

U.S. Fire Administration TOPICAL FIRE RESEARCH SERIES

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Candle Fires in Residential Structures

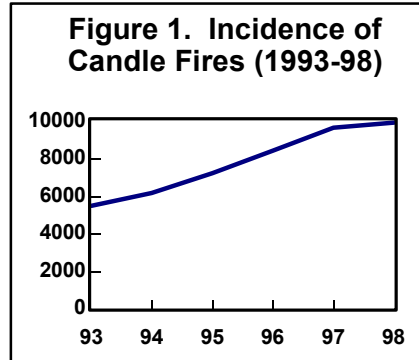
FINDINGS

- The explosive growth of the candle industry parallels the annual increase of candle fires—an average of 9,400 fires, \$120.5 million in losses, 90 deaths, and 950 injuries.
- Women are more likely to be injured or die in candle fires than men.
- Injuries from candle fires are more than twice those of the average of all residential fires.
- One-quarter of candle fires occurs during the holiday season (December and January). During this period, holiday decorations are the materials first ignited.
- 45% of candle fires originate in the bedroom. 41% of candle fires are from either unattended candles or candles placed too close to combustibles.

Retail sales of candles are growing each year. The National Candle Association estimates that sales exceeded \$2.3 billion in 2000. Nearly 2,000 varieties of candles are on the market, ranging from those used for religious purposes to those used for holiday decorations.¹

Candles are responsible for approximately 9,400 residential structure fires each year and cause 950 civilian injuries, 90 fatalities, and \$120.5 million in direct property loss.² This paper examines the causes and characteristics of these candle fires.

The incidence of fires directly attributable to candles in residential structures has increased since 1993 (Figure 1). Simultaneously, the candle industry has experienced a growth rate of 10% to 15% annually since the early 1990s. In recent years, this growth has doubled.³



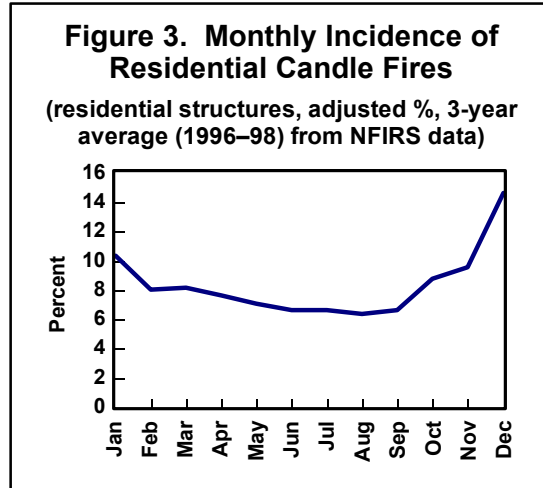
Fires caused directly by candles result in considerably more injuries and slightly more deaths and property loss than the average of all residential fires (Figure 2). When compared to other fires from consumer products that involve open flame (matches and lighters) or from heat (cigarettes and portable heaters), candle fires are less destructive than lighter and portable heater fires, but more destructive than cigarette and match fires. Fatalities may be fewer than lighter, cigarette, and portable heating fires because many candle fires begin when the residence is unoccupied at the time of ignition.

Figure 2. Loss Measures for Residential Open Flame Fires
(residential structures, adjusted %, 3-year average (1996-98) from NFIRS data)

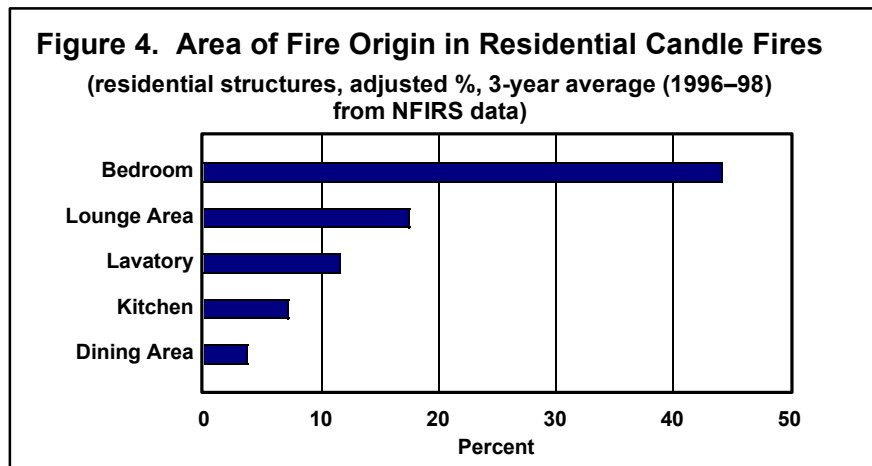
MEASURE	ALL RESIDENTIAL FIRES	RESIDENTIAL CANDLE FIRES	RESIDENTIAL MATCH FIRES	RESIDENTIAL LIGHTER FIRES	RESIDENTIAL CIGARETTE FIRES	PORTABLE HEATING FIRES
Loss per Fire	\$11,271	\$12,598	\$9,856	\$13,324	\$6,665	\$16,791
Injuries/1,000 Fires	48.0	107.9	64.0	128.3	97.4	92.0
Fatalities/1,000 Fires	7.7	8.0	6.1	11.8	23.7	27.2

According to an industry estimate, nearly 96% of candle buyers are women.⁴ This may explain why women are slightly more likely to be injured and are 13% more likely to die in residential candle fires than men.⁵

