

**U.S. STRUCTURE FIRES IN  
EATING AND DRINKING ESTABLISHMENTS**

**Jennifer Flynn  
Fire Analysis and Research Division  
National Fire Protection Association**

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**National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471  
[www.nfpa.org](http://www.nfpa.org)**

## **Abstract**

Eating and drinking establishments include restaurants, cafeterias or diners, nightclubs or dinner theaters, taverns, and lunchrooms, snack bars, or fast food facilities excluding delicatessens. In 2000-2004, U.S. fire departments responded to an estimated average of 8,520 structure fires in these properties. These fires caused an annual average of 3 civilian deaths, 113 civilian fire injuries, and \$190 million in direct property damage. *The 2003 Rhode Island Station nightclub fire that claimed 100 lives is not included in these statistics.* Fires in these properties accounted for 1.6% of all reported structure fires within the same time period. These estimates are based on data from the U.S. Fire Administration's (USFA) National Fire Incident Reporting System (NFIRS) and the National Fire Protection Association's (NFPA) annual fire department experience survey. Not surprisingly, cooking was the leading cause of these structure fires and half of the fires in these establishments began in kitchens or cooking areas. Cooking materials, including foods, accounted for 15% of the direct property damage in these properties, and fires starting in structural members or framing accounted for 14%. The potential life safety hazard is high for these properties, a fact that was brought to light with the 2003 Rhode Island nightclub fire.

Keywords: fire statistics, restaurant fires, bar fires, nightclub fires, cafeteria

## **Acknowledgements**

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National Fire Protection Association  
One-Stop Data Shop  
1 Batterymarch Park  
Quincy, MA 02169-7471  
[www.nfpa.org](http://www.nfpa.org)  
e-mail: [osds@nfpa.org](mailto:osds@nfpa.org)  
phone: 617-984-7450

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## U.S. Eating and Drinking Establishment Property Structure Fires

U. S. fire departments responded to an estimated average of **8,520** structure fires in eating and drinking establishments in 2000-2004. These fires caused annual averages of

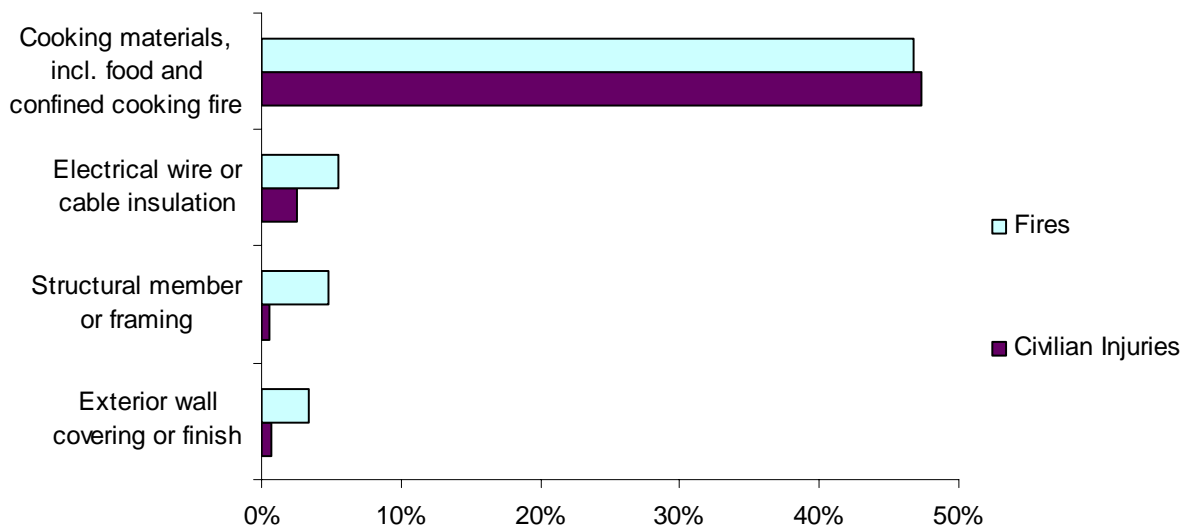


- **3** civilian deaths
- **113** civilian fire injuries
- **\$190** million in direct property damage

These estimates are derived from the U.S. Fire Administration National Fire Incident Reporting System (NFIRS) Version 5.0 and NFPA's annual fire department experience survey.

- Fires in restaurants and cafeterias outnumbered fires in bars and nightclubs by nearly 7-to-1
- Intentionally set fires caused **67%** of the civilian deaths

**Leading Items First Ignited in Eating and Drinking Establishment Structure Fires, 2000-2004 Annual Averages**



- **Cooking material fires, including food and confined cooking fires** occurred most often, and resulted in the highest number of civilian deaths, civilian injuries, and direct property damage, compared to any other item first ignited.

- In 1999-2002 **dry chemical systems** accounted for **43%** of the fires where automatic suppression systems were present



## Structure Fires in Eating and Drinking Establishments

Eating and drinking establishments include: restaurants, cafeterias or diners; nightclubs or dinner theaters; taverns; and lunchrooms, snack bars, or fast food facilities excluding delicatessens. Only fires reported to public fire departments are included in these statistics. The 2003 Rhode Island Station nightclub fire that claimed 100 lives is not included in these statistics. Supporting tables are provided at the end of the text.

Only fires reported to public fire departments are included in these statistics. 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 the Appendix.

NFIRS Version 5.0, first introduced in 1999, brought major changes to fire incident data, including changes in some definitions and coding rules. Certain types of confined fires, including confined cooking fires, chimney fires, trash fires, and fuel burner or boiler fires can be documented more easily. Caution should be used when comparing the information with earlier analyses as changes may be due to data collection practices rather than actual changes in the fire experience.

