



United States

Consumer Product Safety Commission

2017 – 2019 Residential Fire Loss Estimates

U.S. National Estimates of Fires, Deaths, Injuries, and Property Loss from Unintentional Fires

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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 2017 through 2019.

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

- 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;
- 346,800 fires, 2,490 deaths, 11,760 injuries, and \$7.38 billion in property losses in 2019; and
- an estimated annual average of 360,300 fires, 2,390 deaths, 10,860 injuries, and \$7.34 billion in property losses over the 3-year period from 2017 through 2019.

Consumer products involved in fires can be categorized by “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 165,600 cooking equipment-related fires from 2017 through 2019 accounted for 46.0 percent of the average annual estimate of total residential fires for the same period. The corresponding death estimates constitute an annual average of 210 deaths, which is 8.9 percent of the average annual estimate of total residential fire deaths. The annual average number of cooking fire injuries for 2017 through 2019 was estimated to be 3,180, which represents 29.3 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 40,100 fires for 2017 to 2019 was 11.1 percent of the annual average estimate of total residential fires during the same period. The corresponding death estimate is an annual average of 190 deaths, which is 8.0 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 900. This accounts for 8.3 percent of the annual average estimate of total injuries during 2017 to 2019.
- An estimated annual average of 17,700 fires was attributable to electrical distribution equipment (e.g., installed wiring, lighting). This is 4.9 percent of the estimated annual average number of residential fires for this period. The annual average death estimate is 160 (6.5 percent of average annual estimated residential fire deaths); and the injury estimates averaged 620, which is 5.7 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 2017 through 2019, an estimated annual average of 390 deaths was associated with these fires. This constitutes 16.3 percent of the estimated annual average of total deaths (from an estimated 1.1 percent of the fires) associated with residential structure fires for the same period. During 2017 to 2019, mattress or bedding ignitions accounted for an annual average of 310 deaths, which is 13.0 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 it increased to 400 for 2018, and again to 480 for 2019.

For Heat Source, smoking materials were the largest contributor to deaths, associated with an annual average of 550 deaths from 2017 to 2019. This is 23.0 percent of the estimated annual average of total residential fire deaths. Smoking materials as the heat source in fires, however, comprised only 2.9 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 110, which is 4.5 percent of the average estimated total number of residential fire deaths from 2017 to 2019. Candles account for an estimated 1.6 percent of the fires.

There were also an estimated 50 deaths from cigarette lighter fires (2.0 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 0.7 percent of total deaths annually. Matches were involved in an estimated 0.1 percent of residential fires.

There was a large decrease in the estimates of total residential fires from 2018 to 2019 - from an estimate of residential fires of 371,600 in 2018, to 346,800 in 2019; a decrease of 6.7%. This was after a smaller increase from 362,600 in 2017 to 371,600 in 2018; an increase of 2.5 percent.

There was an increase in the residential death and injury estimates from 2017 to 2019. The total residential death estimate rose from 2,230 in 2017, to 2,460 in 2018, to 2,490 in 2019. This is an overall increase of 11.5%. The total residential injury estimate grew from 10,060 in 2017, to 10,740 in 2018, to 11,760 in 2019. This is an overall increase of 16.9%.

By age of fire death victim, older people are the most likely age group to die from fires. The fire death rate, for 2017–2019, for people between the ages of 65 and 74 is 1.6 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 aged 75 and over (2.4 per hundred thousand) is more than three times the overall rate.

By race of fire death victim, Black Americans have the highest rate of fire deaths (1.2 per hundred thousand population), nearly twice the overall rate of 0.7 per hundred thousand. For fire injuries, Black Americans also have the highest rate – 5.9 per hundred thousand, which is more than twice the overall rate (2.9 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 estimates¹ 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 civilian² casualties only. The property losses include property and content losses, as estimated by fire departments. In this report, for convenience, property and content losses combined 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 2017, 2018, and 2019 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 2019, 49 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

¹ 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.

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

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 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 second 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 2017 through 2019, 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, 2017 – 2019

Equipment	2017	2018	2019	2017 – 2019 Avg.
Total Residential³	362,600	371,600	346,800	360,300
Total Heating and Cooling Equipment³	39,600	42,200	38,400	40,100
Local Fixed Heater	4,800	5,200	4,900	5,000
Portable Heater	1,500	2,000	1,600	1,700
Central Heating	800	1,000	800	900
Fireplace, Chimney, Chimney Connector ³	15,900	16,200	15,500	15,800
Water Heater	1,600	1,500	1,300	1,500
Air Conditioning	1,400	1,600	1,300	1,400
Other ³	13,600	14,800	12,900	13,800
Total Cooking Equipment³	170,400	170,100	156,300	165,600
Range/Oven	16,200	15,400	14,000	15,200
<i>Gas</i>	2,300	2,000	2,000	2,100
<i>Electric</i>	13,700	13,300	11,900	13,000
<i>Other</i>	200	*	*	100
Microwave Oven	800	800	800	800
All Other Cooking	4,900	4,800	4,500	4,700
<i>Gas</i>	1,300	1,300	1,100	1,200
<i>Electric</i>	3,200	3,000	2,900	3,000
<i>Other</i>	400	500	500	500
Total Electrical Distribution	18,100	18,100	16,800	17,700
Installed Wiring	8,200	8,000	7,500	7,900
Cord, Plug	1,700	1,700	1,500	1,600
Receptacle, Switch	2,300	2,400	2,100	2,300
Lighting	2,300	2,300	2,000	2,200
Other	3,500	3,600	3,600	3,600
Other Selected Equipment	10,700	10,300	9,200	10,100
Audio/Visual Equipment	400	300	300	300
Clothes Dryer	6,900	6,500	5,800	6,400
Dishwasher	600	500	400	500
Washing Machine	400	400	400	400
Torch	700	600	500	600
Refrigerator/Freezer	800	800	700	800
Shop/Garden Tool	1,000	1,100	1,000	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.

³ 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. 36 for details.

