



2013–2015 Residential Fire Loss Estimates*

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

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CPSA 6(b)(1) CLEARED for PUBLIC

NO MFRS/PRVTBLRS OR
PRODUCTS IDENTIFIED

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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.

Executive Summary

This report presents estimates of consumer product-related fire losses that occurred in U.S. residential structure fires attended by the fire service. The estimates were derived from data for 2013 through 2015, 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.

The fire and fire loss estimates presented in this report pertain to unintentional residential structure fires and civilian casualties. These estimates show there were:

- 359,400 fires, 2,290 deaths, 11,420 injuries, and \$6.22 billion in property loss in 2013;
- 361,500 fires, 2,420 deaths, 11,120 injuries, and \$6.35 billion in property loss in 2014;
- 370,900 fires, 2,230 deaths, 10,800 injuries, and \$6.63 billion in property loss in 2015; and
- an estimated annual average of 363,900 fires, 2,360 deaths, 11,110 injuries, and \$6.40 billion in property loss over the three-year period 2013–2015.

Consumer products involved in fires can be categorized as “sources of ignition” and/or as “the materials first ignited.” Sources of ignition can be small, such as candles, or large, such as ranges. The larger sources of ignition, which are 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 produce 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 can count as both 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.

For 2013 through 2015, the relative ranking of the greatest contributors to fire losses (as measured by Heat Sources and Items First Ignited) remained largely unchanged from what was reported for 2012–2014. Tables 1a–5d show:

- Cooking equipment accounted for the largest percentage of fires. An estimated annual average of 164,600 cooking equipment-related fires during 2013–2015 accounted for 45.2 percent of the average annual estimate of total residential fires for the same period. The corresponding death estimate is an annual average of 220 deaths, which is 9.7 percent of the average annual estimate of total residential fire deaths. The annual average number of cooking fire injuries for 2013–2015 was estimated to be 3,340, which represents 30.1 percent of the total estimated annual average number of injuries for the same time 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 45,800 fires for 2013–2015 was 12.6 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 9.4 percent of the average annual estimated number of total residential fire deaths. The corresponding injuries for the three years averaged to an annual estimate of 860. This accounts for 7.8 percent of the annual average estimate of total injuries during 2013–2015.

- During 2013–2015, an estimated annual average of 13,500 fires was attributable to electrical distribution equipment (*e.g.*, installed wiring, lighting). This is 3.7 percent of the estimated annual average number of residential fires for this period. The annual average death estimate is 170 (7.4 percent of average annual estimated residential fire deaths); and the injury estimates averaged 500, which is 4.5 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 2013 through 2015, an estimated annual average of 480 deaths was associated with these fires. This constitutes 20.9 percent of the estimated annual average of total deaths associated with residential structure fires for the same period. On average, during 2013 to 2015, mattress or bedding ignitions accounted for an annual average of 310 deaths, which is 13.5 percent of the average annual estimated number of total residential fire deaths.
- For Heat Source, smoking materials were the largest contributor to deaths, associated with an annual average of 490 deaths from 2013 to 2015. This is 21.3 percent of the estimated annual average of total residential fire deaths. Smoking materials, however, comprise only 2.8 percent of the total estimated residential fires.
- Among products that are Heat Sources, candles were involved in the second highest number of deaths. The estimated annual average of deaths from candle fires is 60, which is 2.5 percent of the average estimated total number of residential fire deaths from 2013 to 2015. Candles account for an estimated 1.6 percent of the fires.
- There were also an estimated 60 deaths from cigarette lighter fires (2.4 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 responsible for 20 deaths, or 0.8 percent of total deaths annually. Matches were involved in only 0.1 percent of residential fires.
- The estimates for fire injuries fell during the 2013–2015 time period from 11,420 in 2013, to 11,120 in 2014, and 10,800 in 2015.

The USFA implemented a new coding rule for NFIRS cases beginning with 2012 data. The new rule stated that if the Heat Source or the Factor Contributing to Ignition codes suggest there was equipment involved, the Equipment Involved in Ignition must be coded, and not as “NNN – No equipment.” For example, if the Heat Source was coded as “13 – Arcing,” then the code for the equipment involved must be specified. This coding rule appears to have impacted the data in two ways. First, the coding reduced the proportion of fires coded with Heat Source codes suggesting that equipment was involved.¹ Second, it increased the coding of specific equipment codes, particularly “Electrical Equipment,” and reduced the proportion of “Missing Equipment” data.

¹ There are four of these heat source codes: “10 – Heat from powered equipment, other”; “11 – Spark, ember, or flame from operating equipment”; “12 – Radiated, conducted heat from operating equipment”; “13 – Arcing.”

Given the large proportion of missing data in NFIRS (see Tables 9a-9d on page 33) that must be imputed, the questionnaire change would substantially alter estimates based on Heat Source or Equipment Involved in Ignition, unless an adjustment is made to account for the questionnaire change. Therefore, an adjustment was made to the raw counts for electrical Equipment Involved in Ignition, and the Heat Sources that imply that there was equipment involved¹, and the number of missing values for the equipment and heat source variables. This was done before imputation to match historically observed proportions to prevent estimates from being altered dramatically by this design change. However, these adjustments alone cannot fully account for the impact of the change. Interpretations of the differences (or lack thereof) between pre-2012 estimates and the subsequent estimates should be done with caution. These adjustments were done only for estimates from 2012 to 2014 when the NFIRS questionnaire implemented this rule.

Due to the effect that this new coding rule had on the data, USFA decided to revert back to the old rule beginning with 2015 data. So, beginning in 2015, coders have once again been able to leave the Equipment Involved in Ignition code blank or code it as “NNN – No equipment,” even if they used a Heat Source code or Factor Contributing to Ignition code that implied there was equipment involved in the fire.

CPSC staff looked carefully at the 2015 NFIRS fire counts in categories that seemed to be effected by the 2012 – 2014 rule. The proportions of fire counts in these categories in 2015 did not revert back to pre-2012 levels. In some cases, they were very near the 2012 – 2014 levels and in some cases, they were between the pre-2012 levels and the 2012 – 2014 levels. This suggests that perhaps some coders have formed the habit of coding Equipment Involved in Ignition and are less likely to leave it blank or code “NNN – No equipment” even though they are once again permitted to do this.

CPSC staff decided not to continue to use weights to adjust down some of the NFIRS counts to be more in line with pre-2012 estimates. For this reason, some estimates for 2015 are much higher than they would otherwise be and much higher than the corresponding 2013 and 2014 estimates. This is true much more so of estimates involving Equipment Involved in Ignition which were adjusted (from 2012 – 2014) to a much greater degree than estimates involving Heat Source. Estimates for Item First Ignited products were never adjusted in this way.

Introduction

The fire loss estimates presented in this report are based on the National Fire Protection Association's (NFPA) national fire loss estimates² 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. The 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. Among the wealth of information collected, product-specific information, such as the equipment involved in the ignition of the fire, or the item that was first ignited in the fire, is available in NFIRS data. The NFIRS product-specific frequency counts are weighted up to the NFPA estimates for total U.S. fire losses to arrive at the estimates that are presented in this report.

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

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, version 5.0, was implemented. By 2009, 100 percent of fire departments were coding using this version.

To arrive at the product-specific estimates presented in this report, the NFIRS data were weighted up to the 2013, 2014, and 2015 NFPA estimates for total U.S. fire losses. 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. From 1999 forward, as the use of version 5.0 increased, an increasingly large number of confined fires were reported. In 1999, about 2 percent of residential structure fires were reported as confined; by 2015, 50 percent of residential structure fires reported to NFIRS were confined.

In confined fire cases, frequently it is not possible to determine the type of equipment involved because the equipment is rarely coded. For example, when a fire is identified as a "confined cooking fire" in NFIRS, 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 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.

² M.J. Karter, "Fire Loss in the U.S. During 2012," National Fire Protection Association (NFPA), September 2013; M.J. Karter, "Fire Loss in the U.S. During 2013," National Fire Protection Association (NFPA), September 2014; M.J. Karter, "Fire Loss in the U.S. During 2014," National Fire Protection Association (NFPA), September 2015.

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.