To analyze trends and account for changes in data collection practices, single-year estimates for 1999-2001 were calculated using data originally collected in either NFIRS Version 4.1 or NFIRS Version 5.0. Single-year estimates for 2002-2004 were based on data collected in NFIRS Version 5.0 only.

**An average of 8,520 eating and drinking establishment structure fires were reported per year in 2000-2004.** Excluding the 2003 Station nightclub fire that claimed 100 lives, these fires caused an annual average of 3 civilian fire deaths, 113 civilian fire injuries, and \$190 million in direct property damage. As Table A shows, three-quarters of the fires in these properties occurred in restaurants or cafeterias.

**Table A.  
Structure Fires in Eating and Drinking Establishments  
2000-2004 Annual Averages**

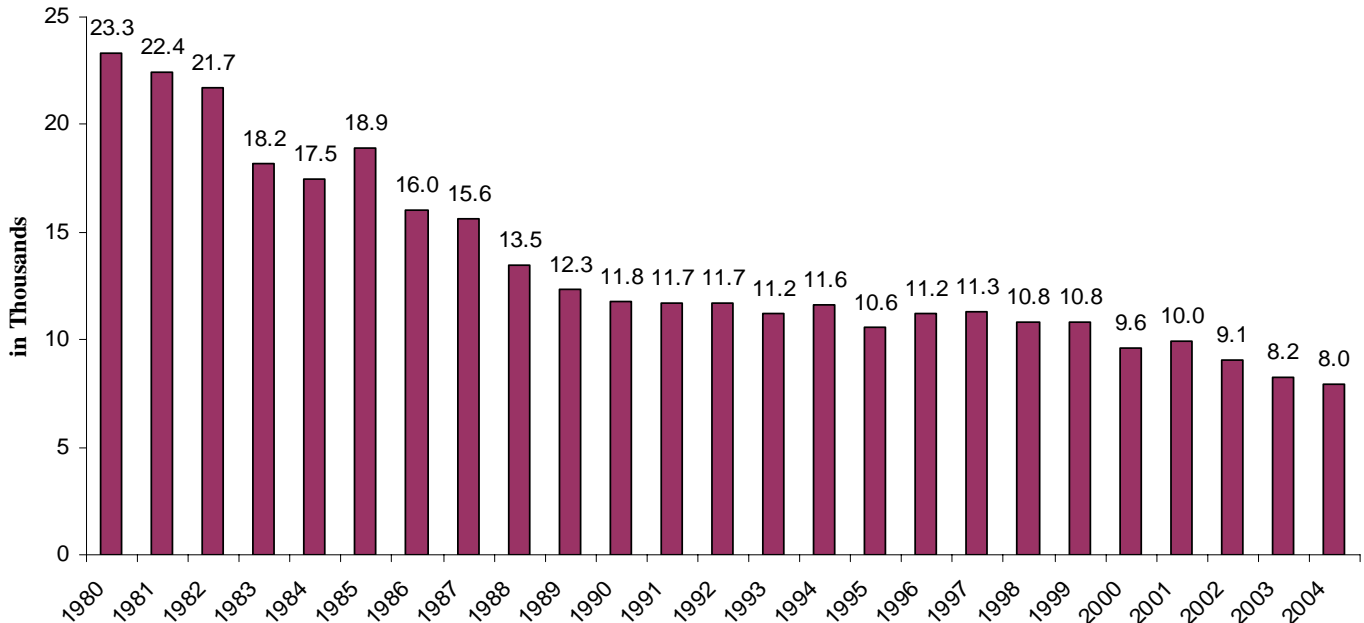
<b>Occupancy</b>	<b>Fires</b>	<b>Civilian Deaths</b>	<b>Civilian Injuries</b>	<b>Direct Property Damage (in Millions)</b>
Restaurant or cafeteria	6,480	1	88	\$127
Bar or nightclub	960	2	10	\$36
Unclassified or unknown-type eating or drinking place	1,080	0	16	\$27
<b>Total</b>	<b>8,520</b>	<b>3</b>	<b>113</b>	<b>\$190</b>

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. These national estimates are projections based on the detailed information collected in Version 5.0 of NFIRS. 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.

**Figure 1.**

**Structure Fires in Eating and Drinking  
Establishments by Year:  
1980-2004**



**The number of fires has decreased by 66% since 1980.**

By the end of the 1980's, the number of reported structure fires in these properties was half the number reported in the beginning of the decade. From 1990 to 1998, the number of fires reported has shown no consistent trend up or down. NFIRS Version 5.0, first introduced in 1999, instituted major changes in the coding rules and definitions. Figure 1 shows that the number of fires after 1999 have decreased. Some portion of the variation between years may be due to changes in NFIRS itself.