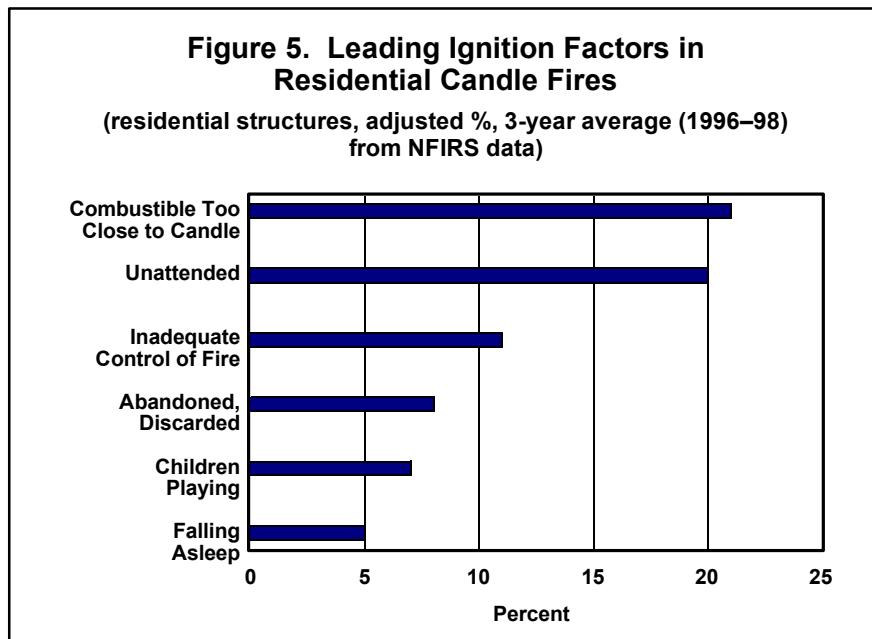
The sale and use of candles increase substantially during the holiday season (November through January). As would be expected, the incidence of residential candle fires corresponds to this time period. In fact, 25% of all candle fires occurs in December and January (Figure 3).



The leading materials first ignited by candles are cabinetry, mattresses, curtains, and furniture. In December, however, holiday decorations are the leading materials first ignited. Overall, the most common area of fire origin is in the bedroom, where nearly 45% of fires start (Figure 4). During the winter months (and the holiday season), however, a higher percentage of candle fires originate in a dining area, although the bedroom remains the leading area of origin. More than 75% of residential candle fires are confined to the object or room of origin.



Unattended candles or candles placed too close to combustibles account for 41% of candle fires (Figure 5). Data from the National Fire Incident Report System (NFIRS) indicate that the majority of candle fires result from human error and negligence. This underscores the importance of ensuring that candles are safely positioned and that they should never be left unattended.



The Consumer Product Safety Commission has issued 30 recalls of nearly 5.4 million candles or candleholders since 1993.⁷ These recalls have been because the candle flame burns several inches above the candle or candleholder, which themselves are flammable.

Recent example of fires caused by candles include:

- During a power outage in 1999, a family lit a candle and placed it on an end table next to a couch. One of the residents fell asleep on the couch; the candle burned through the table and ignited his hair. He suffered only minor burn injuries, but the ensuing fire killed his 9-year old niece and severely burned his mother.⁸
- Two children were killed and their parents critically injured in December 2000 by a fire that was ignited when a candle accidentally rolled under the family's Christmas tree.⁹
- In June 2000, a young woman and her 5-month old daughter were killed by a fire that was ignited by a candle used during a religious observance. The candle was burning on a stove and ignited cabinetry above it.¹⁰
- In February 1999, an unattended candle in a university dormitory room caused nearly \$25,000 in damage and sent two students to the hospital with smoke inhalation.¹¹

- A student was killed in December 2000 when a candle ignited her bedding.¹²

The Massachusetts State Fire Marshal has developed a program called “Candle Circle of Safety.” Recommendations include:¹³

- Burn candles inside a 1-foot circle of safety, free of anything that can ignite.
- Extinguish candles after use.
- Keep candles out of the reach of children and pets.
- Use a sturdy metal, glass, or ceramic candleholder.
- Never leave a burning candle unattended.

For further information, contact your local fire department, the National Candle Association, or the U.S. Fire Administration.

NOTES

1. *News and Information*, National Candle Association, 2000.
2. National estimates are based on 1996–98 data from the National Fire Incident Reporting System and the National Fire Protection Association’s annual survey, *Fire Loss in the United States*.
3. *Candle Industry Facts*, National Candle Association, 2000.
4. *Idem*.
5. NFIRS 1998 casualty data.
6. *News and Information*, loc. cit.
7. “Trendy Candles Linked To Rise in Deadly Fires,” *Chicago Sun–Times*, July 16, 2000.
8. *Idem*.
9. “Candle Starts Fire Fatal to 2 Children,” *New York Daily News*, December 23, 2000.
10. “Killer Blaze Shocks New York Jews: Grand Rabbi’s Relatives Die in Fire Caused by a Holiday Candle,” *The Ottawa Citizen*, June 11, 2000.
11. *Chicago Sun–Times*, loc. cit.
12. “Danger: Playing With Fire,” *Newsweek*, December 11, 2000.
13. *Prevent Candle Fires*, Office of the Massachusetts State Fire Marshal, February 2000.

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