STRUCTURE FIRES IN RESIDENTIAL BOARD AND CARE FACILITIES

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December 2009

National Fire Protection Association
Fire Analysis and Research Division

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Abstract

Based on data from the U.S. Fire Administration's (USFA's) National Fire Incident Reporting System (NFIRS) and the National Fire Protection Association's (NFPA's) annual fire department experience survey, NFPA estimates that an average of 2,070 structure fires in residential board and care facilities per year were reported to U.S. fire departments during 2003-2007. These fires caused an estimated average of ten civilian deaths, 70 civilian injuries and $10.9 million in direct property damage per year. Cooking caused more than three-quarter of these incidents, but two-thirds of the deaths resulted from fires started by smoking materials.

Keywords: Fire statistics, residential board and care, assisted living fires

Acknowledgements

The National Fire Protection Association thanks all the fire departments and state fire authorities who participate in the National Fire Incident Reporting System (NFIRS) and the annual NFPA fire experience survey. These firefighters are the original sources of the detailed data that make this analysis possible. Their contributions allow us to estimate the size of the fire problem.

We are also grateful to the U.S. Fire Administration for its work in developing, coordinating, and maintaining NFIRS.

For more information about the National Fire Protection Association, visit www.nfpa.org or call 617-770-3000. To learn more about the One-Stop Data Shop go to www.nfpa.org/osds or call 617-984-7443.

Copies of this analysis are available from:

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Contents

List of Tables and Figures

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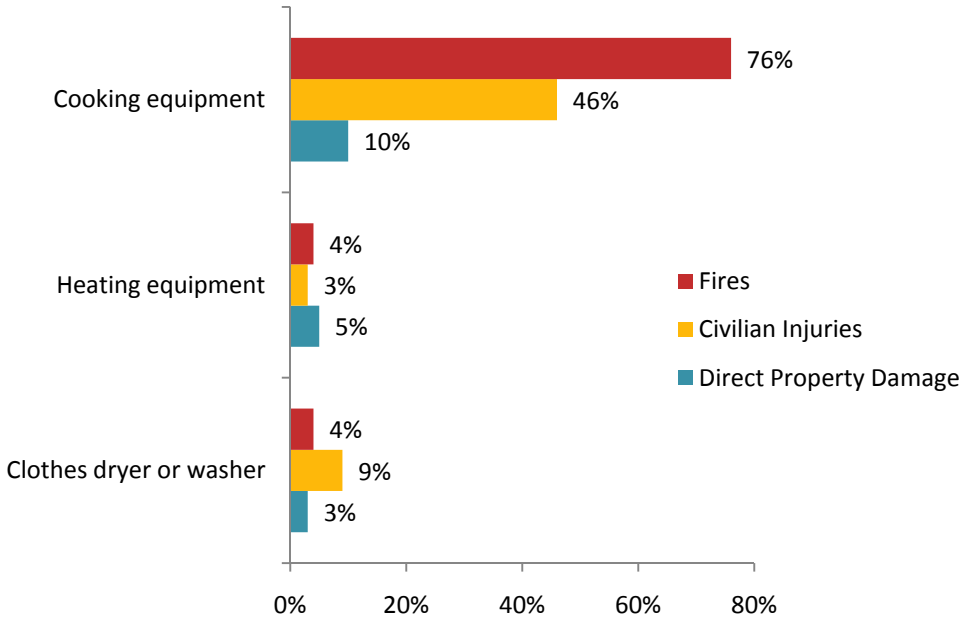
Structure Fires in Residential Board and Care Facilities

U.S. Fire departments responded to an estimated average of 2,070 structure fires in residential board and care facilities annually during 2003-2007. These fires caused annual averages of:

- 10 civilian deaths
- 70 civilian injuries
- $10.9 million in direct property damage

Three of every four structure fires in residential board and care facilities were caused by cooking and the kitchen was the leading area of origin.

Structure Fires in Board and Care Facilities, by Leading Cause
2003-2007 Annual Averages



- Smoking materials caused 3% of fires but 63% of the civilian deaths.
- Fires that started on mattress or bedding material caused 44% of the civilian deaths in these properties.
- Structure fires in these properties peak between 4 and 7 p.m.
- Saturday was the peak day for fires in these properties.

Structure Fires in Residential Board and Care Facilities

The statistics in this analysis are national estimates derived from Version 5.0 of the U.S. Fire Administration's (USFA) National Fire Incident Reporting System (NFIRS) and NFPA's annual fire department experience survey. Details on the methodology used may be found in Appendix A.

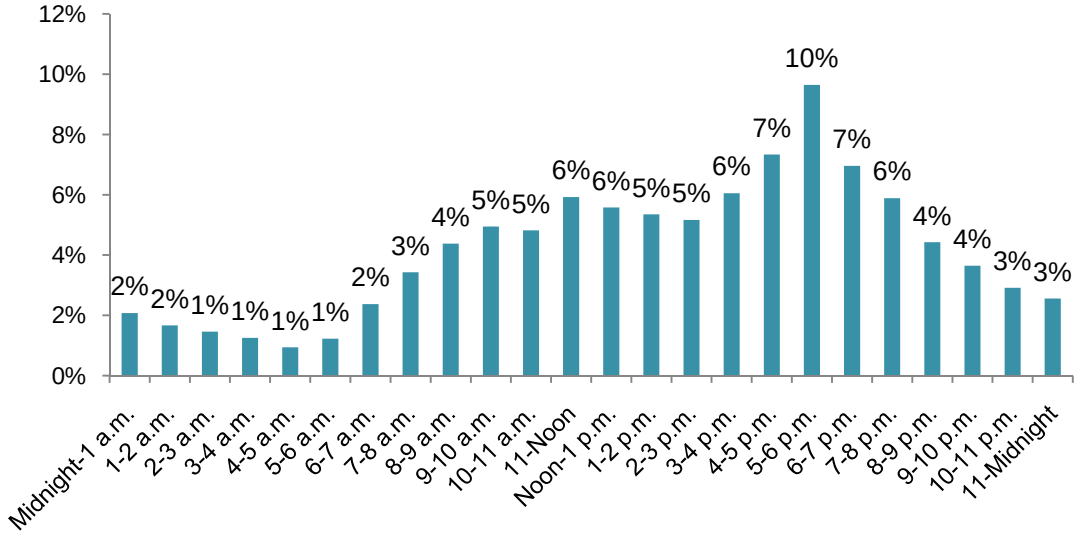
This report contains national estimates for structure fires in residential board and care facilities, captured as property use code 459 in NFIRS Version 5.0. Only fires reported to municipal fire departments are included in these statistics.

2,070 board and care structure fires were reported per year, on average,
In 2003-2007, U.S. fire departments responded to an average of 2,070 fires per year in these properties. These fires caused an average of ten civilian deaths, 70 civilian injuries, and $10.9 million in direct property damage per year. Version 5.0 of NFIRS introduced shorter reporting requirements for cooking fires confined to the vessel, fires confined to chimney or flues, to incinerators, fuel burners or boilers, and to contained trash or rubbish fires with no flame damage to the structure. In 2003-2007, 78% (1,610) of the fires reported in residential board and care facilities were reported as confined incident fires. Additional causal information is not required for these incidents.