**1.6% of all reported structure fires occurred in eating and drinking establishments.**

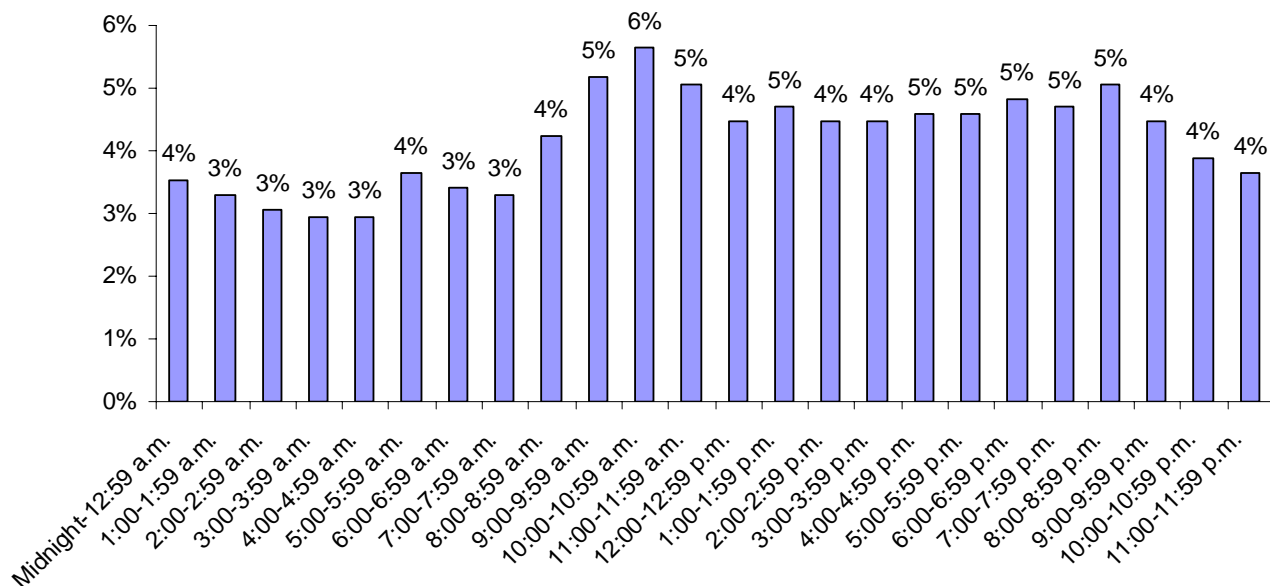
During 2000-2004, the 8,520 structure fires in eating and drinking establishments accounted for 1.6% of the 518,350 structure fires, 0.1% of the 3,240 civilian structure fire deaths, 0.7% of the 16,710 civilian structure fire injuries, and 2.2% of the \$9 billion in direct property damage.

**Structure fires in these properties are higher between 9:00 a.m. and 8:59 p.m.**

Tables 2, 3, and 4 show reported structure fires in these properties by month, day of week and time of day, respectively. Although structure fires in these properties peak in May and December, they vary little by month. Relatively little variation is seen by day of week. Figure 2 shows that the peak time for these fires is between 9:00 am and noon. These are times when food is either prepared or served. These fires are less common between 9 p.m. and 8:59 a.m., when most establishments are closed.

**Figure 2.**

**Structure Fires in Eating and Drinking Establishments by Alarm Time  
2000-2004 Annual Averages**



**Cooking was the leading cause of these 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 “cause” field, 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. More detailed information on equipment involved in ignition may be found in Table 6; more information on heat source is in Table 7.

Some type of cooking equipment was involved in 48% of the structure fires in eating and drinking establishments and 49% of the injuries. Thirty-eight percent of the fires were confined cooking fires and 11% were non-confined cooking fires.

Heating equipment was involved in 9% of the fires in eating and drinking establishments. Electrical distribution or lighting equipment caused 5%, another 4% were started by smoking materials<sup>1</sup>, and 4% of the fires in these properties were intentional.

**More than half of these fires began in kitchens or cooking areas.**

Not surprisingly, the kitchen or cooking area was the leading area of origin for reported structure fires in eating and drinking establishments; 54% of the fires in these establishments began there. Although causal data, including area of origin, is generally not collected for confined fires, presumably nearly all of the confined cooking fires started in the kitchen.\* The non-confined

\*Of the confined cooking fires where area of origin was reported and known, 98.5% started in the kitchen.

<sup>1</sup> A proportional share of fires with heat from unclassified open flame or smoking materials are included in the estimates for fires starting with candles or smoking materials.

fires with kitchen or cooking area specifically identified as the area of origin constituted 16% of total incidents. As previously noted, 38% of total fires in these properties were confined cooking fires. Four percent began on the exterior roof surface, 3% were confined chimney or flue fires, and 3% started on the exterior wall surface. (See Table 8.)

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

Assuming that the confined cooking fires began with food or cooking materials these items were first ignited in almost half (47%) of the reported fires in these properties. Fires beginning with food or cooking materials caused 38% of the associated civilian deaths, 16% of the civilian injuries, and 15% of the direct property damage. Eight percent began with trash, rubbish or waste, including 6% identified as contained or confined trash fires by incident type and 2% non-confined structure fires in which trash, rubbish or waste was specifically identified. Six percent of the fires began with electrical wire or cable insulation. Only 5% of the fires in these properties began with structural members or framing, but these fires accounted for 14% of the direct property damage. (See Table 9.)

**Half of the fires in these properties were confined or contained.**

Forty-nine percent of the reported fires in eating and drinking establishments 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.

In addition to the 49% of contained or confined fires, 24% were confined to the object of origin. Only 15% spread beyond the room of origin. (See Table 10.)

**43% of the automatic suppression systems were dry chemical systems in 1999-2002.**<sup>1</sup>

As Table B shows, automatic suppression systems were present in 29% of these fires in 1994-1998. The average estimated direct property damage was three times as high when no automatic suppression system was present. No deaths were reported in these establishments when these systems were present. Because a code for undetermined automatic suppression 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. Version 5.0 does provide enhanced information on the types of systems present.

**Table B.  
Automatic Suppression Systems  
in Fires in Eating and Drinking Establishments  
Reported to Public Fire Departments:  
1994-1998 Annual Averages**

Percent of fires in buildings with automatic suppression system	29%
Average loss per fire when automatic suppression system was present	\$6,500
Average loss per fire with no automatic suppression system	\$18,800
Reduction in loss per fire when automatic suppression systems were present	65%

Source: National estimates based on NFIRS and NFPA survey.

<sup>1</sup> Kimberly D. Rohr and John R. Hall, Jr, *U.S. Experience with Sprinklers and Other Fire Extinguishing Equipment*, Quincy, MA: NFPA Fire Analysis and research Division, August 2005.