Results

Consistent with previous years' reports, CPSC staff has presented data here using five main tables. 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. Therefore, the detail 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 the jurisdiction of the CPSC. 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 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). 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, 2013–2015

Equipment	2013	2014	2015	2013–2015 Average
Total Residential³	359,400	361,500	370,900	363,900
Total Heating and Cooling Equipment²	44,900	44,300	47,000	45,400
Local Fixed Heater	4,200	4,400	5,700	4,800
Portable Heater	1,400	1,600	2,000	1,700
Central Heating	800	800	1,000	900
Fireplace, Chimney, Chimney Connector ²	23,100	22,500	20,300	21,900
Water Heater	1,500	1,500	2,100	1,700
Air Conditioning	1,000	1,100	1,700	1,300
Other ²	13,600	13,300	15,500	14,100
Total Cooking Equipment²	157,800	159,900	176,100	164,600
Range/Oven	13,300	13,100	19,900	15,500
<i>Gas</i>	2,000	1,800	2,700	2,100
<i>Electric</i>	11,300	11,300	17,200	13,300
<i>Other</i>	*	*	100	*
Microwave Oven	600	500	1,000	700
All Other Cooking	3,300	3,300	6,000	4,200
<i>Gas</i>	800	800	1,400	1,000
<i>Electric</i>	2,200	2,300	4,100	2,900
<i>Other</i>	200	200	500	300
Total Electrical Distribution	9,500	9,400	21,700	13,500
Installed Wiring	4,600	4,700	10,200	6,500
Cord, Plug	900	900	2,000	1,300
Receptacle, Switch	1,300	1,200	3,000	1,800
Lighting	1,300	1,200	2,900	1,800
Other	1,400	1,400	3,600	2,100
Other Selected Equipment	7,800	7,600	12,000	9,100
Audio/Visual Equipment	300	300	400	300
Clothes Dryer	5,200	4,900	7,900	6,000
Dishwasher	300	400	500	400
Washing Machine	200	200	500	300
Torch	500	500	700	600
Refrigerator/Freezer	600	600	900	700
Shop/Garden Tool	600	700	1,100	800

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 8a on p. 34 for details.

TABLE 1b
ESTIMATED RESIDENTIAL STRUCTURE FIRE DEATHS
SELECTED EQUIPMENT, 2013–2015

Equipment	2013	2014	2015	2013–2015 Average
Total Residential⁴	2,290	2,420	2,230	2,320
Total Heating and Cooling Equipment	180	230	210	200
Local Fixed Heater	70	70	70	70
Portable Heater	80	90	80	80
Central Heating	*	10	*	*
Fireplace, Chimney, Chimney Connector ³	10	20	20	20
Water Heater	*	*	*	*
Air Conditioning	10	10	20	10
Other ³	20	30	50	30
Total Cooking Equipment³	190	210	280	220
Range/Oven	180	190	180	180
<i>Gas</i>	60	20	40	40
<i>Electric</i>	120	170	140	140
<i>Other</i>	*	*	*	*
Microwave Oven	*	10	*	*
All Other Cooking	*	20	70	30
<i>Gas</i>	*	10	10	10
<i>Electric</i>	*	10	60	20
<i>Other</i>	*	*	*	*
Total Electrical Distribution	150	150	220	170
Installed Wiring	50	70	70	70
Cord, Plug	50	40	60	50
Receptacle, Switch	20	20	30	20
Lighting	10	10	20	10
Other	10	10	40	20
Other Selected Equipment	20	10	20	10
Audio/Visual Equipment	*	*	*	*
Clothes Dryer	10	*	10	10
Dishwasher	*	*	*	*
Washing Machine	*	*	*	*
Torch	*	*	*	*
Refrigerator/Freezer	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.

⁴ There were no NFIRS confined fire deaths in 2013, 2014, or 2015.

TABLE 1c
ESTIMATED RESIDENTIAL STRUCTURE FIRE INJURIES
SELECTED EQUIPMENT, 2013–2015

Equipment	2013	2014	2015	2013–2015 Average
Total Residential⁵	11,420	11,120	10,800	11,110
Total Heating and Cooling Equipment⁴	790	830	870	830
Local Fixed Heater	340	330	430	370
Portable Heater	130	140	150	140
Central Heating	30	30	20	30
Fireplace, Chimney, Chimney Connector ⁴	50	70	50	50
Water Heater	60	60	60	60
Air Conditioning	50	50	60	50
Other ⁴	160	210	190	180
Total Cooking Equipment⁴	3,300	3,080	3,650	3,340
Range/Oven	1,400	1,410	1,780	1,530
<i>Gas</i>	220	160	200	190
<i>Electric</i>	1,180	1,250	1,580	1,340
<i>Other</i>	10	*	*	*
Microwave Oven	40	30	70	40
All Other Cooking	300	280	390	320
<i>Gas</i>	70	60	80	70
<i>Electric</i>	210	200	280	230
<i>Other</i>	10	20	30	20
Total Electrical Distribution	440	430	620	500
Installed Wiring	150	180	210	180
Cord, Plug	90	90	130	100
Receptacle, Switch	80	40	70	60
Lighting	60	60	110	80
Other	70	60	100	80
Other Selected Equipment	260	260	310	280
Audio/Visual Equipment	20	20	30	20
Clothes Dryer	150	160	160	160
Dishwasher	10	10	*	10
Washing Machine	*	*	10	*
Torch	20	20	30	20
Refrigerator/Freezer	40	20	40	30
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.

⁵ 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 8b on p. 34 for details.

TABLE 1d
ESTIMATED RESIDENTIAL STRUCTURE FIRE PROPERTY LOSS (In Millions)
SELECTED EQUIPMENT, 2013–2015

Equipment	2013	2014	2015	2013 – 2015 Average
Total Residential⁶	\$6,218.3	\$6,352.1	\$6,631.0	\$6,400.5
Total Heating and Cooling Equipment⁵	\$496.6	\$541.5	\$622.9	\$553.7
Local Fixed Heater	\$128.0	\$117.8	\$149.5	\$131.8
Portable Heater	\$65.8	\$69.5	\$101.7	\$79.0
Central Heating	\$32.4	\$23.0	\$33.8	\$29.7
Fireplace, Chimney, Chimney Connector ⁵	\$109.1	\$146.4	\$115.9	\$123.8
Water Heater	\$35.3	\$31.3	\$51.2	\$39.3
Air Conditioning	\$26.2	\$26.0	\$34.3	\$28.8
Other ⁵	\$116.4	\$140.9	\$183.2	\$146.8
Total Cooking Equipment⁵	\$433.1	\$408.5	\$707.9	\$516.5
Range/Oven	\$285.3	\$270.5	\$369.5	\$308.4
<i>Gas</i>	\$43.3	\$40.3	\$47.2	\$43.6
<i>Electric</i>	\$241.4	\$229.7	\$321.3	\$264.1
<i>Other</i>	\$0.7	\$0.5	\$1.1	\$0.8
Microwave Oven	\$9.2	\$9.8	\$23.8	\$14.3
All Other Cooking	\$103.8	\$99.5	\$214.0	\$139.1
<i>Gas</i>	\$30.6	\$25.7	\$86.3	\$47.5
<i>Electric</i>	\$65.1	\$65.7	\$94.5	\$75.1
<i>Other</i>	\$8.1	\$8.1	\$33.1	\$16.4
Total Electrical Distribution	\$313.6	\$326.1	\$639.2	\$426.3
Installed Wiring	\$149.9	\$169.0	\$311.7	\$210.2
Cord, Plug	\$33.3	\$34.3	\$65.3	\$44.3
Receptacle, Switch	\$36.5	\$30.8	\$68.0	\$45.1
Lighting	\$42.9	\$38.9	\$79.1	\$53.6
Other	\$51.0	\$53.0	\$115.2	\$73.1
Other Selected Equipment	\$177.9	\$170.9	\$209.6	\$186.1
Audio/Visual Equipment	\$10.9	\$5.3	\$9.7	\$8.6
Clothes Dryer	\$78.9	\$59.7	\$92.1	\$76.9
Dishwasher	\$11.3	\$12.3	\$15.1	\$12.9
Washing Machine	\$1.8	\$2.4	\$4.4	\$2.8
Torch	\$15.3	\$37.3	\$22.3	\$25.0
Refrigerator/Freezer	\$24.2	\$25.3	\$29.3	\$26.3
Shop/Garden Tool	\$35.6	\$29.0	\$36.6	\$33.7

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.

⁶ 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 8c on p. 34 for details.