0.4% of all reported structure fires occurred in residential board and care facilities.
During 2003-2007, the 2,070 fires in residential board and care facilities accounted for 0.4% of the 522,200 structure fires, 0.3% of the 3,100 civilian structure fire deaths, 0.5% of the 15,230 civilian structure fire injuries, and 0.1% of the $9.3 billion in direct property loss.

Structure fires in these properties peak between 4 and 7 p.m.
Tables 1, 2, and 3 show reported structure fires in these properties by month, day of week and alarm time, respectively. November and December were the peak months for fires in these facilities. Saturday was the peak day for fires in these properties. Figure 1 shows that fires in these properties peaked between 4:00 p.m. and 6:59 p.m. Only 16% of these fires occurred between 10:00 p.m. and 6:59 a.m.

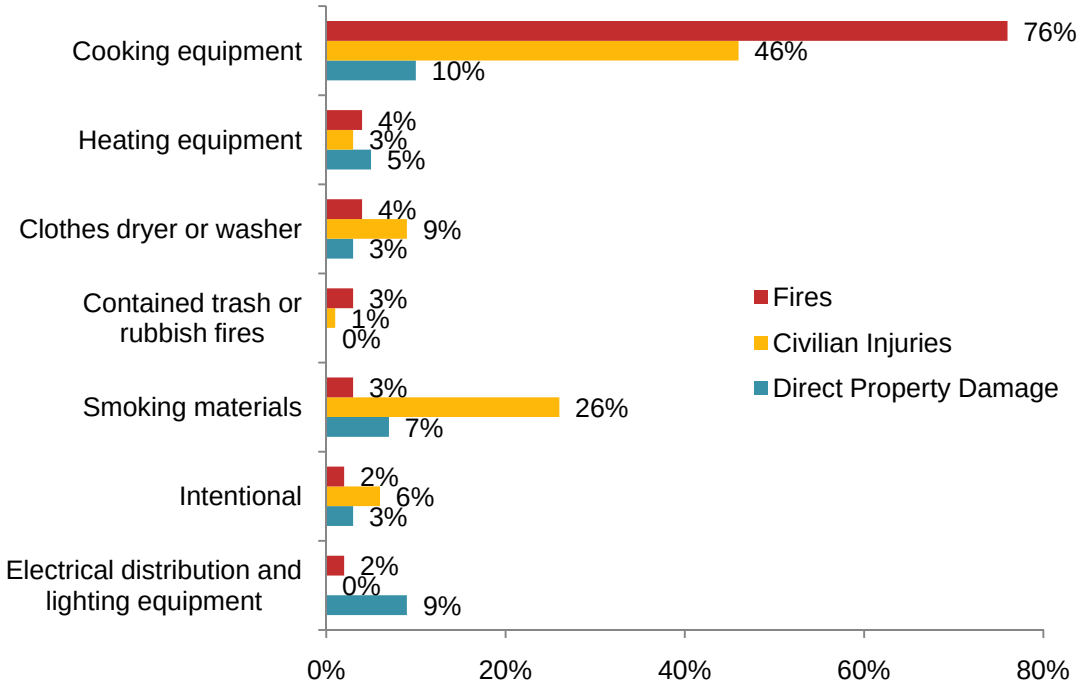
Figure 1. Structure Fires in Board and Care Facilities, by Time of Day
2003-2007 Annual Averages



Three of every four of these fires were caused by cooking.
Table 4 shows the leading causes of fires in these properties with data summarized from several NFIRS fields. In some cases, the equipment involved in ignition is most relevant; heat source, the field "cause," and factor contributing to ignition also provide relevant information. The causes shown in this table are not mutually exclusive when they have been pulled from different fields. Only causes that describe a scenario are shown. More detailed information on equipment involved in ignition may be found in Table 5; more information on heat source is shown in Table 6.

Confined cooking fires accounted for 71% of the reported fires in residential board and care facilities. Cooking equipment was identified as the equipment involved in ignition in an additional 5% of these fires. Overall, cooking equipment was involved in 76% of the fires reported in these properties. Including confined fuel burner, boiler and chimney fires, heating equipment was involved in 4% of these incidents. Clothes dryers or washers were involved in 4% of the fires. Smoking materials caused 3% of the fires but 63% of the deaths in these properties. Three percent of the incidents were confined or contained trash fires. Two percent were intentional and two percent involved electrical distribution and lighting equipment.

Figure 2. Structure Fires in Board and Care Facilities, by Leading Cause
2003-2007 Annual Averages



The kitchen was the leading area of origin.
Assuming that confined cooking fires occurred in the kitchen, 77% of the residential board and care fires started in the kitchen. None of the fatalities resulted from kitchen fires. Four percent of the fires started in a bedroom. Two percent started in the laundry room or area. (See Table 7.)

Fires that started on mattress or bedding material caused 44% of the civilian deaths in these properties.
Assuming that cooking materials, including food were the item first ignited in the confined cooking fires, this was the item first ignited in 71% of fires in board and care facilities. Mattress or bedding material was the item first ignited in only 2% of the fires in these facilities. However, 44% of the deaths resulted from these incidents. (See Table 8.)

When the fire was large enough to activate the sprinkler, 98% of automatic extinguishing equipment operated and were 100% effective when operated.
In 2003-2007, 43% of reported fires in residential board and care facilities were in properties with some type of automatic extinguishing equipment. Comparatively, 16% of reported fires in apartments, 33% of reported fires in lodging and rooming houses, 48% of reported fires in hotels and motels, and 70% of reported fires in nursing homes all had some type of automatic extinguishing equipment.

When automatic extinguishing equipment was present, 89% were sprinklers. Ninety-eight percent of AES systems present during the fire operated when the fire was not too small to activate it and was effective in 100% of the fires when the equipment operated. See NFPA's report, *U.S. Experience with Sprinklers and Other Automatic Fire Extinguishing Equipment* (2009) for more information.

Only 4% of these fires extended beyond the room of origin.
As noted earlier, 78% of these fires had incident types indicating that they were confined or contained fires. Another 11% were coded to indicate that flame damage was confined to the object of origin. Seven percent of the fires extended beyond the initial item ignited but were confined to the room of origin. One-third of the deaths resulted from fires that were confined to the room of origin. (See Table 9.)

An estimated 410 outside and other fires were reported on these properties per year.
In 2003-2007, an estimated average of 410 outside and other fires on board and care facility properties were reported per year. These fires caused an annual average of one civilian death, four civilian injuries, and $0.1 million in direct property damage. During the same time period, an average of 30 vehicle fires reported on these properties caused an average of $0.2 million in direct property damage per year. No reported civilian deaths or injuries were associated with vehicle fires on these properties.

Additional information sources
NFPA members can download a number of investigation reports on board and care fires at no cost from the Research and Reports section of NFPA's website at http://www.nfpa.org/. Non-members may order investigation reports through the NFPA library.

Philip R. Jose's chapter, "Board and Care Facilities," in the 20th edition of the NFPA *Fire Protection Handbook,* describes some of the special fire safety concerns for these properties.