When automatic suppression systems were present in fires reported for 1999-2002, on average, eating and drinking establishments had a 43% to 57% split between sprinkler systems and other systems, respectively. Dry chemical systems accounted for 43% of total systems in eating and drinking establishments, or the same share as all sprinklers combined.

**1,440 vehicle fires per year, on average, were reported at these properties.**

During 2000-2004, an estimated annual average 4,760 outside and other fires on these properties caused an average of 7 civilian injuries and \$2.5 million in direct property damage per year. No civilian fire deaths resulted from any of the outside or vehicle fires that were reported to NFIRS Version 5.0. An average of 1,440 vehicle fires reported on these properties caused an average of 9 civilian injuries and \$2.8 million in direct property damage per year.

**Fatal fires are rare, but the hazard can be high.**

Although fatal fires in these properties are relatively rare, the potential life safety hazard is high. This fact was brought painfully home with the 100 deaths resulting from the February 20, 2003 nightclub fire in Rhode Island. The third deadliest single-building fire in U.S. history, the 1942 Coconut Grove nightclub fire in Boston, Massachusetts, killed 492 people. The 1977 Beverly Hills Supper Club fire in Southgate, Kentucky killed 165 people. Because of the devastating potential of a single large fire in a crowded establishment, careful adherence to fire prevention and fire protection practices is essential.

More information about the 2003 Rhode Island nightclub fire is available, at <http://www.nfpa.org/research>. Here you can find a link to an analysis of this fire, released by The National Institute of Standards and Technology (NIST) in the summer of 2006. Information about codes and standards for nightclubs and educational messages or tips are also available.

**NFPA 101 and NFPA 5000 provide fire safety requirements.**

Since the crowd crush at the E2 Night Club took 21 lives in Chicago (February 17, 2003) and the inferno at The Station nightclub in Rhode Island (February 20, 2003) claimed 100 lives in the fourth-deadliest nightclub fire in U.S. history, NFPA has enacted more stringent code provisions in NFPA 101, 2003 edition, *Life Safety Code*, and NFPA 5000, 2003 edition, *Building Construction and Safety Code*, for fire sprinklers, inspection of exits, new restrictions on festival seating and crowd management in nightclub-type venues.

**Additional information sources**

NFPA members can download a number of investigation reports on public assembly fires at no cost from <http://www.nfpa.org/research>. Non-members may order other investigation reports through the NFPA library. Two chapters in the 19th edition of the NFPA *Fire Protection Handbook*, “Assembly Occupancies” by Gregory E. Harrington, and “Ventilation of Commercial Cooking Operations” by David P. Demers, describe some of the special fire safety concerns for these properties.

**Table 1.**  
**Structure Fires in Eating and Drinking Establishments**  
**by Year: 1980-2004**

<b>Year</b>	<b>Fires</b>	<b>Civilian Deaths</b>	<b>Civilian Injuries</b>	<b>Direct Property Damage (in Millions)</b>	
				<b>As Reported</b>	<b>In 2004 Dollars</b>
1980	23,300	17	210	\$188	\$431
1981	22,400	21	358	\$176	\$366
1982	21,700	16	297	\$212	\$415
1983	18,200	14	369	\$203	\$385
1984	17,500	19	225	\$193	\$351
1985	18,900	27	327	\$210	\$369
1986	16,000	8	280	\$126	\$217
1987	15,600	16	223	\$129	\$215
1988	13,500	15	299	\$178	\$284
1989	12,300	5	242	\$146	\$222
1990	11,800	14	240	\$173	\$344
1991	11,700	6	179	\$174	\$241
1992	11,700	6	190	\$192	\$259
1993	11,200	4	272	\$163	\$213
1994	11,600	8	204	\$167	\$213
1995	10,600	9	146	\$129	\$160
1996	11,200	2	195	\$171	\$206
1997	11,300	2	233	\$173	\$204
1998	10,800	8	166	\$176	\$204
1999	10,830	6	121	\$213	\$242
2000	9,640	4	165	\$193	\$211
2001	9,960	5	120	\$272	\$290
2002	9,090	0	137	\$181	\$190
2003	8,230	5	91	\$176	\$181
2004	7,960	3	72	\$160	\$160

\*The Station nightclub fire that claimed 100 lives is not included in these statistics

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. These national estimates are projections based on the detailed information collected in Version 5.0 of NFIRS. NFIRS 5.0, first introduced in 1999, instituted major changes in the coding rules and definitions. Single-year estimates for 1999-2001 are based on data collected originally in both NFIRS Version 4.1 and 5.0. The 2002-2004 single-year estimates are based on NFIRS Version 5.0 data only. 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 million 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 Eating and Drinking Establishments, by Month**  
**2000-2004 Annual Averages**

<b>Month</b>	<b>Fires</b>		<b>Civilian</b>		<b>Civilian</b>		<b>Direct Property</b>	
			<b>Deaths</b>		<b>Injuries</b>		<b>Damage</b>	
January	690	(8%)	2	(57%)	15	(13%)	\$19	(10%)
February	700	(8%)	0	(0%)	11	(10%)	\$16	(9%)
March	710	(8%)	0	(0%)	9	(8%)	\$16	(9%)
April	740	(9%)	1	(18%)	16	(14%)	\$14	(7%)
May	750	(9%)	0	(0%)	5	(4%)	\$12	(6%)
June	700	(8%)	0	(0%)	8	(7%)	\$13	(7%)
July	690	(8%)	0	(0%)	6	(5%)	\$20	(10%)
August	720	(8%)	1	(25%)	13	(11%)	\$15	(8%)
September	710	(8%)	0	(0%)	10	(8%)	\$14	(8%)
October	700	(8%)	0	(0%)	7	(6%)	\$17	(9%)
November	680	(8%)	0	(0%)	4	(4%)	\$15	(8%)
December	750	(9%)	0	(0%)	9	(8%)	\$17	(9%)
<b>Total</b>	<b>8,520</b>	<b>(100%)</b>	<b>3</b>	<b>(100%)</b>	<b>113</b>	<b>(100%)</b>	<b>\$190</b>	<b>(100%)</b>
<b>Average</b>	<b>710</b>	<b>(8%)</b>	<b>0</b>	<b>(8%)</b>	<b>9</b>	<b>(8%)</b>	<b>\$16</b>	<b>(8%)</b>

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. These national estimates are projections based on the detailed information collected in Version 5.0 of NFIRS. 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 million dollars. Property damage has not been adjusted for inflation. Sums may not equal totals due to rounding errors.

