

**SELECTIONS FROM
U.S. FIRES IN SELECTED OCCUPANCIES
HOTELS AND MOTELS**

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Structure Fires in Hotels and Motels

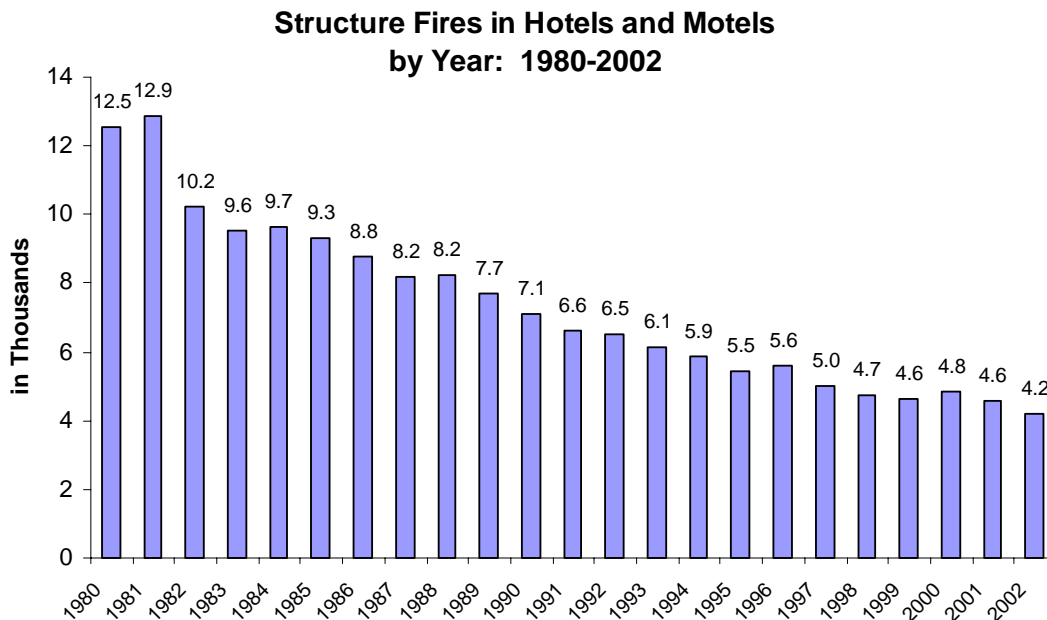
Hotels and motels include facilities for year-round and for seasonal use. In earlier versions of NFIRS, hotels with kitchens in individual units are considered “home hotels” and were not included in this category. With NFIRS Version 5.0, home hotels collected in the older version were converted into the hotel category. However, the rooming house category for fires collected in Version 5.0 includes residential hotels. Only fires reported to public fire departments are included in these statistics. Supporting tables are provided at the end of this section.

An average of 4,550 structure fires were reported in these properties per year.

During the four-year period of 1999-2002, an estimated average of 4,550 structure fires were reported in hotels and motels per year. These fires caused an annual average of 16 civilian deaths, 194 civilian fire injuries, and \$85.9 million in direct property damage.

0.9% of all reported structure fires occurred in hotels and motels.

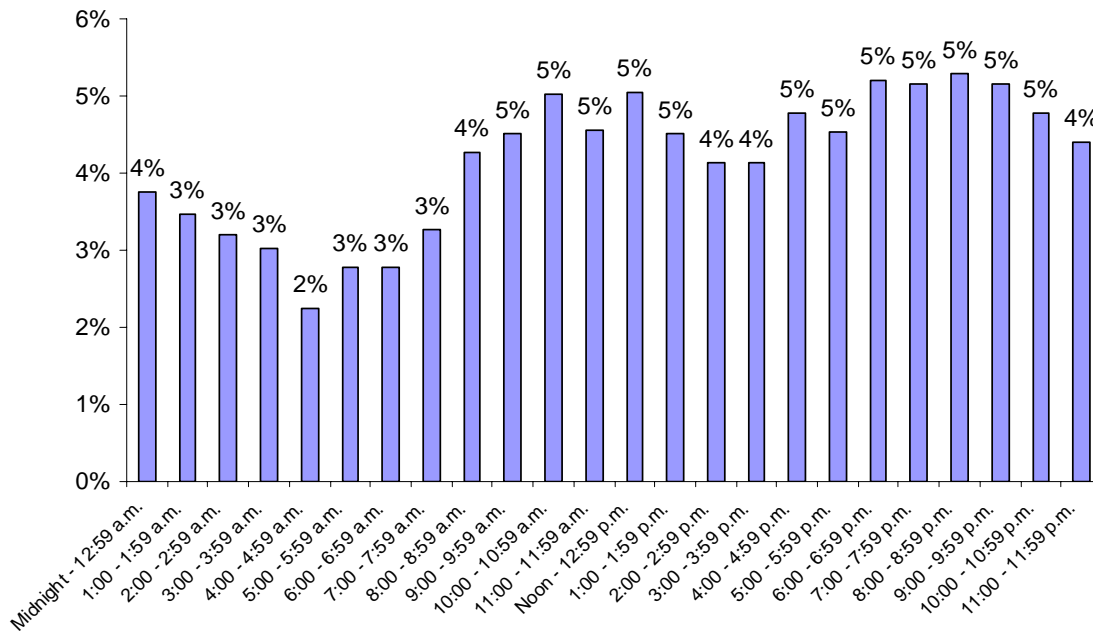
During 1999-2002, the 4,550 structure fires in these properties accounted for 0.9% of the 517,100 structure fires, 0.5% of the 3,140 civilian structure fire deaths, 1.1% of the 17,730 civilian structure fire injuries, and 1.0% of the \$8.6 billion in direct property loss.