TABLE 1b
ESTIMATED RESIDENTIAL STRUCTURE FIRE DEATHS
SELECTED EQUIPMENT

Equipment	2017	2018	2019	2017–2019 Avg.
Total Residential	2,230	2,460	2,490	2,390
Total Heating and Cooling Equipment	230	170	170	190
Local Fixed Heater	80	30	90	60
Portable Heater	60	70	60	70
Central Heating	*	*	*	*
Fireplace, Chimney, Chimney Connector	30	20	*	20
Water Heater	10	10	*	10
Air Conditioning	20	20	*	10
Other	40	20	10	20
Total Cooking Equipment	250	210	180	210
Range/Oven	190	140	150	160
<i>Gas</i>	40	10	30	20
<i>Electric</i>	160	130	120	140
<i>Other</i>	*	*	*	*
Microwave Oven	*	10	*	*
All Other Cooking	20	40	10	20
<i>Gas</i>	10	*	*	*
<i>Electric</i>	10	30	10	20
<i>Other</i>	*	10	*	*
Total Electrical Distribution	180	170	120	160
Installed Wiring	60	60	20	50
Cord, Plug	70	60	50	60
Receptacle, Switch	*	10	10	10
Lighting	*	10	*	10
Other	40	30	30	30
Other Selected Equipment	20	30	10	20
Audio/Visual Equipment	10	*	*	*
Clothes Dryer	*	*	*	*
Dishwasher	*	*	*	*
Washing Machine	*	*	*	*
Torch	*	10	*	10
Refrigerator/Freezer	*	20	*	10
Shop/Garden Tool	*	*	10	10

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

TABLE 1c
ESTIMATED RESIDENTIAL STRUCTURE FIRE INJURIES
SELECTED EQUIPMENT, 2017 – 2019

Equipment	2017	2018	2019	2017 – 2019 Avg.
Total Residential⁴	10,060	10,740	11,760	10,860
Total Heating and Cooling Equipment⁵	820	860	1,010	900
Local Fixed Heater	350	290	420	350
Portable Heater	140	190	160	160
Central Heating	20	30	30	30
Fireplace, Chimney, Chimney Connector ⁵	40	50	50	50
Water Heater	60	50	40	50
Air Conditioning	60	70	80	70
Other ³	150	180	240	190
Total Cooking Equipment⁵	3,150	3,090	3,300	3,180
Range/Oven	1,460	1,420	1,400	1,430
<i>Gas</i>	160	160	140	150
<i>Electric</i>	1,290	1,260	1,260	1,270
<i>Other</i>	10	*	*	10
Microwave Oven	70	50	40	50
All Other Cooking	290	320	310	310
<i>Gas</i>	60	60	70	60
<i>Electric</i>	210	230	220	220
<i>Other</i>	20	30	10	20
Total Electrical Distribution	510	640	700	620
Installed Wiring	200	170	250	210
Cord, Plug	80	90	150	110
Receptacle, Switch	40	100	80	80
Lighting	50	60	70	60
Other	140	230	150	170
Other Selected Equipment	340	360	350	350
Audio/Visual Equipment	20	*	40	20
Clothes Dryer	180	190	160	180
Dishwasher	10	10	10	10
Washing Machine	10	10	10	10
Torch	50	20	30	40
Refrigerator/Freezer	20	90	60	60
Shop/Garden Tool	40	40	20	30

Source: U.S. Consumer Product Safety Commission/EPHA, from data obtained from the USFA and NFPA. Note: Fire injury estimates are rounded to the nearest 10. Rounded estimates of fewer than 10 injuries are denoted by an asterisk (*). Subtotals do not necessarily add to heading totals. Estimates exclude intentionally set fires.

⁴ 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 injury 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 10b on p. 37 for details.

TABLE 1d
ESTIMATED RESIDENTIAL STRUCTURE FIRE PROPERTY LOSS
(In \$Millions⁵) SELECTED EQUIPMENT, 2017 – 2019

Equipment	2017	2018	2019	2017 – 2019 Avg.
Total Residential⁶	\$7,074.0	\$7,559.3	\$7,377.3	\$7,336.9
Total Heating and Cooling Equipment⁵	\$539.8	\$648.2	\$549.8	\$579.3
Local Fixed Heater	\$123.2	\$124.3	\$131.3	\$126.3
Portable Heater	\$44.4	\$79.2	\$52.8	\$58.8
Central Heating	\$23.1	\$37.9	\$18.7	\$26.5
Fireplace, Chimney, Chimney Connector ⁵	\$110.9	\$114.0	\$117.2	\$114.1
Water Heater	\$33.0	\$32.1	\$22.3	\$29.1
Air Conditioning	\$67.3	\$77.0	\$62.8	\$69.0
Other ³	\$137.9	\$183.7	\$144.8	\$155.5
Total Cooking Equipment⁵	\$600.7	\$618.9	\$595.0	\$604.9
Range/Oven	\$327.9	\$334.9	\$303.4	\$322.0
Gas	\$42.1	\$35.2	\$47.5	\$41.6
Electric	\$282.8	\$298.5	\$252.6	\$277.9
Other	\$3.0	\$1.2	\$3.3	\$2.5
Microwave Oven	\$11.7	\$18.5	\$19.2	\$16.5
All Other Cooking	\$157.7	\$163.6	\$155.0	\$158.8
Gas	\$55.7	\$56.4	\$55.3	\$55.8
Electric	\$85.7	\$89.0	\$78.4	\$84.4
Other	\$16.3	\$18.2	\$21.3	\$18.6
Total Electrical Distribution	\$697.8	\$572.8	\$666.0	\$645.6
Installed Wiring	\$234.3	\$265.4	\$265.4	\$255.0
Cord, Plug	\$53.3	\$50.0	\$54.4	\$52.6
Receptacle, Switch	\$59.3	\$53.4	\$56.4	\$56.4
Lighting	\$71.0	\$61.3	\$54.9	\$62.4
Other	\$280.0	\$142.7	\$234.9	\$219.2
Other Selected Equipment	\$317.8	\$232.0	\$220.5	\$256.7
Audio/Visual Equipment	\$8.3	\$8.2	\$8.2	\$8.2
Clothes Dryer	\$123.2	\$106.9	\$85.9	\$105.3
Dishwasher	\$17.0	\$14.2	\$8.8	\$13.3
Washing Machine	\$4.6	\$2.0	\$7.0	\$4.6
Torch	\$88.4	\$35.8	\$20.9	\$48.4
Refrigerator/Freezer	\$33.5	\$37.4	\$41.0	\$37.3
Shop/Garden Tool	\$42.8	\$62.9	\$48.7	\$51.5

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 intentionally set fires.

⁵ Dollar values are not adjusted for inflation in this table or for any of the property loss estimates in the report.

⁶ 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 property loss estimates could not be included in the detail lines as NFIRS does not provide information to determine the type of equipment and power source. See Table 10c on p. 37 for details.