TABLE 2a
ESTIMATED RESIDENTIAL STRUCTURE FIRES
SELECTED PRODUCTS, 2013–2015

Product	2013	2014	2015	2013–2015 Average
Total Residential⁷	359,400	361,500	370,900	363,900
By Heat Source				
Cigarette, Other Tobacco Products	10,100	10,000	10,800	10,300
Match	500	400	400	500
Lighter	1,700	1,500	1,600	1,600
Candle	6,200	5,700	5,800	5,900
By Item First Ignited				
Upholstered Furniture	4,600	4,400	4,600	4,500
Smoking Material Ignition	1,100	1,100	1,200	1,100
Open-Flame Ignition	500	500	500	500
Other	3,000	2,900	2,800	2,900
Mattress, Bedding	7,700	7,500	6,900	7,400
Smoking Material Ignition	1,500	1,500	1,300	1,400
Open-Flame Ignition	1,500	1,300	1,200	1,300
Other	4,800	4,800	4,400	4,700
Other Materials				
Cooking Materials ⁶	163,100	164,400	168,600	165,400
Electric Cable Insulation	16,700	17,300	16,700	16,900
Interior Wall Covering	6,400	6,500	6,300	6,400
Wearing Apparel-Worn	300	300	300	300
Wearing Apparel-Not Worn	5,500	4,900	4,800	5,100
Floor Covering	3,500	3,400	3,400	3,400
Curtains, Drapes	1,500	1,300	1,300	1,300
Magazines, Newspaper	1,600	1,600	1,500	1,500
Thermal Insulation	5,700	5,700	5,700	5,700
Cabinet, Desk	4,600	4,700	4,700	4,700
Trash, Rubbish ⁶	22,000	21,600	22,300	22,000
Toy, Game	200	200	200	200
Box, Carton, Bag, Basket, Barrel	2,800	2,600	2,700	2,700

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 8a on p. 34 for details.

TABLE 2b
ESTIMATED RESIDENTIAL STRUCTURE FIRE DEATHS
SELECTED PRODUCTS, 2013–2015

Product	2013	2014	2015	2012–2014 Average
Total Residential⁸	2,290	2,420	2,230	2,320
By Heat Source				
Cigarette, Other Tobacco Products	480	460	530	490
Match	20	30	*	20
Lighter	50	70	40	60
Candle	40	80	60	60
By Item First Ignited				
Upholstered Furniture	410	540	510	480
Smoking Material Ignition	210	180	300	230
Open-Flame Ignition	*	40	30	20
Other	200	310	180	230
Mattress, Bedding	310	360	270	310
Smoking Material Ignition	90	190	180	150
Open-Flame Ignition	60	20	10	30
Other	150	150	80	130
Other Materials				
Cooking Materials ⁷	180	170	200	180
Electric Cable Insulation	140	160	110	130
Interior Wall Covering	70	60	80	70
Wearing Apparel-Worn	140	60	90	100
Wearing Apparel-Not Worn	40	40	30	40
Floor Covering	30	80	60	60
Curtains, Drapes	20	20	10	10
Magazines, Newspaper	60	40	20	40
Thermal Insulation	*	10	*	10
Cabinet, Desk	20	40	20	30
Trash, Rubbish	50	20	20	30
Toy, Game	*	*	*	*
Box, Carton, Bag, Basket, Barrel	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.

⁸ There were no NFIRS confined fire deaths in 2013, 2014, or 2015.

TABLE 2c
ESTIMATED RESIDENTIAL STRUCTURE FIRE INJURIES
SELECTED PRODUCTS, 2013–2015

Product	2013	2014	2015	2013–2015 Average
Total Residential⁹	11,420	11,120	10,800	11,110
By Heat Source				
Cigarette, Other Tobacco Products	1,010	1,020	850	960
Match	70	60	40	60
Lighter	280	240	230	250
Candle	700	690	540	640
By Item First Ignited				
Upholstered Furniture	670	710	710	700
Smoking Material Ignition	190	200	250	210
Open-Flame Ignition	70	80	90	80
Other	410	430	370	400
Mattress, Bedding	1,110	1,160	910	1,060
Smoking Material Ignition	360	370	280	330
Open-Flame Ignition	280	360	160	270
Other	470	440	470	460
Other Materials				
Cooking Materials ⁸	3,730	3,830	3,600	3,720
Electric Cable Insulation	400	560	440	470
Interior Wall Covering	160	200	260	200
Wearing Apparel-Worn	120	90	100	110
Wearing Apparel-Not Worn	210	330	190	240
Floor Covering	190	210	140	180
Curtains, Drapes	140	110	100	120
Magazines, Newspaper	80	170	110	120
Thermal Insulation	70	60	70	70
Cabinet, Desk	240	350	290	300
Trash, Rubbish ⁸	280	220	240	250
Toy, Game	30	*	10	20
Box, Carton, Bag, Basket, Barrel	100	160	140	130

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 8b on p. 34 for details.

TABLE 2d
ESTIMATED RESIDENTIAL STRUCTURE FIRE PROPERTY LOSS (In Millions)
SELECTED PRODUCTS, 2013–2015

Product	2013	2014	2015	2013–2015 Average
Total Residential¹⁰	\$6,218.3	\$6,352.1	\$6,631.0	\$6,400.5
By Heat Source				
Cigarette, Other Tobacco Products	\$391.4	\$334.6	\$392.9	\$373.0
Match	\$21.5	\$17.5	\$17.0	\$18.7
Lighter	\$215.8	\$58.0	\$57.3	\$110.4
Candle	\$212.6	\$223.2	\$241.5	\$225.8
By Item First Ignited				
Upholstered Furniture	\$225.9	\$242.3	\$263.9	\$244.0
Smoking Material Ignition	\$53.0	\$62.4	\$69.9	\$61.8
Open-Flame Ignition	\$26.6	\$30.9	\$27.7	\$28.4
Other	\$146.3	\$149.0	\$166.2	\$153.8
Mattress, Bedding	\$263.2	\$276.1	\$221.8	\$253.7
Smoking Material Ignition	\$48.6	\$47.6	\$37.7	\$44.6
Open-Flame Ignition	\$51.4	\$66.9	\$42.2	\$53.5
Other	\$163.2	\$161.7	\$141.9	\$155.6
Other Materials				
Cooking Materials ⁹	\$534.8	\$549.6	\$485.4	\$523.3
Electric Cable Insulation	\$463.5	\$437.6	\$438.0	\$446.4
Interior Wall Covering	\$277.4	\$301.7	\$283.5	\$287.5
Wearing Apparel-Worn	\$7.7	\$4.4	\$2.3	\$4.8
Wearing Apparel-Not Worn	\$282.1	\$119.3	\$110.0	\$170.5
Floor Covering	\$101.0	\$105.6	\$106.2	\$104.3
Curtains, Drapes	\$53.3	\$62.6	\$53.7	\$56.5
Magazines, Newspaper	\$44.9	\$44.4	\$45.5	\$44.9
Thermal Insulation	\$183.6	\$193.2	\$167.5	\$181.4
Cabinet, Desk	\$178.3	\$174.5	\$173.8	\$175.5
Trash, Rubbish ⁹	\$157.2	\$137.3	\$162.6	\$152.3
Toy, Game	\$3.3	\$4.5	\$2.9	\$3.6
Box, Carton, Bag, Basket, Barrel	\$101.1	\$104.5	\$98.2	\$101.3

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 losses are included in the *Cooking Materials* fire losses because cooking materials are most likely the item first ignited. See Table 8c on p. 34 for details.

TABLE 3a
ESTIMATED RESIDENTIAL STRUCTURE FIRES
HEATING AND COOLING EQUIPMENT, 2013–2015

Equipment	2013	2014	2015	2013–2015 Average
Total Residential¹¹	359,400	361,500	370,900	363,900
Total Heating and Cooling Equipment¹⁰	44,900	44,300	47,000	45,400
Solid Fuel	2,100	2,000	2,200	2,100
Fixed Heater	500	400	500	500
Portable Heater	*	*	*	*
Fireplace, Chimney, Chimney Connector	1,500	1,400	1,600	1,500
Central Heating	*	*	*	*
Water Heater	*	*	*	*
Other	*	*	*	*
Gas-Fired	2,400	2,300	3,000	2,600
Fixed Heater	800	800	1,000	800
Portable Heater	100	100	200	100
Fireplace, Chimney, Chimney Connector	200	200	200	200
Central Heating	300	300	400	300
Water Heater	800	700	1,000	800
Fixed, Central Air Conditioning	*	*	*	*
Other	200	200	300	200
Electric	9,400	10,100	14,600	11,400
Fixed Heater	2,900	3,100	3,600	3,200
Portable Heater	1,200	1,300	1,500	1,300
Central Heating	400	400	500	400
Water Heater	700	800	900	800
Fixed, Central Air Conditioning	700	800	1,200	900
Portable Air Conditioner	300	300	500	400
Other	4,000	4,300	6,400	4,900
Liquid Fuel	300	300	400	300
Fixed Heater	100	*	100	100
Portable Heater	100	200	200	200
Fireplace, Chimney, Chimney Connector	*	*	*	*
Central Heating	100	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 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 8a on p. 34 for details.

