

HOME STRUCTURE FIRES THAT BEGAN WITH DECORATIONS

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Abstract

During the four-year-period of 2002-2005, NFPA estimates that decorations were the item first ignited in an estimated average of 1,150 reported home structure fires per year. These fires caused an estimated average of three civilian deaths, 56 civilian injuries and \$24.8 million in direct property damage per year. These estimates are based on data from the U.S. Fire Administration's (USFA's) National Fire Incident Reporting System (NFIRS) and the National Fire Protection Association's (NFPA's) annual fire department experience survey.

One-quarter of the home structure decoration fires occurred in December. Half of these fires occurred because the decoration was too close to a heat source. Fifty-six percent of these incidents were started by candles. One-quarter started in the living room, family room, or den.

Keywords: Fire statistics, decorations, home fires, holiday 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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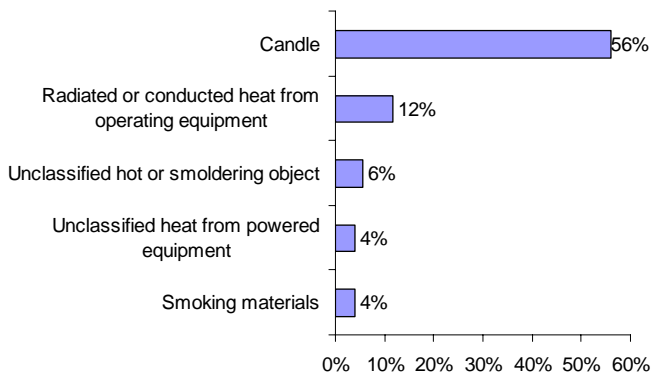
Home Structure Fires Involving Decorations 2002-2005

U.S. fire departments responded to an estimated average of **1,150** home¹ structure fires that began with decorations in 2002-2005.

These fires caused an annual average of

- Three civilian fire deaths
- 56 civilian fire injuries
- \$24.8 million in direct property damage.

Home Structure Decoration Fires by Heat Source



Candles started 56% of home decoration structure fires.

One-quarter of the home decoration fires occurred in December.

The decoration was too close to heat source in one-half (52%) of the fires.

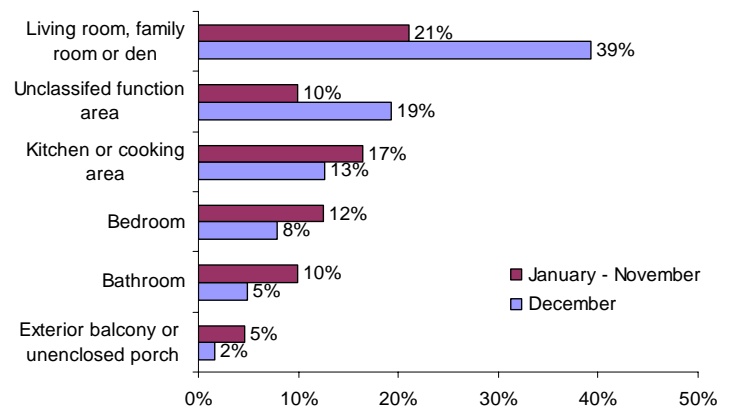
One-quarter (26%) started in the living room, family room or den.

In December, 39% of the home decoration structure fires started in the living room, family room or den, compared to 21% during the rest of the year.

Seventy-one percent of the December home decoration fires were started by candles, compared to 51% in January-November.

Roughly 5,800 people per year were treated at hospital emergency rooms for falls associated with holiday decorations.²

Leading Areas of Origin in Home Structure Decoration Fires
January - November vs. December



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

²J.A. Stevens and M Vajami. "Fall-Related Injuries During the Holiday Season -- United States, 2000--2003, *MMWR Weekly*, December 10, 2004, 53(48); 1127-1129, online at <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5348a1.htm>.

HOME STRUCTURE FIRES THAT BEGAN WITH DECORATIONS

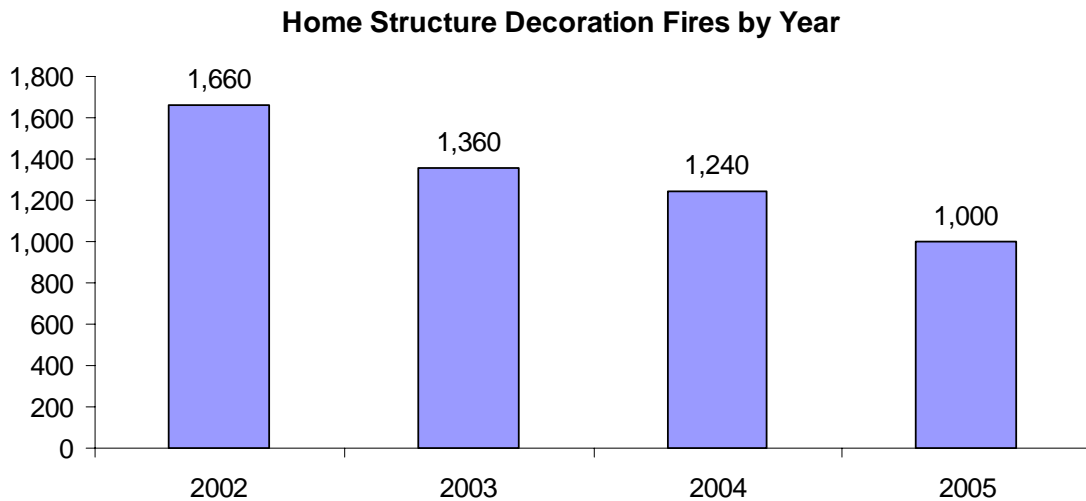
On average, 1,150 home structure fires began with decorations each year.