Since 1980, these structure fires fell 67%.

As shown in Table 1 and the graph above, hotel and motel structure fires fell 67% from 12,530 in 1980 to a 23-year record low of 4,180 in 2002. From 2001 to 2002, these fires fell 9%. In comparison, structure fires of all types declined 51% from 1980 to 2002. From 2001 to 2002, total structure fires fell slightly, less than 1%.

**Structure Fires in Hotels and Motels by Alarm Time
1999-2002 Annual Averages**



Hotel and motel structure fires were more common on weekends.

Tables 2, 3, and 4 show reported structure fires in these properties by month, day of week and alarm time, respectively. January was the peak month for hotel and motel structure fires. Saturday and Sunday were the peak days for fires. Friday ranked third. These fires were spread out through daytime hours and the evening. Only 25% of the reported fires occurred between midnight and 8:00 a.m.

Cooking equipment was involved in one of every four reported hotel and motel structure fires.

Table 5 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 6; more information on heat source is in Table 7.

Cooking equipment was listed as the equipment involved in ignition in 17% of structure fires in these properties; an additional 6% were confined cooking fires. Smoking materials¹ started 16% of the fires and hotels and motels; fires started by smoking materials caused 56% of the civilian fire deaths in this occupancy. Twelve percent of the fires in these properties were intentionally set, compared to 18% intentionally set in all

¹ A proportional share of heat from unclassified open flame or smoking materials are included in the candles and smoking materials.

types of non-home properties in 1999-2002. Heating equipment was listed as the equipment involved in 8% of these fires; an additional 2% were confined heating

equipment fires. Clothes dryers or washers were involved in 9% of the ignitions, electrical distribution or lighting equipment was involved in 8%. Candles started 3% of the reported hotel and motel structure fires. Torches, burners, or soldering irons were involved in 2% and an additional 2% resulted from exposure to another fire. Two percent were contained trash or rubbish fires; causal information is not routinely captured for these incidents.

Roughly half of the fire deaths and injuries resulted from fires starting in the bedroom.

Nineteen percent of the reported fires in hotels and motels originated in the bedroom; these fires caused 53% of the civilian fire deaths and 46% of the civilian fire injuries in this property. Eighteen percent of the fires started in the kitchen or cooking area. Area of origin is generally not collected for confined fires but it is probable that most of the confined cooking fires (6%) also started in the kitchen. Eleven percent of the hotel and motel fires originated in the laundry room or area. (See Table 8.)

Fires beginning with structural members or framing had unusually high property loss.

In 13% of the reported structure fires in hotels and motels, cooking materials, including foods, were the items first ignited. Presumably most of the confined cooking fires (6%), also began with food or cooking materials. Mattresses or bedding were first ignited in 10% of the fires; electrical wire or cable insulation was first ignited in 8% of the fires. Rubbish, trash or waste was identified as the item first ignited in 7% of these incidents. Item first ignited is not routinely documented for contained trash or rubbish fires, but it seems likely that these fires (2%) also began with rubbish-type items. Linen other than bedding was the item first ignited in 6% of these incidents. The 4% of fires originating with structural members or framing caused 16% of the dollar loss. (See Table 9.)

**Automatic Suppression Systems in Hotel and Motel Fires
Reported to Public Fire Departments:
1994-1998 Annual Averages**

Percent of fires in buildings with automatic suppression system	34%
Deaths per 1,000 fires with automatic suppression system	0.0
Deaths per 1,000 fires with no automatic suppression system present	7.7
Reduction in deaths per 1,000 fires when automatic suppression systems were present	100%
Average loss per fire when automatic suppression system was present	\$7,160
Average loss per fire with no automatic suppression system	\$15,320
Reduction in loss per fire when automatic suppression systems were present	53%

Source: National estimates based on NFIRS and NFPA survey.

34% of reported hotel and motel fires occurred in properties with automatic suppression systems.

As shown in the table on the previous page, automatic suppression systems were present in one-third of these fires in 1994-1998. The average estimated direct property damage was more than twice as high when no automatic suppression system was present. None of the civilian fire deaths occurred in properties with this protection. Because a code for undetermined system presence was not included in Version 5.0 of NFIRS until 2004, data on number of fires and loss rates cannot be confidently updated.

Only 12% of hotel and motel structure fires spread beyond room of origin.

Ten percent of the reported structure fires in hotel and motel properties were confined or contained fires. Version 5.0 of NFIRS introduced shorter reporting 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. The percentage of these fires will likely increase as larger shares of the NFIRS data are originally collected in Version 5.0.

In addition to the 10% of contained or confined fires, 47% were confined to the object of origin. Only 12% spread beyond the room of origin. (See Table 10.)

Hotel fires have potential for large loss of life.

Although fatal fires in these properties are less frequent than fatal fires in homes, the potential for large loss of life is very real. The deadliest hotel fire in U.S. history was the 1946 Wincoff Hotel Fire in Atlanta, Georgia that killed 119 people. The 1980 MGM Grand Hotel Fire in Las Vegas, Nevada, claimed 85 lives and was the second deadliest hotel fire in the U.S. proper. Although the Puerto Rican fire experience is not captured by the National Fire Incident Reporting System or the NFPA fire department survey, it is worth remembering the 1987 Dupont Plaza fire in San Juan that killed 97 people.

Average of 1,840 outside and other fires per year were reported at these properties.

