and property losses in these exposures also would be attributed to portable heaters.

If the initial fire is not a residential structure fire, but the exposure fire is a residential structure fire, then the cause information is not passed down from the initial fire. For example, if a wildfire is started by a cigarette, and then the fire spreads to homes, the wildfire would not count as a residential structure fire, but the exposure home fires would. The cigarette as the heat source would not be passed on to the home fires in this case. The cause information for the exposure home fires would be left as is.

### *Confined fires*

NFIRS’s defines a fire that is confined to a noncombustible container causing no flame damage beyond the container to be a confined fire. By far, the largest proportion of missing data was encountered among the confined fires.

In NFIRS version 5.0, the following Incident Type codes are used to identify the different types of confined fires.

<i>Incident Type Code</i>	<i>Definition</i>
113	Fire involving the contents of a cooking vessel without fire extension beyond the vessel.
114	Fire originating in and confined to a chimney or flue.
115	Fire caused by overload or malfunction of an incinerator, with no flame damage outside the incinerator.
116	Fire caused by delayed ignition or malfunction of a fuel or oil burner/boiler, with no flame damage outside the box.
117	Fire originating in and confined to contents of a trash compactor. Home trash compactors are excluded.
118	Fire involving a trash or rubbish fire in a structure with no flame damage to structure or its contents.

With the proportion of reported confined fires increasing, the proportion of missing data also increases. However, imputation of unknowns based on the information from confined fires is not a viable option. CPSC staff’s imputation of unknown data assumes that the unknown data will be like the known. It is unwise to assume that confined fires will be like non-confined fires because they are inherently different. From the definition of the Incident Type of confined fires, it is unclear whether they are at all similar to

the rest of the fires by Equipment Involved in Ignition, the Equipmt Power Source, Heat Source, or Item First Ignited. As such, CPSC staff separates all confined fires from the data before the product-specific estimates are derived.

The confined fire and fire loss counts were weighted up to the NFPA estimates, using the same weights as the rest of the data and presented at the aggregate levels (and sometimes at more specific levels as allowed by the Incident Type definitions). See the section on Estimation Procedure below for a discussion of the weights used. Tables 10a through 10c present all estimates related to confined fires. These estimates are also included in Tables 1a through 5d, as appropriate. Note that they do not appear in Tables 4a through 5d at any of the specific levels because there is no information available on Equipment Power Source.

**Table 10a. Estimated Residential Confined Fires: 2016–2018**

<b>Included in Table Categories:</b>	<b>Appear in Tables:</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
<b>Total Residential</b>	1a, 2a, 3a, 4a, 5a	181,000	190,000	191,600
<b>Total Heating and Cooling Equipment</b>	1a, 3a	22,200	21,700	22,500
<i>Fireplace, Chimney, Connector</i>	<i>1a, 3a</i>	<i>14,500</i>	<i>14,000</i>	<i>14,400</i>
<i>Other (Burner/Boiler)</i>	<i>1a, 3a</i>	<i>7,700</i>	<i>7,700</i>	<i>8,100</i>
<b>Cooking</b>	1a, 2a	139,600	146,500	147,300
<b>Trash, Rubbish</b>	2a	17,900	20,300	20,500
<b>Incinerator</b>	-	500	500	500
<b>Trash Compactor</b>	-	800	900	800

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Fire estimates are rounded to nearest 100. Rounded estimates less than 100 are denoted by an asterisk (\*).

Subtotals do not necessarily add to heading totals. No information was available on the intentionality of these fires.

There were no confined fire deaths in 2016, 2017, or 2018.

**Table 10b. Estimated Residential Confined Fire Injuries: 2016–2018**

<b>Included in Table Categories:</b>	<b>Appear in Tables:</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
<b>Total Residential</b>	1c, 2c, 3c, 4c, 5c	1,410	1,320	1,240
<b>Total Heating and Cooling Equipment</b>	1c, 3c	30	40	30
<i>Fireplace, Chimney, Connector</i>	<i>1c, 3c</i>	<i>20</i>	<i>10</i>	<i>10</i>
<i>Other (Burner/Boiler)</i>	<i>1c, 3c</i>	<i>10</i>	<i>30</i>	<i>20</i>
<b>Cooking</b>	1c, 2c	1,330	1,230	1,140
<b>Trash, Rubbish</b>	2c	50	40	60
<b>Incinerator</b>	-	*	10	*
<b>Trash Compactor</b>	-	*	*	*

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Injury estimates rounded to nearest 10. Rounded estimates less than 10 are denoted by an asterisk (\*).

Subtotals do not necessarily add to heading totals. No information was available on the intentionality of these fires.