TABLE 2a
ESTIMATED RESIDENTIAL STRUCTURE FIRES
SELECTED PRODUCTS, 2017 – 2019

Product	2017	2018	2019	2017–2019 Avg.
Total Residential⁷	362,600	371,600	346,800	360,300
By Heat Source				
Cigarette, Other Tobacco Products	10,800	10,600	9,600	10,300
Candle	5,600	5,600	5,700	5,600
Lighter	1,600	1,500	1,300	1,500
Match	400	300	300	300
By Item First Ignited				
Upholstered Furniture	4,000	4,400	3,800	4,100
Smoking Material Ignition	900	1,000	800	900
Open-Flame Ignition	500	500	500	500
Other ⁸	2,600	2,800	2,500	2,600
Mattress, Bedding	6,500	7,000	6,500	6,700
Smoking Material Ignition	1,400	1,400	1,300	1,400
Open-Flame Ignition	1,100	1,200	1,100	1,100
Other ⁹	4,000	4,300	4,100	4,100
Other Materials				
Cooking Materials ⁷	166,100	167,300	153,900	162,400
Electric Cable Insulation	17,100	18,500	17,800	17,800
Interior Wall Covering	5,800	5,900	5,400	5,700
Wearing Apparel-Worn	300	300	200	300
Wearing Apparel-Not Worn	4,400	4,600	4,100	4,400
Floor Covering	3,300	3,300	3,100	3,200
Curtains, Drapes	1,100	1,000	1,100	1,100
Magazines, Newspaper	1,400	1,500	1,300	1,400
Thermal Insulation	5,200	5,700	5,000	5,300
Cabinet, Desk	4,300	4,500	4,300	4,400
Trash, Rubbish ⁷	25,300	25,400	25,200	25,300
Toy, Game	300	300	300	300
Box, Carton, Bag, Basket, Barrel	2,900	3,200	3,200	3,100

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

⁷ 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. 36 for details.

⁸ 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, 2017 – 2019

Product	2017	2018	2019	2017–2019 Avg.
Total Residential	2,230	2,460	2,490	2,390
By Heat Source				
Cigarette, Other Tobacco Products	550	600	500	550
Candle	110	70	150	110
Lighter	30	40	70	50
Match	40	10	*	20
By Item First Ignited				
Upholstered Furniture	290	400	480	390
Smoking Material Ignition	130	210	140	160
Open-Flame Ignition	20	10	60	30
Other	140	190	280	200
Mattress, Bedding	340	310	290	310
Smoking Material Ignition	180	170	140	160
Open-Flame Ignition	30	30	10	30
Other	120	110	140	120
Other Materials				
Cooking Materials	200	150	140	160
Electric Cable Insulation	100	150	60	110
Interior Wall Covering	80	70	80	80
Wearing Apparel-Worn	90	90	100	100
Wearing Apparel-Not Worn	50	60	30	50
Floor Covering	50	60	40	50
Curtains, Drapes	20	20	10	10
Magazines, Newspaper	50	40	40	40
Thermal Insulation	10	20	10	10
Cabinet, Desk	40	80	30	50
Trash, Rubbish	70	50	80	60
Toy, Game	10	*	*	*
Box, Carton, Bag, Basket, Barrel	20	20	50	30

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

TABLE 2c
ESTIMATED RESIDENTIAL STRUCTURE FIRE INJURIES
SELECTED PRODUCTS, 2017 – 2019

Product	2017	2018	2019	2017–2019 Avg.
Total Residential⁹	10,060	10,740	11,760	10,860
By Heat Source				
Cigarette, Other Tobacco Products	880	880	910	890
Candle	470	510	660	550
Lighter	240	280	260	260
Match	50	40	30	40
By Item First Ignited				
Upholstered Furniture	490	600	580	550
Smoking Material Ignition	130	180	150	150
Open-Flame Ignition	90	80	110	90
Other	270	340	310	310
Mattress, Bedding	950	940	910	930
Smoking Material Ignition	340	220	250	270
Open-Flame Ignition	160	260	190	200
Other	450	460	480	460
Other Materials				
Cooking Materials ⁹	3,210	3,220	3,660	3,360
Electric Cable Insulation	360	490	550	470
Interior Wall Covering	190	190	200	190
Wearing Apparel-Worn	90	110	80	90
Wearing Apparel-Not Worn	240	210	240	230
Floor Covering	150	190	170	170
Curtains, Drapes	50	60	130	80
Magazines, Newspaper	100	120	130	120
Thermal Insulation	80	60	60	70
Cabinet, Desk	270	310	420	330
Trash, Rubbish ⁹	210	290	280	260
Toy, Game	20	*	10	10
Box, Carton, Bag, Basket, Barrel	110	110	140	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.

⁹ 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. 37 for details.

TABLE 2d
ESTIMATED RESIDENTIAL STRUCTURE FIRE PROPERTY LOSS
(In \$Millions) SELECTED PRODUCTS, 2017 – 2019

Product	2017	2018	2019	2017-2019 Avg.
Total Residential¹⁰	\$7,074.0	\$7,559.3	\$7,377.3	\$7,336.9
By Heat Source				
Cigarette, Other Tobacco Products	\$421.3	\$425.4	\$414.7	\$420.5
Candle	\$227.9	\$254.7	\$278.2	\$253.6
Lighter	\$93.6	\$102.4	\$58.1	\$84.7
Match	\$22.7	\$16.2	\$14.6	\$17.8
By Item First Ignited				
Upholstered Furniture	\$202.6	\$247.5	\$223.1	\$224.4
Smoking Material Ignition	\$48.2	\$60.5	\$32.3	\$47.0
Open-Flame Ignition	\$39.1	\$21.1	\$35.7	\$32.0
Other	\$115.2	\$166.0	\$155.1	\$145.4
Mattress, Bedding	\$252.7	\$286.0	\$268.1	\$268.9
Smoking Material Ignition	\$52.5	\$42.7	\$51.7	\$48.9
Open-Flame Ignition	\$44.0	\$49.8	\$55.8	\$49.9
Other	\$156.2	\$193.6	\$160.5	\$170.1
Other Materials				
Cooking Materials ¹⁰	\$551.1	\$549.9	\$510.5	\$537.2
Electric Cable Insulation	\$490.7	\$571.1	\$635.9	\$565.9
Interior Wall Covering	\$273.8	\$315.1	\$277.4	\$288.7
Wearing Apparel-Worn	\$7.6	\$8.1	\$4.7	\$6.8
Wearing Apparel-Not Worn	\$111.3	\$105.0	\$114.8	\$110.4
Floor Covering	\$113.8	\$111.1	\$114.9	\$113.2
Curtains, Drapes	\$40.3	\$71.2	\$53.9	\$55.1
Magazines, Newspaper	\$44.7	\$64.2	\$38.6	\$49.2
Thermal Insulation	\$144.0	\$229.4	\$222.6	\$198.6
Cabinet, Desk	\$150.6	\$184.0	\$164.7	\$166.4
Trash, Rubbish ¹⁰	\$359.7	\$196.3	\$173.3	\$243.1
Toy, Game	\$12.5	\$7.0	\$6.2	\$8.6
Box, Carton, Bag, Basket, Barrel	\$98.7	\$127.1	\$128.5	\$118.1