Source: NFIRS and NFPA survey.

**Table 3.**  
**Structure Fires in Eating and Drinking Establishments, by Day of Week**  
**2000-2004 Annual Averages**

<b>Day</b>	<b>Fires</b>		<b>Civilian</b>		<b>Civilian</b>		<b>Direct Property</b>	
			<b>Deaths</b>		<b>Injuries</b>		<b>Damage</b>	
							<b>(in Millions)</b>	
Sunday	1,220	(14%)	1	(25%)	21	(19%)	\$29	(15%)
Monday	1,160	(14%)	0	(0%)	14	(13%)	\$31	(16%)
Tuesday	1,180	(14%)	1	(18%)	19	(17%)	\$25	(13%)
Wednesday	1,250	(15%)	1	(25%)	16	(14%)	\$31	(16%)
Thursday	1,180	(14%)	0	(0%)	14	(13%)	\$23	(12%)
Friday	1,240	(15%)	1	(16%)	11	(10%)	\$25	(13%)
Saturday	1,280	(15%)	1	(16%)	17	(15%)	\$26	(14%)
<b>Total</b>	<b>8,520</b>	<b>(100%)</b>	<b>3</b>	<b>(100%)</b>	<b>113</b>	<b>(100%)</b>	<b>\$190</b>	<b>(100%)</b>
<b>Average</b>	<b>1,220</b>	<b>(14%)</b>	<b>0</b>	<b>(14%)</b>	<b>16</b>	<b>(14%)</b>	<b>\$27</b>	<b>(14%)</b>

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. These national estimates are projections based on the detailed information collected in Version 5.0 of NFIRS. 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 million 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 Eating and Drinking Establishments**  
**by Alarm Time**  
**2000-2004 Annual Averages**

Alarm Time	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Midnight-12:59 a.m.	300	(4%)	0	(0%)	2	(2%)	\$8	(4%)
1:00-1:59 a.m.	280	(3%)	0	(0%)	1	(1%)	\$22	(11%)
2:00-2:59 a.m.	260	(3%)	1	(18%)	1	(1%)	\$15	(8%)
3:00-3:59 a.m.	250	(3%)	0	(0%)	0	(0%)	\$13	(7%)
4:00-4:59 a.m.	250	(3%)	1	(41%)	5	(5%)	\$13	(7%)
5:00-5:59 a.m.	310	(4%)	0	(0%)	2	(2%)	\$10	(5%)
6:00-6:59 a.m.	290	(3%)	0	(0%)	2	(2%)	\$9	(5%)
7:00-7:59 a.m.	280	(3%)	0	(0%)	4	(4%)	\$7	(4%)
8:00-8:59 a.m.	360	(4%)	0	(0%)	5	(5%)	\$5	(3%)
9:00-9:59 a.m.	440	(5%)	1	(16%)	7	(6%)	\$6	(3%)
10:00-10:59 a.m.	480	(6%)	0	(0%)	10	(8%)	\$7	(3%)
11:00-11:59 a.m.	430	(5%)	0	(0%)	9	(8%)	\$3	(1%)
12:00-12:59 p.m.	380	(4%)	0	(0%)	7	(6%)	\$5	(3%)
1:00-1:59 p.m.	400	(5%)	0	(0%)	9	(8%)	\$6	(3%)
2:00-2:59 p.m.	380	(4%)	0	(0%)	5	(4%)	\$7	(4%)
3:00-3:59 p.m.	380	(4%)	0	(0%)	5	(4%)	\$6	(3%)
4:00-4:59 p.m.	390	(5%)	0	(0%)	8	(7%)	\$5	(2%)
5:00-5:59 p.m.	390	(5%)	0	(0%)	4	(4%)	\$6	(3%)
6:00-6:59 p.m.	410	(5%)	0	(0%)	3	(3%)	\$5	(3%)
7:00-7:59 p.m.	400	(5%)	0	(0%)	8	(7%)	\$5	(3%)
8:00-8:59 p.m.	430	(5%)	1	(25%)	6	(6%)	\$4	(2%)
9:00-9:59 p.m.	380	(4%)	0	(0%)	4	(4%)	\$7	(4%)
10:00-10:59 p.m.	330	(4%)	0	(0%)	2	(2%)	\$7	(4%)
11:00-11:59 p.m.	310	(4%)	0	(0%)	3	(3%)	\$10	(5%)
Total	8,520	(100%)	3	(100%)	113	(100%)	\$190	(100%)
Average	360	(4%)	0	(4%)	5	(4%)	\$8	(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. These national estimates are projections based on the detailed information collected in Version 5.0 of NFIRS. 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 million dollars.

Source: NFIRS and NFPA survey.