Table 1. Structure Fires in Residential Board and Care Facilities, by Month
2003-2007 Annual Averages

Month	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
January	180	(9%)	0	(0%)	3	(4%)	$0.9	(8%)
February	150	(7%)	1	(13%)	11	(15%)	$0.3	(3%)
March	170	(8%)	0	(0%)	4	(6%)	$1.7	(16%)
April	190	(9%)	1	(10%)	3	(5%)	$0.6	(5%)
May	180	(9%)	1	(9%)	9	(13%)	$0.6	(5%)
June	140	(7%)	0	(0%)	1	(2%)	$2.4	(22%)
July	160	(8%)	0	(0%)	5	(8%)	$1.0	(9%)
August	150	(7%)	0	(0%)	7	(9%)	$0.6	(6%)
September	170	(8%)	0	(0%)	3	(4%)	$1.4	(13%)
October	170	(8%)	1	(10%)	4	(6%)	$0.2	(2%)
November	200	(10%)	4	(43%)	14	(19%)	$0.4	(4%)
December	200	(10%)	1	(14%)	6	(8%)	$0.9	(8%)
Total	2,070	(100%)	10	(100%)	70	(100%)	$10.9	(100%)
Average	170	(8%)	1	(8%)	6	(8%)	$0.9	(8%)

Table 2. Structure Fires in Residential Board and Care Facilities, by Day of Week
2003-2007 Annual Averages

Month	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Sunday	320	(15%)	0	(4%)	6	(9%)	$0.9	(8%)
Monday	280	(14%)	5	(52%)	20	(28%)	$1.0	(9%)
Tuesday	270	(13%)	1	(10%)	9	(13%)	$4.3	(39%)
Wednesday	270	(13%)	2	(19%)	11	(16%)	$1.5	(13%)
Thursday	290	(14%)	0	(0%)	6	(9%)	$0.8	(7%)
Friday	290	(14%)	0	(0%)	8	(11%)	$1.1	(10%)
Saturday	340	(17%)	1	(14%)	9	(13%)	$1.4	(13%)
Total	2,070	(100%)	10	(100%)	70	(100%)	$10.9	(100%)
Average	300	(14%)	1	(14%)	10	(14%)	$1.6	(14%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian deaths and injuries are rounded to the nearest one, and direct property damage is rounded to the nearest hundred thousand dollars. Property damage has not been adjusted for inflation. Totals may not equal sums due to rounding errors.
Source: NFIRS and NFPA survey.

Table 3.
Structure Fires in Residential Board and Care Facilities, by Alarm Time
2003-2007 Annual Averages

Alarm Time	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Midnight-12:59 a.m.	40	(2%)	1	(8%)	8	(12%)	$0.1	(1%)
1:00-1:59 a.m.	30	(2%)	5	(47%)	11	(17%)	$0.2	(1%)
2:00-2:59 a.m.	30	(1%)	0	(5%)	0	(1%)	$0.2	(2%)
3:00-3:59 a.m.	30	(1%)	0	(0%)	2	(3%)	$1.9	(18%)
4:00-4:59 a.m.	20	(1%)	0	(0%)	1	(2%)	$0.3	(3%)
5:00-5:59 a.m.	30	(1%)	0	(0%)	1	(2%)	$0.1	(1%)
6:00-6:59 a.m.	50	(2%)	0	(0%)	1	(2%)	$0.3	(3%)
7:00-7:59 a.m.	70	(3%)	1	(5%)	0	(1%)	$0.0	(0%)
8:00-8:59 a.m.	90	(4%)	0	(0%)	2	(3%)	$0.5	(5%)
9:00-9:59 a.m.	100	(5%)	0	(0%)	3	(4%)	$0.1	(1%)
10:00-10:59 a.m.	100	(5%)	1	(14%)	1	(2%)	$0.3	(3%)
11:00-11:59 a.m.	120	(6%)	0	(0%)	3	(4%)	$0.8	(7%)
12:00-12:59 p.m.	120	(6%)	0	(0%)	5	(7%)	$0.5	(5%)
1:00-1:59 p.m.	110	(5%)	0	(0%)	1	(1%)	$0.1	(1%)
2:00-2:59 p.m.	110	(5%)	0	(0%)	2	(2%)	$0.3	(3%)
3:00-3:59 p.m.	130	(6%)	0	(4%)	5	(8%)	$0.5	(4%)
4:00-4:59 p.m.	150	(7%)	1	(5%)	2	(3%)	$0.4	(3%)
5:00-5:59 p.m.	200	(10%)	0	(0%)	2	(3%)	$0.3	(3%)
6:00-6:59 p.m.	140	(7%)	0	(0%)	3	(4%)	$0.4	(4%)
7:00-7:59 p.m.	120	(6%)	0	(0%)	3	(4%)	$0.5	(4%)
8:00-8:59 p.m.	90	(4%)	1	(11%)	2	(3%)	$1.5	(13%)
9:00-9:59 p.m.	80	(4%)	0	(0%)	3	(5%)	$0.3	(3%)
10:00-10:59 p.m.	60	(3%)	0	(0%)	3	(4%)	$1.2	(11%)
11:00-11:59 p.m.	50	(3%)	0	(0%)	3	(4%)	$0.2	(2%)
Total	2,070	(100%)	10	(100%)	70	(100%)	$10.9	(100%)
Average	90	(4%)	0	(4%)	3	(4%)	$0.5	(4%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian deaths and injuries are rounded to the nearest one, and direct property damage is rounded to the nearest hundred thousand dollars. Property damage has not been adjusted for inflation. Totals may not equal sums due to rounding errors.

Source: NFIRS and NFPA survey.

Table 4.
Leading Causes of Structure Fires in Residential Board and Care Facilities
2003-2007 Annual Averages

Cause	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Cooking equipment	1,580	(76%)	0	(0%)	32	(46%)	$1.1	(10%)
Confined cooking fires	*1,480*	*(71%)*	*0*	*(0%)*	*11*	*(15%)*	*$0.1*	*(1%)*
Identified cooking equipment	*110*	*(5%)*	*0*	*(0%)*	*22*	*(31%)*	*$1.1*	*(10%)*
Heating equipment	90	(4%)	0	(0%)	2	(3%)	$0.6	(5%)
Confined heating equipment fires	*50*	*(3%)*	*0*	*(0%)*	*0*	*(0%)*	*$0.3*	*(3%)*
Identified heating equipment	*40*	*(2%)*	*0*	*(0%)*	*2*	*(3%)*	*$0.2*	*(2%)*
Clothes dryer or washer	80	(4%)	0	(0%)	6	(9%)	$0.4	(3%)
Contained trash or rubbish fires	70	(3%)	0	(0%)	1	(1%)	$0.0	(0%)
Smoking materials (i.e. lighted tobacco products)	60	(3%)	6	(63%)	18	(26%)	$0.8	(7%)
Intentional	40	(2%)	0	(0%)	4	(6%)	$0.3	(3%)
Electrical distribution and lighting equipment	40	(2%)	0	(0%)	0	(0%)	$1.0	(9%)

Note: These are the leading causes, obtained from the following list: intentional (from the NFIRS field "cause"); playing with fire (from factor contributing to ignition); confined heating (including confined chimney and confined fuel burner or boiler fires), confined cooking, and contained trash or rubbish) from incident type; identified heating, identified cooking, clothes dryer or washer , torch (including burner and soldering iron), electrical distribution and lighting equipment, medical equipment, and electronic, office or entertainment equipment (from equipment involved in ignition); smoking materials, candles, lightning, and spontaneous combustion or chemical reaction (from heat source), and mobile property involved (from mobile property involved in ignition). The statistics on smoking materials and candles include a proportional share of fires in which the heat source was heat from an unclassified open flame or smoking material. Because contained trash or rubbish fires are a scenario without causal information, they are shown at the bottom of the table if they account for at least 2% of the fires. Casual information is not routinely collected for these incidents. The same fire can be listed under multiple causes, based on multiple data elements. Details on handling of unknowns, partial unknowns, and other underspecified codes may be found in the Appendix.

