



RESEARCH

Home Fires Involving Heating Equipment

March 2016

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Abstract

In 2009-2013, U.S. fire departments responded to an estimated average of 56,000 structure fires per year in homes that involved heating equipment. These fires resulted in annual losses of 470 civilian deaths, 1,490 civilian injuries, and \$1.0 billion in direct property damage. These homes included one- and two-family homes (including manufactured homes) and apartments (including townhouses and other multi-family dwellings).

Space heaters are the type of equipment most often involved in home heating equipment fires, figuring in two of every five fires (40%). The fires involving space heaters accounted for 84% of the civilian deaths and 75% of civilian injuries in home fires caused by heating equipment, as well as over half (52%) of direct property damage. Another one-third (32%) of fires involved a fireplace or chimney, but these fires accounted for a much smaller share of civilian fatalities (5%) and civilian injuries (6%). Central heat and water heaters were responsible for 12% and 10% of home fires caused by heating equipment, respectively.

Keywords: fire statistics, home heating fires, space heater fires, fireplace and chimney fires, central heating fires,

Acknowledgements

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

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

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Executive Summary

In 2009-2013, U.S. fire departments responded to an estimated average of 56,000 structure fires per year in homes that involved heating equipment. These fires resulted in annual losses of 470 civilian deaths, 1,490 civilian injuries, and \$1.0 billion in direct property damage. These homes included one- and two-family homes (including manufactured homes) and apartments (including townhouses and other multi-family dwellings).

Heating equipment is a leading cause of fires in U.S. homes. Heating equipment caused 16% of home structure fires in 2009-2013, ranking as the second leading cause behind fires caused by cooking equipment. Home heating equipment fires also accounted for nearly one-fifth (19%) of civilian deaths (second behind fires caused by smoking materials), 12% of civilian injuries (second behind cooking equipment), and 15% of direct property damage (third behind electrical distribution and lighting equipment and cooking equipment).

Space heaters are the type of equipment most often involved in home heating equipment fires, figuring in two of every five fires (40%). Significantly, the fires involving space heaters accounted for 84% of the civilian deaths and 75% of civilian injuries in home fires caused by heating equipment, as well as over half (52%) of direct property damage. Another one-third (32%) of fires involved a fireplace or chimney, but these fires accounted for a much smaller share of civilian fatalities (5%) and civilian injuries (6%). Central heat and water heaters were responsible for 12% and 10% of home fires caused by heating equipment, respectively.

Home fires caused by heating equipment are influenced by seasonal changes and time of day. The peak months for home heating fires are the cold weather months of December, January, and February, which together account for nearly one-half (49%) of the annual total. (Figure 2) Three out of five (59%) of home heating fire deaths occur in these months. Fires in March and November, each with 11% of fires, also experienced a disproportionate share of heating equipment fires by month.

A variety of factors were identified as contributing to the ignition of home heating equipment fires. The leading factor that contributed to the failure of home heating equipment fires was “failure to clean,” accounting for 30% of fires, the majority of which were confined fires (27% of total). The second leading factor, “heat source too close to combustibles,” accounted for 14% of fires, but was responsible for the greatest share of heating fire losses – 56% of civilian deaths, 31% of civilian injuries, and 31% of direct property damage. A mechanical failure or malfunction (14%), unattended equipment (6%), electrical failures or malfunctions (5%), and unclassified use of materials or products (3%) were other leading factors contributing to ignition.

Fuel and power sources. Heating equipment powered by a solid-fueled source accounted for over two of every five home fires (43%) attributed to heating equipment, and these fires were associated with 25% of civilian deaths, 12% of civilian injuries, and 33% of direct property damage. Electric-powered heating equipment was responsible for a smaller share of the fires (32%), but a larger share of civilian fatalities (46%), civilian injuries (54%), and direct property damage (41%). Gas-fueled heating equipment accounted for another 18% of fires, 19% of civilian deaths, 27% of civilian injuries, and 22% of direct property damage.

Table of Contents

	Page
Abstract	i
Acknowledgements	i
Executive Summary	ii
Fact Sheet	vii
Section 1: Home Fire Involving Heating Equipment	1
Section 2: Home Structure Fires Involving Space Heaters	7
Section 3. Home Structure Fires Involving Fireplaces, Chimneys, and Chimney Connectors	11
Section 4. Home Structure Fires Involving Water Heaters	17
Appendix A. How National Estimates Statistics Are Calculated	59

List of Tables and Figures

Figures

	Page
Figure 1. Home Structure Fires Involving Heating Equipment by Type of Equipment	1
Figure 2. Home Structure Fires Involving Heating Equipment, by Month	2
Figure 3. Home Structure Fires Involving Heating Equipment by Hour	2
Figure 4. Number of Home Structure Fires Involving Heating Equipment by Year	5
Figure 5. Civilian Deaths in Home Structure Fires Involving Heating Equipment	6
Figure 6. Civilian Injuries in Home Structure Fires Involving Heating Equipment	6
Figure 7. Home Structure Fires Involving Space Heaters, by Month	9
Figure 8. Home Structure Fires Involving Space Heaters, by Hour	9
Figure 9. Home Structure Fires Involving Space Heaters by Factor Contributing to Ignition	10
Figure 10. Home Structure Fires Involving Fireplaces, Chimneys, and Chimney Connectors by Alarm Hour	12
Figure 11. Home Structure Fires Involving Fireplaces, Chimneys, and Chimney Connectors by Factor Contributing to Ignition	12
Figure 12. Home Structure Fires Involving Central Heating Units by Month	14
Figure 13. Home Structure Fires Involving Central Heating Units by Time of Day	15
Figure 14. Home Fires Involving Water Heaters by Leading Factors Contributing to Ignition	18

Tables

Table A. Home Fires Involving Heating Equipment, by Equipment Involved in Ignition	3
Table B. Home Fires Involving Heating Equipment, by Fuel or Power Source	5
Table C. Home Space Heater Fires, by Type of Device	7
Table D. Home Space Heater Fires by Fuel or Power Source	8
Table E. Home Fires Involving Fireplaces, Chimneys or Chimney Connectors, by Type of Fuel or Power	11
Table F. Home Fires Involving Water Heaters, by Type of Fuel or Power	17
Table 1. Home Fires Involving Heating Equipment by Year	19
Table 2. Home Fires Involving Heating Equipment by Type of Equipment	21
Table 3. Home Fires Involving Heating Equipment, by Month	22
Table 4. Home Fires Involving Heating Equipment, by Day of Week	23
Table 5. Home Fires Involving Heating Equipment, by Alarm Time	24
Table 6. Home Fires Involving Heating Equipment, by Factor Contributing to Ignition	25
Table 7. Home Fires Involving Heating Equipment, by Item First Ignited	26
Table 8. Home Fires Involving Heating Equipment, by Heat Source	27

List of Tables and Figures (Continued)

Tables

	Page
Table 9. Home Fires Involving Heating Equipment, by Area of Origin	28
Table 10. Home Fires Involving Heating Equipment, by Type of Fuel or Power	29
Table 11. Home Fires Involving Space Heaters, by Type of Fuel or Power and Portability	30
Table 12. Home Fires Involving Space Heaters, by Month	31
Table 13. Home Fires Involving Space Heaters, by Day of Week	32
Table 14. Home Fires Involving Space Heaters, by Alarm Time	33
Table 15. Home Fires Involving Space Heaters, by Type of Device	34
Table 16. Home Fires Involving Space Heaters, by Factor Contributing to Ignition	35
Table 17. Home Fires Involving Space Heaters, by Item First Ignited	36
Table 18. Home Fires Involving Space Heaters, by Area of Origin	37
Table 19. Home Fires Involving Fireplaces, Chimneys or Chimney Connectors, by Type of Fuel or Power	38
Table 20. Home Fires Involving Fireplaces, Chimneys or Chimney Connectors, by Month	39
Table 21. Home Fires Involving Fireplaces, Chimneys or Chimney Connectors, by Day of Week	40
Table 22. Home Fires Involving Fireplaces, Chimneys or Chimney Connectors, by Alarm Time	41
Table 23. Home Fires Involving Fireplaces, Chimneys or Chimney Connectors, by Factor Contributing to Ignition	42
Table 24. Home Fires Involving Fireplaces, Chimneys or Chimney Connectors, by Item First Ignited	43
Table 25. Home Fires Involving Fireplaces, Chimneys or Chimney Connectors by Area of Origin	44
Table 26. Home Fires Involving Central Heating Equipment Fires, by Type of Fuel or Power	45
Table 27. Home Fires Involving Central Heat, by Month	46
Table 28. Home Fires Involving Central Heat, by Day of Week	47

List of Tables and Figures (Continued)

Tables

	Page
Table 29. Home Fires Involving Central Heat, by Alarm Time	48
Table 30. Home Fires Involving Central Heat, by Factor Contributing to Ignition	49
Table 31. Home Fires Involving Central Heat, by Item First Ignited	50
Table 32. Home Fires Involving Central Heat, by Area of Origin	51
Table 33. Home Fires Involving Water Heaters, by Type of Fuel or Power	52
Table 34. Home Fires Involving Water Heaters, by Month	53
Table 35. Home Fires Involving Water Heaters, by Day or Week	54
Table 36. Home Fires Involving Water Heaters, by Alarm Type	55
Table 37. Home Fires Involving Water Heaters, by Factor Contributing to Ignition	56
Table 38. Home Fires Involving Water Heaters, by Item First Ignited	57
Table 39. Home Fires Involving Water Heaters, by Area of Origin	58



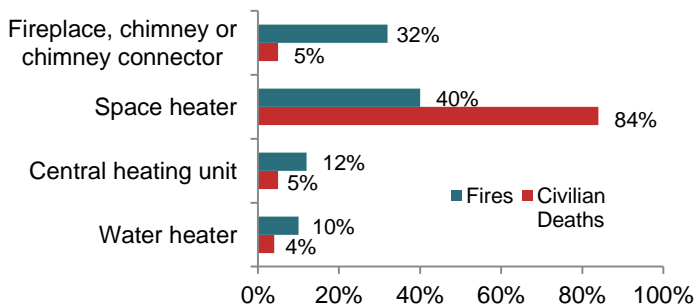
U.S. Home Heating Equipment Fires Fact Sheet

In 2009-2013, U.S. fire departments responded to **56,000** home¹ structure fires that involved heating equipment.

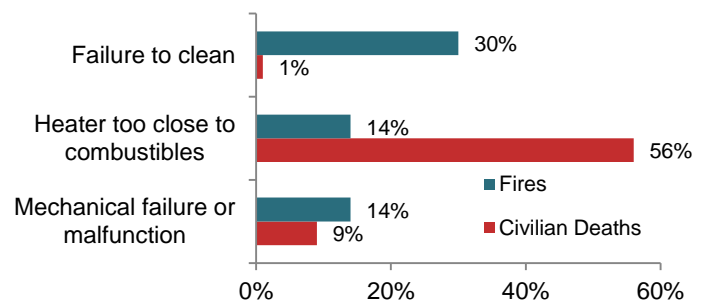
These fires caused

- 470 civilian fire deaths
 - 1,490 civilian fire injuries
 - \$1.0 billion in direct property damage
- Heating equipment fires accounted for 16% of all reported home fires in 2009-2013 (second behind cooking) and 19% of home fire deaths.
 - The leading factor contributing to home heating fires (30%) was failure to clean, principally from solid-fueled heating equipment, primarily chimneys.
 - The leading factor contributing to ignition for home heating fire deaths (56%) was heating equipment too close to things that can burn, such as upholstered furniture, clothing, mattress, or bedding.
 - Most home heating fire deaths (84%) involved stationary or portable space heaters.
 - Nearly half (49%) of all home heating fires occurred in December, January and February.
 - Home heating fires peak during 5:00 to 8:00 p.m.

U.S. Home Heating Fires by Equipment Involved: 2009-2013



Leading Factors in Home Heating Fires 2009-2013



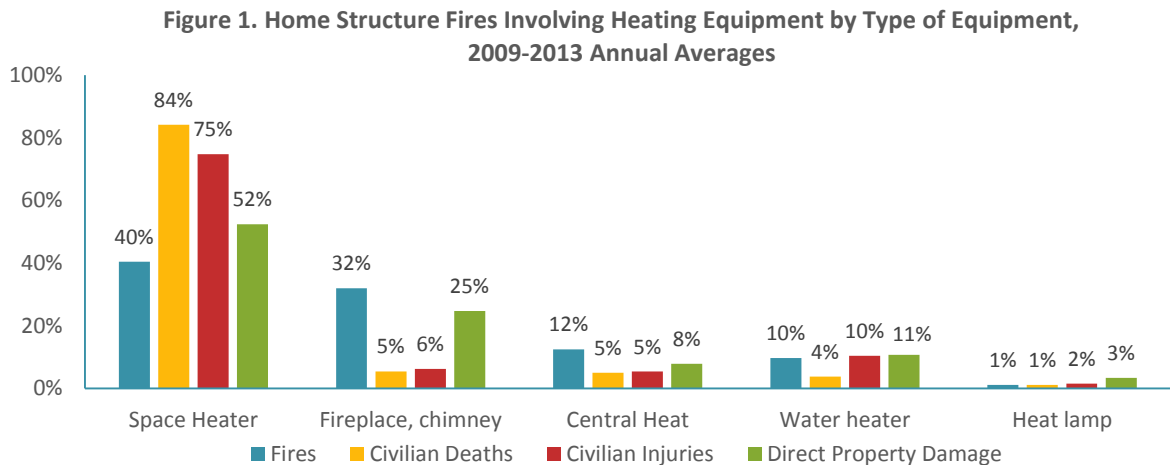
¹Homes are dwellings, duplexes, manufactured homes, apartments, townhouses, rowhouses and condominiums.

Section 1: Home Fires Involving Heating Equipment

In 2009-2013, U.S. fire departments responded to an estimated average of 56,000 structure fires per year in homes that involved heating equipment. These fires resulted in annual losses of 470 civilian deaths, 1,490 civilian injuries, and \$1.0 billion in direct property damage. These homes included one- and two-family homes (including manufactured homes) and apartments (including townhouses and other multi-family dwellings).

Heating equipment is a leading cause of fires in U.S. homes. As indicated in a separate report, *Home Structure Fires* by Marty Ahrens, heating equipment caused 16% of home structure fires in 2009-2013, ranking as the second leading cause behind fires caused by cooking equipment.¹ Home heating equipment fires also accounted for nearly one-fifth (19%) of civilian deaths (second behind fires caused by smoking materials), 12% of civilian injuries (second behind cooking equipment), and 15% of direct property damage (third behind electrical distribution and lighting equipment and cooking equipment).

Space heaters are the type of equipment most often involved in home heating equipment fires, figuring in two of every five fires (40%) (See Figure 1 below). Significantly, the fires involving space heaters accounted for 84% of the civilian deaths and 75% of civilian injuries in home fires caused by heating equipment, as well as over half (52%) of direct property damage. Another one-third (32%) of fires involved a fireplace or chimney, but these fires accounted for a much smaller share of civilian fatalities (5%) and civilian injuries (6%). Central heat and water heaters were responsible for 12% and 10% of home fires caused by heating equipment, respectively.



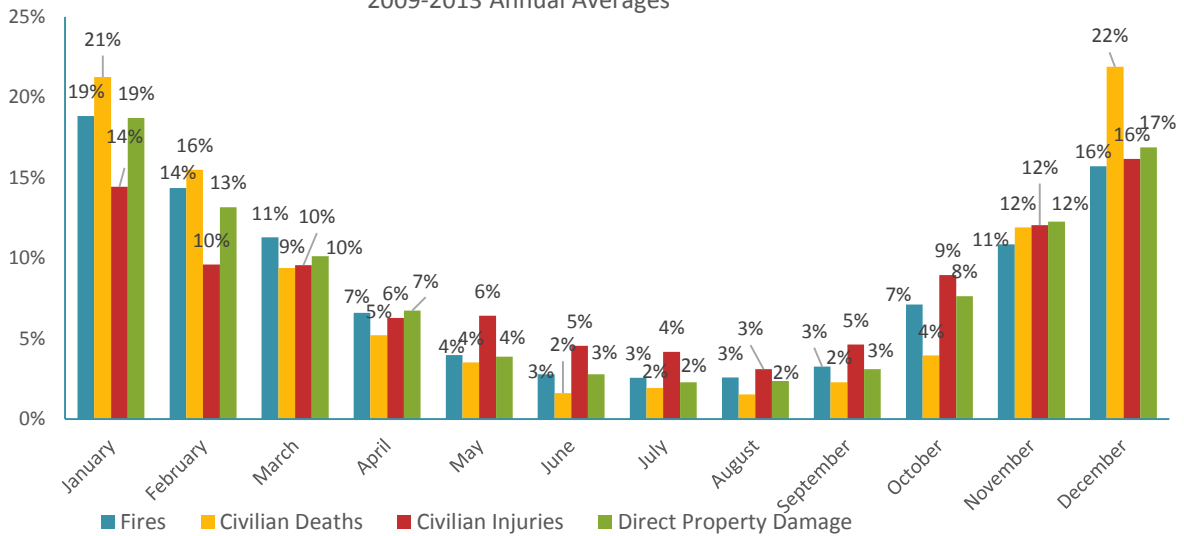
Note and Source: See Table 2.