During the four-year period of 2002-2005, decorations were the items first ignited in an estimated average of 1,150 reported non-confined home structure fires per year. (Homes include one- and two-family dwellings, apartments, row houses, townhouses, and manufactured housing.) Version 5.0 of the National Fire Incident Reporting System (NFIRS 5.0) requires minimal information on certain types of confined fires, e.g., confined cooking, chimney or trash fires. These fires were excluded from the analysis.

The 1,150 decoration fires caused an average of three civilian deaths, 56 civilian injuries, and \$24.8 million in direct property damage per year. Overall, decorations were first ignited in 0.3% of reported home structure fires, 0.1% of home fire deaths, 0.4% of home fire injuries, and 0.4% of direct property damage from home fires.

In NFIRS 5.0, decorations are identified by item first ignited code 42. In older versions of NFIRS, this code captured decorations for special events. Because the newer definition is stated more simply and may be interpreted more broadly, long-term trend analyses of these items cannot be done. Table 1 and Figure 1 show the number of fires by year for 2002 to 2005 based on data collected in NFIRS 5.0 only. Although NFIRS 5.0 was in use in 1999-2001, the percentage of data collected in this version was small, making estimates less reliable. The number of decoration fires decreased steadily from a high of 1,660 in 2002 down to a low of 1,000 in 2005.

Figure 1.

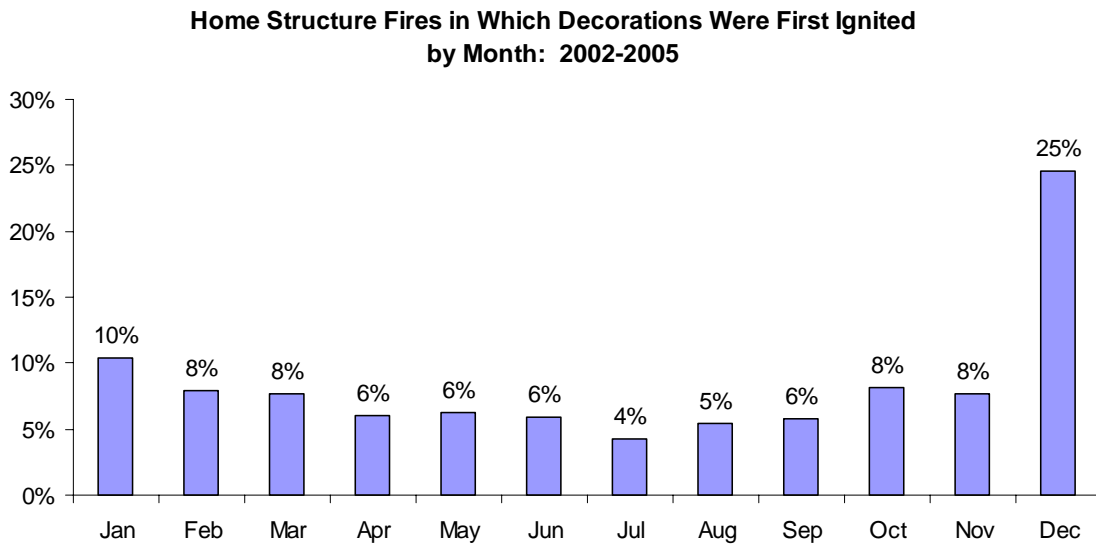


Source: NFIRS 5.0 and NFPA survey.

December has three times as many home decoration fires as an average month.

Figure 2 shows that 25% of home structure decoration fires occurred in December and 10% occurred in January.

Figure 2.



Source: NFIRS 5.0 and NFPA survey.

Flame damage was confined to the object of origin in 43% of these fires.

These fires tend to be small. Table 2 shows that flame damage extended beyond the room of origin in only 12% of these fires.

