

December and Holiday Fires

Findings:

- An estimated 128,700 fires in December account for 415 deaths and 1,650 injuries.
- In December, 72% of structure fires occur in residential buildings.
- The leading cause of December residential building structure fires involves cooking.
- The use of traditional adornments such as Christmas trees and decorations provide additional points of ignition that increase the incidence of holiday fires.

December marks the beginning of the holiday season, which includes Hanukkah, Christmas, Kwanzaa, and New Year's Eve. Using the latest 3 years of data from 2002 to 2004, the yearly national fire loss for December is estimated at \$990 million. Each year, these losses result from an estimated 128,700 December fires that required a fire department response. These December fires cause an average of approximately 1,650 injuries and 415 fatalities.^{1, 2}

The National Fire Incident Reporting System (NFIRS) data show that the average dollar loss per fire is 8% higher during December than during the winter months, but the injury and death rates are relatively unchanged, as shown in Table 1.

Table 1. Loss Measures
[All Fires, 3-year average (2002-2004)]

Measure	Winter Average	December
Loss per fire	\$9,461	\$10,233
Injuries per 1000 fires	13.6	13.4
Deaths per 1000 fires	3.1	3.2

Source: NFIRS 5.0 data only; Loss per fire is computed for only those fires where loss information was provided.

Note: Winter is defined as January, February, and March.

The difference between life and death can result from following basic safety tips and warnings set forth by fire prevention organizations supported by State and local fire marshals. The U.S. Census Bureau estimates that there

were 105,500,000 households in America in 2000.³ Each household's ability to prevent holiday fires improves with persistent fire safety education.

Beyond households, public holiday decorations are often mandated by State and local fire marshals.⁴ In recent years, more ordinances require the application of flame retardant on Christmas trees and prohibit the use of non-U.L. (Underwriters Laboratories) electric lights or lighted candles in public buildings.^{5, 6}

Types of Fires

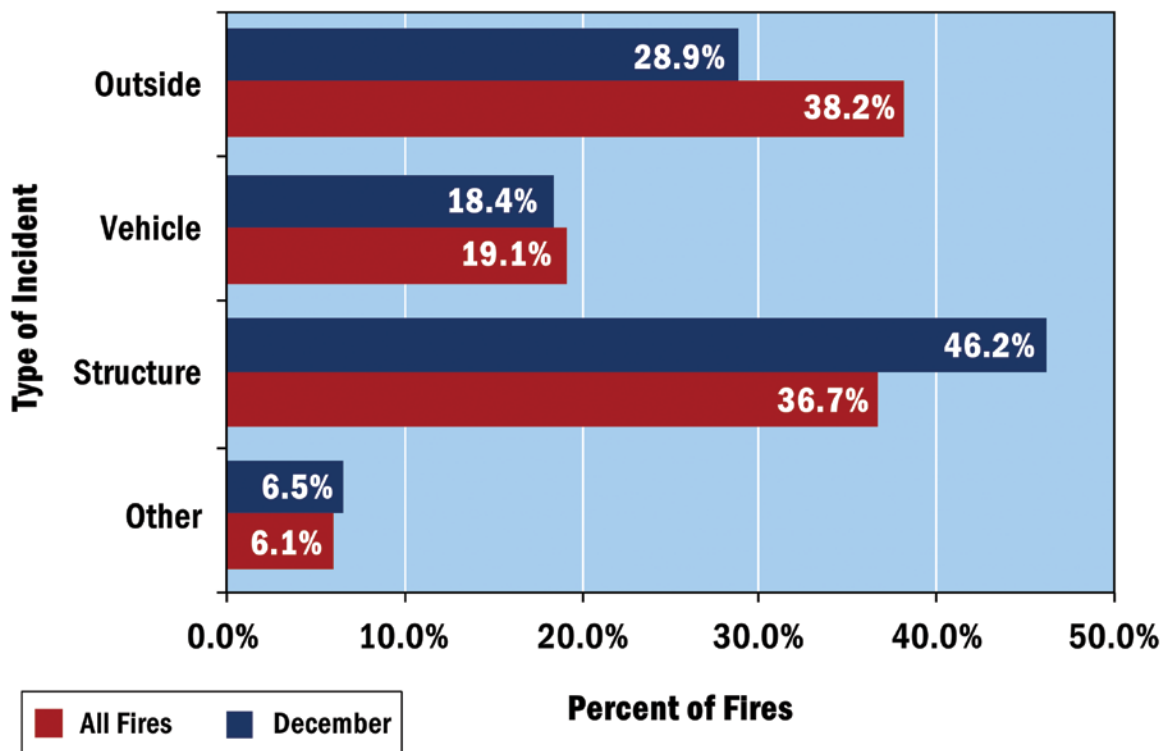
In December, as with other colder winter months, structure fires increase and play a more important role in the fire picture, as more human activities move indoors. Nearly half of December fires are structure fires (46%) while outside fires fall to less than a third of fires (29%), as shown in Figure 1. Even with repeated safety messages, holiday fires continue to occur. On average, structure and outside fires account for a similar percentage of the Nation's fires.