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

¹⁰ There are confined fire property loss estimates included in *Total Residential*, *Cooking Materials*, and *Trash, Rubbish* categories. Estimates for confined cooking fire property loss are included in the *Cooking Materials* fire losses because cooking materials are most likely the item first ignited. See Table 10c on p. 37 for details.

TABLE 3a
ESTIMATED RESIDENTIAL STRUCTURE FIRES
HEATING AND COOLING EQUIPMENT, 2017–2019

Equipment	2017	2018	2019	2017–2019 Avg.
Total Residential¹¹	362,600	371,600	346,800	367,100
Total Heating and Cooling Equipment¹¹	39,600	42,200	38,400	40,900
Solid Fuel	2,200	2,100	2,000	2,100
Fixed Heater	500	500	400	500
Portable Heater	*	*	*	*
Fireplace, Chimney, Chimney Connector	1,600	1,500	1,500	1,600
Central Heating	*	*	*	*
Water Heater	*	*	*	*
Other	*	100	100	*
Gas-Fired	2,600	2,600	2,500	2,600
Fixed Heater	900	900	800	900
Portable Heater	200	200	200	200
Fireplace, Chimney, Chimney Connector	200	200	200	200
Central Heating	300	400	300	400
Water Heater	800	600	600	700
Fixed, Central Air Conditioning	*	*	*	*
Other	200	300	300	200
Electric	12,700	14,500	12,900	13,600
Fixed Heater	3,400	3,600	3,600	3,500
Portable Heater	1,100	1,600	1,300	1,400
Central Heating	400	500	400	400
Water Heater	800	800	800	800
Fixed, Central Air Conditioning	1,000	1,000	1,000	1,000
Portable Air Conditioner	400	500	400	500
Other	5,600	6,400	5,500	6,000
Liquid Fuel	300	300	300	300
Fixed Heater	*	*	*	*
Portable Heater	200	200	100	200
Fireplace, Chimney, Chimney Connector	*	*	*	*
Central Heating	100	100	*	100
Water Heater	*	*	*	*
Other	*	*	*	*
All Other Fuel	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.

¹¹ There are confined fire estimates included in *Total Residential*, and *Total Heating and Cooling Equipment* categories. These confined fire estimates were not included in the detail lines because NFIRS does not provide information to determine the equipment or the power source. See Table 10a on p. 36 for details.

TABLE 3b
ESTIMATED RESIDENTIAL STRUCTURE FIRE DEATHS
HEATING AND COOLING EQUIPMENT, 2017–2019

Equipment	2017	2018	2019	2017–2019 Avg.
Total Residential	2,230	2,460	2,490	2,390
Total Heating and Cooling Equipment	230	170	170	190
Solid Fuel	60	20	30	40
Fixed Heater	50	*	30	30
Portable Heater	*	*	*	*
Fireplace, Chimney, Chimney Connector	10	20	*	10
Central Heating	*	*	*	*
Water Heater	*	*	*	*
Other	*	*	*	*
Gas-Fired	50	30	40	40
Fixed Heater	20	10	30	20
Portable Heater	*	10	10	10
Fireplace, Chimney, Chimney Connector	20	*	*	10
Central Heating	*	*	*	*
Water Heater	*	*	*	*
Fixed, Central Air Conditioning	*	*	*	*
Other	*	10	*	*
Electric	110	120	80	100
Fixed Heater	10	10	20	10
Portable Heater	50	60	50	50
Central Heating	*	*	*	*
Water Heater	*	10	*	*
Fixed, Central Air Conditioning	*	*	*	*
Portable Air Conditioner	10	20	*	10
Other	30	20	10	20
Liquid Fuel	10	*	20	10
Fixed Heater	*	*	20	10
Portable Heater	10	*	*	*
Fireplace, Chimney, Chimney Connector	*	*	*	*
Central Heating	*	*	*	*
Water Heater	*	*	*	*
Other	*	*	*	*
All Other Fuel	*	*	*	*

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.

TABLE 3c
ESTIMATED RESIDENTIAL STRUCTURE FIRE INJURIES
HEATING AND COOLING EQUIPMENT, 2017–2019

Equipment	2017	2018	2019	2017–2019 Avg.
Total Residential¹²	10,060	10,740	11,760	10,860
Total Heating and Cooling Equipment¹²	820	860	1,010	900
Solid Fuel	50	20	60	40
Fixed Heater	20	10	30	20
Portable Heater	*	*	*	*
Fireplace, Chimney, Chimney Connector	20	20	30	20
Central Heating	*	*	*	*
Water Heater	*	*	*	*
Other	*	*	*	*
Gas-Fired	120	150	190	150
Fixed Heater	40	40	100	60
Portable Heater	10	20	10	10
Fireplace, Chimney, Chimney Connector	10	20	10	10
Central Heating	10	10	20	10
Water Heater	40	50	20	40
Fixed, Central Air Conditioning	*	*	*	*
Other	10	10	30	10
Electric	500	630	710	610
Fixed Heater	250	240	290	260
Portable Heater	90	140	140	120
Central Heating	10	10	10	10
Water Heater	10	10	10	10
Fixed, Central Air Conditioning	40	40	30	40
Portable Air Conditioner	20	30	50	30
Other	90	150	180	140
Liquid Fuel	30	30	20	30
Fixed Heater	*	10	*	*
Portable Heater	30	20	10	20
Fireplace, Chimney, Chimney Connector	*	*	*	*
Central Heating	*	*	*	*
Water Heater	*	*	*	*
Other	*	*	*	*
All Other Fuel	*	*	*	*

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.

¹² There are confined fire injury estimates included in *Total Residential*, and *Total Heating and Cooling Equipment* categories. These confined fire injury estimates were not included in the detail lines because NFIRS does not provide information to determine the equipment or the power source of the equipment. See Table 10b on p. 37 for details.