Half of these fires were caused by decorations too close to heat sources

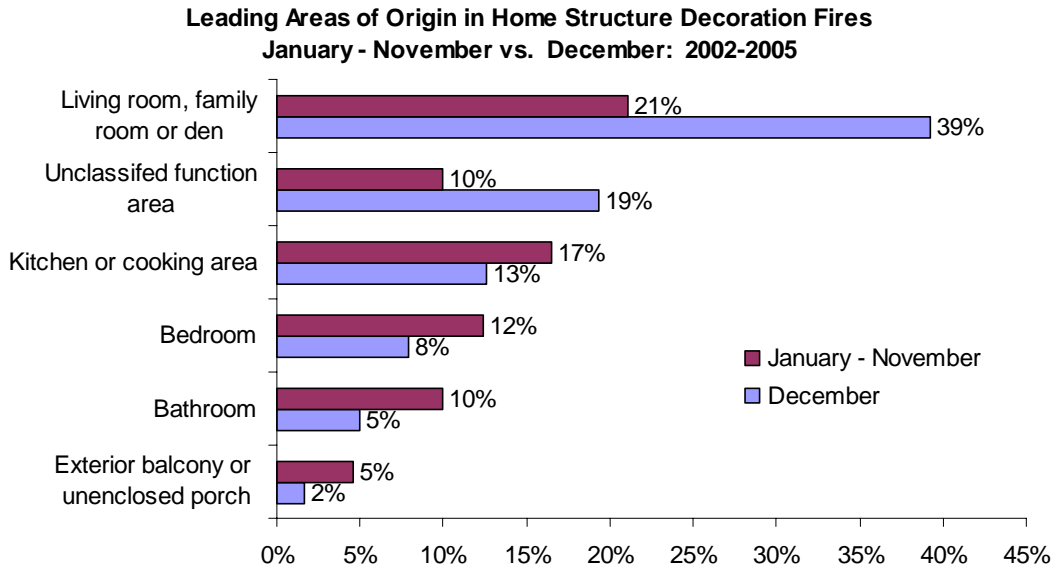
Only 7% of the home structure decoration fires were intentionally set. (See Table 3) Table 4 shows that a heat source too close to the decoration was a factor in 52% of these incidents, abandoned or discarded material was a factor in 11%, and unattended equipment was a factor in 7% of these fires.

Seventy-six percent of home structure decoration fires were coded as no equipment involved. Ranges or cooktops were involved in 7%; lamps or lighting, including decorative lighting, in 5%; and fixed or portable space heaters were involved in 3% of these incidents. (See Table 5.)

The leading area of origin for these fires is the living room, family room or den.

One-quarter (26%) of these fires started in the living room, family room or den. Sixteen percent started in the kitchen, 12% in an unclassified function area, 11% in a bedroom, and 9% in a bathroom. (See Table 6.)

Figure 3.



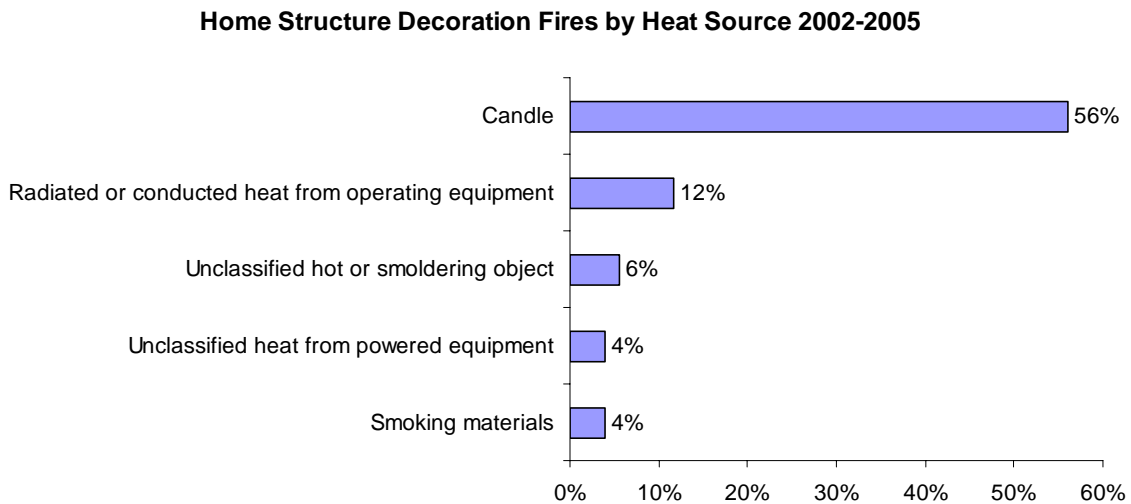
Source: NFIRS 5.0 and NFPA survey.

While the living room, family room or den is the most common area of origin for decoration fires throughout the year, Figure 3 shows that the percentage of fires starting in these areas is nearly twice as high in December as it is during the rest of the year.

More than half of home decoration structure fires were started by candles.

Table 7 and Figure 4 show that candles were the heat source in 56% of these fires. In December, the candle share of decoration fires jumped to 71%, compared to 51% in the remainder of the year.

Figure 4.



Source: NFIRS 5.0 and NFPA survey.

More than one-third of the home decoration fires began with something plastic.

Table 8 shows that in 37% of these incidents, the type of material first ignited was plastic. In 10%, some type of fabric or fiber made of cotton, blends, rayon or wool was first ignited. An unclassified natural product was first ignited in 9% of these fires.

Safety Tips

- Be fire safe when using decorations.
- Do not hang banners or streamers on or over lights or lamps. Keep decorations away from stoves, appliances, and heating equipment.
- Place candles in sturdy holders at least 12 inches away from anything that can burn. Do not leave lit candles unattended. Blow out candles when you leave the room or go to bed.
- Place candles out of the reach of children and pets. Never leave a child unattended in a room with a lit candle.
- Ask smokers to smoke outside the home away from decorations. Provide deep, sturdy ashtrays.
- Remove decorations such as garlands and Christmas stockings from the fireplace before you light a fire. Make sure decorations do not block your exits.