Annually, 69% of structure fires are defined as residential buildings. In December, this proportion rises to nearly three-quarters (72%).⁷ The primary focus of this analysis, therefore, involves fires in residential buildings, which include single or multifamily dwellings, mobile homes, hotels and motels, dormitory-type residences, barracks, and other such occupancies.

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Figure 1. Percent of Fires for the Years 2002-2004



Source: NFIRS 5.0 data only

Table 2. Residential Building Loss Measures [3-year average (2002-2004)]

Measure	Winter	December
Loss per fire	\$15,580	\$15,829
Injuries per 1000 fires	34.0	30.4
Deaths per 1000 fires	8.3	7.0

Source: NFIRS 5.0 data only; Loss per fire is computed for only those fires where loss information was provided.

Note: Winter is defined as January, February, and March.

Dollar loss per fire for winter and December residential building fires is about one-and-a-half times that of all fires for the same period. Death and injury rates however, are over twice that of all fires, as shown in Table 2.

Causes of December Fires in Residential Buildings

Cooking is the leading cause of residential building fires in December, accounting for 41% of fires, followed by heating fires at 28%, open flame fires at 9%, and incendiary/suspicious fires at 7%. This cause profile is very similar to the cause profile of winter residential building fires, as shown

in Figure 2. December sees an increase in cooking and open flame fires and a corresponding decrease in heating fires.

Cooking fires routinely start to increase around Thanksgiving and peak in December, as shown in Figure 3. Meal preparation for parties and family gatherings during the holidays typically generates lots of activity. Traditional holiday decorations and rituals frequently include candles which, as an open flame source, also can lead to holiday tragedies when not monitored properly. Children in particular are attracted to candles.⁸ This attraction can be especially dangerous during the holidays when candle use increases.⁹