These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian deaths and injuries are rounded to the nearest ten, and direct property damage is rounded to the nearest hundred thousand. Property damage has not been adjusted for inflation.

Source: NFIRS and NFPA survey.

Table 5.
Structure Fires in Residential Board and Care Facilities, by Equipment Involved in Ignition
2003-2007 Annual Averages

Equipment Involved	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Confined cooking fire	1,480	(71%)	0	(0%)	11	(15%)	$0.1	(1%)
No equipment involved	140	(7%)	10	(100%)	27	(38%)	$2.6	(23%)
Range with or without oven, cooking surface	70	(4%)	0	(0%)	17	(25%)	$0.6	(6%)
Contained trash or rubbish fire	70	(3%)	0	(0%)	1	(1%)	$0.0	(0%)
Clothes dryer	70	(3%)	0	(0%)	6	(9%)	$0.4	(3%)
Confined fuel burner or boiler fire	40	(2%)	0	(0%)	0	(0%)	$0.0	(0%)
Fan	30	(1%)	0	(0%)	2	(2%)	$0.2	(2%)
Lamp, bulb, or lighting	20	(1%)	0	(0%)	0	(0%)	$0.0	(0%)
Fixed or portable space heater	20	(1%)	0	(0%)	0	(0%)	$0.1	(1%)
Confined chimney or flue fire	10	(1%)	0	(0%)	0	(0%)	$0.3	(3%)
Wiring and related equipment	10	(1%)	0	(0%)	0	(0%)	$1.0	(9%)
Microwave oven	10	(1%)	0	(0%)	1	(2%)	$0.3	(3%)
Other known equipment	80	(4%)	0	(0%)	6	(8%)	$5.4	(49%)
Other confined fire	10	(0%)	0	(0%)	0	(0%)	$0.0	(0%)
Total	2,070	(100%)	10	(100%)	70	(100%)	$10.9	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian deaths and injuries are rounded to the nearest one, and direct property damage is rounded to the nearest hundred thousand dollars. Property damage has not been adjusted for inflation. Non-confined fires in which the equipment involved in ignition was unknown or not reported have been allocated proportionally among fires with known equipment involved. Sums may not equal totals due to rounding errors.
Source: NFIRS and NFPA survey.

Table 6.
Structure Fires in Residential Board and Care Facilities, by Heat Source
2003-2007 Annual Averages

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Confined cooking fire	1,480	(71%)	0	(0%)	11	(15%)	$0.1	(1%)
Unclassified heat from powered equipment	80	(4%)	1	(12%)	10	(14%)	$2.8	(26%)
Radiated, conducted heat from operating equipment	80	(4%)	0	(0%)	15	(22%)	$3.4	(31%)
Contained trash or rubbish fire	70	(3%)	0	(0%)	1	(1%)	$0.0	(0%)
Smoking materials (i.e. lighted tobacco products)	60	(3%)	6	(63%)	18	(26%)	$0.8	(7%)
Arcing	50	(2%)	0	(0%)	3	(4%)	$1.2	(11%)
Confined fuel burner or boiler fire	40	(2%)	0	(0%)	0	(0%)	$0.0	(0%)
Unclassified hot or smoldering object	30	(2%)	2	(25%)	2	(3%)	$0.2	(2%)
Spark, ember or flame from operating equipment	30	(1%)	0	(0%)	1	(1%)	$0.1	(1%)
Unclassified heat source	30	(1%)	0	(0%)	2	(3%)	$0.3	(3%)
Lighter	30	(1%)	0	(0%)	3	(4%)	$0.3	(2%)
Hot ember or ash	20	(1%)	0	(0%)	2	(2%)	$0.6	(6%)
Candle	20	(1%)	0	(0%)	0	(0%)	$0.2	(2%)
Confined chimney or flue fire	10	(1%)	0	(0%)	0	(0%)	$0.3	(3%)
Match	10	(1%)	0	(0%)	2	(2%)	$0.1	(1%)
Other known heat source	30	(1%)	0	(0%)	1	(1%)	$0.5	(5%)
Other confined fire	10	(0%)	0	(0%)	0	(0%)	$0.0	(0%)
Total	2,070	(100%)	10	(100%)	70	(100%)	$11.0	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian deaths and injuries are rounded to the nearest one, and direct property damage is rounded to the nearest hundred thousand dollars. Property damage has not been adjusted for inflation. Non-confined and non-contained structure fires in which the heat source was unknown or not reported have been allocated proportionally among fires with known heat source. The statistics on matches, lighters, smoking materials and candles include a proportional share of fires in which the heat source was heat from an unclassified open flame or smoking material. Totals may not equal sums due to rounding errors

Source: NFIRS and NFPA survey.

Table 7.
Structure Fires in Residential Board and Care Facilities, by Area of Origin
2003-2007 Annual Averages

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Confined cooking fire	1,480	(71%)	0	(0%)	11	(15%)	$0.1	(1%)
Kitchen or cooking area	120	(6%)	0	(0%)	14	(21%)	$1.4	(13%)
Bedroom	80	(4%)	2	(19%)	17	(25%)	$2.9	(26%)
Contained trash or rubbish fire	70	(3%)	0	(0%)	1	(1%)	$0.0	(0%)
Laundry room or area	40	(2%)	1	(5%)	3	(4%)	$0.1	(1%)
Confined fuel burner or boiler fire	40	(2%)	0	(0%)	0	(0%)	$0.0	(0%)
Lavatory, bathroom, locker room or check room	30	(1%)	0	(0%)	1	(1%)	$0.2	(2%)
Common room, living room, family room, lounge or den	20	(1%)	1	(15%)	4	(5%)	$0.9	(9%)
Unclassified function area	20	(1%)	1	(10%)	5	(7%)	$1.7	(15%)
Confined chimney or flue fire	10	(1%)	0	(0%)	0	(0%)	$0.3	(3%)
Attic or ceiling/roof assembly or concealed space	10	(1%)	5	(46%)	10	(14%)	$0.6	(5%)
Unclassified area	10	(1%)	0	(0%)	0	(0%)	$0.1	(1%)
Other known area	120	(6%)	1	(6%)	5	(8%)	$2.6	(24%)
Other confined fire	10	(0%)	0	(0%)	0	(0%)	$0.0	(0%)
Total	2,070	(100%)	10	(100%)	70	(100%)	$10.9	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian deaths and injuries are rounded to the nearest one, and direct property damage is rounded to the nearest hundred thousand dollars. Property damage has not been adjusted for inflation. Non-confined and non-contained structure fires in which the area of origin was unknown or not reported have been allocated proportionally among fires with known area of origin. Totals may not equal sums due to rounding errors.