Home fires caused by heating equipment are influenced by seasonal changes and time of day. The peak months for home heating fires are the cold weather months of December, January, and February, which together account for nearly one-half (49%) of the annual total. (Figure 2) Three out of five (59%) of home heating fire deaths occur in these months. Fires in March and

¹ Marty Ahrens, *Home Structure Fires*, Quincy, MA: National Fire Protection Association, Fire Analysis and Research Division, 2015.

November, each with 11% of fires, also experienced a disproportionate share of heating equipment fires by month.

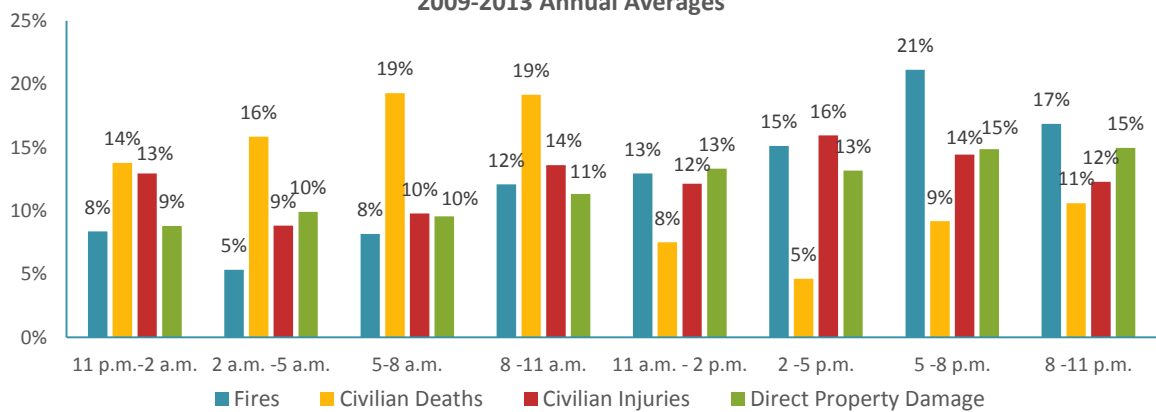
Figure 2. Home Structure Fires Involving Heating Equipment, by Month, 2009-2013 Annual Averages



Note and Source: See Table 3.

The peak time of day for home heating equipment fires are the hours between 5:00 p.m. and 8:00 p.m. (21% of fires), with another 15% of fires occurring between 2:00 p.m. and 5:00 p.m. (Figure 3). The fewest fires occurred in the hours between 2:00 a.m. and 5:00 a.m. The timing of fires is likely to reflect a decrease in the use of heating equipment during the overnight hours. However, it should be noted that the greatest share of civilian deaths occur during the times of day that accounted for the fewest fires, with 68% of civilian deaths recorded in the hours between 11:00 p.m. and 11:00 a.m., which accounted for 34% of fires.

Figure 3. Home Structure Fires Involving Heating Equipment by Time of Day, 2009-2013 Annual Averages



Note and Source: See Table 5.

Home heating fires show little variation by day of week, although Saturday and Sunday had a slightly higher share of fires – each with 15% -- than the remaining days of the week, which each recorded 14% of fires, indicating that people are more likely to be home and using heating equipment over the weekend.

Home structure fires and heating equipment. Fires caused by heating equipment include fires that the National Fire Incident Reporting System (NFIRS 5.0) distinguishes as “non-confined” and “confined” fires. Confined heating equipment fires include: 1) confined chimney or flue fires, and 2) confined fuel burner or boiler fires. Losses are generally minimal in these fires, which are by definition assumed to be limited to the object of fire origin. Table A below shows that 55% of home heating equipment fires involved confined heating equipment, primarily confined chimney or flue fires (37%), but that all of the associated civilian deaths, 96% of civilian injuries, and 99% of direct property damage were associated with non-confined fires caused by heating equipment. A small number of fires that were confined to either the chimney/flue or fuel burner/boiler were coded as not involving heating equipment.

Table A. Home Fires Involving Heating Equipment, By Equipment Involved in Ignition, Annual Average of 2009-2013 Structure Fires Reported to U.S. Fire Departments

Equipment Involved in Ignition	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Non-confined heating equipment	25,120	(45%)	470	(100%)	1,430	(96%)	\$1,019	(99%)
Confined heating equipment	30,880	(55%)	0	(0%)	60	(4%)	\$8	(1%)
Confined chimney, flue	20,550	(37%)	0	(0%)	20	(1%)	\$6	(1%)
Confined chimney, flue, with heating equipment	19,770	(35%)	0	(0%)	10	(1%)	\$6	(1%)
Confined to chimney, flue, no heating equipment	790	(1%)	0	(0%)	10	(0%)	\$0	(0%)
Confined fuel burner, boiler	10,330	(18%)	0	(0%)	30	(2%)	\$2	(0%)
Confined fuel burner, boiler, with heating equipment	8,990	(16%)	0	(0%)	30	(2%)	\$2	(0%)
Confined fuel burner, boiler, no heating equipment	1,330	(2%)	0	(0%)	10	(0%)	\$0	(0%)
Total	56,000	(100%)	470	(100%)	1,490	(100%)	\$1,027	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

A variety of factors were identified as contributing to the ignition of home heating equipment fires. The leading factor that contributed to the failure of home heating equipment fires was “failure to clean,” accounting for 30% of fires, the majority of which were confined fires (27% of total). The second leading factor, “heat source too close to combustibles,” accounted for 14% of fires, but was responsible for the greatest share of heating fire losses – 56% of civilian deaths, 31% of civilian injuries, and 31% of direct property damage. A mechanical failure or malfunction (14%), unattended equipment (6%), electrical failures or malfunctions (5%), and unclassified use of materials or products (3%) were other leading factors contributing to ignition.

Unattended equipment was a factor associated with a disproportionate share of civilian heating equipment deaths (11%), injuries (18%), and direct property damage (10%). See [Table 6](#).

The leading item first ignited in home fires caused by heating equipment was flammable and combustible liquids and gases, piping and filter, which accounted for 12% of fires and 14% of civilian deaths, as well as 17% of civilian injuries and 7% of direct property damage. Other leading items first ignited were unclassified organic materials (10%), structural member or framing (8%), cooking materials (7%), and film or residue, including paint, resin, and creosote (6%). Fires in which a structural member of framing was first ignited had the largest share of direct property damage (27%), while one-quarter of civilian injuries (24%) occurred when cooking materials were first ignited. See [Table 7](#). In some cases, fire places, wood stoves, or other heating equipment may have been used to cook food. It is also possible that some kitchen ranges were erroneously coded heating stoves.

The primary heat sources for home fires caused by heating equipment were hot ember or ash (19% of fires), radiated or conducted heat from operating equipment (18%), a spark, ember, or flame from operating equipment (13%), and unclassified heat from operating equipment (12%). Fires caused by radiated or conducted heat from operating equipment accounted for 42% of civilian deaths, 35% of civilian injuries, and 36% of direct property damage. Fires in which a spark, ember, or flame from operating equipment acted as the heat source were associated with 19% of civilian deaths, 18% of civilian injuries, and 14% of direct property damage. See [Table 8](#).

Excluding confined chimney or flue fires, the leading area of origin for heating equipment fires in the home was a heating equipment room, with 14% of fires. As shown in [Table 9](#), a kitchen or cooking area was the area of origin in 12% of fires, followed by a living room, family room or den, and bedroom, each with 4% of fires. The fires originating in the kitchen or cooking area were associated with 14% of civilian deaths, 38% of civilian injuries, and 14% of direct property damage, while those originating in the living room, family room, or den caused 31% of civilian deaths, as well as 12% of civilian injuries and 12% of direct property damage. Fires originating in the bedroom accounted for 20% of civilian deaths, 13% of civilian injuries, and 10% of direct property damage.

Type of fuel or power with heating equipment fires. Heating equipment powered by a solid-fueled source accounted for over two of every five home fires (43%) attributed to heating equipment, and these fires were associated with 25% of civilian deaths, 12% of civilian injuries, and 33% of direct property damage. See [Table B](#) and [Table 10](#). Electric-powered heating equipment was responsible for a smaller share of the fires (32%), but a larger share of civilian fatalities (46%), civilian injuries (54%), and direct property damage (41%). Gas-fueled heating equipment accounted for another 18% of fires, 19% of civilian deaths, 27% of civilian injuries, and 22% of direct property damage.

Table B. Home Fires Involving Heating Equipment, by Fuel or Power Source, 2009-2013 Annual Averages

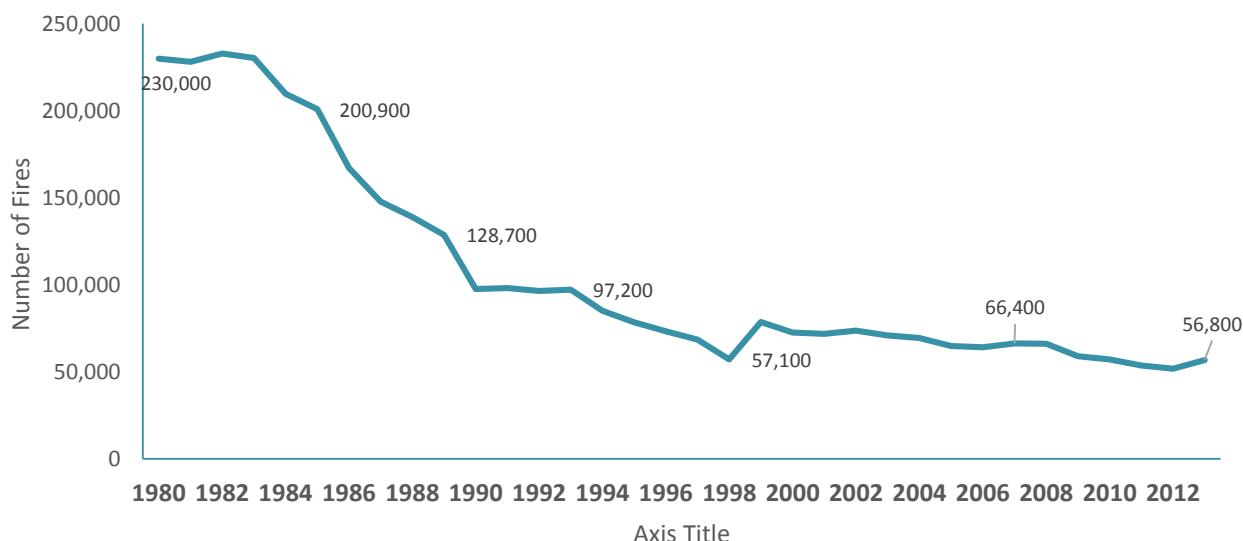
Fuel or Power	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Solid-fueled	24,040	(43%)	120	(25%)	180	(12%)	\$342	(33%)
Electric-powered	17,680	(32%)	220	(46%)	800	(54%)	\$422	(41%)
Gas-fueled	9,980	(18%)	90	(19%)	410	(27%)	\$228	(22%)
Liquid-fueled	3,820	(7%)	50	(11%)	100	(6%)	\$30	(3%)
Other	490	(1%)	0	(0%)	10	(1%)	\$5	(0%)
Total	56,000	(100%)	470	(100%)	1,490	(100%)	\$1,027	(100%)

Note and Source: See Table 10.

Trends in Home Heating Fires, 1980-2013

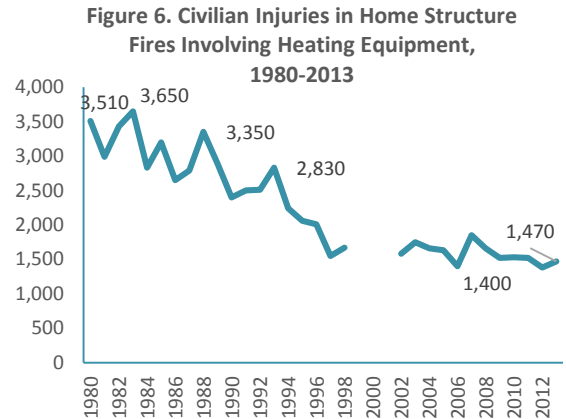
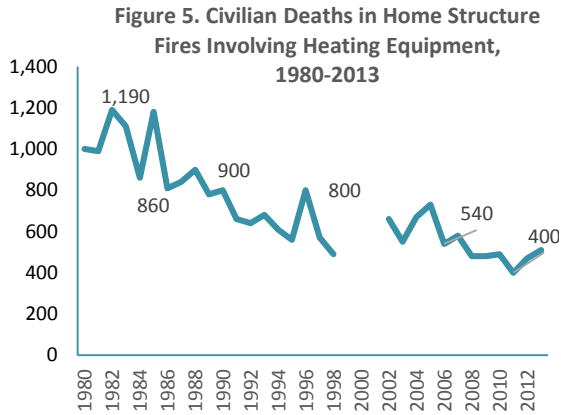
Since 1980, there has been a substantial decline in the estimated number of home structure fires involving heating equipment each year, as shown in Figure 4 and Table 1. Between 1980 and 1985, over 200,000 home fires were attributed to heating equipment each year, while an estimated 128,700 fires in 1989 represented the fewest number of fires during the 1980s. The number of home heating equipment fires dropped below 100,000 in 1990 for the first time (with 97,500), and they have since continued to decline, despite occasional yearly fluctuations. There have been fewer than 60,000 home fires due to heating equipment each year since 2009 -- approximately one-quarter of the totals recorded in the first six years of NFIRS from 1980 to 1985.

Figure 4. Number of Home Structure Fires Involving Heating Equipment by Year, 1980-2013



Note and Source: See Table 1.

There have also been substantial reductions in civilian deaths and injuries associated with home heating equipment fires since 1980. As shown in Figure 5, civilian deaths have fallen from annual death totals over 1,000 in the early 1980s to fewer than 500 in more recent years. Civilian injuries also declined, albeit with fluctuations, from well over 3,000 a year to approximately 1,500 or fewer since 2009, as shown in Figure 6. As shown in [Table 1](#) at the back of this report, the trend in direct property damage when adjusted for inflation has been inconsistent since the early 1990s and does not show a clear decline.



Note and Source: See [Table 1](#). Because of low participation in NFIRS Version 5.0 during 1999-2001, data for those years must be treated with caution and is not reported in these tables.

Section 2. Home Structure Fires Involving Space Heaters

Space heaters account for the vast majority of civilian deaths and injuries associated with home structure fires involving heating equipment, as well as just over half of the direct property damage. In the 2009-2013 period, there were an estimated 22,640 home structure fires involving space heaters each year, resulting in 400 civilian deaths, 1,120 civilian injuries, and \$538 million in direct property damage. Non-confined fires accounted for all of the civilian deaths and nearly all of the civilian injuries and direct property damage from these incidents.

As Table C. below indicates, heating stoves are responsible for the largest share of space heater fires, 45% of the total. These fires accounted for one-third (33%) of civilian deaths and 56% of civilian injuries, as well as 40% of direct property damage. Heaters, including catalytic and oil-filled heaters, were involved in 26% of fires involving space heaters, but they resulted in disproportionately higher shares of losses -- 58% of civilian deaths, as well as 36% of civilian injuries, and 41% of direct property damage. Fires involving a fireplace with insert accounted for 16% of space heater fires, with 5% of civilian deaths, 3% of civilian injuries, and 11% of direct property damage associated with these fires. A local furnace was involved in 12% of space heater fires. These fires also accounted for 5% of civilian deaths, as well as 5% of civilian injuries and 9% of direct property damage.