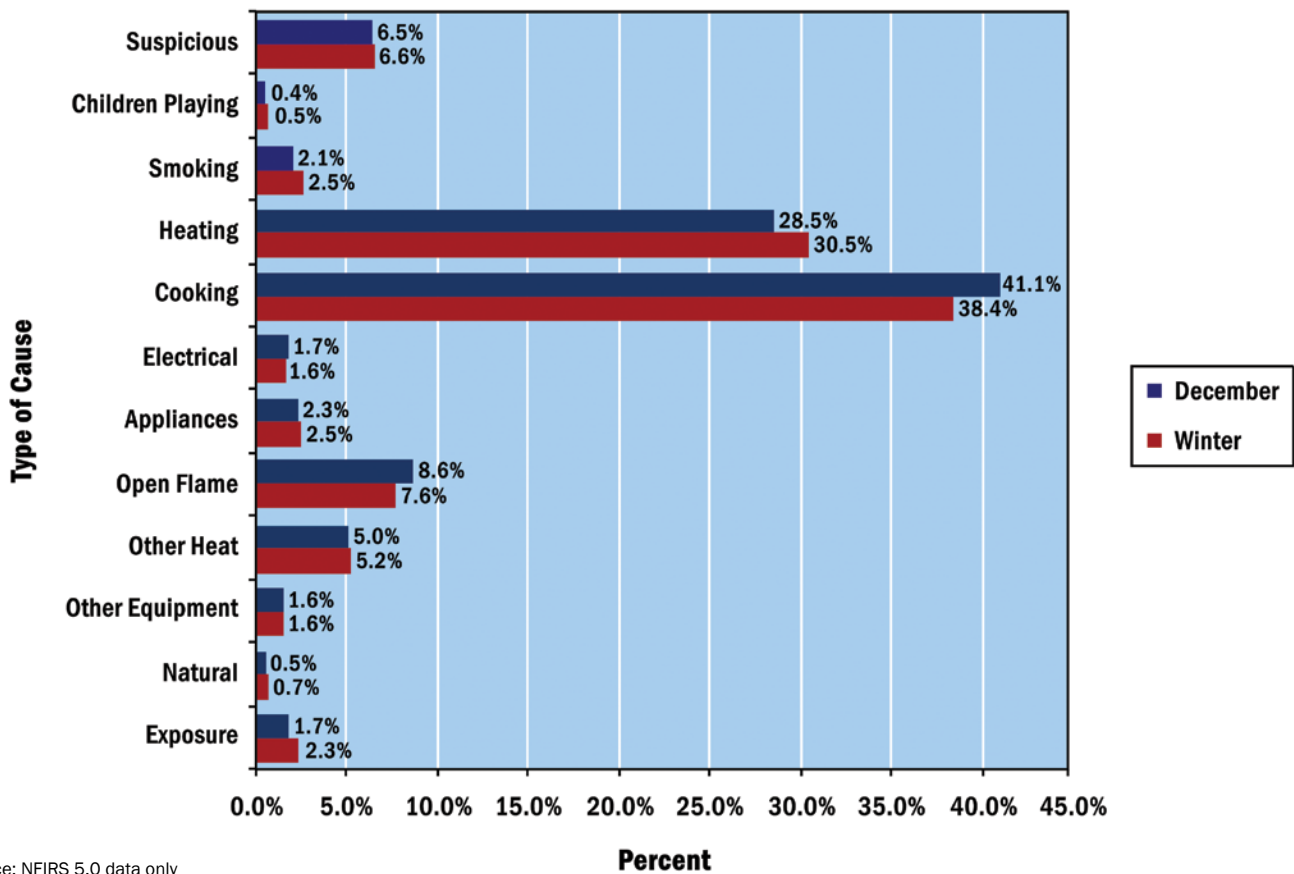
Cooking Fires

Cooks in the kitchen may find themselves distracted with holiday guests, entertaining, and last-minute details. Unfortunately, these distractions can turn into fire hazards all too quickly.

When factors contributing to ignition are noted, over half (54%) of December residential building cooking fires are the result of either the food (8%) or the equipment (36%) being left unattended, or combustible items (such items as oven mitts, cook books, tea towels, or wooden spoons), being left too close to the cooking heat source (10%).

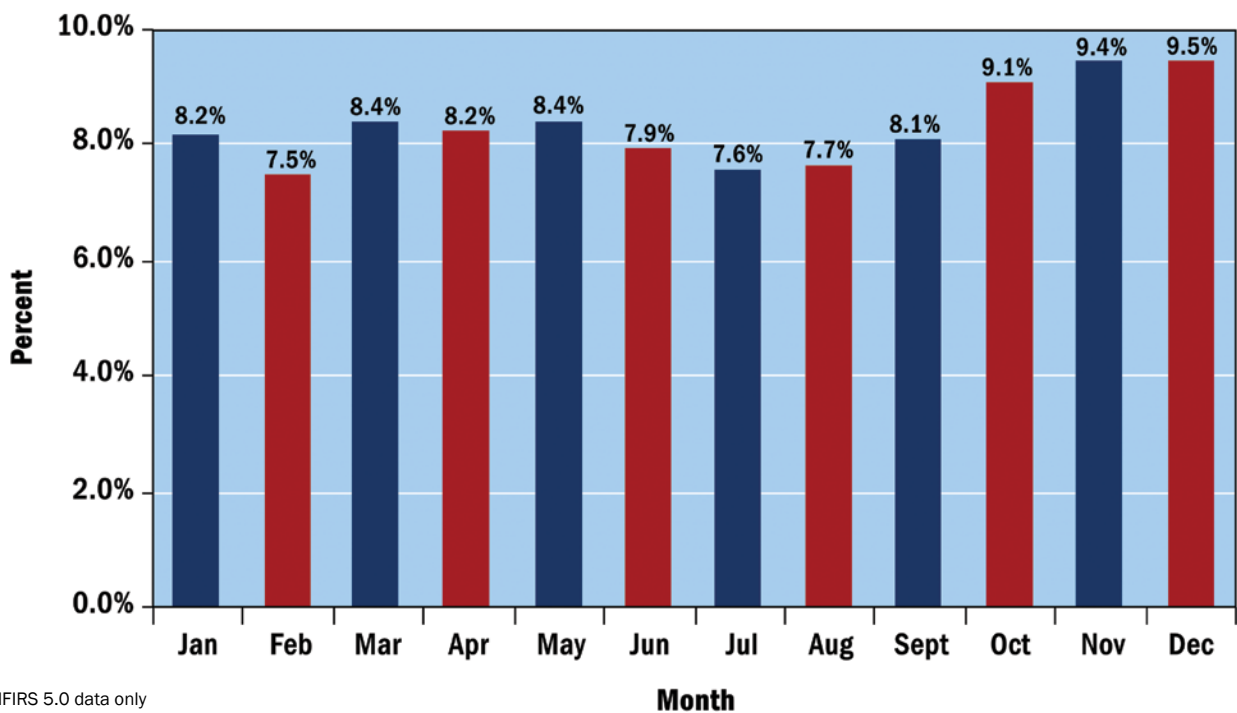
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Figure 2. Percent of Residential Building Fires by Cause for the Years 2002-2004