TABLE 3d
ESTIMATED RESIDENTIAL STRUCTURE FIRE PROPERTY LOSS (In \$Millions)
HEATING AND COOLING EQUIPMENT, 2017–2019

Equipment	2017	2018	2019	2017–2019 Avg.
Total Residential¹³	\$7,074.0	\$7,559.3	\$7,377.3	\$7,336.9
Total Heating and Cooling Equipment¹³	\$539.8	\$648.2	\$549.8	\$579.3
Solid Fuel	\$108.4	\$112.1	\$111.0	\$110.5
Fixed Heater	\$25.9	\$26.1	\$19.6	\$23.9
Portable Heater	\$0.3	*	*	\$0.1
Fireplace, Chimney, Chimney Connector	\$78.9	\$83.5	\$88.3	\$83.6
Central Heating	\$1.7	\$0.4	\$1.1	\$1.1
Water Heater	*	*	\$0.1	*
Other	\$1.6	\$2.1	\$1.8	\$1.8
Gas-Fired	\$100.9	\$95.7	\$74.4	\$90.3
Fixed Heater	\$26.8	\$21.7	\$19.4	\$22.6
Portable Heater	\$3.8	\$8.9	\$6.6	\$6.4
Fireplace, Chimney, Chimney Connector	\$25.3	\$22.7	\$18.9	\$22.3
Central Heating	\$8.2	\$16.5	\$10.5	\$11.7
Water Heater	\$22.9	\$17.8	\$11.1	\$17.3
Fixed, Central Air Conditioning	\$0.3	*	*	\$0.1
Other	\$13.4	\$8.0	\$7.8	\$9.7
Electric	\$306.2	\$413.4	\$341.5	\$353.7
Fixed Heater	\$68.2	\$72.0	\$89.4	\$76.5
Portable Heater	\$35.1	\$61.4	\$42.3	\$46.2
Central Heating	\$8.1	\$18.4	\$6.9	\$11.1
Water Heater	\$9.9	\$14.3	\$10.9	\$11.7
Fixed, Central Air Conditioning	\$26.2	\$32.8	\$26.5	\$28.5
Portable Air Conditioner	\$40.2	\$44.2	\$36.2	\$40.2
Other	\$118.6	\$170.3	\$129.3	\$139.4
Liquid Fuel	\$12.0	\$13.4	\$8.6	\$11.3
Fixed Heater	\$1.5	\$1.8	\$1.9	\$1.7
Portable Heater	\$5.0	\$7.5	\$3.9	\$5.4
Fireplace, Chimney, Chimney Connector	\$0.5	\$0.7	\$1.1	\$0.8
Central Heating	\$4.9	\$2.6	\$0.1	\$2.5
Water Heater	*	*	*	*
Other	*	\$0.9	\$1.7	\$0.9
All Other Fuel	\$1.1	\$5.4	\$5.9	\$4.1

¹³ There are confined fire property loss estimates included in *Total Residential*, and *Total Heating and Cooling Equipment* categories. These estimates were not included in the detail lines because NFIRS does not provide information to determine the equipment or its power source. See Table 10c on p. 37 for details.

TABLE 4a
ESTIMATED RESIDENTIAL STRUCTURE FIRES
SELECTED ELECTRICAL EQUIPMENT, 2017–2019

Equipment	2017	2018	2019	2017–2019 Avg.
Total Residential¹⁴	362,600	371,600	346,800	360,300
Total Electrical	61,900	62,900	57,400	60,800
Electric Heating and Cooling	12,700	14,500	12,900	13,400
Central Heating	400	500	400	400
Local Fixed Heater	3,400	3,600	3,600	3,500
Portable Heater	1,100	1,600	1,300	1,300
Water Heater	800	800	800	800
Fixed, Central Air Conditioning	1,000	1,000	1,000	1,000
Portable Air Conditioner	400	500	400	400
Other	5,600	6,400	5,500	5,800
Electric Cooking Equipment	17,700	17,100	15,500	16,800
Range/Oven	13,700	13,300	11,900	13,000
Range/Oven Hood	200	200	200	200
Deep Fat Fryer	100	100	100	100
Grill	*	*	100	*
Microwave Oven	800	800	800	800
Small Heat-Producing Appliance	800	900	800	800
Other	2,000	1,800	1,700	1,800
Electrical Distribution	18,400	18,500	17,100	18,000
Installed Wiring	8,200	8,000	7,500	7,900
Light Fixture	1,600	1,600	1,400	1,500
Receptacle, Switch	2,300	2,400	2,100	2,300
Cord, Plug	1,700	1,700	1,500	1,600
Lamp, Light Bulb	700	700	600	700
Panel Board	700	700	700	700
Meter	500	500	500	500
Transformer	100	100	100	100
Other	2,600	2,700	2,700	2,700
Other Selected Electrical Appliances	7,700	7,300	6,700	7,200
Clothes Dryer	5,100	4,800	4,400	4,800
Dishwasher	600	500	400	500
Audio/Visual Equipment	400	300	300	300
Washing Machine	400	400	400	400
Refrigerator/Freezer	800	800	700	800
Shop/Garden Tools	300	400	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.

¹⁴ There are confined fire estimates included in *Total Residential*. These were not included in the detail lines because NFIRS does not provide information to determine the equipment or power source. See Table 10a on p. 36 for details.

TABLE 4b
ESTIMATED RESIDENTIAL STRUCTURE FIRE DEATHS
SELECTED ELECTRICAL EQUIPMENT, 2017–2019

Equipment	2017	2018	2019	2017–2019 Avg.
Total Residential	2,230	2,460	2,490	2,390
Total Electrical	610	540	440	530
Electric Heating and Cooling	110	120	80	100
Central Heating	*	*	*	*
Local Fixed Heater	10	10	20	10
Portable Heater	50	60	50	50
Water Heater	*	10	*	*
Fixed, Central Air Conditioning	*	*	*	*
Portable Air Conditioner	10	20	*	10
Other	30	20	10	20
Electric Cooking Equipment	170	170	130	160
Range/Oven	160	130	120	140
Range/Oven Hood	*	*	*	*
Deep Fat Fryer	*	*	*	*
Grill	*	*	*	*
Microwave Oven	*	*	*	*
Small Heat-Producing Appliance	10	20	*	10
Other	*	10	*	*
Electrical Distribution	160	170	130	150
Installed Wiring	60	60	20	50
Light Fixture	*	10	*	*
Receptacle, Switch	*	10	10	10
Cord, Plug	70	60	50	60
Lamp, Light Bulb	*	*	*	*
Panel Board	*	*	*	*
Meter	*	*	*	*
Transformer	*	*	*	*
Other	30	20	30	30
Other Selected Electrical Appliances	10	20	*	10
Clothes Dryer	*	*	*	*
Dishwasher	*	*	*	*
Audio/Visual Equipment	10	*	*	*
Washing Machine	*	*	*	*
Refrigerator/Freezer	*	20	*	10
Shop/Garden Tools	*	*	*	*
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.