TABLE 3b
ESTIMATED RESIDENTIAL STRUCTURE FIRE DEATHS
HEATING AND COOLING EQUIPMENT, 2013–2015

Equipment	2013	2014	2015	2013–2015 Average
Total Residential¹²	2,290	2,420	2,230	2,320
Total Heating and Cooling Equipment	180	230	210	200
Solid Fuel	40	40	50	40
Fixed Heater	30	10	40	30
Portable Heater	*	*	*	*
Fireplace, Chimney, Chimney Connector	10	20	10	10
Central Heating	*	*	*	*
Water Heater	*	*	*	*
Other	*	*	*	*
Gas-Fired	10	40	20	20
Fixed Heater	10	20	10	10
Portable Heater	*	20	*	10
Fireplace, Chimney, Chimney Connector	*	*	*	*
Central Heating	*	*	*	*
Water Heater	*	*	*	*
Fixed, Central Air Conditioning	*	*	*	*
Other	*	*	*	*
Electric	110	150	110	120
Fixed Heater	30	40	10	30
Portable Heater	60	60	50	60
Central Heating	*	*	*	*
Water Heater	*	*	*	*
Fixed, Central Air Conditioning	10	*	10	10
Portable Air Conditioner	*	10	10	10
Other	10	30	40	30
Liquid Fuel	10	10	20	20
Fixed Heater	*	*	*	*
Portable Heater	10	10	20	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.

¹² There were no NFIRS confined fire deaths in 2013, 2014, or 2015.

TABLE 3c
ESTIMATED RESIDENTIAL STRUCTURE FIRE INJURIES
HEATING AND COOLING EQUIPMENT, 2013–2015

Equipment	2013	2014	2015	2013–2015 Average
Total Residential¹³	11,420	11,120	10,800	11,110
Total Heating and Cooling Equipment¹²	790	830	870	830
Solid Fuel	40	50	50	50
Fixed Heater	30	20	20	20
Portable Heater	*	*	*	*
Fireplace, Chimney, Chimney Connector	20	30	20	20
Central Heating	*	*	*	*
Water Heater	*	*	*	*
Other	*	*	10	*
Gas-Fired	180	170	200	180
Fixed Heater	80	50	110	80
Portable Heater	10	30	10	20
Fireplace, Chimney, Chimney Connector	10	10	10	10
Central Heating	20	10	20	20
Water Heater	40	50	50	50
Fixed, Central Air Conditioning	*	*	*	*
Other	20	30	*	*
Electric	490	510	550	520
Fixed Heater	230	240	250	240
Portable Heater	100	100	90	100
Central Heating	10	10	*	10
Water Heater	10	10	10	10
Fixed, Central Air Conditioning	30	40	30	30
Portable Air Conditioner	30	10	30	20
Other	100	130	130	120
Liquid Fuel	20	30	30	30
Fixed Heater	*	*	*	*
Portable Heater	20	20	30	20
Fireplace, Chimney, Chimney Connector	*	*	*	*
Central Heating	*	*	*	*
Water Heater	*	*	*	*
Other	*	*	*	*
All Other Fuel	*	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.

¹³ 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 8b on p. 34 for details.

TABLE 3d
ESTIMATED RESIDENTIAL STRUCTURE FIRE PROPERTY LOSS (In Millions)
HEATING AND COOLING EQUIPMENT, 2013–2015

Equipment	2013	2014	2015	2013–2015 Average
Total Residential¹⁴	\$6,218.3	\$6,352.1	\$6,631.0	\$6,400.5
Total Heating and Cooling Equipment¹³	\$496.6	\$541.5	\$622.9	\$553.7
Solid Fuel	\$126.9	\$107.7	\$129.9	\$121.5
Fixed Heater	\$29.0	\$22.6	\$31.2	\$27.6
Portable Heater	*	*	\$0.5	\$0.2
Fireplace, Chimney, Chimney Connector	\$94.9	\$82.2	\$95.9	\$91.0
Central Heating	\$2.3	\$1.0	\$1.0	\$1.4
Water Heater	*	*	*	*
Other	\$0.7	\$1.9	\$1.3	\$1.3
Gas-Fired	\$77.2	\$112.9	\$111.0	\$100.4
Fixed Heater	\$24.7	\$17.4	\$22.1	\$21.4
Portable Heater	\$5.9	\$4.8	\$30.1	\$13.6
Fireplace, Chimney, Chimney Connector	\$7.7	\$55.8	\$8.0	\$23.9
Central Heating	\$11.4	\$8.5	\$12.4	\$10.8
Water Heater	\$20.1	\$16.6	\$31.9	\$22.9
Fixed, Central Air Conditioning	*	\$0.1	\$0.2	\$0.1
Other	\$7.3	\$9.7	\$6.2	\$7.7
Electric	\$272.0	\$293.3	\$359.6	\$308.3
Fixed Heater	\$71.6	\$75.3	\$72.8	\$73.2
Portable Heater	\$53.2	\$57.7	\$51.0	\$54.0
Central Heating	\$16.9	\$10.4	\$14.6	\$14.0
Water Heater	\$15.2	\$14.2	\$13.6	\$14.3
Fixed, Central Air Conditioning	\$16.6	\$13.4	\$22.7	\$17.6
Portable Air Conditioner	\$9.6	\$12.4	\$36.2	\$19.4
Other	\$105.5	\$123.2	\$148.8	\$125.8
Liquid Fuel	\$11.4	\$16.5	\$12.4	\$13.4
Fixed Heater	\$2.6	\$2.3	\$2.0	\$2.3
Portable Heater	\$6.6	\$7.0	\$7.6	\$7.0
Fireplace, Chimney, Chimney Connector	\$0.1	\$0.3	\$0.5	\$0.3
Central Heating	\$1.8	\$3.1	\$1.1	\$2.0
Water Heater	*	\$0.4	*	\$0.1
Other	\$0.2	\$3.4	\$1.2	\$1.6
All Other Fuel	\$0.6	\$2.1	\$1.4	\$1.4

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.

¹⁴ 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 8c on p. 34 for details.

TABLE 4a
ESTIMATED RESIDENTIAL STRUCTURE FIRES
SELECTED ELECTRICAL EQUIPMENT, 2013–2015

Equipment	2013	2014	2015	2013–2015 Average
Total Residential¹⁵	359,400	361,500	370,900	363,900
Total Electrical	43,100	43,600	73,900	53,600
Electric Heating and Cooling	9,400	10,100	14,600	11,400
Central Heating	400	400	500	400
Local Fixed Heater	2,900	3,100	3,600	3,200
Portable Heater	1,200	1,300	1,500	1,300
Water Heater	700	800	900	800
Fixed, Central Air Conditioning	700	800	1,200	900
Portable Air Conditioner	300	300	500	400
Other	4,000	4,300	6,400	4,900
Electric Cooking Equipment	13,600	13,600	22,300	16,500
Range/Oven	11,300	11,300	17,200	13,300
Range/Oven Hood	200	100	200	200
Deep Fat Fryer	100	100	100	100
Grill	*	*	*	*
Microwave Oven	600	500	1,000	700
Small Heat-Producing Appliance	500	500	1,100	700
Other	2,000	2,000	2,600	2,200
Electrical Distribution	9,500	9,400	22,300	13,700
Installed Wiring	4,600	4,700	10,100	6,500
Light Fixture	900	900	2,000	1,200
Receptacle, Switch	1,300	1,200	3,000	1,800
Cord, Plug	900	900	2,000	1,200
Lamp, Light Bulb	400	400	900	600
Panel Board	400	400	800	500
Meter	300	300	600	400
Transformer	100	*	100	100
Other	700	700	2,700	1,300
Other Selected Electrical Appliances	5,800	5,600	8,500	6,700
Clothes Dryer	4,100	3,800	5,800	4,600
Dishwasher	300	400	500	400
Audio/Visual Equipment	300	300	400	300
Washing Machine	200	200	500	300
Refrigerator/Freezer	600	600	900	700
Shop/Garden Tools	200	300	300	300
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.