Source: NFIRS 5.0 data only

Figure 3. Percent of Cooking Fires in Residential Buildings for the Years 2002-2004



Source: NFIRS 5.0 data only

On average, the percentage of cooking fires that occur on any given day in December is slightly above 3%, which coincides with the first 3 weeks of December. However, a substantial increase in cooking fires emerges on Christmas Eve (4.7%) and Christmas Day (5.3%). Moreover, in the first few days after Christmas, cooking fires drop below average (2.8%) and then rise again on New Year’s Eve (3.7%), as shown in Figure 4.

Otherwise, the overall distribution of cooking fires in December relative to the time of day is consistent with other winter months, when cooking fires peak between 5 p.m. and 7 p.m. Although cooking fires in residences are numerous and produce the most injuries of all fire causes, 94% of these fires are confined fires and usually do not result in major dollar loss or fatalities. For example, a small fire from a pan left on the stove could result in external burns from trying to contain the fire by covering the pan, while the extent of the dollar loss is limited to the cost of replacing the pan.

Children Playing With Fire

Residential building fires attributed to children playing amount to about half a percent of all winter residential

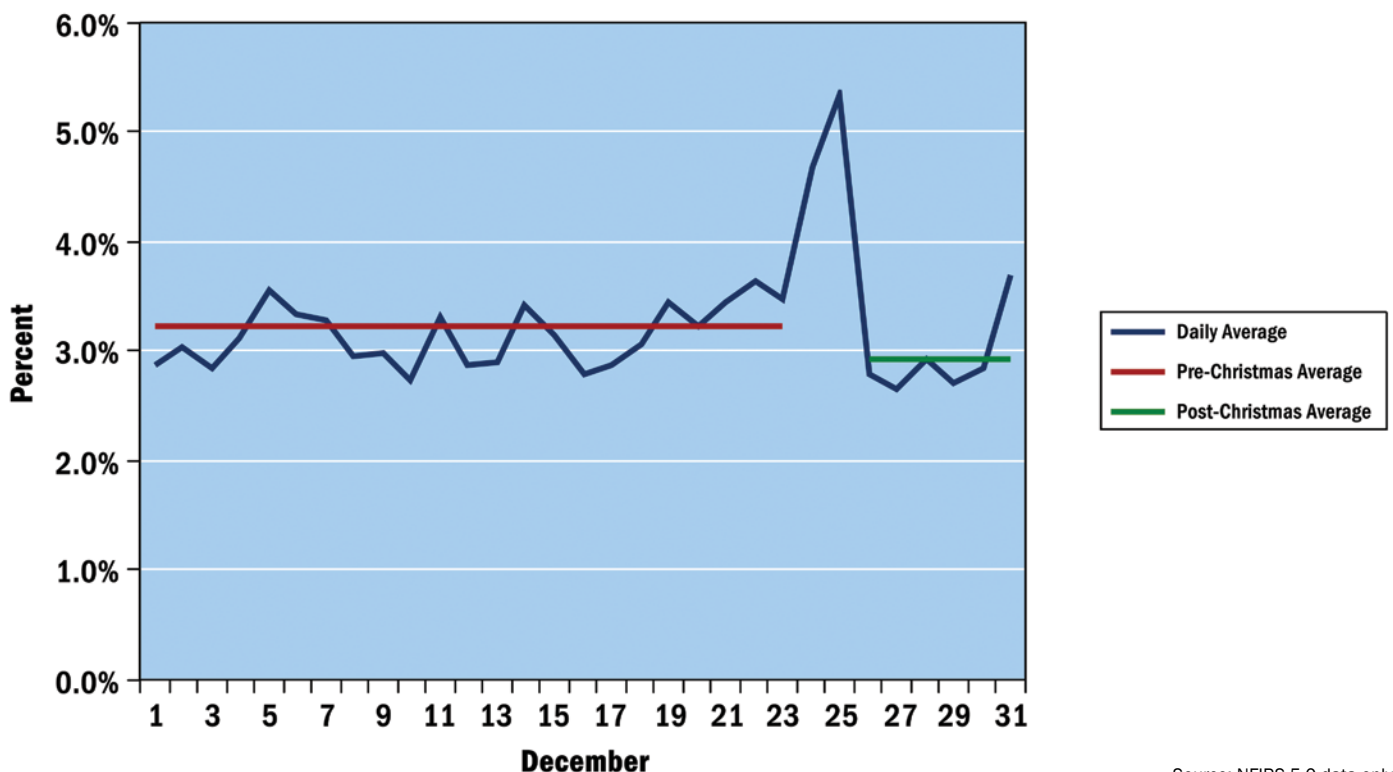
building fires. On average, 8% of casualties (deaths and injuries) occur each month of the year. However, the percent of children-playing injuries increases during December to 11% and the winter average for injuries caused by children playing is also above average at 10%. The proportion of deaths caused by children-playing fires is surprisingly high during the winter months (13%) and double in December at 26%. Fires that result from children playing spike in the days before Christmas, only to decrease on Christmas Day when parents most likely have time to supervise and engage in their children’s activities. However, this lull in children’s mischievousness remains short-lived, as fires due to children playing again increase steadily until New Year’s Day.

Holiday Items First Ignited