Table C. Home Space Heater Fires, By Type of Device
Annual Average of 2009-2013 Home Structure Fires Reported to U.S. Fire Departments

Type of Device	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Heating stove	10,260	(45%)	130	(33%)	630	(56%)	\$216	(40%)
Non-confined	7,480	(33%)	130	(33%)	620	(55%)	\$216	(40%)
Confined	2,780	(12%)	0	(0%)	0	(0%)	\$0	(0%)
Heater (including catalytic and oil-filled)	5,920	(26%)	230	(58%)	400	(36%)	\$218	(41%)
Non-confined	4,720	(21%)	230	(58%)	400	(36%)	\$218	(41%)
Confined	1,190	(5%)	0	(0%)	0	(0%)	\$0	(0%)
Fireplace with insert	3,640	(16%)	20	(5%)	30	(3%)	\$58	(11%)
Non-confined	850	(4%)	20	(5%)	30	(3%)	\$57	(11%)
Confined	2,790	(12%)	0	(0%)	0	(0%)	\$1	(0%)
Local furnace	2,820	(12%)	20	(5%)	60	(5%)	\$46	(9%)
Non-confined	1,300	(6%)	20	(5%)	50	(4%)	\$46	(8%)
Confined	1,520	(7%)	0	(0%)	10	(1%)	\$0	(0%)
Total	22,640	(100%)	400	(100%)	1,120	(100%)	\$538	(100%)
Non-confined	14,350	(63%)	400	(100%)	1,100	(98%)	\$537	(100%)
Confined	8,280	(37%)	0	(0%)	10	(1%)	\$2	(0%)

Note and Source: See Table 15.

Almost one-half of the space heater fires (46%) involved electric-powered equipment, as shown in [Table D](#) and [Table 11](#). These fires accounted for half of civilian deaths (51%), 66% of civilian injuries, and 57% of direct property damage. Solid-fueled devices were involved in 31% of space heater fires, accounting for 24% of civilian deaths, 9% of civilian injuries, and 23% of direct

property damage. Space heaters that were gas-fueled were involved in 15% of space heater fires, accounting for 14% of civilian deaths, 18% of civilian injuries, and 16% of direct property damage. Liquid-fueled space heaters were involved in 8% of space heater fires. These fires accounted for 11% of civilian deaths, 7% of civilian injuries, and 4% of direct property damage.

Table D. Home Space Heater Fires, By Fuel or Power Source

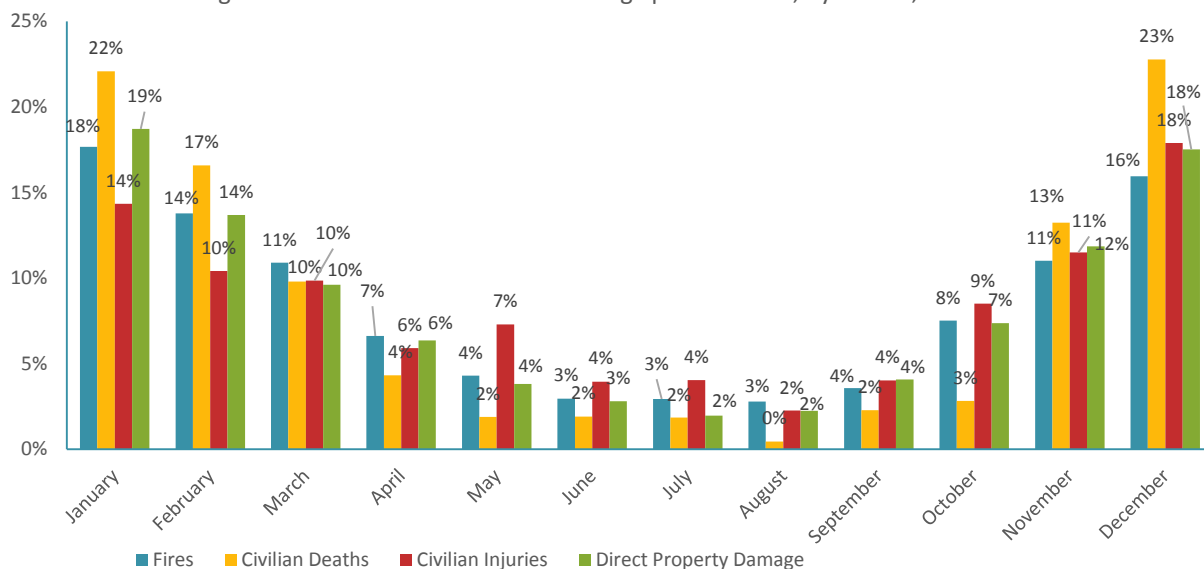
Fuel or Power	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Electric-powered	10,300	(46%)	210	(51%)	730	(66%)	\$305	(57%)
Portable	3,350	(15%)	160	(39%)	310	(28%)	\$150	(28%)
Stationary	6,950	(31%)	50	(12%)	430	(38%)	\$155	(29%)
Solid-fueled	7,050	(31%)	90	(24%)	100	(9%)	\$124	(23%)
Portable	310	(1%)	0	(0%)	0	(0%)	\$2	(0%)
Stationary	6,740	(30%)	90	(23%)	90	(8%)	\$121	(23%)
Gas-fueled	3,460	(15%)	60	(14%)	200	(18%)	\$84	(16%)
Portable	580	(3%)	10	(3%)	50	(5%)	\$25	(5%)
Stationary	2,880	(13%)	40	(11%)	140	(13%)	\$59	(11%)
Liquid-fueled	1,720	(8%)	40	(11%)	80	(7%)	\$23	(4%)
Portable	530	(2%)	40	(11%)	60	(5%)	\$19	(4%)
Stationary	1,200	(5%)	0	(0%)	20	(2%)	\$4	(1%)
Other fuel source	100	(0%)	0	(0%)	10	(1%)	\$2	(0%)
Total	22,640	(100%)	400	(100%)	1,120	(100%)	\$538	(100%)

Note and Source: See [Table 11](#).

Timing of Home Structure Fires Involving Space Heaters

Home structure fires involving space heaters follow a monthly pattern similar to home fires involving all categories of heating equipment, peaking in the cold weather months of December (16% of yearly total), January (18%), and February (14%), followed by March and November, each with 11% of the total. A disproportionate share of civilian deaths (45%) occurred in the 34% of annual space heater fires in December and January. Civilian injuries and direct property damage were generally proportional to the monthly share of annual fires. See [Figure 7](#) below and [Table 12](#).

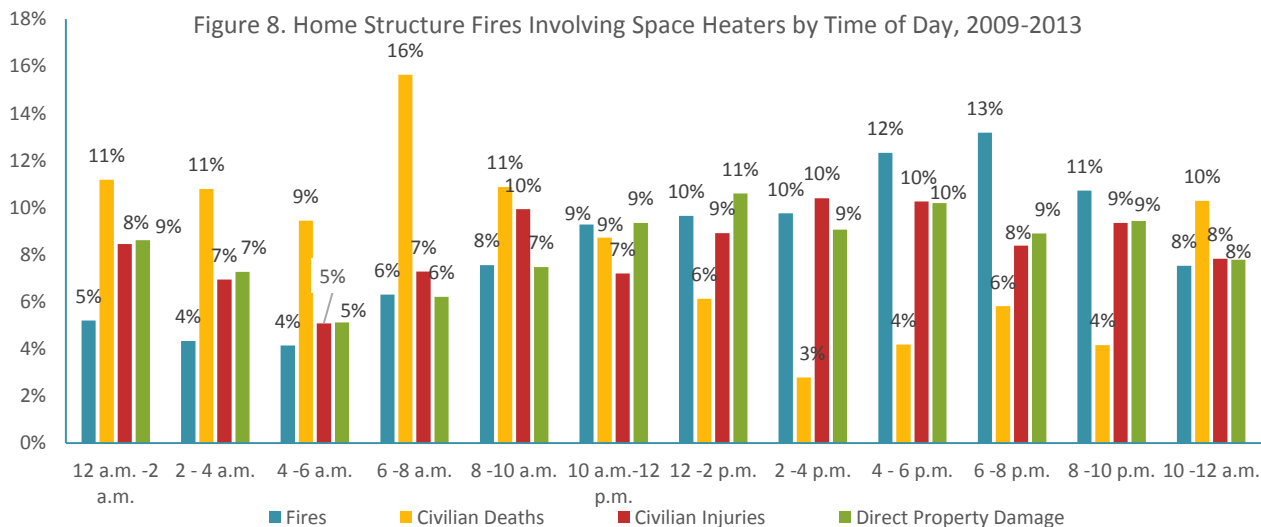
Figure 7. Home Structure Fires Involving Space Heaters, by Month, 2009-2013



Note and Source: See [Table 12](#).

Home structure fires involving space heaters peaked in the early evening and late night hours, much as they did with overall home fires involving heating equipment. [Figure 8](#) and [Table 14](#) show that 13% of fires occurred between 6 p.m. and 8 p.m., 12% of fires between 4 p.m. and 6 p.m. and 11% of fires between 6 p.m. and 8 p.m. Fires in the overnight and early morning hours were associated with a higher proportion of civilian deaths: 58% of deaths occurred in fires between 12 a.m. and 10 a.m., a period which recorded 28% of fires. No clear trend was apparent in civilian injuries and direct property damage by time of day. [Table 13](#) shows that fires involving space heaters showed little variation by day of week.

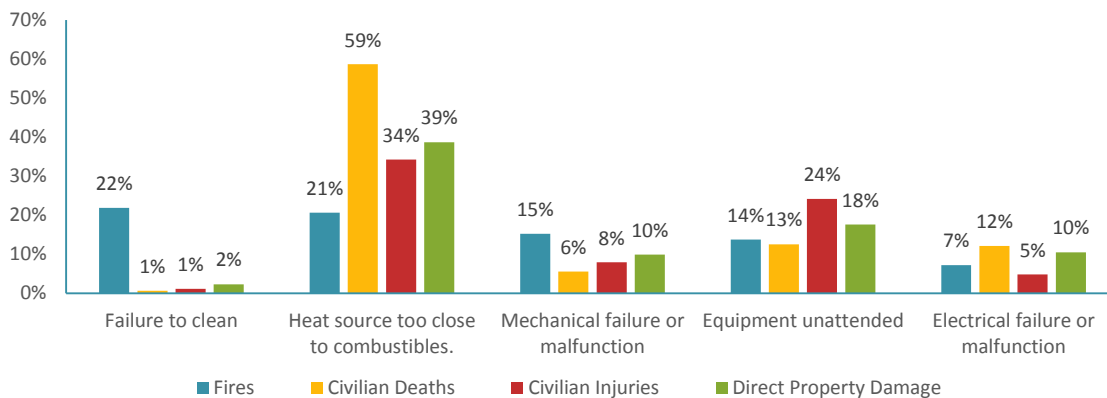
Figure 8. Home Structure Fires Involving Space Heaters by Time of Day, 2009-2013



Notes and Source: See [Table 14](#).

The leading factors contributing to the ignition of home fires caused by space heaters were failure to clean (22% of fires) and heat source too close to combustibles (21%). See Figure 9 and Table 16. Failure to clean fires were primarily confined fires (20%) and losses in this category accounted for just 1% of space heater deaths, 1% of injuries, and 2% of direct property damage. Fires associated with a heat source too close to combustibles were much more consequential, accounting for 59% of the civilian heating equipment deaths, 34% of civilian injuries, and 39% of direct property damage from home space heater fires. Other leading factors contributing to the ignition of space heater fires were mechanical failure or malfunction (15% of fires) and equipment unattended (14%), with the latter accounted for almost one-quarter of civilian injuries (24%).

Figure 9. Home Structure Fires Involving Space Heaters by Factor Contributing to Ignition



Note and Source: See Table 16.

Cooking materials, including food were the leading item identified as first ignited in home fires involving space heaters, with 16% of the space heater total. These fires accounted for 4% of civilian deaths, 32% of civilian injuries, and 14% of direct property damage. Another 12% of fires occurred when flammable and combustible liquids and gases, piping and filter were first ignited, with 6% of civilian deaths, 10% of civilian injuries, and 5% of direct property damage. A structural member of framing accounted for 6% of space heater fires, as did unclassified organic materials, but the former resulted in greater losses, including 17% of direct property damage. Fires in which a mattress or bedding was the item first ignited represented just 3% of space heater fires, but these resulted in 19% of deaths and 8% of civilian injuries. See Table 17.

A kitchen or cooking area was the area of origin for 27% of home fires involving space heaters, and these fires accounted for half of civilian injuries, as well as 16% of civilian deaths and 26% of direct property damage. One-quarter of the fires were confined originating in the chimney or flue, with minimal losses. Fires originating in a bedroom accounted for 8% of space heater fires, 23% of civilian deaths, 15% of civilian injuries, and 16% of direct property damage. Another 8% of fires originated in a living room, family room, or den, and these fires accounted for the greatest share of civilian deaths (35%), as well as 12% of civilian injuries and 14% of direct property damage. See Table 18.

Section 3. Home Structure Fires Involving Fireplaces, Chimneys, and Chimney Connectors

In the 2009 to 2013 period, there were an estimated annual average of 17,910 home structure fires involving fireplaces, chimneys, and chimney connectors, resulting in an estimated 30 deaths, 90 civilian injuries, and \$25 million in direct property damage each year. Fires involving fireplaces, chimneys, and chimney connectors comprised 32% of the 2009-2013 home fires involving heating equipment, as well as 5% of the associated civilian deaths, 6% of civilian injuries, and 25% of direct property damage. The vast majority of these fires (94%) involved solid-fueled equipment. These fires accounted for 93% of civilian deaths, 90% of civilian injuries, and 86% of direct property damage, as indicated in Table E below and [Table 19](#).

Table E. Home Fires Involving Fireplaces, Chimneys or Chimney Connectors, by Type of Fuel or Power, 2009-2013 Annual Averages

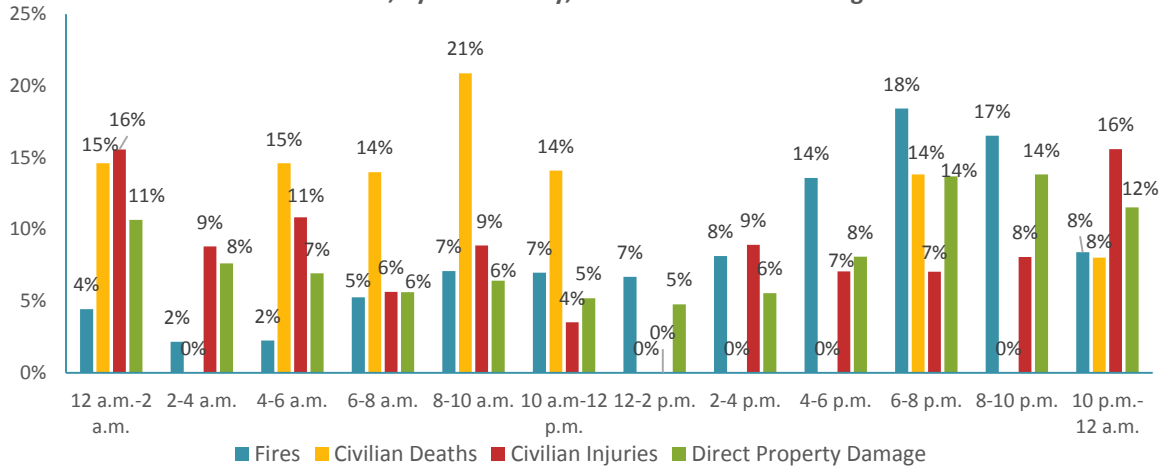
Fuel or Power	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Solid-fueled	16,770	(94%)	20	(93%)	80	(90%)	\$218	(86%)
Gas-fueled	580	(3%)	0	(7%)	10	(9%)	\$22	(9%)
Electric-powered	260	(1%)	0	(0%)	0	(0%)	\$10	(4%)
Liquid-fueled	60	(0%)	0	(0%)	0	(0%)	\$0	(0%)
Other power source	250	(1%)	0	(0%)	0	(1%)	\$3	(1%)
Total	17,910	(100%)	30	(100%)	90	(100%)	\$250	(100%)

Note and Source: See Table 19.

Nearly three-fifths of home structure fires involving fireplaces, chimneys, and chimney connectors occurred in December, January, and February (57%). The fires in December and January alone accounted for 63% of civilian deaths, although these results should be interpreted cautiously due to the comparatively small number of deaths. January was the peak month for civilian injuries (23% of yearly total), followed by December (19%) and November (18%). The warm weather months of June, July, and August combined to account for just 2% of fires, 2% of civilian injuries, and 2% of direct property damage, with no civilian fatalities. See [Table 20](#).

The peak period for fires involving fireplaces, chimneys, and chimney connectors was between 6:00 p.m. and 8:00 p.m., with 18% of fires, followed by 8:00 p.m. to 10:00 p.m. (17%), and 4:00 p.m. to 6:00 p.m. (14%). As shown in [Figure 10](#) and [Table 22](#), just 9% of fires occurred between midnight and 6:00 a.m., but these overnight fires accounted for 29% of civilian deaths, 35% of civilian injuries, and 25% of direct property damage. Saturday (2,740 fires, 15%) and Sunday (2,930 fires, 16%) were the days of the week with the highest number of fires, followed by Monday (2,610 fires, (15%). The remaining days each had 13% to 14% of fires.