¹⁵ 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 8a on p. 34 for details.

TABLE 4b
ESTIMATED RESIDENTIAL STRUCTURE FIRE DEATHS
SELECTED ELECTRICAL EQUIPMENT, 2013–2015

Equipment	2013	2014	2015	2013–2015 Average
Total Residential¹⁶	2,290	2,420	2,230	2,320
Total Electrical	440	540	670	550
Electric Heating and Cooling	110	150	110	120
Central Heating	*	*	*	*
Local Fixed Heater	30	40	10	30
Portable Heater	60	60	50	60
Water Heater	*	*	*	*
Fixed, Central Air Conditioning	10	*	10	10
Portable Air Conditioner	*	10	10	10
Other	10	30	40	30
Electric Cooking Equipment	120	170	210	170
Range/Oven	120	170	140	140
Range/Oven Hood	*	*	*	*
Deep Fat Fryer	*	*	*	*
Grill	*	*	*	*
Microwave Oven	*	10	*	*
Small Heat-Producing Appliance	10	*	30	10
Other	*	*	*	10
Electrical Distribution	150	150	220	170
Installed Wiring	50	70	70	70
Light Fixture	10	10	10	10
Receptacle, Switch	20	20	30	20
Cord, Plug	50	40	60	50
Lamp, Light Bulb	10	*	*	*
Panel Board	*	*	*	*
Meter	*	*	*	*
Transformer	*	*	*	*
Other	10	10	40	20
Other Selected Electrical Appliances	10	10	10	10
Clothes Dryer	*	*	10	*
Dishwasher	*	*	*	*
Audio/Visual Equipment	*	*	*	*
Washing Machine	*	*	*	*
Refrigerator/Freezer	10	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.

¹⁶ There were no NFIRS confined fire deaths in 2013, 2014, or 2015.

TABLE 4c
ESTIMATED RESIDENTIAL STRUCTURE FIRE INJURIES
SELECTED ELECTRICAL EQUIPMENT, 2013–2015

Equipment	2013	2014	2015	2013–2015 Average
Total Residential¹⁷	11,420	11,120	10,800	11,110
Total Electrical	2,790	2,840	3,740	3,120
Electric Heating and Cooling	490	510	550	520
Central Heating	10	10	*	10
Local Fixed Heater	230	240	250	240
Portable Heater	100	100	90	100
Water Heater	10	10	10	10
Fixed, Central Air Conditioning	30	40	30	30
Portable Air Conditioner	30	10	30	20
Other	100	130	130	120
Electric Cooking Equipment	1,390	1,450	1,940	1,590
Range/Oven	1,180	1,250	1,580	1,340
Range/Oven Hood	*	10	10	10
Deep Fat Fryer	10	*	10	10
Grill	*	*	*	*
Microwave Oven	40	30	70	40
Small Heat-Producing Appliance	40	50	100	60
Other	200	190	170	190
Electrical Distribution	440	430	630	500
Installed Wiring	150	180	210	180
Light Fixture	30	40	70	40
Receptacle, Switch	80	40	70	60
Cord, Plug	90	90	130	100
Lamp, Light Bulb	40	20	40	30
Panel Board	10	10	10	10
Meter	10	10	*	*
Transformer	*	*	*	*
Other	50	50	100	70
Other Selected Electrical Appliances	190	180	190	190
Clothes Dryer	110	120	90	110
Dishwasher	10	10	*	10
Audio/Visual Equipment	20	20	30	20
Washing Machine	*	*	10	*
Refrigerator/Freezer	40	20	40	30
Shop/Garden Tool	20	10	10	10
Torch	*	*	*	*

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.

¹⁷ 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 8b on p. 34 for details.

TABLE 4d
ESTIMATED RESIDENTIAL STRUCTURE FIRE PROPERTY LOSS (In Millions)
SELECTED ELECTRICAL EQUIPMENT, 2013–2015

Equipment	2013	2014	2015	2013–2015 Average
Total Residential¹⁸	\$6,218.3	\$6,352.1	\$6,631.0	\$6,400.5
Total Electrical	\$1,176.6	\$1,176.3	\$1,839.2	\$1,397.4
Electric Heating and Cooling	\$272.0	\$293.3	\$359.6	\$308.3
Central Heating	\$16.9	\$10.4	\$14.6	\$14.0
Local Fixed Heater	\$71.6	\$75.3	\$72.8	\$73.2
Portable Heater	\$53.2	\$57.7	\$51.0	\$54.0
Water Heater	\$15.2	\$14.2	\$13.6	\$14.3
Fixed, Central Air Conditioning	\$16.6	\$13.4	\$22.7	\$17.6
Portable Air Conditioner	\$9.6	\$12.4	\$36.2	\$19.4
Other	\$105.5	\$123.2	\$148.8	\$125.8
Electric Cooking Equipment	\$306.5	\$295.3	\$443.9	\$348.6
Range/Oven	\$241.4	\$229.7	\$321.3	\$264.1
Range/Oven Hood	\$2.4	\$2.0	\$3.8	\$2.7
Deep Fat Fryer	\$4.2	\$3.2	\$3.0	\$3.5
Grill	\$0.3	\$1.5	\$1.1	\$1.0
Microwave Oven	\$9.2	\$9.8	\$23.8	\$14.3
Small Heat-Producing Appliance	\$14.0	\$13.1	\$27.7	\$18.2
Other	\$58.2	\$58.9	\$63.3	\$60.1
Electrical Distribution	\$313.6	\$326.1	\$644.5	\$428.1
Installed Wiring	\$149.9	\$169.0	\$310.6	\$209.8
Light Fixture	\$27.4	\$25.2	\$55.9	\$36.1
Receptacle, Switch	\$36.5	\$30.8	\$67.8	\$45.0
Cord, Plug	\$33.3	\$34.3	\$65.3	\$44.3
Lamp, Light Bulb	\$15.5	\$13.7	\$21.6	\$16.9
Panel Board	\$9.3	\$13.1	\$20.6	\$14.3
Meter	\$8.1	\$6.7	\$11.2	\$8.6
Transformer	\$1.9	\$1.4	\$3.0	\$2.1
Other	\$31.7	\$31.8	\$88.7	\$50.8
Other Selected Electrical Appliances	\$123.6	\$107.5	\$144.5	\$125.2
Clothes Dryer	\$62.5	\$49.1	\$71.6	\$61.1
Dishwasher	\$11.3	\$12.3	\$15.1	\$12.9
Audio/Visual Equipment	\$10.9	\$5.1	\$9.7	\$8.6
Washing Machine	\$1.8	\$2.4	\$4.2	\$2.8
Refrigerator/Freezer	\$24.0	\$25.0	\$29.1	\$26.0
Shop/Garden Tool	\$9.1	\$11.6	\$10.9	\$10.6
Torch	\$4.0	\$2.0	\$3.8	\$3.3

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.

¹⁸ 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 8c on p. 34 for details.

TABLE 5a
ESTIMATED RESIDENTIAL STRUCTURE FIRES
SELECTED GAS-FIRED EQUIPMENT, 2013–2015

Equipment	2013	2014	2015	2013–2015 Average
Total Residential¹⁹	359,400	361,500	370,900	363,900
Total Gas-Fired Equipment	7,200	7,000	11,100	8,400
Gas Heating Equipment	2,400	2,300	3,000	2,600
Fixed Heater	800	800	1,000	800
Portable Heater	100	100	200	100
Central Heating	300	300	400	300
Fireplace, Chimney, Connector	200	200	200	200
Water Heater	800	700	1,000	800
Fixed, Central Air Conditioning	*	*	*	*
Other	200	200	300	200
Gas Cooking Equipment	2,800	2,600	3,900	3,100
Range/Oven	2,000	1,800	2,700	2,100
Open Gas Grill	400	400	700	500
Other	400	400	600	500
Other Selected Gas Equipment	1,700	1,800	2,500	2,000
Clothes Dryer	1,100	1,100	1,600	1,200
Torch	400	400	500	400
Shop/Garden Tool	300	300	500	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.