During 1999-2002, an estimated annual average of 1,840 outside and other fires on these properties caused an average of 12 civilian injuries and \$0.4 million in direct property damage per year. An average of 370 vehicle fires reported on these properties caused an average of one civilian injury and \$1.2 million in direct property damage per year. No civilian fire deaths resulted from any outside or vehicle fires on these properties that were reported to NFIRS.

Additional information sources

The Fire Analysis and Research Division's One-Stop Data Shop offers a package of statistics and published articles and reports about fires in high-rise hotels. NFPA fire investigation reports on several hotel fires, including the Dupont Plaza fire in Puerto Rico, can be ordered through the NFPA library. NFPA members may download a number of these reports, including the Dupont Plaza report for free from <http://www.nfpa.org/Research>. Section 13, Chapter 10 in the 19th edition of the NFPA *Fire Protection Handbook*, "Lodging Occupancies" by April Leyla Berkol and Thomas G. Daly describes some of the special fire safety concerns for these properties. An NFPA video, *Fire Safety: Prevention and Response for the Lodging Industry*, teaches employees how to identify and correct fire hazards. NFPA's Hotel/Motel Fire Safety Brochure has tips for travelers.

**Table 1.
Structure Fires in Hotel and Motels
by Year: 1980-2002**

Year	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions)	
				As Reported	In 2002 Dollars
1980	12,530	80	752	\$63.7	\$139.2
1981	12,880	148	719	\$69.5	\$137.3
1982	10,240	52	587	\$42.2	\$78.6
1983	9,550	73	562	\$103.2	\$186.2
1984	9,670	34	538	\$65.6	\$113.4
1985	9,310	85	412	\$74.0	\$123.5
1986	8,790	57	416	\$74.4	\$122.2
1987	8,210	54	430	\$70.6	\$111.7
1988	8,230	35	382	\$85.1	\$129.5
1989	7,710	24	333	\$68.2	\$99.0
1990	7,090	54	496	\$70.3	\$96.9
1991	6,610	22	372	\$84.8	\$111.9
1992	6,530	26	395	\$63.5	\$81.4
1993	6,140	62	456	\$63.9	\$79.5
1994	5,890	28	349	\$59.3	\$72.0
1995	5,460	36	299	\$71.5	\$84.4
1996	5,610	43	332	\$110.6	\$126.9
1997	5,010	21	284	\$81.6	\$91.4
1998	4,750	24	257	\$55.3	\$61.1
1999	4,610	24	249	\$124.6	\$134.4
2000	4,830	11	170	\$82.8	\$86.6
2001	4,590	12	217	\$59.3	\$60.2
2002	4,180	16	138	\$77.1	\$77.1

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.

Source: NFIRS and NFPA survey. Inflation adjustments were based on the consumer price index found in the U.S. Census Bureau's *Statistical Abstract of the United States: 2006*, "Table 705, Purchasing Power of the Dollar."

Table 2.
Structure Fires in Hotel and Motels by Month
1999-2002 Annual Averages

Month	Fires		Civilian		Civilian		Direct	
			Deaths	Injuries	Property Damage			
						(in Millions)		
January	430	(10%)	1	(5%)	17	(9%)	\$9.0	(10%)
February	380	(8%)	4	(25%)	29	(15%)	\$4.1	(5%)
March	420	(9%)	1	(4%)	17	(9%)	\$6.0	(7%)
April	340	(8%)	0	(0%)	14	(7%)	\$8.9	(10%)
May	420	(9%)	0	(0%)	8	(4%)	\$6.2	(7%)
June	370	(8%)	4	(24%)	22	(11%)	\$11.7	(14%)
July	370	(8%)	1	(10%)	10	(5%)	\$6.1	(7%)
August	390	(9%)	1	(9%)	22	(11%)	\$7.9	(9%)
September	340	(7%)	2	(11%)	13	(7%)	\$3.0	(4%)
October	350	(8%)	1	(4%)	14	(7%)	\$8.7	(10%)
November	360	(8%)	1	(5%)	16	(8%)	\$4.3	(5%)
December	380	(8%)	1	(4%)	12	(6%)	\$10.1	(12%)
Total	4,550	(100%)	16	(100%)	194	(100%)	\$85.9	(100%)
Average	380	(8%)	1	(8%)	16	(8%)	\$7.2	(8%)

Table 3.
Structure Fires in Rooming Houses by Day of Week
1999-2002 Annual Averages

Day of Week	Fires		Civilian		Civilian		Direct	
			Deaths	Injuries	Property Damage			
						(in Millions)		
Sunday	720	(16%)	3	(19%)	41	(21%)	\$12.3	(14%)
Monday	610	(13%)	4	(23%)	28	(15%)	\$17.2	(20%)
Tuesday	610	(13%)	2	(10%)	24	(13%)	\$15.9	(19%)
Wednesday	600	(13%)	1	(5%)	24	(12%)	\$8.0	(9%)
Thursday	630	(14%)	1	(10%)	27	(14%)	\$7.7	(9%)
Friday	660	(14%)	1	(5%)	30	(15%)	\$11.0	(13%)
Saturday	730	(16%)	5	(29%)	20	(10%)	\$13.9	(16%)
Total	4,550	(100%)	16	(100%)	194	(100%)	\$85.9	(100%)
Average	650	(14%)	2	(14%)	28	(14%)	\$12.3	(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. Sums may not equal totals due to rounding errors.

Source: NFIRS and NFPA survey.