**Table 10c. Estimated Residential Confined Fire Property Loss (In Millions): 2016–2018**

Included in Table Categories:	Appear in Tables:	2016	2017	2018
<b>Total Residential</b>	1d, 2d, 3d, 4d, 5d	\$42.1	\$47.2	\$50.0
<b>Total Heating and Cooling Equipment</b>	1d, 3d	\$7.9	\$8.1	\$8.2
<i>Fireplace, Chimney, Connector</i>	<i>1d, 3d</i>	<i>\$6.0</i>	<i>\$4.5</i>	<i>\$5.8</i>
<i>Other (Burner/Boiler)</i>	<i>1d, 3d</i>	<i>\$1.9</i>	<i>\$3.5</i>	<i>\$2.4</i>
<b>Cooking</b>	1d, 2d	\$31.0	\$34.2	\$34.9
<b>Trash, Rubbish</b>	2d	\$2.6	\$4.5	\$5.9
<b>Incinerator</b>	-	\$0.4	\$0.3	\$0.9
<b>Trash Compactor</b>	-	\$0.1	\$0.1	\$0.1

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA.

Note: Property loss estimates are rounded to the nearest tenth of a million dollars. Rounded estimates less than \$0.1m are denoted by an asterisk (\*). Subtotals do not necessarily add to heading totals. No information was available on the intentionality of these fires.

#### *Other missing data*

Tables 11a–11c show the proportion of data missing after inferring missing data when appropriate. Because most of the data fields for confined fires were not reported, those data fields were excluded from the tabulations.

**Table 11a. Missing Data on Residential Structure Fires: 2016–2018**

	2016	2017	2018
<b>Cause of Ignition</b>	34%	36%	36%
<b>Heat Source</b>	40%	41%	41%
<b>Item First Ignited</b>	41%	41%	42%
<b>Equipment Involved</b>	43%	48%	48%
<b>Equipment Power</b>	43%	47%	48%

Source: U.S. Consumer Product Safety Commission/EPHA, from NFIRS data obtained from the USFA. Table excludes confined fires.

**Table 11b. Missing Data on Residential Structure Fire Deaths: 2016–2018**

	2016	2017	2018
<b>Cause of Ignition</b>	59%	61%	65%
<b>Heat Source</b>	63%	66%	67%
<b>Item First Ignited</b>	63%	67%	67%
<b>Equipment Involved</b>	51%	55%	56%
<b>Equipment Power</b>	51%	56%	55%
<b>Race</b>	38%	39%	41%

Source: U.S. Consumer Product Safety Commission/EPHA, from NFIRS data obtained from the USFA.

**Table 11c. Missing Data on Residential Structure Fire Injuries: 2016–2018**

	<b>2016</b>	<b>2017</b>	<b>2018</b>
<b>Cause of Ignition</b>	39%	42%	42%
<b>Heat Source</b>	39%	41%	41%
<b>Item First Ignited</b>	36%	39%	40%
<b>Equipment Involved</b>	35%	37%	37%
<b>Equipment Power</b>	34%	38%	37%
<b>Race</b>	50%	51%	50%

Source: U.S. Consumer Product Safety Commission/EPHA, from NFIRS data obtained from the USFA. Table excludes injuries from confined fires.

For these data, an assumption was made that the unknown values for a characteristic had the same distribution as the known values for that characteristic. To allocate these unknowns for the various characteristics, “raking” was performed using a SAS<sup>®</sup> macro.<sup>34</sup> The raking procedure maintains the marginal distributions for the known data, while allocating the unknown data for all characteristics involved.<sup>35</sup> For each year, the raking procedure was applied separately for fires, deaths, injuries, and property loss.

For the CPSC staff estimates going back to 1980 all the way up to 2014, one raking procedure was applied separately for each year for each of the tables 1–5 (a–d). For 2015 and subsequent years, CPSC staff decided to make a change. Instead of using just one raking per table, CPSC staff now does a raking for each product. For example, for the Table 2b estimate for 2018 candle fire deaths, the raking only includes two variables: Cause of Ignition (Intentional or Unintentional) and Heat Source (“candle” or “not candle”). From this raking, an estimate for 2018 candle fire deaths is produced. Such rakings are done for each row in each table<sup>36</sup>.

Because some of the NFIRS information for victim age and victim race was missing/unknown (although victim age is rarely missing or unknown), the raking procedure was used to allocate the unknowns in order to produce age and race estimates. The raking procedure was performed separately for age and race, separately for deaths and injuries, and separately for each of years 2016, 2017, and 2018. For example, it was used to allocate unknown victim ages to produce an estimate for 2016 deaths by age. Subsequently, it was repeated to estimate 2016 injuries by age, and so on.

<sup>34</sup> M. Battaglia, D. Hoaglin and D. Izrael, “To Rake or Not To Rake Is Not the Question Anymore with the Enhanced Raking Macro,” SAS<sup>®</sup> Users Group International (SUGI) 29<sup>th</sup> Annual Conference, May 9–12, 2004, Paper #207-29.

<sup>35</sup> M.A. Greene, L.E. Smith, M.S. Levenson, S. Hiser, and J.H. Mah, “Raking Fire Data,” Presented at the Federal Conference on Statistical Methodology, Arlington, VA, 2001.

<sup>36</sup> The exceptions to the one raking procedure per estimate rule are with the ‘Upholstered Furniture’ and ‘Mattress, Bedding’ estimates in Tables 2 (a-d). For those estimates, one run of the raking procedure produces all three of the ‘Smoking Material Ignition’, ‘Open-Flame Ignition’ and ‘Other’ estimates for a given year. And those three estimates are summed to get the total.