Table 1.
U.S. Non-Confined Home Structure Fires
in Which Decorations Were the Item First Ignited
By Year: 2001-2005

| Year | Fires | Civilian Injuries | Direct Property Damage (in Millions) | Adjusted Loss in Millions of 2005 Dollars |
|-------------|--------------|--------------------------|---|--|
| 2001 | 1,940 | 68 | \$17.4 | \$19.2 |
| 2002 | 1,660 | 92 | \$42.2 | \$45.8 |
| 2003 | 1,360 | 50 | \$16.8 | \$17.9 |
| 2004 | 1,240 | 30 | \$26.8 | \$27.7 |
| 2005 | 1,000 | 64 | \$18.3 | \$18.3 |

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Because the number of decoration fire deaths is so small, estimates for individual years are unreliable and therefore not shown.

Fires are rounded to the nearest ten, civilian injuries are rounded to the nearest one, and direct property damage is rounded to the nearest hundred thousand dollars. Percentages of the total number of non-confined structure fires (incident type 110-129, excluding 113-118) and associated losses for each item first ignited were calculated using only data on non-confined structure fires originally collected in Version 5.0 of NFIRS. Total non-confined structure fires (all versions) are multiplied by these percentages to obtain national estimates of decoration (item first ignited 42) fires. A proportional share of fires and losses in which the item first ignited was undetermined or not reported are included in this table.

Source: NFIRS 5.0 and NFPA survey. Inflation adjustments were based on the consumer price index found in the U.S. Census Bureau's *Statistical Abstract of the United States: 2007*, "Table 705, Purchasing Power of the Dollar: 1950 to 2005" and the Bureau of Labor Statistics Inflation Calculator which uses the consumer price index. The Inflation Calculator may be accessed at <http://data.bls.gov/cgi-bin/cpicalc.pl>.

Table 2.
U.S. Non-Confined Home Structure Fires
in Which Decorations Were the Item First Ignited
by Extent of Flame Damage
2002-2005 Annual Averages

| Extent of Flame Damage | Fires | | Civilian Deaths | | Civilian Injuries | | Property Damage (in Millions) | |
|------------------------------------|--------------|---------------|------------------------|---------------|--------------------------|---------------|--------------------------------------|---------------|
| Confined to object of origin | 490 | (43%) | 0 | (0%) | 25 | (45%) | \$2.7 | (11%) |
| Confined to room of origin | 520 | (45%) | 0 | (0%) | 23 | (40%) | \$5.9 | (24%) |
| Confined to floor of origin | 50 | (5%) | 1 | (50%) | 4 | (8%) | \$1.6 | (6%) |
| Confined to building of origin | 80 | (7%) | 1 | (50%) | 4 | (7%) | \$13.3 | (53%) |
| Extended beyond building of origin | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$1.4 | (6%) |
| Total | 1,150 | (100%) | 3 | (100%) | 56 | (100%) | \$24.8 | (100%) |

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian deaths and injuries are rounded to the nearest one, and direct property damage is rounded to the nearest hundred thousand dollars. Property damage has not been adjusted for inflation. Percentages of the total number of non-confined structure fires (incident type 110-129, excluding 113-118) and associated losses for each item first ignited were calculated using only data on non-confined structure fires originally collected in Version 5.0 of NFIRS. Total non-confined structure fires (all versions) are multiplied by these percentages to obtain national estimates of decoration (item first ignited 42) fires. A proportional share of fires and losses in which the item first ignited was undetermined or not reported are included in this table. Decoration fires in which the extent of flame damage was unreported or undetermined were allocated proportionally among fires of known extent of flame damage. Sums may not equal due to rounding errors.

Source: NFIRS and NFPA survey.

Table 3.
U.S. Non-Confined Home Structure Fires
in Which Decorations Were the Item First Ignited
by Cause
2002-2005 Annual Averages

| Cause | Fires | | Civilian | | Civilian | | Direct | |
|--|-------|--------|----------|----------|-----------------|---------------|--------|--------|
| | | | Deaths | Injuries | Property Damage | (in Millions) | | |
| Unintentional | 960 | (84%) | 3 | (100%) | 48 | (85%) | \$19.6 | (79%) |
| Failure of equipment or heat source | 90 | (7%) | 0 | (0%) | 3 | (5%) | \$2.8 | (11%) |
| Intentional | 80 | (7%) | 0 | (0%) | 4 | (6%) | \$0.9 | (4%) |
| Unclassified | 20 | (1%) | 0 | (0%) | 2 | (3%) | \$1.5 | (6%) |
| Act of nature | 0 | (0%) | 0 | (0%) | 0 | (0%) | \$0.0 | (0%) |
| Total | 1,150 | (100%) | 3 | (100%) | 56 | (100%) | \$24.8 | (100%) |

Note: "Cause" is a field in NFIRS 5.0 with the choices shown above. These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian deaths and injuries are rounded to the nearest one, and direct property damage is rounded to the nearest hundred thousand dollars. Estimates shown as zero may actually be zero or they may be a number that rounds to zero. Property damage has not been adjusted for inflation. Percentages of the total number of non-confined structure fires (incident type 110-129, excluding 113-118) and associated losses for each item first ignited were calculated using only data on non-confined structure fires originally collected in Version 5.0 of NFIRS. Total non-confined structure fires (all versions) are multiplied by these percentages to obtain national estimates of decoration (item first ignited 42) fires. A proportional share of fires and losses in which the item first ignited was undetermined or not reported are included in this table. Decoration fires in which the cause was unreported or undetermined were allocated proportionally among fires of known cause. Sums may not equal due to rounding errors.