¹⁹ 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 8a on p. 34 for details.

TABLE 5b
ESTIMATED RESIDENTIAL STRUCTURE FIRE DEATHS
SELECTED GAS-FIRED EQUIPMENT, 2013–2015

Equipment	2013	2014	2015	2013–2015 Average
Total Residential²⁰	2,290	2,420	2,230	2,320
Total Gas-Fired Equipment	80	80	80	80
Gas Heating Equipment	10	40	20	20
Fixed Heater	10	20	10	10
Portable Heater	*	20	*	10
Central Heating	*	*	*	*
Fireplace, Chimney, Connector	*	*	*	*
Water Heater	*	*	*	*
Fixed, Central Air Conditioning	*	*	*	*
Other	*	*	*	*
Gas Cooking Equipment	60	30	40	50
Range/Oven	60	20	*	40
Open Gas Grill	*	*	*	*
Other	*	10	*	*
Other Selected Gas Equipment	*	*	10	*
Clothes Dryer	*	*	*	*
Torch	*	*	*	*
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.

²⁰There were no NFIRS confined fire deaths in 2013, 2014, or 2015.

TABLE 5c
ESTIMATED RESIDENTIAL STRUCTURE FIRE INJURIES
SELECTED GAS-FIRED EQUIPMENT, 2013–2015

Equipment	2013	2014	2015	2013–2015 Average
Total Residential²¹	11,420	11,120	10,800	11,110
Total Gas-Fired Equipment	550	480	670	570
Gas Heating Equipment	180	170	200	180
Fixed Heater	80	50	110	80
Portable Heater	10	30	10	20
Central Heating	20	10	20	20
Fireplace, Chimney, Connector	10	10	10	10
Water Heater	40	50	50	50
Fixed, Central Air Conditioning	*	*	*	*
Other	20	30	*	20
Gas Cooking Equipment	290	210	260	260
Range/Oven	220	160	200	190
Open Gas Grill	30	20	50	30
Other	40	40	20	30
Other Selected Gas Equipment	60	70	100	70
Clothes Dryer	40	30	50	40
Torch	10	20	30	20
Shop/Garden Tool	10	20	20	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.

²¹ 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 8b on p. 34 for details.

TABLE 5d
ESTIMATED RESIDENTIAL STRUCTURE FIRE PROPERTY LOSS (In Millions)
SELECTED GAS-FIRED EQUIPMENT, 2013–2015

Equipment	2013	2014	2015	2013–2015 Average
Total Residential²²	\$6,218.3	\$6,352.1	\$6,631.0	\$6,400.5
Total Gas-Fired Equipment	\$208.6	\$247.7	\$355.1	\$270.4
Gas Heating Equipment	\$77.2	\$112.9	\$111.0	\$100.4
Fixed Heater	\$24.7	\$17.4	\$22.1	\$21.4
Portable Heater	\$5.9	\$4.8	\$30.1	\$13.6
Central Heating	\$11.4	\$8.5	\$12.4	\$10.8
Fireplace, Chimney, Connector	\$7.7	\$55.8	\$8.0	\$23.9
Water Heater	\$20.1	\$16.6	\$31.9	\$22.9
Fixed, Central Air Conditioning	*	\$0.1	\$0.2	\$0.1
Other	\$7.3	\$9.7	\$6.2	\$7.7
Gas Cooking Equipment	\$73.9	\$66.0	\$127.0	\$89.0
Range/Oven	\$43.3	\$40.3	\$47.2	\$43.6
Open Gas Grill	\$17.9	\$16.1	\$64.9	\$33.0
Other	\$12.7	\$9.7	\$14.9	\$12.4
Other Selected Gas Equipment	\$48.8	\$56.3	\$42.1	\$49.1
Clothes Dryer	\$16.2	\$10.5	\$13.4	\$13.4
Torch	\$10.1	\$33.6	\$15.1	\$19.6
Shop/Garden Tool	\$22.6	\$12.1	\$13.7	\$16.1

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. Estimates exclude property loss from intentionally set fires.

²² 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 8c on p. 34 for details.

Methodology

The Methodology section is divided into five major sections. Section 1 describes the data from which fire loss estimates were made. Section 2 describes the procedures for preparing the data and dealing with missing data. Section 3 describes the quality-control checking and correction of the data. Section 4 describes how the fire loss estimates were made. Section 5 describes other issues that relate to the data and the estimates.

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.²³ 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 2013 through 2015.

Table 6. NFPA Estimates of Residential Structure Fires and Associated Losses 2013–2015

	2013	2014	2015
Structure Fires	387,000	386,500	388,000
Civilian Deaths	2,785	2,795	2,605
Civilian Injuries	12,575	12,175	11,575
Property Loss	\$6.97 billion	\$6.99 billion	\$7.21 billion

Source: See footnote 1 below.

The table above contains the only data from the NFPA survey that CPSC staff uses 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 2014 and 2015. There were no reports from Wyoming in 2013. Not all the states reporting included data from every fire department in the state. The number of fire departments participating in NFIRS increased from 21,585 in 2013 to 21,980 in 2014 and then increased again to 22,610 in 2015. Table 7 shows the number of residential structure fires and the corresponding losses reported to USFA from 2013 through 2015.

²³ M.J. Karter, "Fire Loss in the U.S. During 2013," National Fire Protection Association (NFPA), September 2014; M.J. Karter, "Fire Loss in the U.S. During 2014," National Fire Protection Association (NFPA), September 2015; M.J. Karter, "Fire Loss in the U.S. During 2015," National Fire Protection Association (NFPA), September 2016.

Table 7. Residential Structure Fires and Associated Losses Reported to NFIRS 2013–2015

	2013	2014	2015
Structure Fires	263,903	272,209	269,521
Civilian Deaths	1,404	1,489	1,503
Civilian Injuries	6,916	7,147	6,872
Property Loss	\$4.28 billion	\$4.50 billion	\$4.46 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 387,200 residential structure fires in the United States during 2013 to 2015, and an annual average of 2,730 deaths, 12,100 injuries, and \$7.1 billion in property losses during the same period (Table 6). NFIRS captured about 69 percent of these fires, 54 percent of the deaths, 58 percent of the injuries, and 63 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 in 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 (<i>e.g.</i> , 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 (<i>e.g.</i> , candle, lighter, cigarette, heat from operating equipment, hot object).
<i>Item First Ignited</i>	The functional description or use of that item that was first ignited by the heat source (<i>e.g.</i> , 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"> 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. <p>CPSC staff regrouped the codes as:</p> <ul style="list-style-type: none"> 1: intentional 0, 2, 3, 4 or fire involving child play*: unintentional 5, U, missing information: unknown.
<i>Factors Contributing to Ignition</i>	The event that allowed the heat source and the item first ignited to combine to start the fire. These add specificity to the cause of ignition, such as playing with heat source, heat source too close to combustibles, equipment malfunction.

* See discussion on child play later in this section.

Human Factors Contributing to Ignition

Factors relating to the person or persons involved with the start of the fire. Examples are asleep, possibly impaired by alcohol or drugs, age, unattended or unsupervised person.

Age

Age of the person, if age was considered a factor in contributing to the ignition of the fire.

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, Equipment Portability, Factors Contributing to Ignition, Human Factors Contributing to Ignition, and Age are not required fields. In the change that was incorporated beginning with 2012 data, Equipment Involved became required if certain Heat Source or Factor Contributing to Ignition codes were entered. Beginning in 2015, Equipment Involved reverted to not being a required field, no matter what Heat Source is coded. Variables that are not required are more likely to be missing from a given fire incident report in NFIRS than those that are required.²⁴

In the change that was incorporated beginning with 2012 data, Equipment Involved became required if certain Heat Source or Factor Contributing to Ignition codes were entered. This, not surprisingly, led to a smaller proportion of missing data for Equipment Involved in 2012, 2013, and 2014. Because the code ‘NNN – No equipment involved in ignition’ was also not permitted for fires with these particular Heat Source and Factor Contributing to Ignition codes, the proportion of fires coded as “NNN – No equipment involved in ignition” is much lower in 2012, 2013, and 2014, than in previous years. Requiring Equipment Involved to be coded if certain Heat Source²⁵ codes are entered also appears to have led to entering fewer fires with those Heat Source codes in 2012, 2013, and 2014.