Table 4.
Structure Fires in Hotel and Motels by Alarm Time
1999-2002 Annual Averages

Alarm Time	Fires		Civilian		Civilian		Direct	
			Deaths	Injuries	Injuries	Property Damage (in Millions)		
Midnight - 12:59 a.m.	170	(4%)	2 (14%)	11 (5%)	\$3.7	(4%)		
1:00 - 1:59 a.m.	160	(3%)	1 (4%)	23 (12%)	\$4.2	(5%)		
2:00 - 2:59 a.m.	150	(3%)	2 (14%)	9 (5%)	\$6.6	(8%)		
3:00 - 3:59 a.m.	140	(3%)	1 (5%)	8 (4%)	\$5.3	(6%)		
4:00 - 4:59 a.m.	100	(2%)	1 (4%)	3 (1%)	\$5.0	(6%)		
5:00 - 5:59 a.m.	130	(3%)	0 (0%)	5 (3%)	\$2.5	(3%)		
6:00 - 6:59 a.m.	130	(3%)	1 (4%)	7 (4%)	\$2.2	(3%)		
7:00 - 7:59 a.m.	150	(3%)	1 (4%)	18 (10%)	\$3.0	(3%)		
8:00 - 8:59 a.m.	190	(4%)	0 (0%)	2 (1%)	\$1.9	(2%)		
9:00 - 9:59 a.m.	200	(5%)	0 (0%)	4 (2%)	\$1.7	(2%)		
10:00 - 10:59 a.m.	230	(5%)	1 (5%)	8 (4%)	\$7.3	(8%)		
11:00 - 11:59 a.m.	210	(5%)	3 (21%)	15 (8%)	\$2.2	(3%)		
Noon - 12:59 p.m.	230	(5%)	0 (0%)	6 (3%)	\$2.9	(3%)		
1:00 - 1:59 p.m.	210	(5%)	0 (0%)	3 (1%)	\$2.7	(3%)		
2:00 - 2:59 p.m.	190	(4%)	0 (0%)	10 (5%)	\$1.8	(2%)		
3:00 - 3:59 p.m.	190	(4%)	1 (4%)	8 (4%)	\$2.7	(3%)		
4:00 - 4:59 p.m.	220	(5%)	1 (5%)	8 (4%)	\$1.5	(2%)		
5:00 - 5:59 p.m.	210	(5%)	0 (0%)	3 (2%)	\$2.1	(2%)		
6:00 - 6:59 p.m.	240	(5%)	0 (0%)	9 (5%)	\$3.2	(4%)		
7:00 - 7:59 p.m.	240	(5%)	1 (6%)	9 (5%)	\$2.4	(3%)		
8:00 - 8:59 p.m.	240	(5%)	0 (0%)	10 (5%)	\$1.5	(2%)		
9:00 - 9:59 p.m.	230	(5%)	1 (5%)	6 (3%)	\$4.4	(5%)		
10:00 - 10:59 p.m.	220	(5%)	1 (4%)	4 (2%)	\$2.0	(2%)		
11:00 - 11:59 p.m.	200	(4%)	0 (0%)	7 (4%)	\$12.9	(15%)		
Total	4,550	(100%)	16 (100%)	194 (100%)	\$85.9	(100%)		
Average	190	(4%)	1 (4%)	8 (4%)	\$3.6	(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. Sums may not equal totals due to rounding errors.

Source: NFIRS and NFPA survey.

Table 5.
Leading Causes of Structure Fires in Hotel and Motels
1999-2002 Annual Averages

Cause	Fires		Civilian		Civilian		Direct	
			Deaths	Injuries	Property Damage	(in Millions)		
Cooking equipment fire	1,060	(23%)	0	(0%)	37	(19%)	\$14.0	(16%)
<i>Identified cooking equipment</i>	770	(17%)	0	(0%)	35	(18%)	\$10.2	(12%)
<i>Confined cooking fire</i>	290	(6%)	0	(0%)	2	(1%)	\$3.7	(4%)
Smoking materials	710	(16%)	9	(56%)	45	(23%)	\$7.0	(8%)
Intentional	530	(12%)	6	(37%)	35	(18%)	\$24.7	(29%)
Heating equipment	440	(10%)	3	(17%)	14	(7%)	\$4.1	(5%)
<i>Identified heating equipment</i>	380	(8%)	3	(17%)	13	(7%)	\$4.0	(5%)
<i>Confined chimney or flue fire</i>	30	(1%)	0	(0%)	0	(0%)	\$0.0	(0%)
<i>Confined fuel burner or boiler malfunction or fire</i>	30	(1%)	0	(0%)	1	(0%)	\$0.1	(0%)
Clothes dryer or washer	430	(9%)	0	(0%)	21	(11%)	\$1.9	(2%)
Electrical distribution or lighting equipment	360	(8%)	1	(7%)	15	(8%)	\$9.3	(11%)
Candle	120	(3%)	0	(0%)	10	(5%)	\$1.8	(2%)
Torch, burner or soldering iron	80	(2%)	0	(0%)	6	(3%)	\$3.0	(3%)
Exposure to other fire	80	(2%)	0	(0%)	0	(0%)	\$4.7	(6%)
Contained trash fire	100	(2%)	0	(0%)	0	(0%)	\$0.0	(0%)

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. Exposure fires include fires with an exposure number greater than zero, as well as fires identified by heat source or factor contributing to ignition when no equipment was involved in ignition and the fires were not intentionally set. 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 dollars. Property damage has not been adjusted for inflation.

Source: NFIRS and NFPA survey.