While few incidents involving holiday items (e.g., decorations and Christmas trees) are reported to NFIRS, Christmas tree fires have some of the highest loss rates for December residential building fires as shown in Table 3.¹⁰ Sixty-six percent of residential building Christmas tree fires occur in December; 26% of decoration-related residential building fires occur in December as well.¹¹ Both of these proportions are well above the winter average (8% for Christmas trees and 9% for decorations.)

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Figure 4. Percent of December Cooking Fires in Residential Buildings for the Years 2002-2004



Source: NFIRS 5.0 data only

Why are these fires so expensive and injurious? There are several possible explanations: the location of both the decorations and the trees tend to be in common areas—family rooms, living rooms, and other assembly areas that are typically in the heart of the residence; fires that begin there can easily spread to other areas of the home. Another important explanation is that the Christmas tree itself provides an efficient fuel source. Dry fir trees provide both a large surface area for an open flame and resin to fuel quick-burning, hot fires, which quickly spread outside the room of origin.

NFIRS data show that Christmas tree fires generally are not confined to the room of origin. As the fire spreads, the dollar loss increases; as shown in Table 4.

Attempting to contain such incidents without professional fire assistance is nearly impossible. Most residences are not equipped with sprinkler systems. Residential sprinklers were found in less than 3% of residences that reported fires to NFIRS.¹² In addition, household fire extinguishers

usually only hold two pounds of dry chemical, an amount that is not sufficient to extinguish a fully enveloped fire.¹³ Not surprisingly, fire safety during the holidays emphasizes particular care for Christmas trees.

Table 3. Loss Measures for Holiday Items First Ignited [Residential Buildings, 3-year average (2002-2004)]

Measures	Christmas Trees		Decorations	
	Winter	December	Winter	December
Loss per fire	\$47,378	\$59,299	\$22,655	\$19,878
Injuries per 1000 fires	102.6	105.3	51.2	43.8
Deaths per 1000 fires	0.0	61.4	0.0	0.0

Source: NFIRS 5.0 data only; Loss per fire is computed for only those fires where loss information was provided.