Source: NFIRS and NFPA survey.

Table 8.
Structure Fires in Residential Board and Care Facilities, by Item First Ignited
2003-2007 Annual Averages

Item First Ignited	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Confined cooking fire	1,480	(71%)	0	(0%)	11	(15%)	$0.1	(1%)
Contained trash or rubbish fire	70	(3%)	0	(0%)	1	(1%)	$0.0	(0%)
Cooking materials, including food	50	(2%)	0	(0%)	10	(14%)	$0.4	(4%)
Mattress and bedding material	40	(2%)	4	(44%)	16	(22%)	$0.6	(6%)
Confined fuel burner or boiler fire	40	(2%)	0	(0%)	0	(0%)	$0.0	(0%)
Electrical wire or cable insulation	40	(2%)	0	(0%)	3	(4%)	$0.6	(5%)
Unclassified item first ignited	30	(1%)	0	(0%)	2	(3%)	$0.5	(4%)
Appliance housing or casing	30	(1%)	0	(0%)	2	(3%)	$0.6	(6%)
Clothing	20	(1%)	1	(10%)	2	(3%)	$0.3	(3%)
Linen, other than bedding	20	(1%)	0	(0%)	2	(3%)	$0.1	(1%)
Structural member or framing	20	(1%)	0	(0%)	1	(2%)	$1.7	(16%)
Unclassified furniture, utensils	20	(1%)	2	(24%)	5	(7%)	$0.3	(3%)
Upholstered furniture or vehicle seat	20	(1%)	2	(22%)	1	(2%)	$0.8	(7%)
Rubbish, trash, or waste	10	(1%)	0	(0%)	3	(4%)	$0.3	(3%)
Confined chimney or flue fire	10	(1%)	0	(0%)	0	(0%)	$0.3	(3%)
Flammable or combustible liquid or gas, filter or piping	10	(1%)	0	(0%)	2	(3%)	$0.4	(4%)
Household utensils	10	(1%)	0	(0%)	3	(4%)	$0.2	(2%)
Exterior wall covering or finish	10	(1%)	0	(0%)	0	(0%)	$0.4	(4%)
Unclassified soft goods, or wearing apparel	10	(1%)	0	(0%)	1	(1%)	$0.0	(0%)
Box, carton, bag, basket, barrel	10	(1%)	0	(0%)	2	(3%)	$0.9	(8%)
Magazine, newspaper, writing paper	10	(1%)	0	(0%)	2	(2%)	$0.0	(0%)
Other known item	90	(5%)	0	(0%)	3	(5%)	$2.1	(19%)
Other confined fire	10	(0%)	0	(0%)	0	(0%)	$0.0	(0%)
Total	2,070	(100%)	10	(100%)	70	(100%)	$10.9	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian deaths and injuries are rounded to the nearest one, and direct property damage is rounded to the nearest hundred thousand dollars. Property damage has not been adjusted for inflation. Non-confined and non-contained structure fires in which the item first ignited was unknown or not reported have been allocated proportionally among fires with known item first ignited. Totals may not equal sums due to rounding errors.

Source: NFIRS and NFPA survey.

Table 9.
Structure Fires in Residential Board and Care Facilities, by Extent of Flame Damage
2003-2007 Annual Averages

Extent of Flame Damage	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Contained or confined fire	1,610	(78%)	0	(0%)	11	(16%)	$0.4	(4%)
Confined to object of origin	220	(11%)	0	(0%)	13	(19%)	$0.7	(7%)
Confined to room of origin	150	(7%)	3	(32%)	24	(34%)	$2.1	(20%)
Confined to floor of origin	20	(1%)	1	(10%)	7	(10%)	$0.5	(5%)
Confined to building of origin	60	(3%)	1	(10%)	3	(5%)	$5.3	(49%)
Beyond building of origin	10	(0%)	5	(47%)	11	(16%)	$1.8	(16%)
Total	2,070	(100%)	10	(100%)	70	(100%)	$10.9	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian deaths and injuries are rounded to the nearest one, and direct property damage is rounded to the nearest hundred thousand dollars. Property damage has not been adjusted for inflation. Non-confined and non-contained structure fires in which the extent of flame damage was unknown or not reported have been allocated proportionally among fires with known extent of flame damage.. Totals may not equal sums due to rounding errors.

Source: NFIRS and NFPA survey.

Appendix A.
How National Estimates Statistics Are Calculated

The statistics in this analysis are estimates derived from the U.S. Fire Administration's (USFA's) National Fire Incident Reporting System (NFIRS) and the National Fire Protection Association's (NFPA's) annual survey of U.S. fire departments. NFIRS is a voluntary system by which participating fire departments report detailed factors about the fires to which they respond. Roughly two-thirds of U.S. fire departments participate, although not all of these departments provide data every year. Fires reported to federal or state fire departments or industrial fire brigades are not included in these estimates.

NFIRS provides the most detailed incident information of any national database not limited to large fires. NFIRS is the only database capable of addressing national patterns for fires of all sizes by specific property use and specific fire cause. NFIRS also captures information on the extent of flame spread, and automatic detection and suppression equipment. For more information about NFIRS visit http://www.nfirs.fema.gov/. Copies of the paper forms may be downloaded from http://www.nfirs.fema.gov/documentation/design/NFIRS_Paper_Forms_2008.pdf.

NFIRS has a wide variety of data elements and code choices. The NFIRS database contains coded information. Many code choices describe several conditions. These cannot be broken down further. For example, area of origin code 83 captures fires starting in vehicle engine areas, running gear areas or wheel areas. It is impossible to tell the portion of each from the coded data.

Methodology may change slightly from year to year.
NFPA is continually examining its methodology to provide the best possible answers to specific questions, methodological and definitional changes can occur. *Earlier editions of the same report may have used different methodologies to produce the same analysis, meaning that the estimates are not directly comparable from year to year.*

NFPA's fire department experience survey provides estimates of the big picture.
Each year, NFPA conducts an annual survey of fire departments which enables us to capture a summary of fire department experience on a larger scale. Surveys are sent to all municipal departments protecting populations of 50,000 or more and a random sample, stratified by community size, of the smaller departments. Typically, a total of roughly 3,000 surveys are returned, representing about one of every ten U.S. municipal fire departments and about one third of the U.S. population.

The survey is stratified by size of population protected to reduce the uncertainty of the final estimate. Small rural communities have fewer people protected per department and are less likely to respond to the survey. A larger number must be surveyed to obtain an adequate sample of those departments. (NFPA also makes follow-up calls to a sample of the smaller fire departments that do not respond, to confirm that those that did respond are truly representative of fire departments their size.) On the other hand, large city departments are so few in number and protect such a large proportion of the total U.S. population that it makes sense to survey all of them. Most respond, resulting in excellent precision for their part of the final estimate.