**Table 5.**  
**Leading Causes of Structure Fires in Eating and Drinking Establishments**  
**2000-2004 Annual Averages**

Cause	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Cooking equipment fires	4,130	(48%)	0	(0%)	56	(49%)	\$33	(17%)
<i>Identified cooking equipment</i>	900	(11%)	0	(0%)	20	(17%)	\$30	(16%)
<i>Confined cooking fire, confined to container</i>	3,230	(38%)	0	(0%)	36	(32%)	\$4	(2%)
Heating equipment fires	780	(9%)	0	(0%)	9	(8%)	\$8	(4%)
<i>Identified heating equipment</i>	310	(4%)	0	(0%)	5	(4%)	\$8	(4%)
<i>Confined heating equipment</i>	470	(6%)	0	(0%)	4	(4%)	\$0	(0%)
Electrical distribution and lighting equipment	430	(5%)	0	(0%)	2	(2%)	\$11	(6%)
Smoking materials (i.e., lighted tobacco products)	350	(4%)	0	(0%)	5	(5%)	\$13	(7%)
Intentional	330	(4%)	2	(67%)	10	(9%)	\$21	(11%)
Exposure to other fire	170	(2%)	0	(0%)	0	(0%)	\$10	(5%)
Contained trash or rubbish fire	468	(5%)	0	(0%)	2	(2%)	\$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 on heat source, equipment involved, or factor contributing to ignition, 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. These national estimates are projections based on the detailed information collected in Version 5.0 of NFIRS. 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 million dollars. Property damage has not been adjusted for inflation.

Source: NFIRS and NFPA survey.

**Table 6.**  
**Structure Fires in Eating and Drinking Establishments**  
**by Equipment Involved in Ignition**  
**2000-2004 Annual Averages**

Equipment Involved	Fires		Civilian		Civilian		Direct Property	
			Deaths	Injuries	Injuries	Damage		
							(in Millions)	
Confined cooking fire	3,230	(38%)	0	(0%)	36	(32%)	\$4	(2%)
No equipment involved	2,250	(26%)	3	(100%)	36	(32%)	\$118	(63%)
Deep fryer	270	(3%)	0	(0%)	5	(4%)	\$6	(3%)
Confined chimney or flue fire	270	(3%)	0	(0%)	1	(1%)	\$0	(0%)
Confined fuel burner or boiler fire	200	(2%)	0	(0%)	3	(3%)	\$0	(0%)
Lamp, bulb or lighting	190	(2%)	0	(0%)	1	(1%)	\$4	(2%)
Range or stovetop	180	(2%)	0	(0%)	2	(2%)	\$5	(2%)
Unclassified kitchen or cooking equipment	150	(2%)	0	(0%)	7	(6%)	\$13	(7%)
Wiring, switch or outlet	130	(2%)	0	(0%)	0	(0%)	\$3	(2%)
Water heater	100	(1%)	0	(0%)	3	(3%)	\$3	(2%)
Grill	90	(1%)	0	(0%)	5	(4%)	\$3	(1%)
Fan	80	(1%)	0	(0%)	1	(1%)	\$5	(3%)
Unclassified heating, ventilating and air conditioning equipment	80	(1%)	0	(0%)	0	(0%)	\$2	(1%)
Clothes dryer or washer	80	(1%)	0	(0%)	4	(3%)	\$2	(1%)
Oven or rotisserie	70	(1%)	0	(0%)	0	(0%)	\$1	(0%)
Fixed or portable space heater	70	(1%)	0	(0%)	0	(0%)	\$1	(0%)
Portable cooking or warming equipment	70	(1%)	0	(0%)	1	(1%)	\$1	(1%)
Grease hood or duct exhaust fan	50	(1%)	0	(0%)	0	(0%)	\$1	(1%)
Air conditioner	40	(1%)	0	(0%)	1	(1%)	\$1	(0%)
Other known or confined equipment	460	(5%)	0	(0%)	5	(5%)	\$19	(10%)
Contained trash or rubbish fire	470	(6%)	0	(0%)	2	(2%)	\$0	(0%)
<b>Total</b>	<b>8,520</b>	<b>(100%)</b>	<b>3</b>	<b>(100%)</b>	<b>113</b>	<b>(100%)</b>	<b>\$190</b>	<b>(100%)</b>

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. These national estimates are projections based on the detailed information collected in Version 5.0 of NFIRS. 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 million 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 Eating and Drinking Establishments, by Heat Source**  
**2000-2004 Annual Averages**

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Confined cooking fire	3,230	(38%)	0	(0%)	36	(32%)	\$4	(2%)
Arcing	760	(9%)	0	(0%)	3	(3%)	\$28	(15%)
Unclassified heat from powered equipment	740	(9%)	0	(0%)	11	(10%)	\$27	(14%)
Radiated or conducted heat from operating equipment	730	(9%)	0	(0%)	15	(14%)	\$27	(14%)
Spark, ember or flame from operating equipment	540	(6%)	0	(0%)	14	(13%)	\$30	(16%)
Smoking materials (i.e., lighted tobacco products)	350	(4%)	0	(0%)	5	(5%)	\$13	(7%)
Confined chimney or flue fire	270	(3%)	0	(0%)	1	(1%)	\$0	(0%)
Unclassified hot or smoldering object	260	(3%)	0	(0%)	3	(3%)	\$13	(7%)
Unclassified heat source	250	(3%)	3	(100%)	3	(3%)	\$15	(8%)
Confined fuel burner or boiler fire	200	(2%)	0	(0%)	3	(3%)	\$0	(0%)
Hot ember or ash	180	(2%)	0	(0%)	3	(2%)	\$10	(5%)
Flame or torch used for lighting	70	(1%)	0	(0%)	3	(2%)	\$1	(1%)
Lighter	70	(1%)	0	(0%)	3	(3%)	\$4	(2%)
Match	60	(1%)	0	(0%)	4	(4%)	\$3	(2%)
Other known or confined heat source	340	(4%)	0	(0%)	2	(2%)	\$16	(8%)
Contained trash or rubbish fire	470	(6%)	0	(0%)	2	(2%)	\$0	(0%)
<b>Total</b>	<b>8,520</b>	<b>(100%)</b>	<b>3</b>	<b>(100%)</b>	<b>113</b>	<b>(100%)</b>	<b>\$190</b>	<b>(100%)</b>