Source: NFIRS and NFPA survey.

Table 4.
U.S. Non-Confined Home Structure Fires
in Which Decorations Were the Item First Ignited
by Factor Contributing to Ignition
2002-2005 Annual Averages

| Factor Contributing | Fires | | Civilian Deaths | | Civilian Injuries | | Direct Property Damage (in Millions) | |
|---|--------------|--------|------------------------|--------|--------------------------|--------|---|--------|
| Heat source too close to combustibles | 590 | (52%) | 0 | (0%) | 35 | (63%) | \$15.7 | (63%) |
| Abandoned or discarded material or product | 130 | (11%) | 0 | (0%) | 2 | (4%) | \$1.5 | (6%) |
| Unclassified misuse of material or product | 90 | (7%) | 0 | (0%) | 4 | (7%) | \$1.3 | (5%) |
| Equipment unattended | 80 | (7%) | 0 | (0%) | 4 | (7%) | \$0.5 | (2%) |
| Unclassified factor contributed to ignition | 60 | (5%) | 0 | (0%) | 6 | (10%) | \$2.1 | (9%) |
| Playing with heat source | 40 | (4%) | 3 | (100%) | 3 | (6%) | \$1.3 | (5%) |
| Unintentionally turned on or not turned off | 30 | (3%) | 0 | (0%) | 0 | (0%) | \$0.1 | (1%) |
| Unclassified electrical failure or malfunction | 30 | (3%) | 0 | (0%) | 1 | (2%) | \$1.1 | (4%) |
| Unspecified short circuit arc | 20 | (2%) | 0 | (0%) | 0 | (0%) | \$0.5 | (2%) |
| Improper container or storage | 20 | (1%) | 0 | (0%) | 0 | (0%) | \$0.1 | (0%) |
| Short circuit arc from defective or worn insulation | 20 | (1%) | 0 | (0%) | 0 | (0%) | \$0.2 | (1%) |
| Collision or knock down | 10 | (1%) | 0 | (0%) | 1 | (2%) | \$0.3 | (1%) |
| Improperly operated equipment | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.5 | (2%) |
| Unclassified operational deficiency | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.0 | (0%) |
| Unclassified mechanical failure or malfunction | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.2 | (1%) |
| Design deficiency | 10 | (1%) | 0 | (0%) | 1 | (2%) | \$0.0 | (0%) |
| Installation deficiency | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.0 | (0%) |
| Other known factor | 50 | (4%) | 0 | (0%) | 1 | (2%) | \$0.9 | (4%) |
| Total* | 1,150 | (100%) | 3 | (100%) | 56 | (100%) | \$24.8 | (100%) |
| Total entries* | 1,220 | (106%) | 3 | (100%) | 58 | (104%) | \$26.5 | (107%) |

* 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 only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian deaths and injuries are rounded to the nearest one, and direct property damage is rounded to the nearest hundred thousand dollars. Property damage has not been adjusted for inflation. Percentages of the total number of non-confined structure fires and associated losses for each item first ignited were calculated using only data on non-confined structure fires originally collected in Version 5.0 of NFIRS. Total non-confined structure fires (all versions) are multiplied by these percentages to obtain national estimates of decoration (item first ignited 42) fires. A proportional share of fires and losses in which the item first ignited was undetermined or not reported are included in this table. Decoration fires in which the factor contributing to ignition was undetermined, not reported or coded as "none" were allocated proportionally among fires of known factor contributing to ignition.

Source: NFIRS and NFPA survey.

Table 5.
U.S. Non-Confined Home Structure Fires
in Which Decorations Were the Item First Ignited
by Equipment Involved in Ignition
2002-2005 Annual Averages

| Equipment Involved | Fires | | Civilian Deaths | | Civilian Injuries | | Direct Property Damage (in Millions) | |
|---|--------------|---------------|------------------------|---------------|--------------------------|---------------|---|---------------|
| No equipment involved | 880 | (76%) | 3 | (100%) | 41 | (74%) | \$21.5 | (87%) |
| Range or cooktop | 80 | (7%) | 0 | (0%) | 5 | (8%) | \$0.4 | (2%) |
| Lamp or lighting, including decorative lights | 50 | (5%) | 0 | (0%) | 5 | (9%) | \$0.9 | (4%) |
| Fixed or portable space heater | 30 | (3%) | 0 | (0%) | 0 | (0%) | \$0.6 | (2%) |
| Fireplace or chimney | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.7 | (3%) |
| Water heater | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.0 | (0%) |
| Unclassified equipment involved in ignition | 10 | (1%) | 0 | (0%) | 2 | (4%) | \$0.1 | (1%) |
| Wiring, switch or outlet | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.3 | (1%) |
| Extension cord | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.0 | (0%) |
| Unclassified heating, ventilating or air conditioning equipment | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.1 | (0%) |
| Oven or rotisserie | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.0 | (0%) |
| Other known equipment | 40 | (4%) | 0 | (0%) | 3 | (5%) | \$0.2 | (1%) |
| Total | 1,150 | (100%) | 3 | (100%) | 56 | (100%) | \$24.8 | (100%) |

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian deaths and injuries are rounded to the nearest one, and direct property damage is rounded to the nearest hundred thousand dollars. Property damage has not been adjusted for inflation. Percentages of the total number of non-confined structure fires (incident type 110-129, excluding 113-118) and associated losses for each item first ignited were calculated using only data on non-confined structure fires originally collected in Version 5.0 of NFIRS. Total non-confined structure fires (all versions) are multiplied by these percentages to obtain national estimates of decoration (item first ignited 42) fires. A proportional share of fires and losses in which the item first ignited was undetermined or not reported are included in this table. Decoration fires in which the equipment involved was undetermined or not reported were allocated proportionally among fires of known equipment involved. Sums may not equal due to rounding errors.