In 2015, when Equipment Involved in Ignition reverted to not being required, even when the Heat Source coded implied that equipment was involved, the proportion of fires coded in the effected Equipment Involved in Ignition codes did not revert to the levels they were at before 2012. For example, from 2009 to 2011, 37.3 percent of NFIRS nonconfined residential structure fires were coded as ‘NNN – No equipment involved in ignition.’ For 2012–2014, when that code was not permitted for fires with certain Heat Source codes, that proportion dropped to 32.1 percent. In 2015, when coders were again permitted to ‘NNN – No equipment involved’ no matter the Heat Source, 31.6 percent of residential structure fires were coded as ‘NNN – No equipment involved’.

In 2009 to 2011, 48.7 percent of NFIRS nonconfined residential structure fires had an Equipment Involved in Ignition that was left blank or was coded as ‘UUU – Equipment involved in ignition undetermined’. In 2012 to 2014, that proportion dropped to 36.0 percent. In 2015, it was 41.3 percent. In 2009 to 2011, 2.5 percent of NFIRS nonconfined residential structure fires had an Equipment Involved in Ignition coded between 200 and 263, which are the codes for “Electrical Distribution, Lighting and Power Transfer”. Between 2012 and 2014, when the new rule required that Equipment Involved in Ignition be coded for fires with certain Heat Source codes (including ‘13 – Arcing’), the proportion of fires with an Equipment Involved in Ignition code between 200 and 263 jumped to 8.0 percent. It had been 2.5 percent over the period from 2009 to 2011. In 2015 it was 6.6 percent.

²⁴ NFIRS Complete Reference Guide, January 2015.

²⁵ There are four of these heat source codes: ‘10 – Heat from powered equipment, other’; ‘11 – Spark, ember, or flame from operating equipment’; ‘12 – Radiated, conducted heat from operating equipment’; ‘13 – Arcing.’

CPSC staff had a decision to make. When staff was first producing NFIRS estimates for 2012 fires, staff felt compelled to make an adjustment because the large increase in estimates for certain products (if no adjustment was made) were a function of the new rule and not a function of an increase in actual fires for those products. When the rule changed back in 2015, the coding practices did not revert back, or at least not all the way back, to pre-2012 practices. Perhaps some coders had formed the habit of coding Equipment Involved in Ignition for these fires and continued to do so beyond when it was required. Over time, these newer habits could erode as there is turnover among coders at NFIRS fire departments. CPSC staff determined it did not seem possible to produce estimates that were completely comparable to 2011, or 2014 in a repeatable and defensible way.

CPSC staff chose instead to stop making these adjustments beginning with the 2015 data. This means a large increase in estimates for particular products. Staff understands that this increase is likely, to a large degree, a function of the rule change having a lasting effect on some coding behavior, and not the result of an actual increase in these types of fires. An important question to ask is if there is an upward shift in estimates after 2014, does that shift produce estimates that are closer to the true number of fires (and losses) for these products?

While CPSC staff does not have a definitive answer to this question, it is useful to think about the rule change and the effect that it may have had. There are many different Electrical Distribution codes for Equipment Involved in Ignition. Examples include '211 – Electrical power (utility)', '212 – Electrical service supply wires from utility', '213 – Electric meter, meter box', '214 – Wiring from meter box to circuit breaker', '215 – Panelboard, switchboard, circuit breaker board', '216 – Electrical branch circuit', etc. It seems reasonable that there would be many electrical fires where the attending fire department would determine the fire to have been caused by electrical wiring or some other electrical source, but not know what the correct code is. Before 2012, the person coding the NFIRS report was permitted to leave the Equipment Involved in Ignition code blank for such fires or code them as undetermined. From 2012 to 2014, they were forced to select a code. This means that the data in 2012 to 2014 (and to some degree in 2015) have more electrical fires getting specific electrical fire codes where before they may be left blank or coded as unknown. Data that is left blank or coded as unknown gets allocated among all of the possible Equipment Involved in Ignition codes.

It is possible that electrical fires and losses have been underestimated in the past and that the increased use of specific equipment codes will lead to more accurate estimates of electrical fires. It also stands to reason that there might be an increase in coders selecting an incorrect specific electrical code where in the past they might have not coded an equipment or coded it as undetermined. An example would be a fire where it was thought to have started in either an electrical outlet, a power cord, or an extension cord. Before 2012, perhaps this type of fire would typically have a missing or unknown equipment code. From 2012 to 2014, perhaps this type of fire would see the specific codes for outlet, power cord, or extension cord get selected (sometimes correctly and sometimes incorrectly). In 2015, it seems likely that some coders would have reverted to leaving the equipment blank or coding it as unknown, while others have continued to select specific equipment codes.

It is not only electrical distribution equipment that has seen an increase in estimates related to CPSC staff not making the rule change adjustment in 2015. While that particular type of equipment seems to have the biggest change, there is also an increase for heating and cooling equipment and cooking equipment. The effect is largest for fires and property loss. The effect is smaller for injuries and deaths, but there is still an effect.

From 2012 to 2014, a very small adjustment was made for Heat Source, due to the fact that the rule change seemed to cause coders to be slightly less likely to select the codes that would then require them to code an equipment. That adjustment was stopped in 2015 which could lead to a very small effect on

estimates of Heat Source products (Table 2), such as Cigarette, match, lighter, and candle. No adjustments were ever made for products that are Item First Ignited, such as Upholstered Furniture, Mattress and bedding, Floor Covering, etc. So the estimates for these products should be unaffected.

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 above, 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 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, then it is likely 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, then it is likely that no equipment was involved.

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

These changes 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.

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. Thus, 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. Any residential structure exposure fire that originated from a non-residential structure fire is also considered in-scope for this report. 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

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

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 fire 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. 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 8a through 8c 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 8a. Estimated Residential Confined Fires: 2013–2015

Included in Table Categories:	Appear in Tables:	2013	2014	2015
Total Residential	1a, 2a, 3a, 4a, 5a	190,300	191,200	193,000
Total Heating and Cooling Equipment	1a, 3a	30,600	29,600	26,700
<i>Fireplace, Chimney, Connector</i>	<i>1a, 3a</i>	<i>21,300</i>	<i>20,800</i>	<i>18,300</i>
<i>Other (Burner/Boiler)</i>	<i>1a, 3a</i>	<i>9,300</i>	<i>8,700</i>	<i>8,400</i>
Cooking	1a, 2a	140,700	142,900	146,900
Trash, Rubbish	2a	17,500	17,100	17,900
Incinerator	-	600	600	600
Trash Compactor	-	900	900	900

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 2013, 2014, or 2015.

Table 8b. Estimated Residential Confined Fire Injuries: 2013–2015

Included in Table Categories:	Appear in Tables:	2013	2014	2015
Total Residential	1c, 2c, 3c, 4c, 5c	1,690	1,510	1,420
Total Heating and Cooling Equipment	1c, 3c	50	80	40
<i>Fireplace, Chimney, Connector</i>	<i>1c, 3c</i>	<i>20</i>	<i>30</i>	<i>20</i>
<i>Other (Burner/Boiler)</i>	<i>1c, 3c</i>	<i>30</i>	<i>40</i>	<i>30</i>
Cooking	1c, 2c	1,560	1,360	1,310
Trash, Rubbish	2c	70	70	60
Incinerator	-	10	*	*
Trash Compactor	-	10	*	*

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 8c. Estimated Residential Confined Fire Property Loss (In Millions): 2013–2015

Included in Table Categories:	Appear in Tables:	2013	2014	2015
Total Residential	1d, 2d, 3d, 4d, 5d	\$45.9	\$40.8	\$44.2
Total Heating and Cooling Equipment	1d, 3d	\$8.5	\$9.1	\$8.5
<i>Fireplace, Chimney, Connector</i>	<i>1d, 3d</i>	<i>\$6.0</i>	<i>\$7.1</i>	<i>\$6.3</i>
<i>Other (Burner/Boiler)</i>	<i>1d, 3d</i>	<i>\$2.5</i>	<i>\$2.0</i>	<i>\$2.3</i>
Cooking	1d, 2d	\$34.8	\$28.7	\$32.1
Trash, Rubbish	2d	\$2.2	\$2.6	\$2.7
Incinerator	-	\$0.3	\$0.4	\$0.7
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 9a–9c 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 9a. Missing Data on Residential Structure Fires: 2013–2015