Table 6.
Structure Fires in Hotel and Motels
by Equipment Involved in Ignition
1999-2002 Annual Averages

Equipment Involved	Fires		Civilian		Civilian		Direct	
			Deaths	Injuries	Injuries	Property Damage (in Millions)		
No equipment involved	1,780	(39%)	12	(76%)	88	(45%)	\$49	(58%)
Clothes dryer or washer	430	(9%)	0	(0%)	21	(11%)	\$2	(2%)
Range or cooking surface	430	(9%)	0	(0%)	16	(8%)	\$2	(2%)
Confined cooking fire	290	(6%)	0	(0%)	2	(1%)	\$4	(4%)
Lamp, bulb or lighting	120	(3%)	0	(0%)	1	(0%)	\$2	(2%)
Wiring, switch or outlet	120	(3%)	1	(7%)	3	(2%)	\$5	(6%)
Fixed area heater	120	(3%)	0	(0%)	4	(2%)	\$1	(1%)
Unclassified kitchen or cooking equipment	100	(2%)	0	(0%)	5	(3%)	\$4	(5%)
Contained trash or rubbish fire	100	(2%)	0	(0%)	0	(0%)	\$0	(0%)
Portable cooking or warming equipment	90	(2%)	0	(0%)	6	(3%)	\$0	(0%)
Torch, burner or soldering iron	80	(2%)	0	(0%)	6	(3%)	\$3	(3%)
Oven or rotisserie	80	(2%)	0	(0%)	5	(2%)	\$0	(1%)
Unclassified heating, ventilating & air conditioning, other	80	(2%)	0	(0%)	5	(2%)	\$0	(1%)
Air conditioner	80	(2%)	0	(0%)	3	(1%)	\$0	(1%)
Unclassified equipment involved in ignition	60	(1%)	0	(0%)	3	(2%)	\$0	(1%)
Central heat or boiler	60	(1%)	0	(0%)	0	(0%)	\$0	(1%)
Water heater	60	(1%)	3	(17%)	4	(2%)	\$1	(1%)
Cord or plug	50	(1%)	0	(0%)	9	(5%)	\$1	(1%)
Fireplace or chimney	50	(1%)	0	(0%)	0	(0%)	\$0	(0%)
Confined chimney fire	30	(1%)	0	(0%)	0	(0%)	\$0	(0%)
Confined fuel burner or boiler fire or malfunction	30	(1%)	0	(0%)	1	(0%)	\$0	(0%)
Elevator or lift	30	(1%)	0	(0%)	0	(0%)	\$0	(0%)
Unclassified portable appliance designed to produce heat	20	(1%)	0	(0%)	1	(0%)	\$0	(0%)
Steam table or warming drawer or table	20	(1%)	0	(0%)	0	(0%)	\$0	(0%)
Other known equipment	230	(5%)	0	(0%)	14	(7%)	\$9	(10%)
Other confined fire	10	(0%)	0	(0%)	0	(0%)	\$0	(0%)
Total	4,550	(100%)	16	(100%)	194	(100%)	\$86	(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 7.
Structure Fires in Hotel and Motels by Heat Source
1999-2002 Annual Averages**

Heat Source	Fires		Civilian		Civilian		Direct	
			Deaths	Injuries	Injuries	Property Damage (in Millions)		
Radiated or conducted heat from operating equipment	1,280	(28%)	4	(28%)	47	(24%)	\$21.5	(25%)
Smoking materials	710	(16%)	9	(56%)	45	(23%)	\$7.0	(8%)
Arcing	520	(11%)	1	(8%)	19	(10%)	\$15.1	(18%)
Unclassified heat from powered equipment	360	(8%)	0	(0%)	10	(5%)	\$4.2	(5%)
Confined cooking fire	290	(6%)	0	(0%)	2	(1%)	\$3.7	(4%)
Unclassified hot or smoldering object	190	(4%)	0	(0%)	10	(5%)	\$5.1	(6%)
Spark, ember or flame from operating equipment	190	(4%)	0	(0%)	8	(4%)	\$3.5	(4%)
Match	180	(4%)	0	(0%)	11	(6%)	\$8.0	(9%)
Candle	130	(3%)	0	(0%)	10	(5%)	\$1.8	(2%)
Unclassified heat source	110	(3%)	0	(0%)	5	(2%)	\$2.7	(3%)
Contained trash or rubbish fire	100	(2%)	0	(0%)	0	(0%)	\$0.0	(0%)
Lighter	80	(2%)	1	(8%)	9	(5%)	\$1.6	(2%)
Hot ember or ash	60	(1%)	0	(0%)	0	(0%)	\$0.7	(1%)
Heat from direct flame or convection currents	40	(1%)	0	(0%)	0	(0%)	\$2.5	(3%)
Spontaneous combustion or chemical reaction	40	(1%)	0	(0%)	0	(0%)	\$0.4	(0%)
Unclassified heat spread from another fire	40	(1%)	0	(0%)	1	(1%)	\$2.0	(2%)
Confined chimney fire	30	(1%)	0	(0%)	0	(0%)	\$0.0	(0%)
Heat or spark from friction	30	(1%)	0	(0%)	3	(2%)	\$0.3	(0%)
Confined fuel burner or boiler fire or malfunction	30	(1%)	0	(0%)	1	(0%)	\$0.1	(0%)
Radiated heat from another fire	20	(1%)	0	(0%)	0	(0%)	\$0.7	(1%)
Other known heat source	110	(2%)	0	(0%)	13	(7%)	\$4.9	(6%)
Other confined fire	10	(0%)	0	(0%)	0	(0%)	\$0.0	(0%)
Total	4,550	(100%)	16	(100%)	194	(100%)	\$85.9	(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 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 8.
Structure Fires in Hotel and Motels by Area of Origin
1999-2002 Annual Averages