TABLE 4c
ESTIMATED RESIDENTIAL STRUCTURE FIRE INJURIES
SELECTED ELECTRICAL EQUIPMENT, 2017–2019

Equipment	2017	2018	2019	2017–2019 Avg.
Total Residential¹⁵	10,060	10,740	11,760	10,860
Total Electrical	2,940	3,470	3,430	3,280
Electric Heating and Cooling	500	630	710	610
Central Heating	10	10	10	10
Local Fixed Heater	250	240	290	260
Portable Heater	90	140	140	120
Water Heater	10	10	10	10
Fixed, Central Air Conditioning	40	40	30	40
Portable Air Conditioner	20	30	50	30
Other	90	150	180	140
Electric Cooking Equipment	1,390	1,540	1,530	1,490
Range/Oven	1,150	1,260	1,260	1,220
Range/Oven Hood	*	10	20	10
Deep Fat Fryer	10	*	10	*
Grill	*	*	*	*
Microwave Oven	60	50	40	50
Small Heat-Producing Appliance	70	30	50	50
Other	100	190	150	150
Electrical Distribution	440	620	670	580
Installed Wiring	180	170	250	200
Light Fixture	30	20	40	30
Receptacle, Switch	40	100	80	70
Cord, Plug	70	90	150	100
Lamp, Light Bulb	10	40	30	30
Panel Board	*	10	30	10
Meter	10	40	*	20
Transformer	*	*	*	*
Other	90	160	90	110
Other Selected Electrical Appliances	200	280	260	250
Clothes Dryer	110	150	130	130
Dishwasher	10	10	10	10
Audio/Visual Equipment	20	*	40	20
Washing Machine	10	10	10	10
Refrigerator/Freezer	20	90	60	60
Shop/Garden Tools	10	10	*	10
Torch	10	*	*	10

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

Note: Fire 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 intentionally set fires.

¹⁵ There are confined fire estimates included in *Total Residential*. These were not included in the detail lines because NFIRS does not provide information to determine the equipment or power source. See Table 10b on p. 37 for details.

TABLE 4d
ESTIMATED RESIDENTIAL STRUCTURE FIRE PROPERTY LOSS
(In \$Millions) SELECTED ELECTRICAL EQUIPMENT, 2017–2019

Equipment	2017	2018	2019	2017–2019 Avg.
Total Residential¹⁶	\$7,074.0	\$7,559.3	\$7,377.3	\$7,336.9
Total Electrical	\$1,582.9	\$1,848.2	\$1,717.5	\$1,716.2
Electric Heating and Cooling	\$306.2	\$413.4	\$341.5	\$353.7
Central Heating	\$8.1	\$18.4	\$6.9	\$11.1
Local Fixed Heater	\$68.2	\$72.0	\$89.4	\$76.5
Portable Heater	\$35.1	\$61.4	\$42.3	\$46.2
Water Heater	\$9.9	\$14.3	\$10.9	\$11.7
Fixed, Central Air Conditioning	\$26.2	\$32.8	\$26.5	\$28.5
Portable Air Conditioner	\$40.2	\$44.2	\$36.2	\$40.2
Other	\$118.6	\$170.3	\$129.3	\$139.4
Electric Cooking Equipment	\$374.4	\$396.0	\$345.3	\$371.9
Range/Oven	\$281.1	\$298.5	\$252.6	\$277.4
Range/Oven Hood	\$2.9	\$1.4	\$3.2	\$2.5
Deep Fat Fryer	\$2.4	\$5.6	\$1.9	\$3.3
Grill	\$1.4	\$2.5	\$1.8	\$1.9
Microwave Oven	\$11.5	\$18.1	\$19.2	\$16.3
Small Heat-Producing Appliance	\$29.3	\$30.2	\$26.7	\$28.7
Other	\$45.9	\$39.8	\$40.0	\$41.9
Electrical Distribution	\$533.0	\$582.6	\$666.4	\$594.0
Installed Wiring	\$232.9	\$265.4	\$265.4	\$254.6
Light Fixture	\$55.1	\$40.1	\$37.5	\$44.2
Receptacle, Switch	\$58.9	\$53.4	\$56.4	\$56.3
Cord, Plug	\$53.0	\$50.0	\$54.4	\$52.5
Lamp, Light Bulb	\$15.4	\$21.2	\$17.4	\$18.0
Panel Board	\$15.4	\$23.7	\$31.7	\$23.6
Meter	\$14.3	\$13.7	\$9.9	\$12.6
Transformer	\$1.3	\$4.7	\$4.8	\$3.6
Other	\$86.7	\$110.4	\$188.9	\$128.6
Other Selected Electrical Appliances	\$174.9	\$174.5	\$148.7	\$166.0
Clothes Dryer	\$100.4	\$84.1	\$64.5	\$83.0
Dishwasher	\$16.9	\$14.2	\$8.8	\$13.3
Audio/Visual Equipment	\$8.2	\$8.2	\$8.2	\$8.2
Washing Machine	\$4.5	\$1.9	\$7.1	\$4.5
Refrigerator/Freezer	\$33.1	\$37.1	\$40.7	\$37.0
Shop/Garden Tools	\$9.4	\$16.5	\$12.9	\$12.9
Torch	\$2.4	\$12.7	\$6.6	\$7.2

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

Note: Fire 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 intentionally set fires.

¹⁶ There are confined fire estimates included in *Total Residential*. These were not included in the detail lines because NFIRS does not provide information to determine the equipment or power source. See Table 10c on p. 37 for details.