	2013	2014	2015
Cause of Ignition	35%	35%	34%
Heat Source	39%	39%	39%
Item First Ignited	38%	39%	39%
Equipment Involved	36%	37%	41%
Equipment Power	35%	37%	41%

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

Table 9b. Missing Data on Residential Structure Fire Deaths: 2013–2015

	2013	2014	2015
Cause of Ignition	59%	62%	60%
Heat Source	62%	64%	63%
Item First Ignited	62%	63%	64%
Equipment Involved	49%	52%	55%
Equipment Power	50%	52%	53%

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

Table 9c. Missing Data on Residential Structure Fire Injuries: 2013–2015

	2013	2014	2015
Cause of Ignition	36%	38%	39%
Heat Source	35%	37%	39%
Item First Ignited	33%	36%	37%
Equipment Involved	28%	29%	34%
Equipment Power	28%	29%	34%

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[®] macro.²⁶ The raking procedure maintains the marginal distributions for the known data, while allocating the unknown data for all characteristics involved.²⁷ 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 of the tables 1 – 5 (a – d). In 2013, there was a lot of volatility in the estimates from the raking for Table 2b (the fire death estimates for products that are a Heat Source or Item First Ignited). The raking behaved erratically and produced estimates abnormally high for some products and abnormally low for others even though these discrepancies were not apparent in the pre-rake counts. To cope with this, in order to produce the Table 2b estimates for 2013, CPSC staff ran a raking on combined 2012 – 2014 data where year was added as a raking variable. This smoothed out the estimates for 2013.

²⁶ 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.

²⁷ 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.

This erratic behavior in the initial Table 2b raking for 2013 is more likely to happen as more and more of the data is unknown, which is the trend with Heat Source in deadly fires. It is also more likely to happen the more *cells* that there are in the raking. Cells are the different values for the known data that the unknown data are allocated into. For example, in Table 2b, the different cells are all the different possible combinations of the three raking variables: Cause of Ignition (Unintentional or Intentional), Heat Source (Cigarette, Candle, Match, Lighter, etc.), and Item First Ignited (Upholstered Furniture, Mattress, Bedding, Cooking Materials, Floor Covering, Clothing, etc.). The number of cells in the raking is the product of the number of levels for each of these variables. So for Table 2b, the raking was dealing with a large number of cells, a lot of missing data, and a lot of cells filled with zeros (combinations of the three raking variables where there are zero NFIRS deaths for a given year).

In anticipation of more difficulties like the one that occurred for Table 2b in 2013, CPSC staff decided to make a change for 2015 and subsequent years. Instead of using just one raking per table, now CPSC staff does a raking for each product. For example, for the Table 2b estimate for 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 candle fire deaths is produced. Such rakings are done for each row in each table. With so few cells in the rakings, this should prevent the problem that occurred in 2013, from happening in the future.

Quality Control Checks of NFIRS Data

In 2006, a California home fire with a \$100 million property loss was reported to NFIRS. Because this loss was unusually high, CPSC staff decided to assign the fire to CPSC field staff to investigate and confirm the amount of this large property loss. The actual fire department estimate of property loss for the fire was \$100,000. The property loss was corrected, and the weight used for property loss estimates was changed accordingly.

Accordingly, CPSC staff initiated more quality-control checking of the NFIRS data, beginning with the 2007 data. In 2013, 2014, and 2015, residential structure fires with reported property losses of \$5 million or higher were assigned to CPSC field staff to confirm with the fire department the high property loss estimate. There were 15 high property loss fires from 2015 assigned for investigation. In six of the fires, the property loss estimate was confirmed. In the other nine fires, a different property loss estimate was obtained, and the data were corrected.

In addition to the quality-control checking of high property loss fire reports, some quality control was carried out on multiple-death fire incidents for the 2013, 2014, and 2015 data. In cases with three or more civilian deaths reported, a search of the Internet was conducted to look for news articles and fire marshal reports to confirm (or add to) the fire cause information given in the NFIRS report. There were 17 cases from 2015 where it appeared that there might be information to conflict with or add to the information from the NFIRS report. These cases were assigned to field staff to contact the fire department and reconcile the information. From these investigations, nine cases had fire cause information edited. In two instances, the investigation concluded that the deaths involved occurred before the fires (one involved a murder-suicide and the other involved a plane crash) and the data was edited so that there were no deaths attributed to these fires.

For the 2015 data, a new class of NFIRS incident was assigned to CPSC field staff for investigation. There has been concern that some fires where the "Heat Source" was coded as '43 – Hot ember or ash' or where the "Heat Source" was coded as '60 – Heat from other open flame or smoking materials', are actually miscodings of fires where a cigarette was the correct "Heat Source". For the 2015 data, CPSC staff assigned to field investigators all incidents with at least one fire death where the coded "Heat

Source” was either ‘43 – Hot ember or ash’ or ‘60 – Heat from other open flame or smoking materials’. In these cases, the investigator was instructed to contact the attending fire department and inquire about what specifically provided the source of heat for the fire.

In 2015, there were 43 residential structure fires in NFIRS with at least one death and a “Heat Source” coded as either ‘43 – Hot ember or ash’ or ‘60 – Heat from other open flame or smoking materials’. One had been assigned to CPSC field investigators for an investigation for other reasons before this quality control effort began. CPSC staff assigned the remaining 42 incidents to field investigators to try to identify the heat source of each of these fires. These 42 fires led to 45 deaths and 12 nonfatal injuries.

Of these 42 fatal fires, 18 were coded with a “Heat Source” of ‘43 – Hot ember or ash’ and 24 were coded ‘60 – Heat from other open flame or smoking materials’. Of the 18 deadly fires that were coded as ‘Hot ember or ash’, an investigation was completed in 15 of them. From those 15 investigations, CPSC staff edited the “Heat Source” in 10 of them including six where CPSC staff changed the “Heat Source” to ‘61 – Cigarette’. In two other incidents, the “Heat Source” was changed to ‘UU – Undetermined heat source’, which means it was then subject to allocation. Of the 24 deadly fires where the “Heat Source” was coded as ‘60 – Heat from other open flame or smoking materials’, CPSC field staff were able to complete investigations for 20 of them. From these 20 completed investigations, information was provided such that CPSC staff changed the “Heat Source” in 18 of them, including seven where the “Heat Source” was changed to ‘61 – Cigarette’.

The “Heat Source” codes of ‘43 – Hot ember or ash’ and ‘60 – Heat from other open flame or smoking materials’ are two of the heat sources that comprise the ‘Other’ category for the estimates for ‘Upholstered Furniture’ and ‘Mattress, Bedding’ in Tables 2a, 2b, 2c, and 2d. This editing that was done in 2015 will have the effect of increasing the deaths estimates (Table 2b) for the ‘Smoking’ subset of ‘Upholstered Furniture’ and ‘Mattress, Bedding’ and decreasing the ‘Other’ estimates. A shift of one NFIRS fire death from one category to another will shift the estimates by more than one, due to the deaths being weighted and because the editing is done before the unknowns are allocated. To a lesser degree than the deaths (Table 2b), this shift will occur for the injury estimates (Table 2c) because there were also some nonfatal injuries that occurred in these fires.

Summary of Changes

For the 2015 estimates in this report, and for the estimates for subsequent years, there are three differences from the methodology for producing estimates for previous years. The first is that CPSC staff did not make adjustments for the Equipment Involved in Ignition rule change as they did in 2012, 2013, and 2014. This lack of adjustment will lead to much higher estimates for many equipment products, particularly electrical distribution equipment.

The second difference is that raking was done for each row in each table as opposed to just one per table. This will have a small effect on estimates, but not a consistently upward or downward effect. This change should prevent the raking from misbehaving even if the proportion of data that is unknown (particularly for deadly fire Heat Sources) continues to rise.

The third change is that quality control editing for deadly fires coded with a Heat Source of ‘43 – Hot ember or ash’ or ‘60 – Heat from other open flame or smoking materials’, are assigned to CPSC field staff for possible editing. This change should lead to a shift in the estimates for fire deaths from ‘Other’ Heat Source in Table 2b (under Upholstered Furniture and Mattress, Bedding) to ‘Smoking Material Ignition’ and an increase in the estimates for ‘Cigarette, Other Tobacco Products’.

Comparisons between 2015 estimates and estimates for previous years should be made with caution because these changes have an effect on the estimates.