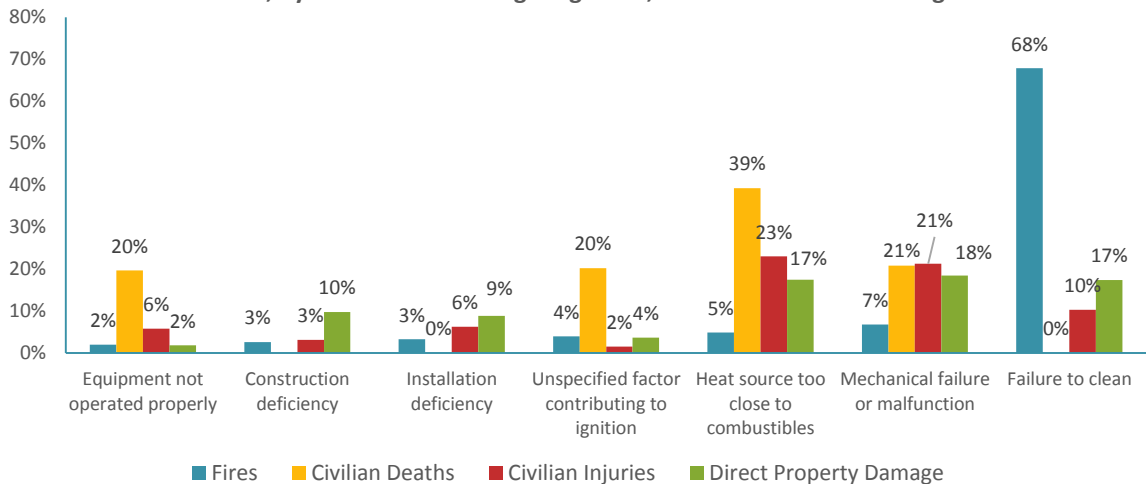
Figure 10. Home Structure Fires Involving Fireplaces, Chimneys, and Chimney Connectors, by Time of Day, 2009-2013 Annual Averages



Note and Source: See Table 22.

Failure to clean was a factor contributing to the ignition of 68% of home structure fires involving fireplaces, chimneys, or chimney connectors. These fires were not associated with any civilian deaths, and just 10% of civilian injuries from fires involving fireplaces, chimneys, or chimney connectors, as well as 17% of direct property damage. A mechanical failure or malfunction contributed to 7% of the fires, but these fires accounted for 21% of civilian deaths, 21% of civilian injuries, and 18% of direct property damage. Fires in which a heat source too close to combustibles was a factor contributing to ignition – 5% of total – accounted for 39% of civilian deaths, 23% of civilian injuries, and 17% of direct property damage. Equipment not operated properly was a factor in 2% of fires involving fireplaces, chimneys or chimney connectors, but were associated with a disproportionate share of the civilian deaths (20%) and injuries (6%). See Figure 11 and Table 23.

Figure 11. Home Structure Fires Involving Fireplaces, Chimneys, and Chimney Connectors, by Factor Contributing to Ignition, 2009-2013 Annual Averages



Note and Source: See Table 23.

The leading items first ignited in home fires involving fireplaces, chimneys, or chimney connectors were film or residue, including paint, resin and creosote (19%) and unclassified organic materials (also 19%). As shown in [Table 24](#), these fires were associated with minimal losses, with film or residue accounting for 1% of direct property damage and unclassified organic materials with 2% of direct property damage. The items first ignited associated with the greatest losses were structural member or framing (11% of fires), which accounted for 40% of civilian deaths, 26% of civilian losses, and 54% of direct property damage and unclassified structural components or finish (3% of fires), which was associated with 15% of civilian deaths, 10% of civilian injuries, and 9% of direct property damage.

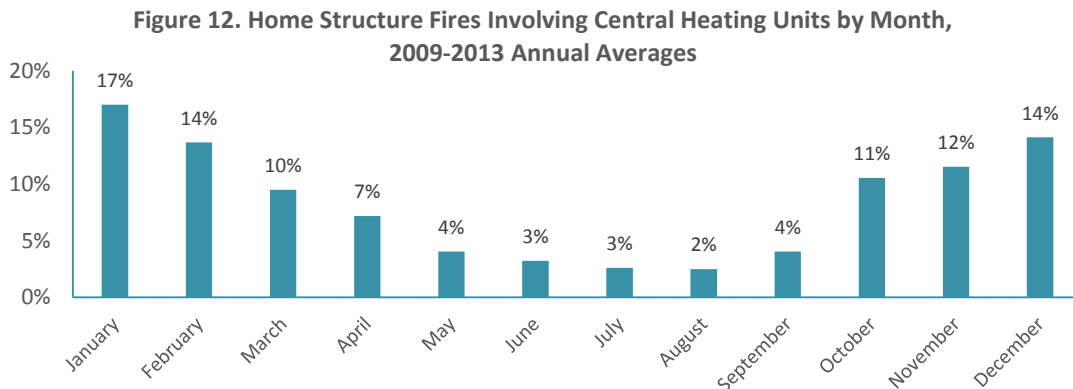
Most of the home structure fires involving fireplaces, chimneys, or chimney connectors were confined fires originating in the chimney or flue (79%). These fires were associated with 10% of civilian injuries and 2% of direct property damage. A wall assembly or concealed space was the area of origin in 5% of fires, accounting for 16% of civilian deaths, 11% of civilian injuries, and 23% of direct property damage, while 4% of fires originated in a living room, family room, or den, with 23% of civilian deaths, 39% of civilian injuries, and 17% of direct property damage. See [Table 25](#).

Section 4. Home Structure Fires Involving Central Heating Units

In 2009-2013, there were an estimated 6,970 home structure fires each year that involved central heating units. These fires resulted in an estimated 20 civilian deaths, 80 civilian injuries, and \$81 million in direct property damage each year. The fires involving central heating units comprised 12% of the home structure fires involving heating equipment during this period, as well as 5% of civilian deaths, 5% of civilian injuries, and 8% of direct property damage arising from home heating equipment fires.

Electric-powered equipment accounted for 37% of home structure fires involving central heating units during 2009-2013. These fires accounted for 16% of the civilian deaths, 16% of civilian injuries, and 35% of direct property damage from central heating unit fires. Another 31% of central heating unit fires involved gas-fueled equipment, and these fires accounted for 53% of civilian deaths, 67% of civilian injuries, and 50% of direct property damage. Liquid-fueled central heating units accounted for 29% of central heating unit fires, 31% of associated civilian deaths, 18% of civilian injuries, and 7% of direct property damage. Only 2% of these fires involved solid-fueled equipment, accounting for 8% of direct property damage. See [Table 26](#).

Timing of home structure fires involving central heating units. Consistent with seasonal trends already observed, fires involving home heating units peak in cold weather months, with 45% of these fires occurring in December through February, with another 32% of fires in March, October, and November. Fires from October through February accounted for 70% of civilian injuries, while 75% of direct property damage came in fires between November and March, as shown in Figure 12 and [Table 27](#).

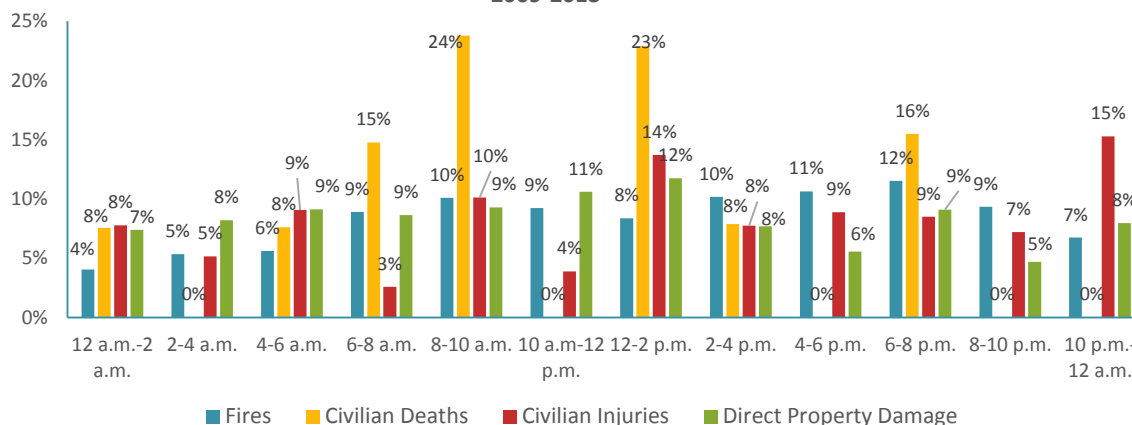


Note and Source: See [Table 27](#).

The peak period for home structure fires involving central heating units by time of day came in the hours between 4 p.m. and 6 p.m. (11%) and 6 p.m. and 8 p.m. (12%). The fewest fires occurred from midnight to 2 a.m. (4%), 2 a.m. to 4 a.m. (5%), and 4 a.m. to 6 a.m. (6%). This is consistent with the timing of heating equipment fires more generally in reflecting a decrease in use during overnight hours. The high point for civilian injuries came in the hours between 10 p.m. and midnight, 15% of the total, but there is no apparent trend with the timing of

injuries, with another 14% of injuries occurring between noon and 2 p.m. and 10% between 8:00 a.m. and 10:00 a.m. Over one-fifth of direct property damage resulted from fires occurring between 10:00 a.m. and 2:00 p.m. See Figure 13 and Table 29.

Figure 13. Home Structure Fires Involving Central Heating Units by Time of Day, 2009-2013



Note and Source: See Table 29.

Factors contributing to the ignition of home fires involving central heating units. As shown in Table 30, mechanical failure or malfunction was the predominant factor contributing to ignition of fires involving central heating units (58% of fires), as well as associated losses in all categories (60% of civilian deaths, 32% of civilian injuries, and 60% of direct property damage). An electrical failure or malfunction was a factor in 13% of fires, accounting for 8% of civilian injuries and 15% of direct property damage, while failure to clean was a factor in another 9% of fires, with 7% of civilian injuries and just 1% of direct property damage. A heat source too close to combustibles was a factor in 5% of fires, but these fires accounted for 10% of civilian deaths, 18% of civilian injuries, and 16% of direct property damage.

The leading item first ignited in home fires involving central heating units was flammable and combustible liquids and gases, piping and filter, figuring in 51% of the fires. These fires accounted for the vast majority of civilian deaths (83%) in fires involving central heating units, as well as 51% of civilian injuries and 15% of direct property damage. Electrical wire or cable insulation was the item first ignited in 14% of the fires (9% of civilian deaths, 10% of civilian injuries, and 5% of direct property damage), while a structural member or framing was first ignited in 5% of fires (29% of direct property damage, as well as 8% of civilian deaths and 7% of civilian injuries). See Table 31.

Almost three of five fires involving central heating units (56%) originated in a heating equipment room. These fires accounted for 53% of the civilian deaths, 51% of civilian injuries, and 37% of the direct property damage. A duct for HVAC, cable, exhaust, or air conditioning was the area of origin in 11% of fires, with 20% of civilian injuries and 8% of direct property damage, followed by a crawl space or substructure space (7% of fires, 16% of civilian deaths, 4% of civilian injuries, and 9% of direct property damage). Just 3% of central heating unit fires

originated in an attic or ceiling/roof assembly or concealed space, but they were responsible for 14% of direct property damage. See [Table 32](#).

Section 5. Home Structure Fires Involving Water Heaters

In 2009-2013, there were an estimated average of 5,440 home fires involving water heaters each year, resulting in annual losses of 20 civilian deaths, 160 civilian injuries, and \$111 million in direct property damage. As shown in Table F below and [Table 33](#), just over half (53%) of these fires involved gas-fueled equipment, and these fires accounted for all of the fatalities, 83% of civilian injuries, and 70% of the direct property damage. Electric-powered water heaters were involved in 45% of the fires, with 17% of water heater injuries and 29% of direct property damage associated with these fires.

**Table F. Home Fires Involving Water Heaters, by Type of Fuel or Power,
Annual Average of 2009-2013 Structure Fires Reported to U.S. Fire Departments**

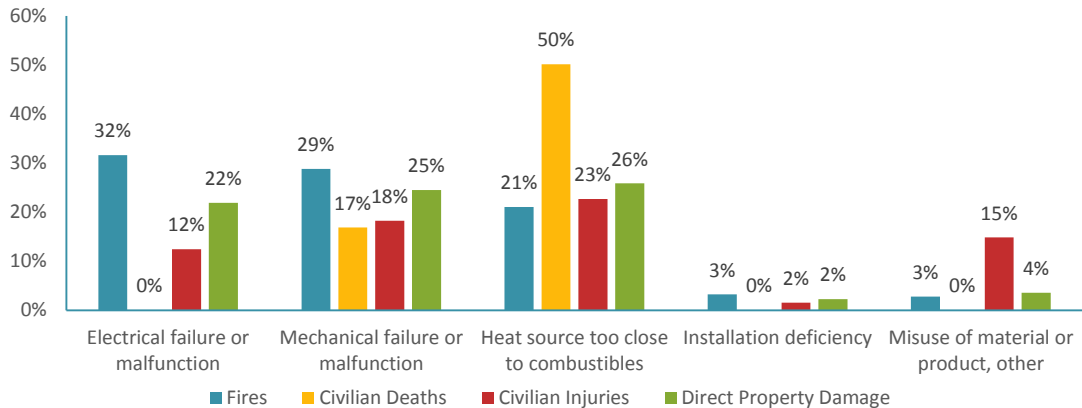
Fuel or Power	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Gas-fueled	2,900	(53%)	20	(100%)	130	(83%)	\$78	(70%)
Electric-powered	2,450	(45%)	0	(0%)	30	(17%)	\$32	(29%)
Liquid-fueled	70	(1%)	0	(0%)	0	(0%)	\$1	(1%)
Solid-fueled	10	(0%)	0	(0%)	0	(0%)	\$0	(0%)
Other	10	(0%)	0	(0%)	0	(0%)	\$0	(0%)
Total	5,440	(100%)	20	(100%)	160	(100%)	\$111	(100%)

Note and Source: See [Table 33](#).

Home fires involving water heaters did not follow as strong a seasonal pattern as fires involving other types of heating equipment. January recorded the highest share of fires, 10%, but December and February each recorded 8% of fires, fewer than the share of fires in March, April, May, or June, each of which had 9% of the annual total. See [Table 34](#).

An electrical failure or malfunction was a factor in 32% of home fires involving water heaters, accounting for no civilian deaths, 12% of civilian injuries, and 22% of direct property damage. A mechanical failure or malfunction was a factor contributing to 29% of fires (17% of civilian deaths, 18% of civilian injuries, 25% of direct property damage), while a heat source too close to combustibles was a factor in 21% of fires (50% of civilian deaths, 23% of civilian injuries, 26% of direct property damage). Flammable or liquid gas spilled was a factor in just 2% of fires, but these fires accounted for 33% of civilian deaths, 18% of civilian injuries, and 14% of direct property damage. See [Figure 14](#) and [Table 37](#).

Figure 14. Home Fires Involving Water Heaters by Leading Factors Contributing to Ignition, 2009-2013 Annual Averages



Note and Source: See [Table 37](#).

An electrical wire or cable insulation was the item first ignited in approximately one-quarter (24%) of water heater fires, accounting for 4% of civilian injuries and 9% of direct property damage. See [Table 38](#). Fires in which flammable and combustible liquids and gases, piping and filter were the item first ignited represented 19% of water heater fires, but these were associated with a disproportionate losses in all categories -- 86% of civilian deaths, 62% of civilian injuries, and 28% of direct property damage.

Almost two of five home fires involving water heaters originated in a heating equipment room (38%). As shown in [Table 39](#), these fires accounted for 44% of civilian deaths, 41% of civilian injuries, and 39% of direct property damage. Almost one-quarter of the fires were confined chimney or flue fires with minimal losses. A laundry room or area was the area of origin for 14% of fires (22% of civilian deaths, 13% of civilian injuries, 14% of direct property damage).