TABLE 5a
ESTIMATED RESIDENTIAL STRUCTURE FIRES
SELECTED GAS-FIRED EQUIPMENT, 2017–2019

Equipment	2017	2018	2019	2017–2019 Avg.
Total Residential¹⁷	362,200	371,600	346,800	360,300
Total Gas-Fired Equipment	9,900	9,500	8,800	9,400
Gas Heating Equipment	2,600	2,600	2,500	2,600
Fixed Heater	900	900	800	900
Portable Heater	200	200	200	200
Central Heating	300	400	300	400
Fireplace, Chimney, Connector	200	200	200	200
Water Heater	800	600	600	600
Fixed, Central Air Conditioning	*	*	*	*
Other	200	300	300	300
Gas Cooking Equipment	3,600	3,200	3,100	3,300
Range/Oven	2,300	2,000	2,000	2,100
Open Gas Grill	700	700	600	600
Other	500	500	400	500
Other Selected Gas Equipment	2,200	2,100	1,800	2,100
Clothes Dryer	1,400	1,300	1,100	1,300
Torch	500	400	400	400
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.

¹⁷ There are confined fire estimates included in *Total Residential*. These were not included in the detail lines because NFIRS does not provide information to determine the equipment or power source. See Table 10a on p. 36 for details.

TABLE 5b
ESTIMATED RESIDENTIAL STRUCTURE FIRE DEATHS
SELECTED GAS-FIRED EQUIPMENT, 2017–2019

Equipment	2017	2018	2019	2017–2019 Avg.
Total Residential	2,230	2,460	2,490	2,390
Total Gas-Fired Equipment	130	60	120	110
Gas Heating Equipment	50	30	40	40
Fixed Heater	20	10	30	20
Portable Heater	*	10	10	10
Central Heating	*	*	*	*
Fireplace, Chimney, Connector	20	*	*	10
Water Heater	*	*	*	*
Fixed, Central Air Conditioning	*	*	*	*
Other	*	10	*	*
Gas Cooking Equipment	40	10	30	30
Range/Oven	40	10	30	20
Open Gas Grill	*	*	*	*
Other	*	*	*	*
Other Selected Gas Equipment	*	10	10	10
Clothes Dryer	*	*	*	*
Torch	*	10	*	10
Shop/Garden Tool	*	*	10	*

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.

TABLE 5c
ESTIMATED RESIDENTIAL STRUCTURE FIRE INJURIES
SELECTED GAS-FIRED EQUIPMENT, 2017–2019

Equipment	2017	2018	2019	2017–2019 Avg.
Total Residential¹⁸	10,060	10,740	11,760	10,860
Total Gas-Fired Equipment	490	540	590	540
Gas Heating Equipment	120	150	190	150
Fixed Heater	40	40	100	60
Portable Heater	10	20	10	10
Central Heating	10	10	20	10
Fireplace, Chimney, Connector	10	20	10	10
Water Heater	40	50	20	40
Fixed, Central Air Conditioning	*	*	*	*
Other	10	10	30	10
Gas Cooking Equipment	190	200	200	200
Range/Oven	140	160	140	150
Open Gas Grill	20	30	40	30
Other	20	20	20	20
Other Selected Gas Equipment	60	60	70	60
Clothes Dryer	30	20	20	30
Torch	30	20	30	20
Shop/Garden Tool	10	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.

¹⁸ 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. See Table 10b on p. 37 for details.

TABLE 5d
ESTIMATED RESIDENTIAL STRUCTURE FIRE PROPERTY LOSS
(In \$Millions) SELECTED GAS-FIRED EQUIPMENT, 2017–2019

Equipment	2017	2018	2019	2017–2019 Avg.
Total Residential¹⁹	\$7,074.0	\$7,559.3	\$7,377.3	\$7,336.9
Total Gas-Fired Equipment	\$394.3	\$298.0	\$287.2	\$326.5
Gas Heating Equipment	\$100.9	\$95.7	\$74.4	\$90.3
Fixed Heater	\$26.8	\$21.7	\$19.4	\$22.6
Portable Heater	\$3.8	\$8.9	\$6.6	\$6.4
Central Heating	\$8.2	\$16.5	\$10.5	\$11.7
Fireplace, Chimney, Connector	\$25.3	\$22.7	\$18.9	\$22.3
Water Heater	\$22.9	\$17.8	\$11.1	\$17.3
Fixed, Central Air Conditioning	\$0.3	*	*	\$0.1
Other	\$13.4	\$8.0	\$7.8	\$9.7
Gas Cooking Equipment	\$93.6	\$91.9	\$98.3	\$94.6
Range/Oven	\$41.8	\$35.2	\$47.5	\$41.5
Open Gas Grill	\$32.7	\$39.1	\$32.3	\$34.7
Other	\$19.0	\$17.7	\$18.5	\$18.4
Other Selected Gas Equipment	\$119.7	\$53.1	\$43.3	\$72.0
Clothes Dryer	\$14.6	\$15.6	\$12.9	\$14.4
Torch	\$83.8	\$17.5	\$10.2	\$37.1
Shop/Garden Tool	\$21.3	\$19.8	\$20.2	\$20.4

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. 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.

¹⁹ There are confined fire property loss estimates included in the *Total Residential*. These confined fire property loss estimates could not be included in the detail lines because NFIRS does not provide information to determine the equipment or the power source. See Table 10c on p. 37 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 '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 2.9 per hundred thousand. In general, older adults suffer higher rates of fire deaths and injuries than younger people. The difference in rates is much larger for deaths.

Table 6. Death and Injury Estimates by Age Category: 2017–2019

Age Category	Fire Deaths per Hundred Thousand People ²⁰	Fire Injuries per Hundred Thousand People ²⁹
Overall	0.7	2.9
Under 5 years	0.7	2.5
5 – 14 years	0.3	1.3
15 – 39 years	0.3	2.9
40 – 64 years	0.8	3.4
65 – 74 years	1.6	3.3
75+ years	2.4	3.4

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 Black people, 1.2 per hundred thousand, is nearly twice the overall rate. The estimated rate of injuries per person for Black people (5.9 per hundred thousand) is more than twice the overall rate. The fire injury rate for 'Other – Including multi-racial' (5.4 per hundred thousand) is nearly twice the overall rate (2.9 per hundred thousand).

²⁰ Population estimates obtained from U.S. Census Bureau resident population estimates by age for 2017 – 2019. Estimates can be found at <https://www.census.gov/data/datasets/time-series/demo/popest/2010s-national-detail.html>.

Table 7. Death and Injury Estimates by Race: 2017 - 2019

Race	Fire Deaths per Hundred Thousand People²¹	Fire Injuries per Hundred Thousand People³⁰
Overall	0.7	2.9
White	0.7	2.5
Black	1.2	5.9
Asian	0.1	0.9
American Indian, Alaska Native	0.6	1.2
Other – Including multi-racial	0.7	5.4

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 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.