The survey includes the following information: (1) the total number of fire incidents, civilian deaths, and civilian injuries, and the total estimated property damage (in dollars), for each of the

major property use classes defined in NFIRS; (2) the number of on-duty firefighter injuries, by type of duty and nature of illness; 3) the number and nature of non-fire incidents; and (4) information on the type of community protected (e.g., county versus township versus city) and the size of the population protected, which is used in the statistical formula for projecting national totals from sample results. The results of the survey are published in the annual report *Fire Loss in the United States*. To download a free copy of the report, visit http://www.nfpa.org/assets/files/PDF/OS.fireloss.pdf.

Projecting NFIRS to National Estimates

As noted, NFIRS is a voluntary system. Different states and jurisdictions have different reporting requirements and practices. Participation rates in NFIRS are not necessarily uniform across regions and community sizes, both factors correlated with frequency and severity of fires. This means NFIRS may be susceptible to systematic biases. No one at present can quantify the size of these deviations from the ideal, representative sample, so no one can say with confidence that they are or are not serious problems. But there is enough reason for concern so that a second database -- the NFPA survey -- is needed to project NFIRS to national estimates and to project different parts of NFIRS separately. This multiple calibration approach makes use of the annual NFPA survey where its statistical design advantages are strongest.

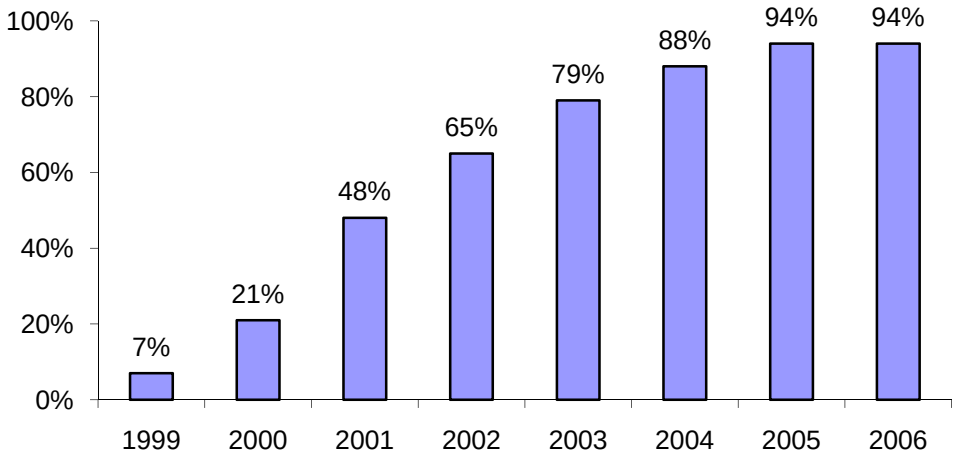
Scaling ratios are obtained by comparing NFPA's projected totals of residential structure fires, non-residential structure fires, vehicle fires, and outside and other fires, and associated civilian deaths, civilian injuries, and direct property damage with comparable totals in NFIRS. Estimates of specific fire problems and circumstances are obtained by multiplying the NFIRS data by the scaling ratios. Reports for incidents in which mutual aid was given are excluded NFPA's analyses.

Analysts at the NFPA, the USFA and the Consumer Product Safety Commission developed the specific basic analytical rules used for this procedure. "The National Estimates Approach to U.S. Fire Statistics," by John R. Hall, Jr. and Beatrice Harwood, provides a more detailed explanation of national estimates. A copy of the article is available online at http://www.nfpa.org/osds or through NFPA's One-Stop Data Shop.

Version 5.0 of NFIRS, first introduced in 1999, used a different coding structure for many data elements, added some property use codes, and dropped others. The essentials of the approach described by Hall and Harwood are still used, but some modifications have been necessary to accommodate the changes in NFIRS 5.0.

Figure 1 shows the percentage of fires originally collected in the NFIRS 5.0 system. Each year's release version of NFIRS data also includes data collected in older versions of NFIRS that were converted to NFIRS 5.0 codes.

Figure 1. Fires Originally Collected in NFIRS 5.0 by Year



For 2002 data on, analyses are based on scaling ratios using only data originally collected in NFIRS 5.0:

NFPA survey projections
NFIRS totals (Version 5.0)

For 1999 to 2001, the same rules may be applied, but estimates for these years in this form will be less reliable due to the smaller amount of data originally collected in NFIRS 5.0; they should be viewed with extreme caution.

NFIRS 5.0 introduced six categories of confined structure fires, including:

- cooking fires confined to the cooking vessel,
- confined chimney or flue fires,
- confined incinerator fire,
- confined fuel burner or boiler fire or delayed ignition,
- confined commercial compactor fire, and
- trash or rubbish fires in a structure with no flame damage to the structure or its contents.

Although causal and other detailed information is typically not required for these incidents, it is provided in some cases (typically 10-20%). Some analyses, particularly those that examine cooking equipment, heating equipment, fires caused by smoking materials, and fires started by playing with fire, may examine the confined fires in greater detail. Because the confined fire incident types describe certain scenarios, the distribution of unknown data differs from that of all fires. Consequently, allocation of unknowns must be done separately.

Some analyses of structure fires show only non-confined fires. In these tables, percentages shown are of non-confined structure fires rather than alls structure fires. This approach has the advantage of showing the frequency of specific factors in fire causes, but the disadvantage of possibly overstating the percentage of factors that are seldom seen in the confined fire incident types.

Other analyses include entries for confined fire incident types in the causal tables and show percentages based on total structure fires. In these cases, the confined fire incident type is treated as a general causal factor.

For most fields other than Property Use, NFPA allocates unknown data proportionally among known data. This approach assumes that if the missing data were known, it would be distributed in the same manner as the known data. NFPA makes additional adjustments to several fields. *Casualty and loss projections can be heavily influenced by the inclusion or exclusion of unusually serious fire.*

In the formulas that follow, the term "all fires" refers to all fires in NFIRS on the dimension studied.

Factor Contributing to Ignition: In this field, the code "none" is treated as an unknown and allocated proportionally. For Human Factor Contributing to Ignition, NFPA enters a code for "not reported" when no factors are recorded. "Not reported" is treated as an unknown, but the code "none" is treated as a known code and not allocated. Multiple entries are allowed in both of these fields. Percentages are calculated on the total number of fires, not entries, resulting in sums greater than 100%. Although Factor Contributing to Ignition is only required when the cause of ignition was coded as: 2) unintentional, 3) failure of equipment or heat source; or 4) act of nature, data is often present when not required. Consequently, any fire in which no factor contributing to ignition was entered was treated as unknown.