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. These national estimates are projections based on the detailed information collected in Version 5.0 of NFIRS. 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 million 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 Eating and Drinking Establishments**  
**by Area of Origin**  
**2000-2004 Annual Averages**

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Confined cooking fire	3,230	(38%)	0	(0%)	36	(32%)	\$4	(2%)
Kitchen or cooking area	1,400	(16%)	2	(50%)	30	(27%)	\$55	(29%)
Exterior roof surface	300	(4%)	0	(0%)	3	(2%)	\$6	(3%)
Confined chimney or flue fire	270	(3%)	0	(0%)	1	(1%)	\$0	(0%)
Exterior wall surface	250	(3%)	0	(0%)	0	(0%)	\$3	(2%)
Confined fuel burner or boiler fire	200	(2%)	0	(0%)	3	(3%)	\$0	(0%)
Lavatory, bathroom, locker room or check room	190	(2%)	0	(0%)	2	(1%)	\$2	(1%)
Attic or ceiling/roof assembly or concealed space	180	(2%)	0	(0%)	1	(1%)	\$17	(9%)
Wall assembly or concealed space	160	(2%)	0	(0%)	1	(1%)	\$4	(2%)
Dining room, bar or beverage area, cafeteria	140	(2%)	0	(0%)	3	(3%)	\$11	(6%)
Heating equipment or service area	120	(1%)	0	(0%)	4	(4%)	\$4	(2%)
Unclassified storage area	90	(1%)	0	(0%)	2	(2%)	\$7	(4%)
Duct for HVAC, cable exhaust, heating or air conditioning	90	(1%)	0	(0%)	2	(2%)	\$2	(1%)
Ceiling/floor assembly or concealed	90	(1%)	0	(0%)	0	(0%)	\$9	(5%)
Unclassified equipment or service area	90	(1%)	0	(0%)	4	(3%)	\$4	(2%)
Storage room, area, tank, or bin	90	(1%)	0	(0%)	0	(0%)	\$6	(3%)
Unclassified outside area	90	(1%)	0	(0%)	0	(0%)	\$3	(1%)
Small assembly area, less than 100 person capacity	90	(1%)	0	(0%)	1	(1%)	\$4	(2%)
Office	70	(1%)	0	(0%)	2	(2%)	\$5	(3%)
Laundry room or area	60	(1%)	0	(0%)	2	(2%)	\$1	(0%)
Unclassified structural area	60	(1%)	0	(0%)	0	(0%)	\$4	(2%)

**Table 8.**  
**Structure Fires in Eating and Drinking Establishments**  
**by Area of Origin**  
**2000-2004 Annual Averages**  
**(Continued)**

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Lobby or entrance way	50	(1%)	0	(0%)	1	(1%)	\$3	(1%)
Crawl space or substructure space	50	(1%)	0	(0%)	0	(0%)	\$4	(2%)
Awning	50	(1%)	0	(0%)	0	(0%)	\$0	(0%)
Storage of supplies or tools or dead storage	50	(1%)	0	(0%)	2	(1%)	\$3	(1%)
Unclassified	50	(1%)	0	(0%)	0	(0%)	\$1	(1%)
Other known or confined area	540	(6%)	2	(50%)	11	(10%)	\$29	(15%)
Contained trash or rubbish fire	470	(6%)	0	(0%)	2	(2%)	\$0	(0%)
<b>Total</b>	<b>8,520</b>	<b>(100%)</b>	<b>3</b>	<b>(100%)</b>	<b>113</b>	<b>(100%)</b>	<b>\$190</b>	<b>(100%)</b>

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. These national estimates are projections based on the detailed information collected in Version 5.0 of NFIRS. 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 million 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 Eating and Drinking Establishments**  
**by Item First Ignited**  
**2000-2004 Annual Averages**

<b>Item First Ignited</b>	<b>Fires</b>		<b>Civilian Deaths</b>		<b>Civilian Injuries</b>		<b>Direct Property Damage (in Millions)</b>	
Confined cooking fire	3,230	(38%)	36	(32%)	0	(0%)	\$4	(2%)
Cooking materials, including food	750	(9%)	18	(16%)	1	(38%)	\$28	(15%)
Electrical wire or cable insulation	470	(6%)	3	(2%)	0	(0%)	\$13	(7%)
Structural member or framing	410	(5%)	1	(0%)	0	(0%)	\$26	(14%)
Exterior wall covering or finish	290	(3%)	1	(1%)	0	(0%)	\$8	(4%)
Confined chimney or flue fire	270	(3%)	1	(1%)	0	(0%)	\$0	(0%)
Flammable or combustible liquid or gas, filter or piping	290	(3%)	17	(15%)	1	(38%)	\$16	(8%)
Unclassified	230	(3%)	1	(0%)	0	(0%)	\$9	(5%)
Exterior roof covering or finish	230	(3%)	2	(2%)	0	(0%)	\$6	(3%)
Confined fuel burner or boiler fire	200	(2%)	3	(3%)	0	(0%)	\$0	(0%)
Rubbish, trash, or waste	150	(2%)	4	(3%)	0	(0%)	\$11	(6%)
Interior wall covering, excluding drapes	140	(2%)	1	(1%)	0	(0%)	\$7	(4%)
Box, carton, bag, basket, or barrel	120	(1%)	0	(0%)	0	(0%)	\$5	(3%)
Insulation within structural area	120	(1%)	4	(4%)	0	(0%)	\$7	(4%)
Linen other than bedding	100	(1%)	0	(0%)	0	(0%)	\$3	(2%)
Unclassified structural component or finish	90	(1%)	0	(0%)	0	(0%)	\$7	(3%)
Interior ceiling cover or finish	70	(1%)	1	(1%)	0	(0%)	\$5	(3%)
Multiple items first ignited	60	(1%)	2	(1%)	0	(0%)	\$5	(3%)
Unclassified organic materials	60	(1%)	2	(1%)	0	(0%)	\$2	(1%)
Appliance housing or casing	60	(1%)	1	(1%)	0	(0%)	\$2	(1%)
Exterior trim, including doors	60	(1%)	0	(0%)	0	(0%)	\$1	(0%)
Magazine, newspaper, or writing paper	40	(1%)	0	(0%)	0	(0%)	\$1	(1%)
Other known or confined item	620	(7%)	16	(14%)	1	(24%)	\$23	(12%)
Contained trash or rubbish fire	470	(6%)	2	(2%)	0	(0%)	\$0	(0%)
<b>Total</b>	<b>8,520</b>	<b>(100%)</b>	<b>113</b>	<b>(100%)</b>	<b>3</b>	<b>(100%)</b>	<b>\$190</b>	<b>(100%)</b>