Note: Winter is defined as January, February, and March. Zero death rates are the result of no deaths reported to NFIRS.

Table 4. Loss Measures for December Fire Spread by Christmas Trees in Common Living Areas [Residential Buildings, 3-year average (2002-2004)]

Measure	Flame Spread Confined to:			
	Room of origin	Floor of origin	Building of origin	Beyond building of origin
Loss per fire w/o Christmas Tree first ignited	\$14,433	\$36,256	\$56,479	\$78,686
Loss per fire with Christmas Tree first ignited	\$26,262	\$89,167	\$95,419	\$181,600

Source: NFIRS 5.0 data only; Loss per fire is computed for only those fires where loss information was provided.

Candles

Holiday rituals traditionally use candles to create a festive and warm atmosphere. Three percent of all residential building fires during the holidays and winter months involve candles as the initial heat source. In most cases, candles lead to residential building fires when they are left unattended or ignite nearby combustibles, resulting in more candle-related fire incidents in December than in any other month.¹⁴ According to NFIRS data, 14% of annual candle fires occur in December. Therefore, several recommendations for candle safety during the December and winter months include the following:

- Never use candles to decorate a Christmas tree.
- Keep candles inside a 1-foot circle, free from decorations and other combustible materials.

- Use sturdy candle holders that won't tip over easily and are large enough to collect candle wax.
- Keep candles up high and out of reach of children and pets.
- Extinguish candles after use.
- Do not leave candles unattended.

Examples

Each year, newspapers are filled with tragic stories of families killed by fires related to holiday items. Below are four examples of such fires:

- On December 29, 2003, candles too close to a dry Christmas tree started a house fire that killed the father and his two children. A total of nine people were inside the home at the time of the fire.¹⁵

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- On December 24, 2002, malfunctioning Christmas lights were responsible for starting a fire on the first floor of an apartment complex, which destroyed all 16 units.¹⁶
- On December 27, 2001, overloaded electrical wires and a space heater that were too close ignited a Christmas tree, and the fire killed three children and injured three other family members.¹⁷
- On Christmas Day, 2003, a woman died in a fire that apparently started in the kitchen of her apartment. A family member said the kitchen had been the scene of small fires twice in the past couple of years.¹⁸

Conclusion

The December holidays and winter months produce a seasonally-specific fire profile due to activities and rituals during Hanukkah, Christmas, Kwanzaa, and New Year's Eve. December fires cost more per fire than the average winter fire. The major causes of residential building fires include

cooking, heating fires, open flame, and incendiary/suspicious fires. During the holidays, major peaks develop relative to daily and monthly averages. Christmas day has the most cooking fires. Fires resulting from Christmas trees, as the items first ignited, generate some of the highest dollar loss per fire in the month of December. Christmas tree fires spread quickly, compounding the dollar loss as they spread. In addition, December also has the most fire incidents caused by children playing, where candles represent the heat source. By following local ordinances and common fire safety procedures related to cooking, candle usage, and decorations, potential fires remain preventable.

A substantial proportion of holiday and winter residential building fires are small, confined fires, particularly related to cooking, which highlights the need for individuals to keep fire extinguishers and working smoke alarms in their homes. More information about how you can help prevent fires during the holidays and winter months can be obtained from your local fire department or the USFA.

**To request additional information or comment on this report, visit
<http://www.usfa.dhs.gov/applications/feedback/>**

Notes:

¹ NFIRS 5.0 contains both converted NFIRS 4.1 data and native NFIRS 5.0 data. This topical report includes only native 5.0 data.

² National estimates are based on native version 5.0 data 2002–04 from the National Fire Incident Reporting System (NFIRS) and national fire loss estimates from the National Fire Protection Association's (NFPA) Annual Survey of fire loss. Fires are rounded to the nearest 100, deaths to the nearest 5, injuries to the nearest 25, and loss to nearest \$M.