In some analyses, all entries in the category of electrical failure or malfunction (factor contributing to ignition 30-39) are combined and shown as "electrical failure or malfunction." This category includes:

31. Water-caused short circuit arc;
32. Short-circuit arc from mechanical damage;
33. Short-circuit arc from defective or worn insulation;
34. Unspecified short circuit arc;
35. Arc from faulty contact or broken connector, including broken power lines and loose connections;
36. Arc or spark from operating equipment, switch, or electric fence;
37. Fluorescent light ballast; and
30. Electrical failure or malfunction, other.

Type of Material First Ignited (TMI). This field is required only if the Item First Ignited falls within the code range of 00-69. NFPA has created a new code "not required" for this field that is applied when Item First Ignited is in code 70-99 (organic materials, including cooking materials and vegetation, and general materials, such as electrical wire, cable insulation, transformers, tires, books, newspaper, dust, rubbish, etc..) and TMI is blank. The ratio for allocation of unknown data is:

$$\frac{\text{(All fires – TMI Not required)}}{\text{(All fires – TMI Not Required – Undetermined – Blank)}}$$

Heat Source. In NFIRS 5.0, one grouping of codes encompasses various types of open flames and smoking materials. In the past, these had been two separate groupings. A new code was added to NFIRS 5.0, which is code 60: "Heat from open flame or smoking material, other." NFPA treats this code as a partial unknown and allocates it proportionally across the codes in the 61-69 range, shown below.

61. Cigarette;
62. Pipe or cigar;
63. Heat from undetermined smoking material;
64. Match;
65. Lighter: cigarette lighter, cigar lighter;
66. Candle;
67 Warning or road flare, fuse;
68. Backfire from internal combustion engine. Excludes flames and sparks from an exhaust system, (11); and
69. Flame/torch used for lighting. Includes gas light and gas-/liquid-fueled lantern.

In addition to the conventional allocation of missing and undetermined fires, NFPA multiplies fires with codes in the 61-69 range by

$$\frac{\text{All fires in range 60-69}}{\text{All fires in range 61-69}}$$

The downside of this approach is that heat sources that are truly a different type of open flame or smoking material are erroneously assigned to other categories. The grouping "smoking materials" includes codes 61-63 (cigarettes, pipes or cigars, and heat from undetermined smoking material, with a proportional share of the code 60s and true unknown data.

Equipment Involved in Ignition (EII). NFIRS 5.0 originally defined EII as the piece of equipment that provided the principal heat source to cause ignition if the equipment malfunctioned or was used improperly. In 2006, the definition was modified to "the piece of equipment that provided the principal heat source to cause ignition." However, much of the data predates the change. Individuals who have already been trained with the older definition may not change their practices. To compensate, NFPA treats fires in which EII = NNN and heat source is not in the range of 40-99 as an additional unknown.

To allocate unknown data for EII, the known data is multiplied by

$$\frac{\text{All fires}}{\text{(All fires – blank – undetermined – [fires in which EII =NNN and heat source <>40-99])}}$$

In addition, the partially unclassified codes for broad equipment groupings (i.e., code 100, - heating, ventilation, and air conditioning, other; code 200- electrical distribution, lighting and power transfer, other; etc.) were allocated proportionally across the individual code choices in their respective broad groupings (heating, ventilation, and air conditioning; electrical distribution, lighting and power transfer, other; etc.). Equipment that is totally unclassified is not allocated further. This approach as the same downside as the allocation of heat source 60 described above. Equipment that is truly different is erroneously assigned to other categories.

In some analyses, various types of equipment are grouped together. (Confined fire incident types are not discussed here)

Code Grouping	EII Code	NFIRS definitions
Central heat	132	Furnace or central heating unit
	133	Boiler (power, process or heating)
Fixed or portable space heater	131	Furnace, local heating unit, built-in
	123	Fireplace with insert or stove
	124	Heating stove
	141	Heater, excluding catalytic and oil-filled
	142	Catalytic heater
	143	Oil-filled heater
Fireplace or chimney	121	Fireplace, masonry
	122	Fireplace, factory-built
	125	Chimney connector or vent connector
	126	Chimney – brick, stone or masonry
	127	Chimney-metal, including stovepipe or flue
Wiring, switch or outlet	210	Unclassified electrical wiring
	211	Electrical power or utility line
	212	Electrical service supply wires from utility
	214	Wiring from meter box to circuit breaker
	216	Electrical branch circuit
	217	Outlet, receptacle
	218	Wall switch
Power switch gear or overcurrent protection device	215	Panel board, switch board, circuit breaker board
	219	Ground fault interrupter
	222	Overcurrent, disconnect equipment
	227	Surge protector
Lamp, bulb or lighting	230	Unclassified lamp or lighting
	231	Lamp-tabletop, floor or desk
	232	Lantern or flashlight
	233	Incandescent lighting fixture
	234	Fluorescent light fixture or ballast
	235	Halogen light fixture or lamp
	236	Sodium or mercury vapor light fixture or lamp
	237	Work or trouble light
	238	Light bulb
	241	Nightlight
	242	Decorative lights – line voltage
	243	Decorative or landscape lighting – low voltage
	244	Sign
Cord or plug	260	Unclassified cord or plug

	261	Power cord or plug, detachable from appliance
	262	Power cord or plug- permanently attached
	263	Extension cord
Torch, burner or soldering iron	331	Welding torch
	332	Cutting torch
	333	Burner, including Bunsen burners
	334	Soldering equipment
Portable cooking or warming equipment	631	Coffee maker or teapot
	632	Food warmer or hot plate
	633	Kettle
	634	Popcorn popper
	635	Pressure cooker or canner
	636	Slow cooker
	637	Toaster, toaster oven, counter-top broiler
	638	Waffle iron, griddle
	639	Wok, frying pan, skillet
	641	Breadmaking machine

Item First Ignited. In most analyses, mattress and pillows (item first ignited 31) and bedding, blankets, sheets, and comforters (item first ignited 32) are combined and shown as "mattresses and bedding." In many analyses, wearing apparel not on a person (code 34) and wearing apparel on a person (code 35) are combined and shown as "clothing." In some analyses, flammable and combustible liquids and gases, piping and filters (item first ignited 60-69) are combined and shown together

Area of Origin. Two areas of origin: bedroom for more than five people (code 21) and bedroom for less than five people (code 22) are combined and shown as simply "bedroom."

Rounding and percentages. The data shown are estimates and generally rounded. An entry of zero may be a true zero or it may mean that the value rounds to zero. Percentages are calculated from unrounded values. It is quite possible to have a percentage entry of up to 100%, even if the rounded number entry is zero. The same rounded value may account for a slightly different percentage share. Because percentages are expressed in integers and not carried out to several decimal places, percentages that appear identical may be associated with slightly different values.

Inflation. Property damage estimates are not adjusted for inflation unless so indicated.