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage	
							(in Millions)	
Bedroom	870	(19%)	8	(53%)	89	(46%)	\$15.2	(18%)
Kitchen or cooking area	810	(18%)	1	(6%)	28	(15%)	\$9.4	(11%)
Laundry room or area	490	(11%)	0	(0%)	18	(9%)	\$4.3	(5%)
Confined cooking fire	290	(6%)	0	(0%)	2	(1%)	\$3.7	(4%)
Lavatory, bathroom, locker room or check room	180	(4%)	2	(13%)	4	(2%)	\$1.9	(2%)
Hallway, corridor or mall	170	(4%)	0	(0%)	4	(2%)	\$2.2	(3%)
Common room, living room, family room, lounge or den	110	(3%)	1	(7%)	10	(5%)	\$2.8	(3%)
Trash or rubbish chute, area or container	100	(2%)	0	(0%)	1	(0%)	\$0.1	(0%)
Heating equipment room	90	(2%)	2	(11%)	1	(0%)	\$2.2	(3%)
Attic or ceiling/roof assembly or concealed space	90	(2%)	0	(0%)	1	(1%)	\$10.6	(12%)
Exterior wall surface	90	(2%)	0	(0%)	1	(0%)	\$1.5	(2%)
Storage of supplies or tools or dead storage	80	(2%)	0	(0%)	4	(2%)	\$1.1	(1%)
Exterior roof surface	60	(1%)	0	(0%)	1	(0%)	\$2.1	(2%)
Machinery room or area or elevator machinery room	60	(1%)	0	(0%)	3	(2%)	\$0.5	(1%)
Wall assembly or concealed space	50	(1%)	0	(0%)	1	(0%)	\$1.9	(2%)
Dining room, bar or beverage area, cafeteria	50	(1%)	0	(0%)	0	(0%)	\$1.7	(2%)
Lobby or entrance way	50	(1%)	0	(0%)	2	(1%)	\$4.7	(5%)
Unclassified	40	(1%)	0	(0%)	0	(0%)	\$0.3	(0%)
Chimney	40	(1%)	0	(0%)	0	(0%)	\$0.1	(0%)
Closet	40	(1%)	0	(0%)	5	(3%)	\$0.4	(0%)
Exterior balcony or open porch	40	(1%)	0	(0%)	1	(0%)	\$1.2	(1%)
Unclassified equipment or service area	30	(1%)	0	(0%)	3	(2%)	\$0.1	(0%)
Unclassified function area	30	(1%)	0	(0%)	0	(0%)	\$0.1	(0%)
Crawl space or substructure space	30	(1%)	1	(5%)	2	(1%)	\$1.1	(1%)
Office	30	(1%)	0	(0%)	1	(0%)	\$1.0	(1%)
Interior stairway or ramp	30	(1%)	0	(0%)	0	(0%)	\$0.0	(0%)
Confined chimney fire	30	(1%)	0	(0%)	0	(0%)	\$0.0	(0%)
Unclassified structural area	30	(1%)	0	(0%)	1	(0%)	\$0.2	(0%)
Ceiling/floor assembly or concealed space	30	(1%)	0	(0%)	1	(0%)	\$1.5	(2%)

Table 8.
Structure Fires in Hotel and Motels by Area of Origin
1999-2002 Annual Averages
(Continued)

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Small assembly area with less than 100 person capacity	30	(1%)	0	(0%)	1	(1%)	\$0.4	(0%)
Confined fuel burner or boiler fire or malfunction	30	(1%)	0	(0%)	1	(0%)	\$0.1	(0%)
Duct for HVAC, cable, exhaust, heating or air conditioning	30	(1%)	0	(0%)	0	(0%)	\$0.1	(0%)
Other known service or equipment area	90	(2%)	0	(0%)	3	(2%)	\$0.9	(1%)
Other known storage area	50	(1%)	1	(5%)	3	(1%)	\$1.9	(2%)
Other known outside area	50	(1%)	0	(0%)	1	(1%)	\$4.3	(5%)
Other known assembly or sales area	40	(1%)	0	(0%)	1	(0%)	\$0.5	(1%)
Other known means of egress	30	(1%)	0	(0%)	1	(0%)	\$0.3	(0%)
Other known technical processing area	30	(1%)	0	(0%)	0	(0%)	\$0.3	(0%)
Other known area	40	(1%)	0	(0%)	1	(0%)	\$5.3	(6%)
Contained trash or rubbish area	100	(2%)	0	(0%)	0	(0%)	\$0.0	(0%)
Other confined fire	10	(0%)	0	(0%)	0	(0%)	\$0.0	(0%)
Total	4,550	(100%)	16	(100%)	194	(100%)	\$86.0	(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 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 9. Structure Fires in Hotel and Motels by Item First Ignited
1999-2002 Annual Averages**