Source: NFIRS and NFPA survey.

Table 6.
U.S. Non-Confined Home Structure Fires
in Which Decorations Were the Item First Ignited, by Area of Origin
2002-2005 Annual Averages

| Area of Origin | Fires | | Civilian Deaths | | Civilian Injuries | | Direct Property Damage (in Millions) | |
|---|--------------|---------------|------------------------|---------------|--------------------------|---------------|---|---------------|
| Living room, family room or den | 290 | (26%) | 0 | (0%) | 20 | (36%) | \$5.0 | (20%) |
| Kitchen or cooking area | 180 | (16%) | 1 | (50%) | 5 | (9%) | \$1.8 | (7%) |
| Unclassified function area | 140 | (12%) | 0 | (0%) | 9 | (16%) | \$3.4 | (14%) |
| Bedroom | 130 | (11%) | 0 | (0%) | 10 | (18%) | \$6.8 | (28%) |
| Bathroom | 100 | (9%) | 0 | (0%) | 3 | (6%) | \$0.6 | (3%) |
| Exterior balcony or unenclosed porch | 40 | (4%) | 0 | (0%) | 1 | (1%) | \$0.1 | (0%) |
| Lobby or entrance way | 30 | (3%) | 0 | (0%) | 1 | (2%) | \$0.9 | (4%) |
| Wall assembly or concealed space | 20 | (2%) | 0 | (0%) | 0 | (0%) | \$1.6 | (7%) |
| Exterior wall surface | 20 | (2%) | 0 | (0%) | 0 | (0%) | \$0.2 | (1%) |
| Interior stairway or ramp | 20 | (1%) | 0 | (0%) | 1 | (2%) | \$0.3 | (1%) |
| Courtyard, terrace or patio | 20 | (1%) | 0 | (0%) | 0 | (0%) | \$0.3 | (1%) |
| Unclassified structural area | 10 | (1%) | 1 | (50%) | 2 | (3%) | \$0.2 | (1%) |
| Unclassified means of egress | 10 | (1%) | 0 | (0%) | 1 | (2%) | \$0.1 | (0%) |
| Garage or vehicle storage area* | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.3 | (1%) |
| Closet | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.2 | (1%) |
| Hallway or corridor | 10 | (1%) | 0 | (0%) | 1 | (1%) | \$0.0 | (0%) |
| Exterior stairway, ramp, or fire escape | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.2 | (1%) |
| Unclassified | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.2 | (1%) |
| Heating equipment room | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.1 | (0%) |
| Crawl space or substructure space | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.2 | (1%) |
| Unclassified storage area | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.4 | (2%) |
| Laundry room or area | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.0 | (0%) |
| Attic or ceiling/roof assembly or concealed space | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.4 | (2%) |
| Office | 10 | (1%) | 0 | (0%) | 3 | (5%) | \$0.2 | (1%) |
| Other known area | 30 | (2%) | 0 | (0%) | 0 | (0%) | \$1.2 | (5%) |
| Total | 1,150 | (100%) | 3 | (100%) | 56 | (100%) | \$24.8 | (100%) |

* Does not include fires in properties coded as dwelling garages.

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian deaths and injuries are rounded to the nearest one, and direct property damage is rounded to the nearest hundred thousand dollars. Property damage has not been adjusted for inflation. Percentages of the total number of non-confined structure fires (incident type 110-129, excluding 113-118) and associated losses for each item first ignited were calculated using only data on non-confined structure fires originally collected in Version 5.0 of NFIRS. Total non-confined structure fires (all versions) are multiplied by these percentages to obtain national estimates of decoration (item first ignited 42) fires. A proportional share of fires and losses in which the item first ignited was undetermined or not reported are included in this table. Decoration fires in which the area of origin was undetermined or not reported were allocated proportionally among fires of known area of origin. Sums may not equal due to rounding errors.

Source: NFIRS and NFPA survey.