³ USA Quick Facts. Households, Persons per Household, and Households with Individuals Under 18, 2000. http://quickfacts.census.gov/qfd/meta/long_71058.htm

⁴ Kathleen Murphy, "'O Christmas Tree' More Than a Carol in Some States," *Stateline.org*, December 24, 2003, <http://www.stateline.org/live/ViewPage.action?siteNodeId=136&languageId=1&contentId=15513>

⁵ Sacramento Metropolitan Fire District. Fire Prevention Standards <http://www.smfcd.ca.gov/pdf/FPS435.201%20Cut%20Natural%20Christmas%20Trees.pdf#search=%22fire%20retardant%20for%20christmas%20trees%20in%20buildings%22>

⁶ State of Maryland, Department of State Police, Office of the State Fire Marshal, *Evergreen Fire Safety Regulations*, <http://www.firemarshal.state.md.us/tree.htm>

⁷ In NFIRS 5.0, a structure is a constructed item, of which a building is one type. The term "residential structure" commonly refers to buildings where people live. The definition of a residential structure fire has, therefore, changed to include only those fires where the NFIRS 5.0 structure type is 1 or 2 (enclosed building and fixed portable or mobile structure) with a residential property use. Such fires are referred to as "residential buildings" to distinguish these buildings from other structures on residential properties that may include fences, sheds, and other nonhabitable structures. Incident type 112 was excluded from this analysis of residential building fires, however, as incident type 112 is defined as "fires in a structure other than a building." As the confined fire incidents may not have the structure type noted, confined fires without a structure type specified are assumed to be buildings. Those that occur on residential properties are then assumed to be residential buildings. Only confined trash fires coded as enclosed buildings and fixed portable or mobile structures are included in this definition; all other confined trash fires are excluded.

⁸ Holiday Safety Tips for Kids, newswise, November 26, 2004, Cedars-Sinai Medical Center, as referenced at <http://www.newswise.com/articles/view/508518/?sc=mwtn>

⁹ United States Fire Administration, "Candle Fires in Residential Structures," *Topical Fire Research Series*, Volume 6, Issue 1/July 2006.

¹⁰ In the three years of NFIRS data available for this report (2002–2004), only 1,154 residential building fires noted Christmas trees

or decorations as the item first ignited. This sample represents less than 0.3% of all residential building fires for this period.

¹¹ Christmas tree and decoration fires spill over into the first week of January as well. Approximately 14% of residential Christmas tree fires occur between January 1 and 7; an additional 4% of decoration-related fires occur in this same week.

¹² *Fire in the United States 1989–1998*, 12th ed. Federal Emergency Management Agency, United States Fire Administration, National Fire Data Center, FA-216, August 2001.

¹³ Discussion with line firefighters have noted that, at a minimum, it would take a 5-pound commercial-grade extinguisher to perhaps put out a Christmas tree fire at its origin, and that most homeowners do not have commercial-grade fire extinguishers.

¹⁴ United States Fire Administration, "Candle Fires in Residential Structures," *Topical Fire Research Series*, Volume 6, Issue 1/July 2006.

¹⁵ Associated Press, "Christmas Tree Blamed For Deadly Fire," <http://www.nbc4.com>, December 30, 2003.

¹⁶ Dana Tofig, Paul Kaplan, "Victim Sees Lesson in Christmas Fire: Lightning-fast Blaze Chars Gifts But Claims No Lives", *The Atlanta Journal*, December 24, 2003.

¹⁷ "National Briefing: Midwest: Michigan: 3 Children Die In Fire," *The New York Times*, December 27, 2001.

¹⁸ Oren Yaniv, "Kitchen Fire Leaves Pillar of Harlem Dead at 71," *The New York Times*, December 31, 2003, <http://query.nytimes.com/gst/fullpage.html?sec=health&res=9800E7DD113EF932A05751C1A9659C8B63>

Related Topics:

- **Holiday Fire Prevention:** <http://www.usfa.dhs.gov/safety/tips/holiday.shtm>
- **The Seasonal Nature of Fires, January 2005:** <http://www.usfa.dhs.gov/downloads/pdf/publications/fa-236.pdf>
- **Topical Fire Research Series: New Year's Holiday Fires, Vol. 4, Issue 5,** <http://www.usfa.dhs.gov/statistics/reports/pubs/tfrs.shtm>
- **Topical Fire Research Series: Christmas/Christmas Tree Fires, Vol. 1, Issue 4,** <http://www.usfa.dhs.gov/statistics/reports/pubs/tfrs.shtm>