Item First Ignited	Fires		Civilian		Civilian		Direct	
			Deaths		Injuries		Property Damage (in Millions)	
Cooking materials, including food	580	(13%)	0	(0%)	20	(11%)	\$4.7	(6%)
Mattress or bedding	440	(10%)	2	(14%)	24	(12%)	\$7.8	(9%)
Electrical wire or cable insulation	360	(8%)	0	(0%)	18	(9%)	\$8.6	(10%)
Rubbish, trash, or waste	310	(7%)	1	(7%)	4	(2%)	\$1.2	(1%)
Confined cooking fire	290	(6%)	0	(0%)	2	(1%)	\$3.7	(4%)
Linen other than bedding	290	(6%)	0	(0%)	18	(9%)	\$1.6	(2%)
Unclassified	230	(5%)	0	(0%)	7	(4%)	\$4.1	(5%)
Structural member or framing	170	(4%)	0	(0%)	2	(1%)	\$14.1	(16%)
Dust, fiber, lint, sawdust, or excelsior	120	(3%)	0	(0%)	1	(0%)	\$1.5	(2%)
Clothing	110	(2%)	1	(6%)	11	(6%)	\$1.0	(1%)
Multiple items first ignited	100	(2%)	2	(14%)	15	(8%)	\$5.5	(6%)
Contained trash or rubbish fire	100	(2%)	0	(0%)	0	(0%)	\$0.0	(0%)
Floor covering, rug, carpet or mat	90	(2%)	0	(0%)	4	(2%)	\$0.8	(1%)
Upholstered furniture or vehicle seat	90	(2%)	2	(16%)	5	(3%)	\$4.1	(5%)
Exterior wall covering or finish	90	(2%)	0	(0%)	0	(0%)	\$3.4	(4%)
Interior wall covering, excluding drapes	90	(2%)	0	(0%)	6	(3%)	\$3.7	(4%)
Unclassified furniture or utensils	80	(2%)	1	(7%)	14	(7%)	\$1.9	(2%)
Appliance housing or casing	80	(2%)	0	(0%)	4	(2%)	\$0.3	(0%)
Flammable or combustible liquid or gas, filter or piping	80	(2%)	2	(12%)	11	(6%)	\$1.5	(2%)
Magazine, newspaper or writing paper	70	(1%)	0	(0%)	3	(2%)	\$0.2	(0%)
Box, carton, bag, basket, or barrel	60	(1%)	0	(0%)	1	(0%)	\$0.9	(1%)
Insulation within structural area	60	(1%)	0	(0%)	0	(0%)	\$1.9	(2%)
Unclassified soft goods or wearing apparel	60	(1%)	0	(0%)	2	(1%)	\$0.2	(0%)
Exterior roof covering or finish	60	(1%)	0	(0%)	3	(1%)	\$3.3	(4%)
Curtains, blinds, drapes or tapestry	50	(1%)	0	(0%)	1	(0%)	\$0.3	(0%)
Exterior trim, including doors	40	(1%)	0	(0%)	0	(0%)	\$3.6	(4%)
Unclassified structural component or finish	40	(1%)	0	(0%)	2	(1%)	\$2.4	(3%)
Cabinetry, including built-in	40	(1%)	0	(0%)	2	(1%)	\$0.5	(1%)
Confined chimney fire	30	(1%)	0	(0%)	0	(0%)	\$0.0	(0%)
Confined fuel burner or boiler fire or malfunction	30	(1%)	0	(0%)	1	(0%)	\$0.1	(0%)
Unclassified adornment, recreational material or sign	30	(1%)	0	(0%)	1	(0%)	\$0.1	(0%)
Household utensils	20	(1%)	0	(0%)	1	(0%)	\$0.1	(0%)
Other known item	250	(6%)	4	(24%)	14	(7%)	\$2.5	(3%)
Other confined fire	10	(0%)	0	(0%)	0	(0%)	\$0.0	(0%)
Total	4,550	(100%)	16	(100%)	194	(100%)	\$85.9	(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 10.
Structure Fires in Hotel and Motels by Extent of Flame Damage
1999-2002 Annual Averages

Extent Flame Damage	Fires		Civilian		Civilian		Direct	
			Deaths	Injuries	Injuries	Property Damage (in Millions)		
Confined or contained fire	450	(10%)	0	(0%)	2	(1%)	\$3.9	(5%)
Confined to object of origin	2,140	(47%)	2	(14%)	47	(24%)	\$6.0	(7%)
Confined to room of origin	1,430	(31%)	6	(41%)	92	(47%)	\$13.8	(16%)
Confined to floor of origin	160	(4%)	1	(9%)	15	(8%)	\$10.3	(12%)
Confined to building of origin	300	(7%)	5	(32%)	29	(15%)	\$33.6	(39%)
Extended beyond building of origin	70	(2%)	1	(4%)	10	(5%)	\$18.4	(21%)
Total	4,550	(100%)	16	(100%)	194	(100%)	\$85.9	(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

Estimates are made using the National Fire Incident Reporting System (NFIRS) of the Federal Emergency Management Agency's (FEMA's) United States Fire Administration (USFA), supplemented by the annual stratified random-sample survey of fire experience conducted by the National Fire Protection Association (NFPA), which is used for calibration.

Databases Used

NFIRS provides annual computerized databases of fire incidents, with data classified according to a standard format based on the NFPA 901 Standard. Roughly three-fourths of all states have NFIRS coordinators, who receive fire incident data from participating fire departments and combine the data into a state database. These data are then transmitted to FEMA/USFA. Participation by the states, and by local fire departments within participating states, is voluntary. NFIRS captures roughly one-third to one-half of all U.S. fires each year. More than one-third of all U.S. fire departments are listed as participants in NFIRS, although not all of these departments provide data every year.

The strength of NFIRS is that it 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. (The NFPA survey separates fewer than 20 of the hundreds of property use categories defined by NFPA 901 and solicits no cause-related information except for incendiary and suspicious fires.) NFIRS also captures information on the avenues and extent of flame spread and smoke spread and on the performance of detectors and sprinklers. For more information about NFIRS visit <http://www.usfa.fema.gov/nfirs>.