Table 7.
U.S. Non-Confined Home Structure Fires
in Which Decorations Were the Item First Ignited
by Heat Source
2002-2005 Annual Averages

| Heat Source | Fires | | Civilian Deaths | | Civilian Injuries | | Direct Property Damage | |
|---|--------------|---------------|-----------------|---------------|-------------------|---------------|------------------------|---------------|
| | | | | | | | (in Millions) | |
| Candle* | 640 | (56%) | 1 | (50%) | 39 | (71%) | \$14.8 | (60%) |
| Radiated or conducted heat from operating equipment | 130 | (12%) | 0 | (0%) | 4 | (7%) | \$2.6 | (11%) |
| Unclassified hot or smoldering object | 60 | (6%) | 0 | (0%) | 1 | (2%) | \$0.9 | (4%) |
| Unclassified heat from powered equipment | 50 | (4%) | 0 | (0%) | 0 | (0%) | \$1.1 | (4%) |
| Smoking materials* | 50 | (4%) | 0 | (0%) | 0 | (0%) | \$0.2 | (1%) |
| Lighter* | 40 | (3%) | 1 | (50%) | 6 | (10%) | \$0.9 | (4%) |
| Arcing | 40 | (3%) | 0 | (0%) | 1 | (2%) | \$2.3 | (9%) |
| Hot ember or ash | 30 | (3%) | 0 | (0%) | 1 | (2%) | \$0.6 | (2%) |
| Spark, ember or flame from operating equipment | 30 | (2%) | 0 | (0%) | 1 | (2%) | \$0.5 | (2%) |
| Unclassified heat source | 20 | (2%) | 0 | (0%) | 1 | (2%) | \$0.2 | (1%) |
| Molten or hot material | 20 | (2%) | 0 | (0%) | 1 | (2%) | \$0.3 | (1%) |
| Match* | 10 | (1%) | 0 | (0%) | 1 | (2%) | \$0.4 | (2%) |
| Flame or torch used for lighting* | 10 | (1%) | 0 | (0%) | 1 | (2%) | \$0.0 | (0%) |
| Other known heat source | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.0 | (0%) |
| Total | 1,150 | (100%) | 3 | (100%) | 56 | (100%) | \$24.8 | (100%) |

* Estimates for heat sources in the open flame or smoking material category (e.g., candles, matches, lighters, and flames or torches used for lighting) include a proportional share of fires coded with heat source code 60 – “heat from open flame or smoking materials, other.”

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian deaths and injuries are rounded to the nearest one, and direct property damage is rounded to the nearest hundred thousand dollars. Property damage has not been adjusted for inflation. Percentages of the total number of non-confined structure fires (incident type 110-129, excluding 113-118) and associated losses for each item first ignited were calculated using only data on non-confined structure fires originally collected in Version 5.0 of NFIRS. Total non-confined structure fires (all versions) are multiplied by these percentages to obtain national estimates of decoration (item first ignited 42) fires. A proportional share of fires and losses in which the item first ignited was undetermined or not reported are included in this table. Decoration fires in which the heat source was undetermined or not reported were allocated proportionally among fires of known heat source. Sums may not equal due to rounding errors.

Source: NFIRS and NFPA survey.

Table 8.
U.S. Non-Confined Home Structure Fires
in Which Decorations Were the Item First Ignited
by Type of Material First Ignited
2002-2005 Annual Averages

| Type of Material | Fires | | Civilian | | Civilian | | Direct | |
|--|--------------|---------------|----------|---------------|-----------|----------------------------------|---------------|---------------|
| | | | Deaths | Injuries | Injuries | Property Damage (in Millions) | | |
| Plastic | 430 | (37%) | 0 | (0%) | 23 | (41%) | \$12.4 | (50%) |
| Fabric or fiber made of cotton, blends, rayon or wool | 120 | (10%) | 3 | (100%) | 4 | (7%) | \$1.9 | (8%) |
| Unclassified natural product | 110 | (9%) | 0 | (0%) | 9 | (16%) | \$2.1 | (8%) |
| Polish, paraffin or wax | 90 | (8%) | 0 | (0%) | 3 | (6%) | \$0.5 | (2%) |
| Unclassified wood or paper | 70 | (6%) | 0 | (0%) | 4 | (7%) | \$1.5 | (6%) |
| Paper | 60 | (6%) | 0 | (0%) | 5 | (9%) | \$3.4 | (14%) |
| Hay or straw | 50 | (4%) | 0 | (0%) | 3 | (4%) | \$0.2 | (1%) |
| Sawn wood or finished lumber | 40 | (3%) | 0 | (0%) | 0 | (0%) | \$0.2 | (1%) |
| Unclassified type of material first ignited | 40 | (3%) | 0 | (0%) | 0 | (0%) | \$0.6 | (2%) |
| Multiple types of material | 30 | (3%) | 0 | (0%) | 2 | (3%) | \$0.3 | (1%) |
| Unclassified fabric, textile or fur | 30 | (2%) | 0 | (0%) | 2 | (4%) | \$0.7 | (3%) |
| Fur, silk or other fabric or finished goods | 20 | (2%) | 0 | (0%) | 1 | (1%) | \$0.0 | (0%) |
| Cardboard | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.1 | (0%) |
| Plastic-coated fabric | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.1 | (0%) |
| Fiberboard, particleboard or hardboard | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.1 | (0%) |
| Wood chips, sawdust or shavings | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.0 | (0%) |
| Grain or natural fiber | 10 | (1%) | 0 | (0%) | 0 | (0%) | \$0.3 | (1%) |
| Other known type of material | 20 | (2%) | 0 | (0%) | 0 | (0%) | \$0.4 | (1%) |
| Total | 1,150 | (100%) | 3 | (100%) | 56 | (100%) | \$24.8 | (100%) |

Note: These are national estimates of fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten, civilian deaths and injuries are rounded to the nearest one, and direct property damage is rounded to the nearest hundred thousand dollars. Property damage has not been adjusted for inflation. Percentages of the total number of non-confined structure fires (incident type 110-129, excluding 113-118) and associated losses for each item first ignited were calculated using only data on non-confined structure fires originally collected in Version 5.0 of NFIRS. Total non-confined structure fires (all versions) are multiplied by these percentages to obtain national estimates of decoration (item first ignited 42) fires. A proportional share of fires and losses in which the item first ignited was undetermined or not reported are included in this table. Decoration fires in which the type of material first ignited was undetermined or not reported were allocated proportionally among fires of known type of material. Sums may not equal due to rounding errors.