Table 1.
Home Fires Involving Heating Equipment, by Year, 1980-2013

Year	Fires	Civilian Deaths	Civilian Injuries	Direct Property Damage (in Millions of Current Dollars)	Direct Property Damage (in Millions of 2013 Dollars)
1980	230,000	1,000	3,510	\$760	\$2,152
1981	228,200	990	2,990	\$620	\$1,587
1982	232,900	1,190	3,430	\$847	\$2,043
1983	230,400	1,110	3,650	\$842	\$1,969
1984	209,700	860	2,830	\$777	\$1,741
1985	200,900	1,180	3,200	\$884	\$1,912
1986	167,000	810	2,650	\$692	\$1,473
1987	147,700	840	2,790	\$652	\$1,337
1988	138,900	900	3,350	\$809	\$1,595
1989	128,700	780	2,890	\$822	\$1,546
1990	97,500	800	2,400	\$732	\$1,307
1991	98,200	660	2,500	\$1,027	\$1,757
1992	96,500	640	2,510	\$703	\$1,168
1993	97,200	680	2,830	\$715	\$1,153
1994	85,100	610	2,240	\$726	\$1,142
1995	78,400	560	2,060	\$733	\$1,121
1996	73,300	800	2,010	\$825	\$1,227
1997	68,600	570	1,550	\$735	\$1,067
1998	57,100	490	1,670	\$648	\$927
1999	78,700	180 (180)	2,080 (2,080)	\$813 (\$756)	\$1,137 (\$1,057)
2000	72,500	810 (810)	1,980 (1,890)	\$929 (\$908)	\$1,258 (\$1,230)
2001	71,900	410 (410)	1,670 (1,580)	\$849 (\$830)	\$1,118 (\$1,093)
2002	73,600	660 (660)	1,580 (1,550)	\$1,310 (\$1,288)	\$1,698 (\$1,669)
2003	71,000	550 (550)	1,750 (1,620)	\$961 (\$940)	\$1,219 (\$1,192)
2004	69,500	670 (670)	1,660 (1,520)	\$922 (\$907)	\$1,139 (\$1,121)
2005	64,900	730 (730)	1,630 (1,510)	\$966 (\$943)	\$1,153 (\$1,125)
2006	64,100	540 (540)	1,400 (1,300)	\$943 (\$937)	\$1,090 (\$1,083)
2007	66,400	580 (580)	1,850 (1,710)	\$608 (\$601)	\$683 (\$675)
2008	66,100	480 (480)	1,660 (1,570)	\$1,090 (\$1,081)	\$1,181 (\$1,172)
2009	58,900	480 (480)	1,520 (1,470)	\$1,053 (\$1,043)	\$1,144 (\$1,133)
2010	57,100	490 (490)	1,530 (1,470)	\$1,072 (\$1,064)	\$1,147 (\$1,138)
2011	53,600	400 (400)	1,520 (1,480)	\$893 (\$886)	\$926 (\$919)
2012	51,800	470 (470)	1,380 (1,320)	\$938 (\$930)	\$953 (\$945)
2013	56,800	510 (510)	1,470 (1,430)	\$1,133 (\$1,125)	\$1,133 (\$1,125)

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. Numbers in parentheses exclude confined fires. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires reported as confined to cooking vessel, trash container, incinerator, or commercial compactor are not included in these estimates. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors. Figures reflect a proportional share of home fires with equipment involved in ignition unknown or reported as heating or air conditioning equipment of unknown type. Fires reported as “no equipment” but lacking a confirming specific heat source (codes 40-99) are also treated as unknown equipment and allocated. Because of low participation in NFIRS Version 5.0 during 1999-2001, estimates for those years are highly uncertain and must be used with caution. Inflation adjustment to 2013 dollars is calculated using the Consumer Price Index.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013

Table 2.
Home Fires Involving Heating Equipment by Type of Equipment,
2009-2013 Annual Averages

Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Space heater	22,640	(40%)	400	(84%)	1,120	(75%)	\$538	(52%)
Fireplace or chimney	17,910	(32%)	30	(5%)	90	(6%)	\$254	(25%)
Central heat	6,970	(12%)	20	(5%)	80	(5%)	\$81	(8%)
Water heater	5,440	(10%)	20	(4%)	160	(10%)	\$111	(11%)
Heat lamp	640	(1%)	10	(1%)	20	(2%)	\$35	(3%)
Heat tape	230	(0%)	0	(0%)	0	(0%)	\$6	(1%)
Steamline, heat pipe, hot air duct	50	(0%)	0	(0%)	0	(0%)	\$1	(0%)
Confined fuel burner/boiler, no heating equipment	1,330	(2%)	0	(0%)	7	(0%)	\$0	(0%)
Confined to chimney/flue, no heating equipment	790	(1%)	0	(0%)	7	(0%)	\$0	(0%)
Total	56,000	(100%)	470	(100%)	1,490	(100%)	\$1,027	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 3.
Home Fires Involving Heating Equipment, by Month,
2009-2013 Annual Averages

Month	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)
January	10,550	(19%)	100	(21%)	220	(14%)	\$192	(19%)
February	8,040	(14%)	70	(16%)	140	(10%)	\$135	(13%)
March	6,320	(11%)	40	(9%)	140	(10%)	\$104	(10%)
April	3,700	(7%)	20	(5%)	90	(6%)	\$69	(7%)
May	2,230	(4%)	20	(4%)	100	(6%)	\$40	(4%)
June	1,560	(3%)	10	(2%)	70	(5%)	\$29	(3%)
July	1,440	(3%)	10	(2%)	60	(4%)	\$24	(2%)
August	1,450	(3%)	10	(2%)	50	(3%)	\$24	(2%)
September	1,830	(3%)	10	(2%)	70	(5%)	\$32	(3%)
October	3,990	(7%)	20	(4%)	130	(9%)	\$79	(8%)
November	6,080	(11%)	60	(12%)	180	(12%)	\$126	(12%)
December	8,800	(16%)	100	(22%)	240	(16%)	\$173	(17%)
Total	56,000	(100%)	470	(100%)	1,490	(100%)	\$1,027	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 4.
Home Fires Involving Heating Equipment, by Day of Week,
2009-2013 Annual Averages

Day of Week	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Sunday	8,350	(15%)	70	(14%)	230	(15%)	\$146	(14%)
Monday	7,920	(14%)	70	(16%)	230	(15%)	\$149	(14%)
Tuesday	7,800	(14%)	50	(10%)	220	(15%)	\$140	(14%)
Wednesday	7,590	(14%)	60	(13%)	190	(13%)	\$135	(13%)
Thursday	7,770	(14%)	70	(14%)	200	(14%)	\$155	(15%)
Friday	8,070	(14%)	70	(15%)	200	(13%)	\$153	(15%)
Saturday	8,500	(15%)	80	(17%)	230	(15%)	\$149	(15%)
Total	56,000	(100%)	470	(100%)	1,490	(100%)	\$1,027	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

**Table 5.
Home Fires Involving Heating Equipment, by Time of Day,
2009-2013 Annual Averages**

Time of Day	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Midnight-12:59 a.m.	1,520	(3%)	20	(5%)	70	(5%)	\$46	(5%)
1:00-1:59 a.m.	1,270	(2%)	30	(6%)	60	(4%)	\$44	(4%)
2:00-2:59 a.m.	1,030	(2%)	30	(6%)	50	(3%)	\$35	(3%)
3:00-3:59 a.m.	1,010	(2%)	20	(5%)	50	(3%)	\$39	(4%)
4:00-4:59 a.m.	950	(2%)	20	(5%)	40	(2%)	\$28	(3%)
5:00-5:59 a.m.	1,080	(2%)	20	(4%)	50	(3%)	\$34	(3%)
6:00-6:59 a.m.	1,490	(3%)	40	(9%)	50	(4%)	\$30	(3%)
7:00-7:59 a.m.	2,010	(4%)	30	(6%)	40	(3%)	\$34	(3%)
8:00-8:59 a.m.	2,180	(4%)	20	(4%)	80	(5%)	\$36	(4%)
9:00-9:59 a.m.	2,240	(4%)	40	(8%)	70	(5%)	\$39	(4%)
10:00-10:59 a.m.	2,350	(4%)	30	(7%)	50	(3%)	\$41	(4%)
11:00-11:59 a.m.	2,380	(4%)	10	(1%)	50	(3%)	\$45	(4%)
12:00-12:59 p.m.	2,460	(4%)	10	(2%)	60	(4%)	\$40	(4%)
1:00-1:59 p.m.	2,410	(4%)	20	(4%)	70	(5%)	\$52	(5%)
2:00-2:59 p.m.	2,590	(5%)	10	(1%)	80	(5%)	\$48	(5%)
3:00-3:59 p.m.	2,690	(5%)	10	(2%)	80	(5%)	\$43	(4%)
4:00-4:59 p.m.	3,190	(6%)	10	(2%)	80	(5%)	\$44	(4%)
5:00-5:59 p.m.	3,720	(7%)	10	(2%)	80	(6%)	\$49	(5%)
6:00-6:59 p.m.	4,050	(7%)	20	(4%)	70	(5%)	\$53	(5%)
7:00-7:59 p.m.	4,060	(7%)	20	(3%)	60	(4%)	\$50	(5%)
8:00-8:59 p.m.	3,770	(7%)	0	(1%)	60	(4%)	\$61	(6%)
9:00-9:59 p.m.	3,130	(6%)	20	(4%)	60	(4%)	\$44	(4%)
10:00-10:59 p.m.	2,540	(5%)	30	(6%)	60	(4%)	\$49	(5%)
11:00-11:59 p.m.	1,900	(3%)	10	(3%)	60	(4%)	\$42	(4%)
Total	56,000	(100%)	470	(100%)	1,490	(100%)	\$1,027	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

**Table 6.
Home Fires Involving Heating Equipment, by Factor Contributing to Ignition,
2009-2013 Annual Averages**

Factor Contributing to Ignition	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Failure to clean	16,600	(30%)	0	(1%)	30	(2%)	\$57	(6%)
Heat source too close to combustibles.	7,940	(14%)	260	(56%)	460	(31%)	\$318	(31%)
Mechanical failure or malfunction	7,660	(14%)	40	(9%)	140	(9%)	\$166	(16%)
Equipment unattended	3,440	(6%)	50	(11%)	260	(18%)	\$105	(10%)
Electrical failure or malfunction	2,870	(5%)	40	(9%)	80	(5%)	\$84	(8%)
Unclassified misuse of material or product	1,880	(3%)	10	(2%)	90	(6%)	\$29	(3%)
Unclassified operational deficiency	1,510	(3%)	10	(2%)	30	(2%)	\$33	(3%)
Installation deficiency	1,470	(3%)	0	(1%)	40	(2%)	\$44	(4%)
Abandoned or discarded materials or products	1,080	(2%)	0	(1%)	40	(3%)	\$19	(2%)
Accidentally turned on, not turned off	1,020	(2%)	10	(2%)	60	(4%)	\$27	(3%)
Equipment not being operated properly	920	(2%)	10	(1%)	40	(2%)	\$20	(2%)
Other known factor contributing to ignition	9,180	(16%)	60	(13%)	320	(22%)	\$216	(21%)
Other unspecified factor contributing to ignition	3,320	(6%)	10	(3%)	60	(4%)	\$38	(4%)
Total fires	56,000	(100%)	470	(100%)	1,490	(100%)	\$1,027	(100%)
Total factors contributing to ignition*	58,890	(105%)	515	(109%)	1,644	(110%)	\$1,154	(112%)

*Multiple entries are allowed, which can result in sums higher than totals.

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

**Table 7.
Home Fires Involving Heating Equipment, by Item First Ignited, Annual Average of 2009-2013
Structure Fires Reported to U.S. Fire Departments**

Item First Ignited	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Flammable and combustible liquids and gases, piping and filter	6,690	(12%)	60	(14%)	250	(17%)	\$73	(7%)
Unclassified organic materials	5,790	(10%)	0	(1%)	10	(1%)	\$6	(1%)
Structural member or framing	4,310	(8%)	30	(6%)	70	(4%)	\$273	(27%)
Cooking materials, including food	3,780	(7%)	10	(3%)	350	(24%)	\$74	(7%)
Film or residue, including paint, resin and creosote	3,570	(6%)	0	(0%)	0	(0%)	\$2	(0%)
Electrical wire or cable insulation	2,810	(5%)	0	(1%)	50	(3%)	\$28	(3%)
Appliance housing or casing	1,370	(2%)	0	(0%)	30	(2%)	\$13	(1%)
Interior wall covering, excluding drapes	1,340	(2%)	20	(5%)	50	(3%)	\$68	(7%)
Unclassified structural component or finish	1,240	(2%)	10	(1%)	30	(2%)	\$59	(6%)
Heavy vegetation including trees	1,090	(2%)	0	(0%)	10	(0%)	\$2	(0%)
Dust, fiber, lint, including sawdust or excelsior	1,080	(2%)	10	(1%)	10	(1%)	\$6	(1%)
Clothing	1,020	(2%)	40	(9%)	70	(5%)	\$35	(3%)
Magazine, newspaper, writing paper	1,020	(2%)	20	(3%)	20	(1%)	\$10	(1%)
Floor covering rug, carpet, or mat	940	(2%)	40	(8%)	40	(3%)	\$31	(3%)
Chips, including wood chips	860	(2%)	0	(0%)	0	(0%)	\$1	(0%)
Unclassified item first ignited	9,550	(17%)	10	(1%)	40	(3%)	\$32	(3%)
Other known item first ignited	9,580	(17%)	220	(47%)	460	(31%)	\$314	(31%)
Total	56,000	(100%)	470	(100%)	1,490	(100%)	\$1,027	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 8.
Home Fires Involving Heating Equipment, by Heat Source, Annual Average of 2009-2013
Structure Fires Reported to U.S. Fire Departments

Heat Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Hot ember or ash	10,520	(19%)	20	(4%)	50	(3%)	\$71	(7%)
Radiated, conducted heat from operating equipment	10,290	(18%)	200	(42%)	530	(35%)	\$368	(36%)
Spark, ember or flame from operating equipment	7,390	(13%)	90	(19%)	260	(18%)	\$145	(14%)
Unclassified heat from powered equipment	6,880	(12%)	70	(15%)	330	(22%)	\$156	(15%)
Heat from direct flame or convection currents	3,350	(6%)	10	(2%)	40	(3%)	\$38	(4%)
Arcing	2,880	(5%)	20	(5%)	60	(4%)	\$51	(5%)
Unclassified hot or smoldering object	2,760	(5%)	10	(1%)	40	(2%)	\$37	(4%)
Match	1,820	(3%)	10	(2%)	30	(2%)	\$9	(1%)
Unclassified heat source	4,010	(7%)	20	(4%)	70	(5%)	\$50	(5%)
Other specified heat source	6,090	(11%)	30	(6%)	80	(6%)	\$100	(10%)
Total	56,000	(100%)	470	(100%)	1,490	(100%)	\$1,027	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 9.
Home Fires Involving Heating Equipment, by Area of Origin, Annual Average of 2009-2013
Structure Fires Reported to U.S. Fire Departments

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Confined chimney or flue fire*	20,550	(37%)	0	(0%)	20	(1%)	\$6	(1%)
Heating equipment room	7,790	(14%)	20	(5%)	140	(9%)	\$97	(9%)
Kitchen or cooking area	6,850	(12%)	70	(14%)	570	(38%)	\$148	(14%)
Living room, family room, or den	2,490	(4%)	150	(31%)	180	(12%)	\$121	(12%)
Bedroom	2,070	(4%)	90	(20%)	190	(13%)	\$98	(10%)
Unclassified function area	1,690	(3%)	40	(8%)	60	(4%)	\$43	(4%)
Duct for HVAC, cable, exhaust, heating, or AC	1,530	(3%)	0	(1%)	20	(1%)	\$20	(2%)
Wall assembly or concealed space	1,500	(3%)	10	(1%)	30	(2%)	\$89	(9%)
Crawl space substructure	1,330	(2%)	10	(2%)	30	(2%)	\$38	(4%)
Laundry room or area	1,230	(2%)	0	(1%)	30	(2%)	\$23	(2%)
Attic or ceiling/roof assembly or concealed space	1,130	(2%)	0	(0%)	20	(1%)	\$75	(7%)
Other known area of origin	7,000	(13%)	80	(17%)	200	(13%)	\$261	(25%)
Unclassified area of origin	830	(1%)	0	(0%)	0	(0%)	\$8	(1%)
Total	56,000	(100%)	470	(100%)	1,490	(100%)	\$1,027	(100%)

*NFIRS 5.0 does not have a separate area of origin code for fires starting in chimneys. Any home fire with NFIRS incident type 114 (Chimney or flue fire originating in and confined to a chimney or flue) is captured here.