The NFPA survey is based on a stratified random sample of roughly 3,000 U.S. fire departments (or just over one of every ten fire departments in the country). 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 by the NFPA 901 Standard; (2) the number of on-duty firefighter injuries, by type of duty and nature of illness; and (3) 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 NFPA survey begins with the NFPA Fire Service Inventory, a computerized file of about 30,000 U.S. fire departments, which is the most complete and thoroughly validated such listing in existence. The survey is stratified by size of population protected to reduce the uncertainty of the final estimate. Small rural communities protect fewer people per department and are less likely to respond to the survey, so a large 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 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

To project NFIRS results to national estimates, one needs at least an estimate of the NFIRS fires as a fraction of the total so that the fraction can be inverted and used as a multiplier or scaling ratio to generate national estimates from NFIRS data. But NFIRS is a sample from a universe whose size cannot be inferred from NFIRS alone. Also, participation rates in NFIRS are not necessarily uniform across regions and sizes of community, both of which are 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.

There are separate projection formulas for four major property classes (residential structures, non-residential structures, vehicles, and other) and for each measure of fire severity (fire incidents, civilian deaths, and civilian injuries, and direct property damage).

For example, the scaling ratio for 2002 civilian deaths in residential structures is equal to the total number of 2002 civilian deaths in residential structure fires reported to fire departments, according to the NFPA survey (2,695), divided by the total number of 2002 civilian deaths in residential structure fires reported to NFIRS (1,029). Therefore, the scaling ratio is $2,695/1,029 = 2.62$.

The scaling ratios for civilian deaths and injuries and direct property damage are often significantly different from those for fire incidents. Except for fire service injuries, average severity per fire is generally higher for NFIRS than for the NFPA survey. Use of different scaling ratios for each measure of severity is equivalent to assuming that these differences are due either to NFIRS under-reporting of small fires, resulting in a higher-than-actual loss-per-fire ratio, or possible biases in the NFIRS sample representation by region or size of community, resulting in severity-per-fire ratios characteristic only of the oversampled regions or community sizes.

Note that this approach also means that the NFPA survey results for detailed property-use classes (e.g., fires in storage structures) may not match the national estimates of the same value.

Calculating National Estimates of Particular Types of Fires

Most analyses of interest involve the calculation of the estimated number of fires not only within a particular occupancy but also of a particular type. The types that are mostly frequently of interest are those defined by some ignition-cause characteristic. The six

cause-related characteristics most commonly used to describe fires are: form of the heat that caused the ignition, equipment involved in ignition, form or type of material first ignited, the ignition factor that brought heat source and ignited material together, and area of origin. Other characteristics of interest are victim characteristics, such as ages of persons killed or injured in fire.

For any characteristic of interest in NFIRS, some reported fires have that characteristic unknown or not reported. If the unknowns are not taken into account, then the propensity to report or not report a characteristic may influence the results far more than the actual patterns on that characteristic. For example, suppose the number of fires remained the same for several consecutive years, but the percentage of fires with cause unreported steadily declined over those years. If the unknown-cause fires were ignored, it would appear as if fires due to every specific cause increased over time while total fires remained unchanged. This, of course, does not make sense.

Consequently, most national estimates analyses allocate unknowns. This is done by using scaling ratios defined by NFPA survey estimates of totals divided by only those NFIRS fires for which the dimension in question was known and reported. This approach is equivalent to assuming that the fires with unreported characteristics, if known, would show the same proportions as the fires with known characteristics. For example, it assumes that the fires with unknown item first ignited contain the same relative share of fires beginning with: cooking materials or food; rubbish, trash or waste; upholstered furniture; structural members or framing; and so forth, as are found in the fires where the item first ignited was reported.

Note that percentages are calculated from unrounded values, and so it is quite possible to have a percentage entry of up to 100%, even if the rounded number entry is zero.

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 U.S. Fire Administration’s National Fire Incident Reporting System (NFIRS). 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/>.

Cooking equipment and heating equipment are calculated by summing 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 112) 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.

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. Earlier versions of NFIRS included codes for incendiary and suspicious; both convert to intentional. Intentional fires were deliberately set; they may or may not be incendiary in a legal sense. 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.” Because of conversion issues, only data originally collected in Version 5.0 of NFIRS is used in the initial calculation. 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. After the Version 5.0 only data has been run for non-confined fires and the unknown data allocated, percentages are calculated for each code of Version 5.0 non-confined fires. Total non-confined structure fires (all versions) are multiplied by these percentages to obtain national estimates. The final percentage of fires is calculated by dividing these estimates by the total number of confined and non-confined fires from all versions.

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 600, 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. Unclassified kitchen and cooking equipment (code 600) is included here because a larger share of the whole category involved cooking rather than kitchen equipment.

Identified heating equipment (codes 100 and 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.

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 resulting in underestimates for this type of equipment.

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. Because of conversion issues, only data originally collected in Version 5.0 of NFIRS is used in the initial calculation. The data was obtained by first running Version 5.0 non confined fires only to identify vehicles that were involved in ignition whether or not they burned themselves (mobile property involved codes 2 and 3). After the unknown data was allocated, percentages are calculated for each code of Version 5.0 non-confined fires.

Total non-confined structure fires (all versions) are multiplied by these percentages to obtain national estimates. The final percentage of fires is calculated by dividing these estimates by the total number of confined and non-confined fires from all versions.

Exposures are fires that are caused by the spread of or from another fire. These include fires in which the exposure number is greater than 0; the factor contributing to ignition is property too close (code 71); or heat source is heat spreading from another fire via direct flame or convection current (code 80-89). Because exposures are identified by the older hierarchical sort, all non-confined fires with exposure number greater than zero are counted as exposures, but those identified by heat source and factor contributing to ignition include only fires that were not grouped in other categories such as cooking or heating equipment.