²¹ Population estimates obtained from U.S. Census Bureau resident population estimates by race for 2017 – 2019. Estimates can be found at <https://www.census.gov/data/datasets/time-series/demo/popest/2010s-national-detail.html>.

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 by imputing missing and unknown data.

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.²² 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 2017 through 2019.

Table 8. NFPA Estimates of Residential Structure Fires and Associated Losses 2017–2019

	2017	2018	2019
Structure Fires	379,000	387,000	361,500
Civilian Deaths	2,710	2,820	2,870
Civilian Injuries	10,910	11,600	12,700
Property Loss	\$7.90 billion	\$8.29 billion	\$7.98 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 2017, 2018, and 2019. Not all the states reporting included data from every fire department in the state. The number of fire departments participating in NFIRS increased from 22,823 in 2017 to 23,206 in 2018, which was a new high. But then the number of participating fire departments decreased to 22,685 in 2019. Table 9 shows the number of

²² 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.

residential structure fires and the corresponding losses reported to USFA from 2017 through 2019.

Table 9. Residential Structure Fires and Associated Losses Reported to NFIRS 2017–2019

	2017	2018	2019
Structure Fires	262,847	266,613	261,405
Civilian Deaths	1,590	1,628	1,617
Civilian Injuries	6,422	6,739	6,682
Property Loss	\$4.80 billion	\$4.85 billion	\$4.69 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 375,800 residential structure fires in the United States during 2017 to 2019, and an annual average of 2,800 deaths, 11,700 injuries, and \$8.1 billion in property losses. NFIRS captured about 70 percent of these fires, 58 percent of the deaths, 56 percent of the injuries, and 59 percent of the property losses (Table 9).

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 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. Content losses are 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.

Incident Type

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.

Equipment Involved

Device that provided the heat that started the fire (e.g., heater, clothes dryer).

Power Source

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.

Equipment Portability

Identifies the equipment involved as stationary or portable.

Heat Source

Source of heat that ignited the fire (e.g., candle, lighter, cigarette, heat from operating equipment, hot object).

Item First Ignited

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).

Cause of Ignition

The general causal factor that resulted in a heat source igniting a combustible material. The cause code values are:

- 1: intentional
- 2: unintentional
- 3: failure of equipment or heat source
- 4: act of nature
- 5: cause under investigation
- 0: cause, other
- U: cause undetermined after investigation

CPSC staff regrouped the codes as:

- 1: intentional
- 0, 2, 3, 4, or fire involving child play: unintentional
- 5, U, missing information: unknown

Age

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.²³

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 Loss²⁴ 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,

²³ NFIRS Complete Reference Guide, January 2015.

²⁴ These are property loss and content loss which CPSC staff add together for what they call *property loss*.

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 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.

Incident Type Code

	<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 Equipment 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: 2017–2019

Included in Table Categories:	Appear in Tables:	2017	2018	2019
Total Residential	1a, 2a, 3a, 4a, 5a	190,000	191,600	177,800
Total Heating and Cooling Equipment	1a, 3a	21,700	22,500	20,600
<i>Fireplace, Chimney, Connector</i>	1a, 3a	14,000	14,400	13,700
<i>Other (Burner/Boiler)</i>	1a, 3a	7,700	8,100	6,900
Cooking	1a, 2a	146,500	147,300	135,300
Trash, Rubbish	2a	20,300	20,500	20,700
Incinerator	-	500	500	500
Trash Compactor	-	900	800	700

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 2017, 2018, or 2019.

Table 10b. Estimated Residential Confined Fire Injuries: 2017–2019

Included in Table Categories:	Appear in Tables:	2017	2018	2019
Total Residential	1c, 2c, 3c, 4c, 5c	1,320	1,240	1,520
Total Heating and Cooling Equipment	1c, 3c	40	30	40
<i>Fireplace, Chimney, Connector</i>	1c, 3c	10	10	10
<i>Other (Burner/Boiler)</i>	1c, 3c	30	20	20
Cooking	1c, 2c	1,230	1,140	1,420
Trash, Rubbish	2c	40	60	60
Incinerator	-	10	*	*
Trash Compactor	-	*	*	*

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): 2017–2019

Included in Table Categories:	Appear in Tables:	2017	2018	2019
Total Residential	1d, 2d, 3d, 4d, 5d	\$47.2	\$50.0	\$51.5
Total Heating and Cooling Equipment	1d, 3d	\$8.1	\$8.2	\$8.4
<i>Fireplace, Chimney, Connector</i>	1d, 3d	\$4.5	\$5.8	\$5.0
<i>Other (Burner/Boiler)</i>	1d, 3d	\$3.5	\$2.4	\$3.4
Cooking	1d, 2d	\$34.2	\$34.9	\$39.3
Trash, Rubbish	2d	\$4.5	\$5.9	\$3.2
Incinerator	-	\$0.3	\$0.9	\$0.5
Trash Compactor	-	\$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: 2017–2019

	2017	2018	2019
Cause of Ignition	36%	36%	36%
Heat Source	41%	41%	41%
Item First Ignited	41%	42%	42%
Equipment Involved	48%	48%	47%
Equipment Power	47%	48%	46%

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: 2017–2019

	2017	2018	2019
Cause of Ignition	61%	65%	67%
Heat Source	66%	67%	68%
Item First Ignited	67%	67%	69%
Equipment Involved	55%	56%	57%
Equipment Power	56%	55%	56%
Race	39%	41%	39%

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

Table 11c. Missing Data on Residential Structure Fire Injuries: 2017–2019

	2017	2018	2019
Cause of Ignition	42%	42%	43%
Heat Source	41%	41%	41%
Item First Ignited	39%	40%	43%
Equipment Involved	37%	37%	37%
Equipment Power	38%	37%	38%
Race	51%	50%	49%

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

Using Raking to Allocate Missing Data and Make Estimates

For these missing 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[®] macro.²⁵ The raking procedure maintains the marginal distributions for the known data, while allocating the unknown data for all characteristics involved.²⁶ 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.³⁶

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

²⁵ M. Battaglia, D. Hoaglin and D. Izrael, “To Rake or Not To Rake Is Not the Question Anymore with the Enhanced Raking Macro,” SAS[®] Users Group International (SUGI) 29th Annual Conference, May 9–12, 2004, Paper #207-29.

²⁶ 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.

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 2017, 2018, and 2019. For example, it was used to allocate unknown victim ages to produce an estimate for 2017 deaths by age. Subsequently, it was repeated to estimate 2017 injuries by age, and so on.