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. These national estimates are projections based on the detailed information collected in Version 5.0 of NFIRS. 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 million 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 Eating and Drinking Establishments**  
**by Extent of Flame Damage**  
**2000-2004 Annual Averages**

<b>Extent of Flame Damage</b>	<b>Fires</b>		<b>Civilian Deaths</b>		<b>Civilian Injuries</b>		<b>Direct Property Damage (in Millions)</b>	
Confined or contained fire	4,200	(49%)	0	(0%)	42	(37%)	\$4	(2%)
Confined to object of origin	2,030	(24%)	0	(0%)	30	(26%)	\$19	(10%)
Confined to room of origin	1,060	(12%)	0	(0%)	18	(16%)	\$19	(10%)
Confined to floor of origin	220	(3%)	0	(0%)	2	(2%)	\$11	(6%)
Confined to building of origin	920	(11%)	3	(100%)	19	(17%)	\$121	(64%)
Extended beyond building of origin	90	(1%)	0	(0%)	2	(2%)	\$16	(8%)
<b>Total</b>	<b>8,520</b>	<b>(100%)</b>	<b>3</b>	<b>(100%)</b>	<b>113</b>	<b>(100%)</b>	<b>\$190</b>	<b>(100%)</b>

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. These national estimates are projections based on the detailed information collected in Version 5.0 of NFIRS. 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 million 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.

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. 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/>.

NFPA conducts an annual stratified random sample survey of fire departments which enables us to capture a summary of fire department experience on a larger scale. 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. 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**

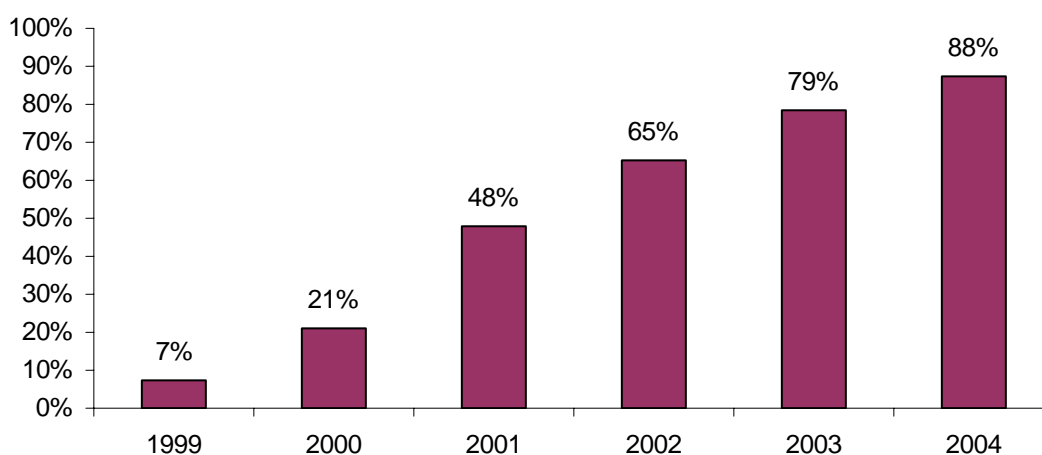
As noted, NFIRS is a voluntary system. Different states and jurisdictions have different reporting requirements and practices. Participation rates in NFIRS are not necessarily uniform across regions and community sizes, both factors correlated with frequency and severity of fires. This means NFIRS may 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.

Analysts at the NFPA, the USFA and the Consumer Product Safety Commission have developed the specific 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

### Fires Originally Collected in NFIRS 5.0 by Year



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. It also introduced incident type codes for certain confined structure fires, including confined cooking fires, confined chimney fires, confined fuel burner fires, confined incinerator and compactor fires, and contained or confined trash fires. Very limited causal information is required for these incidents.

In this analysis, only data originally collected in NFIRS 5.0 is included in the calculations of the 2000-2004 national estimates. The portion of fires originally collected in NFIRS Version 5.0 has increased steadily over time. The total number of structure fires in eating and drinking establishments (property use 160-169) was calculated by taking the percentage of these incidents collected in NFIRS Version 5.0 compared to fires in other properties. This percentage was then multiplied by the estimated combined total structure fires reported in all versions of NFIRS during the time period.

Queries for property use, month, day of week, and alarm time were based on all types of structure fires collected in NFIRS Version 5.0. The percentages were then multiplied by the totals. Queries for causal factors, equipment involved in ignition, heat source, area of origin, item first ignited, extent of flame damage, and smoke alarm status were done first on non-

confined fires (incident type 110-129, except 113-118). Unknown data was allocated proportionally to calculate the percentage of fires with each characteristic. These percentages were multiplied against the total number of non-confined fires. New total percentages were calculated of the estimates against totals that included the confined fires and confined fires were added to the list of factors.

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.

**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.