Source: NFIRS and NFPA survey.

Appendix A.

How National Estimates Statistics Are Calculated

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

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/download/nfirspaperforms2007.pdf>.

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; and (3) information on the type of community protected (e.g., county versus township versus city) and the size of the population protected, which is used in the statistical formula for projecting national totals from sample results. The results of the survey are published in the annual report *Fire Loss in the United States*. To download a free copy of the report, visit <http://www.nfpa.org/assets/files/PDF/OS.fireloss.pdf>.

Projecting NFIRS to National Estimates

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

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

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

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.

Figure 1.

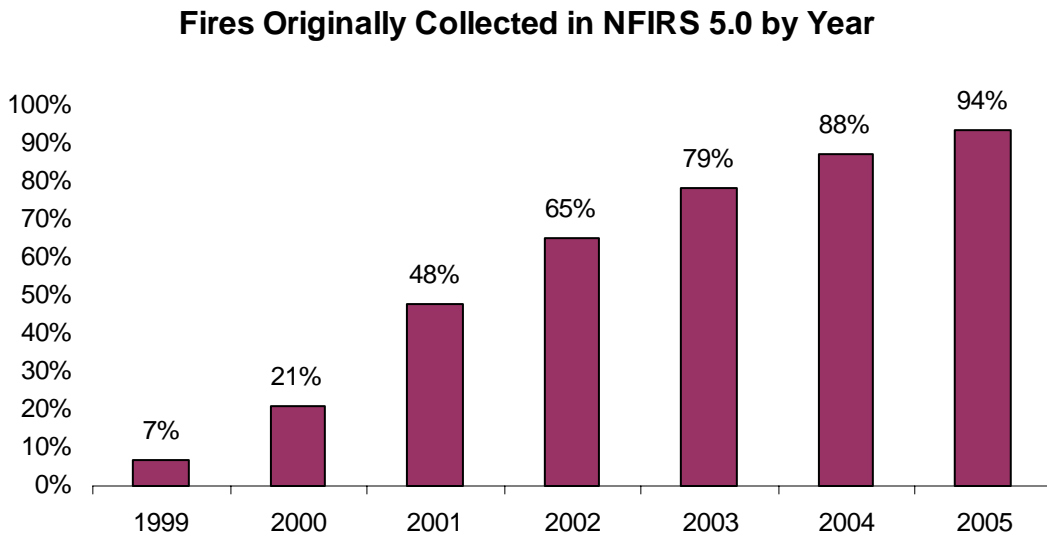


Figure 1 shows the percentage of fires originally collected in the NFIRS 5.0 system. Each year's release version of NFIRS data also includes data collected in older versions of NFIRS that were converted to NFIRS 5.0 codes.

For 2002 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.

A second option is to omit year estimates for 1999-2001 from year tables.

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

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

Although causal and other detailed information is typically not required for these incidents, it is provided in some cases. In order for that limited detail to be used to characterize the confined fires, they must be analyzed separately from non-confined fires. Otherwise, the patterns in a factor for the more numerous non-confined fires with factor known will dominate the allocation of the unknown factor fires for both non-confined and confined fires. If the pattern is different for confined fires, which is often the case, that fact will be lost unless analysis is done separately.

For most fields other than Property Use, NFPA allocates unknown data proportionally among known data. This approach assumes that if the missing data were known, it would be distributed in the same manner as the known data. NFPA makes additional adjustments to several fields.

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

For Factor Contributing to Ignition, 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%. Groupings for this field show all category headings and specific factors if they account for a rounded value of at least 1%.

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

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

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

61. Cigarette,
62. Pipe or cigar,
63. Heat from undetermined smoking material,
64. Match
65. Lighter: cigarette lighter, cigar lighter,
66. Candle
- 67 Warning or road flare, fusee
68. Backfire from internal combustion engine. Excludes flames and sparks from an exhaust system, (11)
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, the 2006 data is not yet available and a large portion of the fires coded as no equipment involved (NNN) have heat sources in the operating equipment category. 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

All fires

(All fires – blank – undetermined – [fires in which EII = NNN and heat source <>40-99])

Additional allocations may be used in specific analyses. For example, NFPA’s report about home heating fires treats Equipment Involved in Ignition Code 120, fireplace, chimney, other” as a partial unknown (like Heat Source 60) and allocates it over its related decade of 121-127, which includes codes for fireplaces (121-122) and chimneys (126-127) but also includes codes for fireplace insert or stove, heating stove, and chimney or vent connector. More general analyses of specific occupancies may not perform as many allocations of partial allocations. Notes at the end of each table describe what was allocated.

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.