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 10.
Home Fires Involving Heating Equipment, by Type of Fuel or Power,
2009-2013 Annual Averages

Fuel or Power	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Solid-fueled	24,040	(43%)	120	(25%)	180	(12%)	\$342	(33%)
Electric-powered	17,680	(32%)	220	(46%)	800	(54%)	\$422	(41%)
Gas-fueled	9,980	(18%)	90	(19%)	410	(27%)	\$228	(22%)
Liquid-fueled	3,820	(7%)	50	(11%)	100	(6%)	\$30	(3%)
Other	490	(1%)	0	(0%)	10	(1%)	\$5	(0%)
Total	56,000	(100%)	470	(100%)	1,490	(100%)	\$1,027	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

**Table 11.
Home Fires Involving Space Heaters, by Type of Fuel or Power and Portability,
2009-2013 Annual Averages**

Equipment Portability	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Electric-powered	10,300	(46%)	210	(51%)	730	(66%)	\$305	(57%)
Portable	3,350	(15%)	160	(39%)	310	(28%)	\$150	(28%)
Stationary	6,950	(31%)	50	(12%)	430	(38%)	\$155	(29%)
Solid-fueled	7,050	(31%)	90	(24%)	100	(9%)	\$124	(23%)
Portable	310	(1%)	0	(0%)	0	(0%)	\$2	(0%)
Stationary	6,740	(30%)	90	(23%)	90	(8%)	\$121	(23%)
Gas-fueled	3,460	(15%)	60	(14%)	200	(18%)	\$84	(16%)
Portable	580	(3%)	10	(3%)	50	(5%)	\$25	(5%)
Stationary	2,880	(13%)	40	(11%)	140	(13%)	\$59	(11%)
Liquid-fueled	1,720	(8%)	40	(11%)	80	(7%)	\$23	(4%)
Portable	530	(2%)	40	(11%)	60	(5%)	\$19	(4%)
Stationary	1,200	(5%)	0	(0%)	20	(2%)	\$4	(1%)
Other fuel source	100	(0%)	0	(0%)	10	(1%)	\$2	(0%)
Portable	20	(0%)	0	(0%)	0	(0%)	\$0	(0%)
Stationary	90	(0%)	0	(0%)	0	(0%)	\$2	(0%)
Total	22,640	(100%)	400	(100%)	1,120	(100%)	\$538	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 12.
Home Fires Involving Space Heaters, by Month,
2009-2013 Annual Averages

Month	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
January	4,000	(18%)	90	(22%)	160	(14%)	\$101	(19%)
February	3,120	(14%)	70	(17%)	120	(10%)	\$74	(14%)
March	2,470	(11%)	40	(10%)	110	(10%)	\$52	(10%)
April	1,500	(7%)	20	(4%)	70	(6%)	\$34	(6%)
May	970	(4%)	10	(2%)	80	(7%)	\$21	(4%)
June	670	(3%)	10	(2%)	40	(4%)	\$15	(3%)
July	660	(3%)	10	(2%)	50	(4%)	\$11	(2%)
August	630	(3%)	0	(0%)	30	(2%)	\$12	(2%)
September	810	(4%)	10	(2%)	40	(4%)	\$22	(4%)
October	1,700	(8%)	10	(3%)	90	(9%)	\$40	(7%)
November	2,490	(11%)	50	(13%)	130	(11%)	\$64	(12%)
December	3,610	(16%)	90	(23%)	200	(18%)	\$94	(18%)
Total	22,640	(100%)	400	(100%)	1,120	(100%)	\$538	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 13.
Home Fires Involving Space Heaters, by Day of Week,
2009-2013 Annual Averages

Day of Week	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Sunday	3,170	(14%)	60	(15%)	170	(16%)	\$75	(14%)
Monday	3,320	(15%)	60	(16%)	170	(16%)	\$75	(14%)
Tuesday	3,250	(14%)	40	(10%)	140	(13%)	\$81	(15%)
Wednesday	3,090	(14%)	40	(11%)	150	(13%)	\$73	(14%)
Thursday	3,240	(14%)	60	(14%)	160	(14%)	\$84	(16%)
Friday	3,260	(14%)	70	(18%)	140	(13%)	\$78	(15%)
Saturday	3,310	(15%)	70	(17%)	180	(16%)	\$72	(13%)
Total	22,640	(100%)	400	(100%)	1,120	(100%)	\$538	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 14.
Home Fires Involving Space Heaters, by Time of Day,
2009-2013 Annual Averages

Time of Day	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Midnight-12:59 a.m.	620	(3%)	20	(5%)	50	(5%)	\$24	(4%)
1:00-1:59 a.m.	560	(2%)	20	(6%)	40	(4%)	\$22	(4%)
2:00-2:59 a.m.	490	(2%)	30	(7%)	40	(3%)	\$20	(4%)
3:00-3:59 a.m.	490	(2%)	20	(4%)	40	(4%)	\$19	(4%)
4:00-4:59 a.m.	460	(2%)	20	(5%)	20	(2%)	\$13	(2%)
5:00-5:59 a.m.	480	(2%)	20	(4%)	30	(3%)	\$15	(3%)
6:00-6:59 a.m.	610	(3%)	40	(10%)	40	(4%)	\$17	(3%)
7:00-7:59 a.m.	820	(4%)	20	(6%)	40	(3%)	\$16	(3%)
8:00-8:59 a.m.	850	(4%)	20	(4%)	60	(5%)	\$20	(4%)
9:00-9:59 a.m.	860	(4%)	30	(7%)	50	(5%)	\$20	(4%)
10:00-10:59 a.m.	1,030	(5%)	30	(7%)	40	(4%)	\$23	(4%)
11:00-11:59 a.m.	1,070	(5%)	10	(1%)	40	(3%)	\$28	(5%)
12:00-12:59 p.m.	1,080	(5%)	10	(2%)	50	(4%)	\$23	(4%)
1:00-1:59 p.m.	1,110	(5%)	20	(4%)	50	(5%)	\$34	(6%)
2:00-2:59 p.m.	1,080	(5%)	10	(1%)	60	(5%)	\$26	(5%)
3:00-3:59 p.m.	1,130	(5%)	10	(1%)	60	(5%)	\$23	(4%)
4:00-4:59 p.m.	1,340	(6%)	10	(1%)	60	(5%)	\$25	(5%)
5:00-5:59 p.m.	1,450	(6%)	10	(3%)	60	(5%)	\$30	(6%)
6:00-6:59 p.m.	1,560	(7%)	10	(3%)	60	(5%)	\$23	(4%)
7:00-7:59 p.m.	1,430	(6%)	10	(2%)	40	(3%)	\$25	(5%)
8:00-8:59 p.m.	1,370	(6%)	0	(1%)	50	(4%)	\$28	(5%)
9:00-9:59 p.m.	1,050	(5%)	10	(3%)	60	(5%)	\$23	(4%)
10:00-10:59 p.m.	1,000	(4%)	30	(7%)	50	(4%)	\$23	(4%)
11:00-11:59 p.m.	710	(3%)	10	(3%)	40	(4%)	\$19	(4%)
Total	22,640	(100%)	400	(100%)	1,120	(100%)	\$538	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 15.
Home Fires Involving Space Heaters, by Type of Device, Annual Average of 2009-2013
Structure Fires Reported to U.S. Fire Departments

Type of Device	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Space heater	22,640	(40%)	400	(84%)	1,120	(75%)	\$538	(52%)
Heating stove	10,260	(45%)	130	(33%)	630	(56%)	\$216	(40%)
Heater (including catalytic and oil-filled)	5,920	(26%)	230	(58%)	400	(36%)	\$218	(41%)
Local furnace	2,820	(12%)	20	(5%)	60	(5%)	\$46	(9%)
Fireplace with insert	3,640	(16%)	20	(5%)	30	(3%)	\$58	(11%)
Total	22,640	(100%)	400	(100%)	1,120	(100%)	\$538	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reported as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 16.
Home Fires Involving Space Heaters, by Factor Contributing to Ignition,
2009-2013 Annual Averages

Factor Contributing to Ignition	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Failure to clean	4,950	(22%)	0	(1%)	10	(1%)	\$12	(2%)
Heat source too close to combustibles.	4,670	(21%)	230	(59%)	380	(34%)	\$208	(39%)
Mechanical failure or malfunction	3,450	(15%)	20	(6%)	90	(8%)	\$53	(10%)
Equipment unattended	3,110	(14%)	50	(13%)	270	(24%)	\$95	(18%)
Electrical failure or malfunction	1,630	(7%)	50	(12%)	50	(5%)	\$56	(10%)
Accidentally turned on, not turned off	950	(4%)	10	(2%)	60	(5%)	\$25	(5%)
Abandoned or discarded materials or products	720	(3%)	0	(1%)	30	(3%)	\$16	(3%)
Misuse of material or product, other	670	(3%)	10	(2%)	60	(6%)	\$14	(3%)
Installation deficiency	520	(2%)	0	(1%)	20	(2%)	\$16	(3%)
Equipment not being operated properly	460	(2%)	0	(1%)	30	(2%)	\$11	(2%)
Operational deficiency, other	390	(2%)	10	(2%)	20	(2%)	\$13	(2%)
Unclassified factor contributed to ignition	680	(3%)	10	(3%)	60	(5%)	\$19	(4%)
Other known factor contributing to ignition	1,830	(8%)	40	(9%)	140	(13%)	\$60	(11%)
Total fires	22,640	(100%)	400	(100%)	1,120	(100%)	\$538	(100%)
Total factors contributing to ignition*	24,050	(106%)	440	(109%)	1,230	(110%)	\$600	(111%)

*Multiple entries are allowed, which can result in sums higher than totals.

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013. Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

**Table 17.
Home Fires Involving Space Heaters, by Item First Ignited,
2009-2013 Annual Averages**

Item First Ignited	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Cooking materials, including food	3,680	(16%)	10	(4%)	360	(32%)	\$76	(14%)
Flammable and combustible liquids and gases, piping and filter	2,720	(12%)	20	(6%)	110	(10%)	\$25	(5%)
Structural member or framing	1,440	(6%)	10	(3%)	20	(2%)	\$92	(17%)
Unclassified organic materials	1,420	(6%)	0	(1%)	10	(1%)	\$2	(0%)
Film or residue, including paint, resin and creosote	1,110	(5%)	0	(0%)	0	(0%)	\$0	(0%)
Electrical wire or cable insulation	840	(4%)	0	(0%)	30	(3%)	\$11	(2%)
Interior wall covering, excluding drapes	780	(3%)	20	(6%)	30	(3%)	\$36	(7%)
Appliance housing or casing	710	(3%)	0	(0%)	30	(3%)	\$8	(2%)
Mattress or bedding	710	(3%)	80	(19%)	90	(8%)	\$38	(7%)
Cabinetry	630	(3%)	10	(2%)	40	(4%)	\$22	(4%)
Clothing	550	(2%)	40	(9%)	50	(4%)	\$20	(4%)
Floor covering rug, carpet, or mat	530	(2%)	40	(10%)	30	(3%)	\$20	(4%)
Upholstered furniture or vehicle seat	390	(2%)	30	(9%)	30	(3%)	\$20	(4%)
Unclassified structural component or finish	380	(2%)	0	(0%)	20	(2%)	\$22	(4%)
Magazine, newspaper, writing paper	380	(2%)	20	(4%)	10	(1%)	\$8	(2%)
Unspecified item first ignited	2,020	(9%)	10	(2%)	20	(2%)	\$12	(2%)
Other known item first ignited	4,360	(19%)	110	(26%)	220	(20%)	\$125	(23%)
Total	22,640	(100%)	400	(100%)	1,120	(100%)	\$538	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 18.
Home Fires Involving Space Heaters, by Area of Origin,
2009-2013 Annual Averages

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Kitchen or cooking area*	6,140	(27%)	60	(16%)	560	(50%)	\$142	(26%)
Bedroom	1,820	(8%)	90	(23%)	170	(15%)	\$84	(16%)
Living room, family room, or den	1,770	(8%)	140	(35%)	140	(12%)	\$74	(14%)
Heating equipment room	1,650	(7%)	0	(0%)	30	(3%)	\$20	(4%)
Unclassified function area	1,150	(5%)	30	(8%)	50	(5%)	\$32	(6%)
Wall assembly or concealed space	600	(3%)	0	(1%)	10	(1%)	\$29	(5%)
Lavatory, bathroom, locker room or check room	510	(2%)	10	(2%)	10	(1%)	\$11	(2%)
Duct for HVAC, cable, exhaust, heating, or AC	430	(2%)	0	(0%)	0	(0%)	\$6	(1%)
Crawl space or substructure space	370	(2%)	0	(0%)	10	(1%)	\$18	(3%)
Garage or vehicle storage area	340	(2%)	0	(0%)	30	(3%)	\$29	(5%)
Unclassified area of origin	200	(1%)	0	(0%)	0	(0%)	\$4	(1%)
Confined chimney or flue fire	5,370	(24%)	0	(0%)	0	(0%)	\$1	(0%)
Other known area of origin	2,290	(10%)	60	(14%)	90	(8%)	\$89	(17%)
Total	22,640	(100%)	400	(100%)	1,120	(100%)	\$538	(100%)

*NFIRS 5.0 does not have a separate area of origin code for fires starting in chimneys. Any home fire with NFIRS incident type 114 (Chimney or flue fire originating in and confined to a chimney or flue) is captured here.

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 19.
Home Fires Involving Fireplaces, Chimneys or Chimney Connectors, by Type of Fuel or Power,
2009-2013 Annual Averages

Fuel or Power	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Solid-fueled	16,770	(94%)	20	(93%)	80	(90%)	\$218	(86%)
Gas-fueled	580	(3%)	0	(7%)	10	(9%)	\$22	(9%)
Electric-powered	260	(1%)	0	(0%)	0	(0%)	\$10	(4%)
Liquid-fueled	60	(0%)	0	(0%)	0	(0%)	\$0	(0%)
Other power source	250	(1%)	0	(0%)	0	(1%)	\$3	(1%)
Total	17,910	(100%)	30	(100%)	90	(100%)	254	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 20.
Home Fires Involving Fireplaces, Chimneys or Chimney Connectors,
by Month, 2009-2013 Annual Averages

Month	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)
January	3,750	(21%)	10	(35%)	20	(23%)	\$54	(22%)
February	3,230	(18%)	0	(0%)	10	(9%)	\$35	(14%)
March	2,390	(13%)	0	(14%)	10	(12%)	\$23	(10%)
April	1,030	(6%)	0	(15%)	0	(3%)	\$15	(6%)
May	370	(2%)	0	(0%)	0	(0%)	\$3	(1%)
June	110	(1%)	0	(0%)	0	(2%)	\$3	(1%)
July	70	(0%)	0	(0%)	0	(0%)	\$1	(0%)
August	100	(1%)	0	(0%)	0	(0%)	\$1	(0%)
September	240	(1%)	0	(0%)	10	(7%)	\$2	(1%)
October	1,030	(6%)	0	(0%)	10	(7%)	\$23	(9%)
November	2,390	(13%)	0	(7%)	20	(18%)	\$38	(15%)
December	3,200	(18%)	10	(28%)	20	(19%)	\$51	(21%)
Total	17,910	(100%)	30	(100%)	90	(100%)	\$254	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 21.
Home Fires Involving Fireplaces, Chimneys or Chimney Connectors, by Day of Week,
2009-2013 Annual Averages

Day of Week	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Sunday	2,930	(16%)	0	(7%)	10	(9%)	\$42	(17%)
Monday	2,610	(15%)	0	(0%)	10	(10%)	\$37	(14%)
Tuesday	2,340	(13%)	0	(7%)	10	(10%)	\$28	(11%)
Wednesday	2,390	(13%)	20	(64%)	10	(10%)	\$32	(13%)
Thursday	2,480	(14%)	0	(7%)	20	(20%)	\$32	(13%)
Friday	2,420	(13%)	0	(7%)	20	(17%)	\$41	(16%)
Saturday	2,740	(15%)	0	(7%)	20	(24%)	\$41	(16%)
Total	17,910	(100%)	30	(100%)	90	(100%)	\$254	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 22.
Home Fires Involving Fireplaces, Chimneys, or Chimney Connectors, by Time of Day,
2009-2013 Annual Averages