Appendix B.
Methodology and Definitions Used in "Leading Cause" Tables

The cause table reflects relevant causal factors that accounted for at least 2% of the fires in a given occupancy. Only those causes that seemed to describe a scenario are included. Because the causal factors are taken from different fields, some double counting is possible. Percentages are calculated against the total number of structure fires, including both confined and non-confined fires. Bear in mind that every fire has at least three "causes" in the sense that it could have been prevented by changing behavior, heat source, or ignitability of first fuel, the last an aspect not reflected in any of the major cause categories. For example, several of the cause categories in this system refer to types of equipment (cooking, heating, electrical distribution and lighting, clothes dryers and washers, torches). However, the problem may be not with the equipment but with the way it is used. The details in national estimates are derived from the Version 5.0 of the U.S. Fire Administration's National Fire Incident Reporting System (NFIRS 5.0). This methodology is based on the coding system used in Version 5.0 of NFIRS. The *NFIRS 5.0 Reference Guide*, containing all of the codes, can be downloaded from http://www.nfirs.fema.gov/documentation/reference/. Actual estimates are projections based derived from NFPA"s annual fire department experience survey and the procedures below.

Cooking equipment and heating equipment are calculated by summing non-confined fires identified by equipment involved in ignition and relevant confined fires. Confined fires will be shown if they account for at least 1% of the incidents. **Confined cooking fires** (cooking fires involving the contents of a cooking vessel without fire extension beyond the vessel) are identified by NFIRS incident type 113;

Confined heating equipment fires include **confined chimney or flue fires (**incident type 114) and **confined fuel burner or boiler** fires (incident type 116). The latter includes delayed ignitions and incidents where flames caused no damage outside the fire box. The two types of confined heating fires may be combined or listed separately, depending on the numbers involved.

Contained trash or rubbish fires with no flame damage to structure or its contents are identified by incident type 118. No cause can be ascertained for these incidents, but they account for a substantial share of the incidents in some occupancies. When appropriate, these fires are generally shown at the bottom of a cause table.

Confined or contained fires (incident type 113-118) are excluded from the remaining estimates. Unknown data is allocated proportionally among non-confined fires. Reports on specific causal factors may include analysis of confined fires and consequently have higher estimates of specific causes,

Intentional fires are identified by fires with a "1" (intentional) in the field "cause." The estimate includes a proportional share of fires in which the cause was undetermined after investigation, under investigation, or not reported. All fires with intentional causes are included in this category regardless of the age of the person involved. Intentional include those of an incendiary nature and those resulting from a deliberate misuse of the heat source. No age restriction is applied.

Fires caused by **playing with heat source** (typically matches or lighters) are identified by code 19 in the field "factor contributing to ignition." It appears that "none" is often being used in place of "unknown." Fires in which the factor contribution to ignition was undetermined (UU),

entered as none (NN) or left blank are considered unknown and allocated proportionally. Because factor contributing to ignition is not required for intentional fires, the share unknown, by these definitions, is somewhat larger than it should be.

The heat source field is used to identify fires started by: **smoking materials** (cigarette, code 61; pipe or cigar, code 62; and heat from undetermined smoking material, code 63); **candles** (code 66), **lightning** (code 73); and **spontaneous combustion or chemical reaction** (code 72). Fires started by heat from unclassified open flame or smoking materials (code 60) are allocated proportionally among the "other open flame or smoking material" codes (codes 61-69) in an allocation of partial unknown data. This includes smoking materials and candles. This approach results in any true unclassified smoking or open flame heat sources such as incense being inappropriately allocated. However, in many fires, this code was used as an unknown.

The equipment involved in ignition field is used to find several cause categories. This category includes equipment that functioned properly and equipment that malfunctioned.

Identified cooking equipment refers to equipment used to cook, heat or warm food (codes 620-649 and 654). Fire in which ranges, ovens or microwave ovens, food warming appliances, fixed or portable cooking appliances, deep fat fryers, open fired charcoal or gas grills, grease hoods or ducts, or other cooking appliances) were involved in the ignition are said to be caused by cooking equipment. Food preparation devices that do not involve heating, such as can openers or food processors, are not included here. A proportional share of fires involving unclassified cooking kitchen and cooking equipment (code 600) are included here.

Identified heating equipment (codes 120-199) includes central heat, portable and fixed heaters (including wood stoves), fireplaces, chimneys, hot water heaters, and heat transfer equipment such as hot air ducts or hot water pipes. Heat pumps are not included. Unclassified heating, ventilation and air condition equipment (code 100) is included here because a larger share of the whole category involved heating rather than air conditioning or ventilation equipment. A proportional share of fires involving unclassified heating, ventilation, and air conditioning equipment (code 100) are included here.

Electrical distribution and lighting equipment (codes 200-299) include: fixed wiring; transformers; associated overcurrent or disconnect equipment such as fuses or circuit breakers; meters; meter boxes; power switch gear; switches, receptacles and outlets; light fixtures, lamps, bulbs or lighting; signs; cords and plugs; generators, transformers, inverters, batteries and battery charges.

Torch, burner or soldering iron (codes 331-334) includes welding torches, cutting torches, Bunsen burners, plumber furnaces, blowtorches, and soldering equipment.

Clothes dryer or washer (codes 811, 813 and 814) includes clothes dryers alone, washer and dryer combinations within one frame, and washing machines for clothes.

Electronic, office or entertainment equipment (codes 700-799) includes: computers and related equipment; calculators and adding machines;, telephones or answering machines; copiers; fax machines; paper shredders; typewriters; postage meters; other office equipment; musical instruments; stereo systems and/or components; televisions and cable TV converter boxes,, cameras, excluding professional television studio cameras, video equipment and other electronic equipment. Older versions of NFIRS had a code for electronic equipment that included radar, X-

rays, computers, telephones, and transmitter equipment. Because this code was so broad, it unfortunately converts to equipment involved undetermined.

Shop tools and industrial equipment excluding torches, burners or soldering irons (codes 300-330, 335-399) includes power tools; painting equipment; compressors; atomizing equipment; pumps; wet/dry vacuums; hoists, lifts or cranes; powered jacking equipment; water or gas drilling equipment; unclassified hydraulic equipment; heat-treating equipment; incinerators, industrial furnaces, ovens or kilns; pumps; compressors; internal combustion engines; conveyors; printing presses; casting, molding; or forging equipment; heat treating equipment; tar kettles; working or shaping machines; coating machines; chemical process equipment; waste recovery equipment; power transfer equipment; power takeoff; powered valves; bearings or brakes; picking, carding or weaving machines; testing equipment; gas regulators; separate motors; non-vehicular internal combustion engines; and unclassified shop tools and industrial equipment.

Medical equipment (codes 410-419) includes: dental, medical or other powered bed, chair or wheelchair; dental equipment; dialysis equipment; medical monitoring and imaging equipment; oxygen administration equipment; radiological equipment; medical sterilizers, therapeutic equipment and unclassified medical equipment.

Mobile property (vehicle) describes fires in which some type of mobile property was involved in ignition, regardless of whether the mobile property itself burned. Mobile property includes: highway-type vehicles such as cars, trucks, recreational vehicles, and motorcycles; trains, trolleys and subways; boats and ships; aircraft; industrial, agricultural and construction vehicles; and riding lawn mowers, snow removal vehicles and tractors.

Exposures are fires that are caused by the spread of or from another fire. These fires are identified by factor contributing to ignition 71. This code is automatically applied for all fires with exposure numbers greater than zero. As with playing with fire, Fires in which the factor contribution to ignition was undetermined (UU), entered as none (NN) or left blank are considered unknown and allocated proportionally.