Time of Day	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Midnight-12:59 a.m.	440	(2%)	0	(0%)	10	(12%)	\$14	(6%)
1:00-1:59 a.m.	360	(2%)	0	(15%)	0	(3%)	\$13	(5%)
2:00-2:59 a.m.	210	(1%)	0	(0%)	10	(5%)	\$8	(3%)
3:00-3:59 a.m.	180	(1%)	0	(0%)	0	(3%)	\$12	(5%)
4:00-4:59 a.m.	200	(1%)	0	(7%)	0	(3%)	\$8	(3%)
5:00-5:59 a.m.	210	(1%)	0	(7%)	10	(8%)	\$10	(4%)
6:00-6:59 a.m.	370	(2%)	0	(14%)	0	(3%)	\$7	(3%)
7:00-7:59 a.m.	570	(3%)	0	(0%)	0	(2%)	\$7	(3%)
8:00-8:59 a.m.	600	(3%)	0	(14%)	10	(6%)	\$8	(3%)
9:00-9:59 a.m.	670	(4%)	0	(7%)	0	(3%)	\$8	(3%)
10:00-10:59 a.m.	620	(3%)	0	(14%)	0	(1%)	\$6	(2%)
11:00-11:59 a.m.	630	(4%)	0	(0%)	0	(2%)	\$7	(3%)
12:00-12:59 p.m.	620	(3%)	0	(0%)	0	(0%)	\$7	(3%)
1:00-1:59 p.m.	580	(3%)	0	(0%)	0	(0%)	\$5	(2%)
2:00-2:59 p.m.	660	(4%)	0	(0%)	10	(6%)	\$5	(2%)
3:00-3:59 p.m.	800	(4%)	0	(0%)	0	(3%)	\$9	(3%)
4:00-4:59 p.m.	1,040	(6%)	0	(0%)	0	(2%)	\$12	(5%)
5:00-5:59 p.m.	1,390	(8%)	0	(0%)	0	(5%)	\$9	(3%)
6:00-6:59 p.m.	1,690	(9%)	0	(0%)	0	(3%)	\$18	(7%)
7:00-7:59 p.m.	1,600	(9%)	0	(14%)	0	(4%)	\$17	(7%)
8:00-8:59 p.m.	1,630	(9%)	0	(0%)	0	(4%)	\$21	(8%)
9:00-9:59 p.m.	1,330	(7%)	0	(0%)	0	(4%)	\$15	(6%)
10:00-10:59 p.m.	890	(5%)	0	(8%)	10	(9%)	\$15	(6%)
11:00-11:59 p.m.	610	(3%)	0	(0%)	10	(7%)	\$14	(6%)
Total	17,910	(100%)	30	(100%)	90	(100%)	\$254	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 23.
Home Fires Involving Fireplaces, Chimneys or Chimney Connectors,
by Factor Contributing to Ignition, 2009-2013 Annual Averages

Factor Contributing to Ignition	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Failure to clean	12,160	(68%)	0	(0%)	10	(10%)	\$44	(17%)
Mechanical failure or malfunction	1,210	(7%)	10	(21%)	20	(21%)	\$47	(18%)
Heat source too close to combustibles.	870	(5%)	10	(39%)	20	(23%)	\$44	(17%)
Unspecified factor contributing to ignition	710	(4%)	10	(20%)	0	(2%)	\$9	(4%)
Installation deficiency	580	(3%)	0	(0%)	10	(6%)	\$22	(9%)
Construction deficiency	470	(3%)	0	(0%)	0	(3%)	\$25	(10%)
Equipment not operated properly	350	(2%)	10	(20%)	10	(6%)	\$5	(2%)
Unspecified operational deficiency	410	(2%)	0	(0%)	0	(5%)	\$15	(6%)
Other known factor contributing to ignition	2,070	(12%)	0	(0%)	30	(30%)	\$78	(31%)
Total fires	17,910	(100%)	30	(100%)	90	(100%)	\$254	(100%)
Total factors contributing to ignition*	18,840	(105%)	30	(100%)	100	(106%)	\$289	(114%)

*Multiple entries are allowed, which can result in sums higher than totals.

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 24.
Home Fires Involving Fireplaces, Chimneys or Chimney Connectors, by Item First Ignited,
2009-2013 Annual Averages

Item First Ignited	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Film or residue, including paint, resin and creosote	3,320	(19%)	0	(0%)	0	(0%)	\$2	(1%)
Unclassified organic materials	3,320	(19%)	0	(0%)	0	(0%)	\$4	(2%)
Structural member or framing	1,960	(11%)	10	(40%)	20	(26%)	\$136	(54%)
Flammable and combustible liquids and gases, piping and filter	1,110	(6%)	0	(0%)	0	(4%)	\$4	(1%)
Heavy vegetation including trees	830	(5%)	0	(0%)	0	(3%)	\$1	(0%)
Unclassified structural component or finish	450	(3%)	0	(15%)	10	(10%)	\$24	(9%)
Chips, including wood chips	410	(2%)	0	(0%)	0	(2%)	\$0	(0%)
Rubbish, trash, or waste	330	(2%)	0	(0%)	0	(1%)	\$1	(0%)
Insulation within structural area	290	(2%)	0	(0%)	10	(10%)	\$8	(3%)
Exterior wall covering or finish	280	(2%)	0	(0%)	0	(2%)	\$11	(4%)
Magazine, newspaper, writing paper	270	(2%)	0	(0%)	0	(3%)	\$1	(0%)
Unspecified item first ignited	3,500	(20%)	0	(0%)	0	(2%)	\$9	(4%)
Other known item first ignited	1,860	(10%)	10	(45%)	30	(37%)	\$50	(21%)
Total	17,910	(100%)	30	(100%)	90	(100%)	\$254	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 25.
Home Fires Involving Fireplaces, Chimneys, or Chimney Connectors, by Area of Origin,
2009-2013 Annual Averages

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Confined chimney or flue fire*	14,120	(79%)	0	(0%)	10	(10%)	\$4	(2%)
Wall assembly or concealed space	840	(5%)	0	(16%)	10	(11%)	\$58	(23%)
Living room, family room, or den	670	(4%)	10	(23%)	40	(39%)	\$43	(17%)
Attic or ceiling/roof assembly or concealed space	540	(3%)	0	(0%)	10	(11%)	\$43	(17%)
Unspecified area of origin	90	(1%)	0	(0%)	0	(0%)	\$3	(1%)
Other known area of origin	1,640	(9%)	20	(61%)	30	(29%)	\$103	(40%)
Total	17,910	(100%)	30	(100%)	90	(100%)	\$254	(100%)

*NFIRS 5.0 does not have a separate area of origin code for fires starting in chimneys. Any home fire with NFIRS incident type 114 (Chimney or flue fire originating in and confined to a chimney or flue) is captured here.

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 26.
Home Fires Involving Central Heating Equipment Fires, by Type of Fuel or Power,
2009-2013 Annual Averages

Fuel or Power	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Electric-powered	2,600	(37%)	0	(16%)	10	(16%)	\$29	(35%)
Gas-fueled	2,170	(31%)	10	(53%)	50	(67%)	\$40	(50%)
Liquid-fueled	2,010	(29%)	10	(31%)	10	(18%)	\$6	(7%)
Solid-fueled	170	(2%)	0	(0%)	0	(0%)	\$6	(8%)
Other fuel source	20	(0%)	0	(0%)	0	(0%)	\$0	(0%)
Total	6,970	(100%)	20	(100%)	80	(100%)	\$80	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 27.
Home Fires Involving Central Heat, by Month,
2009-2013 Annual Averages

Month	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
January	1,190	(17%)	0	(8%)	10	(14%)	\$18	(23%)
February	950	(14%)	10	(22%)	10	(14%)	\$10	(13%)
March	660	(10%)	0	(0%)	0	(1%)	\$9	(11%)
April	500	(7%)	0	(0%)	10	(6%)	\$6	(8%)
May	280	(4%)	0	(16%)	10	(8%)	\$3	(4%)
June	220	(3%)	0	(0%)	0	(5%)	\$0	(1%)
July	180	(3%)	0	(0%)	0	(2%)	\$1	(1%)
August	170	(2%)	0	(0%)	0	(1%)	\$2	(2%)
September	280	(4%)	0	(0%)	10	(6%)	\$2	(3%)
October	740	(11%)	10	(31%)	10	(15%)	\$5	(7%)
November	800	(12%)	0	(8%)	10	(13%)	\$11	(14%)
December	990	(14%)	0	(16%)	10	(13%)	\$12	(15%)
			0					
Total	6,970	(100%)	20	(100%)	80	(100%)	\$81	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reported as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 28.
Home Fires Involving Central Heat, by Day of Week,
2009-2013 Annual Averages

Day of Week	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Sunday	890	(13%)	0	(7%)	10	(18%)	\$9	(11%)
Monday	1,190	(17%)	10	(22%)	10	(15%)	\$15	(19%)
Tuesday	960	(14%)	0	(15%)	20	(23%)	\$12	(15%)
Wednesday	,1040	(15%)	0	(8%)	10	(10%)	\$11	(14%)
Thursday	990	(14%)	10	(32%)	0	(5%)	\$9	(11%)
Friday	940	(14%)	0	(0%)	10	(15%)	\$12	(14%)
Saturday	950	(14%)	0	(16%)	10	(14%)	\$13	(16%)
Total	6,970	(100%)	20	(100%)	80	(100%)	\$81	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 29.
Home Fires Involving Central Heat, by Time of Day,
2009-2013 Annual Averages

Time of Day	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Midnight-12:59 a.m.	170	(2%)	0	(8%)	0	(4%)	\$3	(4%)
1:00-1:59 a.m.	110	(2%)	0	(0%)	0	(4%)	\$3	(4%)
2:00-2:59 a.m.	180	(3%)	0	(0%)	0	(3%)	\$3	(4%)
3:00-3:59 a.m.	200	(3%)	0	(0%)	0	(3%)	\$3	(4%)
4:00-4:59 a.m.	160	(2%)	0	(0%)	0	(5%)	\$2	(3%)
5:00-5:59 a.m.	230	(3%)	0	(8%)	0	(4%)	\$5	(6%)
6:00-6:59 a.m.	270	(4%)	0	(0%)	0	(0%)	\$3	(4%)
7:00-7:59 a.m.	350	(5%)	0	(15%)	0	(3%)	\$4	(5%)
8:00-8:59 a.m.	340	(5%)	0	(0%)	0	(1%)	\$3	(3%)
9:00-9:59 a.m.	370	(5%)	10	(24%)	10	(9%)	\$5	(6%)
10:00-10:59 a.m.	340	(5%)	0	(0%)	0	(3%)	\$5	(6%)
11:00-11:59 a.m.	300	(4%)	0	(0%)	0	(1%)	\$4	(5%)
12:00-12:59 p.m.	300	(4%)	0	(0%)	10	(7%)	\$4	(5%)
1:00-1:59 p.m.	280	(4%)	10	(23%)	10	(6%)	\$6	(7%)
2:00-2:59 p.m.	350	(5%)	0	(0%)	0	(4%)	\$2	(3%)
3:00-3:59 p.m.	360	(5%)	0	(8%)	0	(4%)	\$4	(5%)
4:00-4:59 p.m.	390	(6%)	0	(0%)	0	(4%)	\$1	(2%)
5:00-5:59 p.m.	350	(5%)	0	(0%)	0	(5%)	\$3	(4%)
6:00-6:59 p.m.	430	(6%)	0	(8%)	0	(5%)	\$5	(6%)
7:00-7:59 p.m.	370	(5%)	0	(8%)	0	(4%)	\$3	(3%)
8:00-8:59 p.m.	370	(5%)	0	(0%)	0	(5%)	\$2	(2%)
9:00-9:59 p.m.	280	(4%)	0	(0%)	0	(3%)	\$2	(2%)
10:00-10:59 p.m.	250	(4%)	0	(0%)	0	(3%)	\$3	(4%)
11:00-11:59 p.m.	230	(3%)	0	(0%)	10	(13%)	\$3	(4%)
Total	6,970	(100%)	20	(100%)	80	(100%)	\$81	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 30.
Home Fires Involving Central Heat, by Factor Contributing to Ignition,
2009-2013 Annual Averages

Factor Contributing to Ignition	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Mechanical failure or malfunction	4,030	(58%)	10	(60%)	30	(32%)	\$48	(60%)
Electrical failure or malfunction	920	(13%)	0	(0%)	10	(8%)	\$12	(15%)
Failure to clean	650	(9%)	0	(0%)	10	(7%)	\$1	(1%)
Heat source too close to combustibles.	350	(5%)	0	(10%)	10	(18%)	\$13	(16%)
Operational deficiency, other	240	(3%)	0	(0%)	0	(0%)	\$3	(4%)
Equipment not being operated properly	180	(3%)	0	(0%)	0	(3%)	\$3	(3%)
Installation deficiency	160	(2%)	0	(0%)	0	(5%)	\$3	(3%)
Improper startup	150	(2%)	0	(0%)	10	(8%)	\$0	(0%)
Other factor contributed to ignition	120	(2%)	0	(0%)	0	(3%)	\$0	(5%)
Other known factor contributing to ignition	530	(8%)	10	(30%)	20	(21%)	\$7	(8%)
Total fires	6,970	(100%)	20	(100%)	80	(100%)	\$81	(100%)
Total factors contributing to ignition*	7,340	(105%)	20	(100%)	80	(104%)	\$90	(116%)

*Multiple entries are allowed, which can result in sums higher than totals.

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 31.
Home Fires Involving Central Heat, by Item First Ignited,
2009-2013 Annual Averages

Item First Ignited	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Flammable and combustible liquids and gases, piping and filter	3,540	(51%)	20	(83%)	40	(51%)	\$12	(15%)
Electrical wire or cable insulation	990	(14%)	0	(9%)	10	(10%)	\$4	(5%)
Unspecified item first ignited	600	(9%)	0	(0%)	0	(5%)	\$5	(7%)
Structural member or framing	340	(5%)	0	(8%)	10	(7%)	\$23	(29%)
Dust, fiber, lint, including sawdust or excelsior	260	(4%)	0	(0%)	0	(6%)	\$2	(3%)
Appliance housing or casing	250	(4%)	0	(0%)	0	(0%)	\$2	(2%)
Other known item first ignited	990	(14%)	0	(0%)	20	(20%)	\$32	(39%)
Total	6,970	(100%)	20	(100%)	80	(100%)	\$81	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 32.
Home Fires Involving Central Heat, by Area of Origin,
2009-2013 Annual Averages

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Heating equipment room	3,910	(56%)	10	(53%)	40	(51%)	\$30	(37%)
Duct for HVAC, cable, exhaust, heating, or AC	760	(11%)	0	(0%)	20	(20%)	\$7	(8%)
Crawl space or substructure space	510	(7%)	0	(16%)	0	(4%)	\$7	(9%)
Unclassified equipment or service area	230	(3%)	0	(0%)	0	(2%)	\$2	(2%)
Confined chimney or flue fire*	220	(3%)	0	(0%)	0	(0%)	\$0	(0%)
Unclassified function area	200	(3%)	0	(9%)	0	(3%)	\$1	(1%)
Attic or ceiling/roof assembly or concealed space	190	(3%)	0	(0%)	0	(1%)	\$12	(14%)
Laundry room or area	140	(2%)	0	(0%)	0	(3%)	\$3	(3%)
Closet	130	(2%)	0	(0%)	0	(0%)	\$2	(3%)
Unspecified area of origin	170	(2%)	0	(0%)	0	(0%)	\$0	(0%)
Other known area of origin	520	(8%)	10	(23%)	10	(15%)	\$17	(21%)
Total	6,970	(100%)	20	(100%)	80	(100%)	\$81	(100%)

*NFIRS 5.0 does not have a separate area of origin code for fires starting in chimneys. Any home fire with NFIRS incident type 114 (Chimney or flue fire originating in and confined to a chimney or flue) is captured here.

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 33.
Home Fires Involving Water Heaters, by Type of Fuel or Power,
2009-2013 Annual Averages

Fuel or Power	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Gas-fueled	2,900	(53%)	20	(100%)	130	(83%)	\$78	(70%)
Electric-powered	2,450	(45%)	0	(0%)	30	(17%)	\$32	(29%)
Liquid-fueled	70	(1%)	0	(0%)	0	(0%)	\$1	(1%)
Solid-fueled	10	(0%)	0	(0%)	0	(0%)	\$0	(0%)
Other	10	(0%)	0	(0%)	0	(0%)	\$0	(0%)
Total	5,440	(100%)	20	(100%)	160	(100%)	\$111	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 34.
Home Fires Involving Water Heaters, by Month,
2009-2013 Annual Averages

Month	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
January	540	(10%)	0	(0%)	10	(7%)	\$12	(10%)
February	440	(8%)	0	(0%)	0	(2%)	\$8	(7%)
March	520	(9%)	0	(10%)	20	(12%)	\$16	(15%)
April	500	(9%)	0	(10%)	20	(10%)	\$9	(8%)
May	490	(9%)	0	(20%)	10	(3%)	\$10	(9%)
June	480	(9%)	0	(0%)	10	(9%)	\$9	(8%)
July	420	(8%)	0	(10%)	10	(9%)	\$10	(9%)
August	380	(7%)	10	(30%)	20	(12%)	\$8	(8%)
September	400	(7%)	0	(10%)	10	(7%)	\$5	(4%)
October	440	(8%)	0	(0%)	20	(13%)	\$7	(6%)
November	390	(7%)	0	(0%)	20	(13%)	\$9	(8%)
December	450	(8%)	0	(10%)	10	(5%)	\$8	(7%)
Total	5,440	(100%)	20	(100%)	160	(100%)	\$111	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

**Table 35.
Home Fires Involving Water Heaters, by Day of Week,
2009-2013 Annual Averages**

Day of Week	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Sunday	760	(14%)	0	(0%)	20	(11%)	\$15	(14%)
Monday	730	(13%)	10	(30%)	30	(16%)	\$14	(12%)
Tuesday	810	(15%)	0	(10%)	40	(23%)	\$15	(13%)
Wednesday	780	(14%)	0	(10%)	20	(12%)	\$14	(13%)
Thursday	780	(14%)	0	(10%)	20	(12%)	\$23	(21%)
Friday	770	(14%)	0	(0%)	30	(18%)	\$15	(14%)
Saturday	810	(15%)	10	(40%)	10	(7%)	\$15	(13%)
Total	5,440	(100%)	20	(100%)	160	(100%)	\$111	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 36.
Home Fires Involving Water Heaters, by Time of Day,
Annual Average of 2009-2013 Structure Fires Reported to U.S. Fire Departments

Time of Day	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Midnight-12:59 a.m.	160	(3%)	0	(0%)	0	(2%)	\$3	(3%)
1:00-1:59 a.m.	140	(2%)	0	(0%)	10	(3%)	\$4	(3%)
2:00-2:59 a.m.	90	(2%)	0	(0%)	0	(1%)	\$2	(2%)
3:00-3:59 a.m.	100	(2%)	0	(10%)	0	(1%)	\$3	(2%)
4:00-4:59 a.m.	90	(2%)	0	(10%)	0	(1%)	\$4	(4%)
5:00-5:59 a.m.	120	(2%)	0	(0%)	0	(2%)	\$2	(2%)
6:00-6:59 a.m.	130	(2%)	0	(10%)	0	(3%)	\$1	(1%)
7:00-7:59 a.m.	220	(4%)	0	(0%)	0	(1%)	\$5	(4%)
8:00-8:59 a.m.	220	(4%)	0	(0%)	10	(5%)	\$4	(4%)
9:00-9:59 a.m.	220	(4%)	0	(20%)	10	(9%)	\$5	(4%)
10:00-10:59 a.m.	290	(5%)	0	(0%)	10	(5%)	\$4	(3%)
11:00-11:59 a.m.	250	(5%)	0	(0%)	10	(5%)	\$6	(5%)
12:00-12:59 p.m.	290	(5%)	0	(0%)	10	(6%)	\$4	(3%)
1:00-1:59 p.m.	260	(5%)	0	(0%)	10	(7%)	\$5	(4%)
2:00-2:59 p.m.	270	(5%)	0	(0%)	10	(5%)	\$13	(12%)
3:00-3:59 p.m.	290	(5%)	0	(10%)	10	(7%)	\$5	(4%)
4:00-4:59 p.m.	290	(5%)	0	(10%)	10	(8%)	\$5	(4%)
5:00-5:59 p.m.	330	(6%)	0	(0%)	10	(9%)	\$7	(6%)
6:00-6:59 p.m.	290	(5%)	0	(10%)	10	(9%)	\$6	(6%)
7:00-7:59 p.m.	330	(6%)	0	(0%)	10	(5%)	\$5	(4%)
8:00-8:59 p.m.	290	(5%)	0	(0%)	0	(1%)	\$8	(7%)
9:00-9:59 p.m.	320	(6%)	0	(20%)	0	(0%)	\$4	(3%)
10:00-10:59 p.m.	270	(5%)	0	(0%)	10	(3%)	\$5	(5%)
11:00-11:59 p.m.	190	(3%)	0	(0%)	10	(3%)	\$3	(3%)
Total	5,440	(100%)	20	(100%)	160	(100%)	\$111	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 37.
Home Fires Involving Water Heaters, by Factor Contributing to Ignition,
Annual Average of 2009-2013 Structure Fires Reported to U.S. Fire Departments

Factor Contributing to Ignition	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Electrical failure or malfunction	1,720	(32%)	0	(0%)	20	(12%)	\$24	(22%)
Mechanical failure or malfunction	1,570	(29%)	0	(17%)	30	(18%)	\$27	(25%)
Heat source too close to combustibles	1,150	(21%)	10	(50%)	40	(23%)	\$29	(26%)
Installation deficiency	180	(3%)	0	(0%)	0	(2%)	\$3	(2%)
Unclassified misuse of material or product	150	(3%)	0	(0%)	20	(15%)	\$4	(4%)
Improper container or storage	140	(2%)	0	(0%)	10	(8%)	\$6	(5%)
Failure to clean	120	(2%)	0	(0%)	0	(1%)	\$1	(1%)
Other factor contributed to ignition	120	(2%)	0	(0%)	0	(1%)	\$3	(3%)
Flammable liquid or gas spilled	120	(2%)	10	(33%)	30	(18%)	\$15	(14%)
Other known factor contributing to ignition	520	(10%)	0	(17%)	30	(18%)	\$10	(9%)
Total fires	5,440	(100%)	20	(100%)	160	(100%)	\$111	(100%)
Total factors contributing to ignition*	5,780	(106%)	20	(117%)	180	(117%)	\$122	(110%)

*Multiple entries are allowed, which can result in sums higher than totals.

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 38.
Home Fires Involving Water Heaters, by Item First Ignited,
Annual Average of 2009-2013 Structure Fires Reported to U.S. Fire Departments

Item First Ignited	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Electrical wire or cable insulation	1,300	(24%)	0	(0%)	10	(4%)	\$10	(9%)
Flammable and combustible liquids and gases, piping and filter	1,010	(19%)	20	(86%)	100	(62%)	\$31	(28%)
Appliance housing or casing	470	(9%)	0	(0%)	0	(2%)	\$3	(3%)
Unclassified item first ignited	360	(7%)	0	(0%)	0	(2%)	\$3	(2%)
Clothing	320	(6%)	0	(0%)	10	(5%)	\$12	(11%)
Structural member or framing	310	(6%)	0	(0%)	10	(4%)	\$9	(8%)
Interior wall covering, excluding drapes	200	(4%)	0	(0%)	10	(4%)	\$8	(7%)
Floor covering rug, carpet, or mat	160	(3%)	0	(0%)	0	(2%)	\$2	(1%)
Insulation within structural area	150	(3%)	0	(0%)	0	(1%)	\$1	(1%)
Unclassified structural component or finish	140	(3%)	0	(0%)	0	(1%)	\$4	(4%)
Multiple items first ignited	130	(2%)	0	(0%)	0	(3%)	\$8	(7%)
Unclassified soft goods or wearing apparel	90	(2%)	0	(0%)	0	(3%)	\$3	(3%)
Box, carton, bag, basket, barrel	90	(2%)	0	(0%)	0	(1%)	\$4	(4%)
Dust, fiber, lint, including sawdust or excelsior	80	(2%)	0	(0%)	0	(0%)	\$0	(0%)
Other known item first ignited	640	(12%)	0	(14%)	10	(7%)	\$13	(12%)
Total	5,440	(100%)	20	(100%)	160	(100%)	\$111	(100%)

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Table 39.
Home Fires Involving Water Heaters, by Area of Origin,
2009-2013 Annual Averages

Area of Origin	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Heating equipment room	2,080	(38%)	10	(44%)	60	(41%)	\$43	(39%)
Confined chimney or flue fires*	1,270	(23%)	0	(0%)	0	(2%)	\$0	(0%)
Laundry room or area	760	(14%)	0	(22%)	20	(13%)	\$16	(14%)
Closet	570	(11%)	0	(0%)	10	(3%)	\$6	(5%)
Garage or vehicle storage area	320	(6%)	0	(0%)	20	(10%)	\$19	(17%)
Kitchen or cooking area	210	(4%)	0	(11%)	10	(5%)	\$2	(2%)
Crawl space or substructure space	200	(4%)	0	(0%)	10	(4%)	\$3	(3%)
Storage room, area, tank, or bin	180	(3%)	0	(22%)	0	(3%)	\$4	(4%)
Unclassified function area	140	(3%)	0	(0%)	0	(2%)	\$1	(1%)
Lavatory, bathroom, locker room or check room	140	(2%)	0	(0%)	0	(2%)	\$2	(1%)
Unclassified storage area	130	(2%)	0	(0%)	0	(1%)	\$2	(1%)
Unspecified area of origin	50	(1%)	0	(0%)	0	(1%)	\$0	(0%)
Other known area of origin	630	(12%)	0	(0%)	20	(14%)	\$14	(12%)
Total	5,440	(100%)	20	(100%)	160	(100%)	\$111	(100%)

*NFIRS 5.0 does not have a separate area of origin code for fires starting in chimneys. Any home fire with NFIRS incident type 114 (Chimney or flue fire originating in and confined to a chimney or flue) is captured here.

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported to federal or state agencies or industrial fire brigades. Analyses were performed separately for non-confined fires, fires reported as confined chimney or flue fires, and fires reports as confined to fuel burner or boiler. Fires, deaths, and injuries are rounded to the nearest ten and direct property damage to the nearest million dollars. Totals may not equal sums due to rounding errors.

Source: NFIRS 5.0 and NFPA Fire Experience Survey, 2009-2013.

Appendix A.

How National Estimates Statistics Are Calculated

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

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

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

Methodology may change slightly from year to year.

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

NFPA's fire department experience survey provides estimates of the big picture.

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

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

The survey includes the following information: (1) the total number of fire incidents, civilian deaths, and civilian injuries, and the total estimated property damage (in dollars), for each of the major property use classes defined in NFIRS; (2) the number of on-duty firefighter injuries, by type of duty and nature of illness; (3) the number and nature of non-fire incidents; and (4)

information on the type of community protected (e.g., county versus township versus city) and the size of the population protected, which is used in the statistical formula for projecting national totals from sample results. The results of the survey are published in the annual report *Fire Loss in the United States*. To download a free copy of the report, visit <http://www.nfpa.org/assets/files/PDF/OS.fireloss.pdf>.

Projecting NFIRS to National Estimates

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

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

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

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

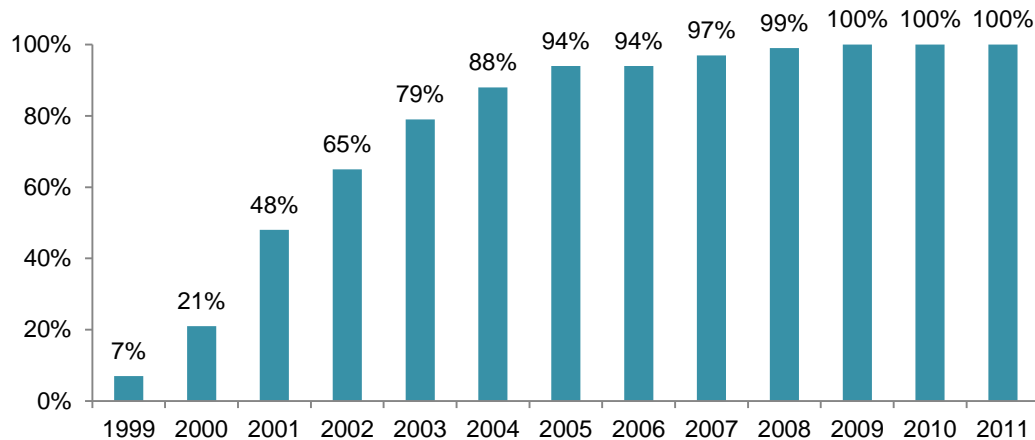
Figure A.1 shows the percentage of fires originally collected in the NFIRS 5.0 system. Each year's release version of NFIRS data also includes data collected in older versions of NFIRS that were converted to NFIRS 5.0 codes.

From 1999 data on, analyses are based on scaling ratios using only data originally collected in NFIRS 5.0:

$$\frac{\text{NFPA survey projections}}{\text{NFIRS totals (Version 5.0)}}$$

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

Figure A.1. Fires Originally Collected in NFIRS 5.0 by Year



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

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

Because this analysis focused on fatalities only, no distinction was made between confined and non-confined fires.

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

In the formulas that follow, the term “all fires” refers to all fires in NFIRS on the dimension studied. The percentages of fires with known or unknown data are provided for non-confined fires and associated losses, and for confined fires only.

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

In the formulas that follow, the term “all fires” refers to all fires in NFIRS on the dimension studied. The percentages of fires with known or unknown data are provided for non-confined fires and associated losses, and for confined fires only.

Cause of Ignition: This field is used chiefly to identify intentional fires. “Unintentional” in this

field is a specific entry and does not include other fires that were not intentionally set: failure of equipment or heat source, act of nature, or “other” (unclassified).” The last should be used for exposures but has been used for other situations as well. Fires that were coded as under investigation and those that were coded as undetermined after investigation were treated as unknown.

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

In some analyses, all entries in the category of mechanical failure, malfunction (factor contributing to ignition 20-29) are combined and shown as one entry, “mechanical failure or malfunction.” This category includes:

21. Automatic control failure;
22. Manual control failure;
23. Leak or break. Includes leaks or breaks from containers or pipes. Excludes operational deficiencies and spill mishaps;
25. Worn out;
26. Backfire. Excludes fires originating as a result of hot catalytic converters;
27. Improper fuel used; Includes the use of gasoline in a kerosene heater and the like; and
20. Mechanical failure or malfunction, other.

Entries in “electrical failure, malfunction” (factor contributing to ignition 30-39) may also be combined into one entry, “electrical failure or malfunction.” This category includes:

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

Heat Source. In NFIRS 5.0, one grouping of codes encompasses various types of open flames and smoking materials. In the past, these had been two separate groupings. A new code was added to NFIRS 5.0, which is code 60: “Heat from open flame or smoking material, other.”

NFPA treats this code as a partial unknown and allocates it proportionally across the codes in the 61-69 range, shown below.

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

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

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

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

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

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

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

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

In some analyses, various types of equipment are grouped together.

Code Grouping	EII Code	NFIRS definitions
Central heat	132	Furnace or central heating unit
	133	Boiler (power, process or heating)
Fixed or portable space heater	131	Furnace, local heating unit, built-in
	123	Fireplace with insert or stove
	124	Heating stove
	141	Heater, excluding catalytic and oil-filled
	142	Catalytic heater
	143	Oil-filled heater
Fireplace or chimney	120	Fireplace or chimney
	121	Fireplace, masonry
	122	Fireplace, factory-built
	125	Chimney connector or vent connector
	126	Chimney – brick, stone or masonry
	127	Chimney-metal, including stovepipe or flue
	Fixed wiring and related equipment	210
211		Electrical power or utility line
212		Electrical service supply wires from utility
213		Electric meter or meter box
214		Wiring from meter box to circuit breaker
215		Panel board, switch board or circuit breaker board
216		Electrical branch circuit
217		Outlet or receptacle
218		Wall switch
219		Ground fault interrupter
Transformers and power supplies	221	Distribution-type transformer
	222	Overcurrent, disconnect equipment
	223	Low-voltage transformer
	224	Generator
	225	Inverter
	226	Uninterrupted power supply (UPS)
	227	Surge protector
	228	Battery charger or rectifier
	229	Battery (all types)

Code Grouping	EII Code	NFIRS definitions
Lamp, bulb or lighting	230	Unclassified lamp or lighting
	231	Lamp-tabletop, floor or desk
	232	Lantern or flashlight
	233	Incandescent lighting fixture
	234	Fluorescent light fixture or ballast
	235	Halogen light fixture or lamp
	236	Sodium or mercury vapor light fixture or lamp
	237	Work or trouble light
	238	Light bulb
	241	Nightlight
	242	Decorative lights – line voltage
	243	Decorative or landscape lighting – low voltage
	244	Sign
	Cord or plug	260
261		Power cord or plug, detachable from appliance
262		Power cord or plug- permanently attached
263		Extension cord
Torch, burner or soldering iron	331	Welding torch
	332	Cutting torch
	333	Burner, including Bunsen burners
	334	Soldering equipment
Portable cooking or warming equipment	631	Coffee maker or teapot
	632	Food warmer or hot plate
	633	Kettle
	634	Popcorn popper
	635	Pressure cooker or canner
	636	Slow cooker
	637	Toaster, toaster oven, counter-top broiler
	638	Waffle iron, griddle
	639	Wok, frying pan, skillet
641	Breadmaking machine	

Equipment was not analyzed separately for confined fires. Instead, each confined fire incident type was listed with the equipment or as other known equipment.

Item First Ignited. In most analyses, mattress and pillows (item first ignited 31) and bedding, blankets, sheets, and comforters (item first ignited 32) are combined and shown as “mattresses and bedding.” In many analyses, wearing apparel not on a person (code 34) and wearing apparel

on a person (code 35) are combined and shown as “clothing.” In some analyses, flammable and combustible liquids and gases, piping and filters (item first ignited 60-69) are combined and shown together.

Area of Origin. Two areas of origin: bedroom for more than five people (code 21) and bedroom for less than five people (code 22) are combined and shown as simply “bedroom.” Chimney is no longer a valid area of origin code for non-confined fires.

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