

U.S. Fire Administration/National Fire Data Center

Kitchen Fires

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Findings

- There were an estimated 156,500 kitchen fires in 2002, yielding 331 fatalities, 4,914 injuries, and \$876 million in property loss.
- On average, kitchen fires caused less property loss and were less fatal than structure fires in general, but resulted in more injuries.
- Cooking caused nearly 90% of all kitchen fires. The primary factor in the ignition of these fires was unattended equipment, and the leading type of material first ignited was oil, fat, or grease.
- Kitchen fires followed no seasonal patterns. When analyzed by time of day, kitchen fires peaked during the dinner period between 6 p.m. and 7 p.m.
- A smoke alarm was present and operational in 45% of kitchen fires, compared with 29% of all structure fires generally.

In 2002, approximately 30% of reported structure fires first ignited in a kitchen and accounted for 12% of deaths, 32% of injuries, and 10% of property loss.¹ As a fixture of modern homes, restaurants, institutions (e.g., schools), food manufacturers, and some office environments, kitchens introduce the risk of cooking fires to a range of structures. This topical report examines the characteristics and frequency of kitchen fires and compares them with structure fires and all fires generally.

LOSS ESTIMATES AND MEASURES

An estimated 156,500 kitchen fires in 2002 caused 331 fatalities, 4,914 injuries, and \$876 million in property loss.² On average, kitchen fires had similar rates of fatalities and property loss per fire as all fires generally, but more than two and one-half times the rate of injuries, as Figure 1 indicates. When compared with all structure fires, kitchen fires were less than half as deadly and costly but slightly more injurious.

FIGURE 1. LOSS MEASURES FOR KITCHEN FIRES

Loss Measure	All Fires	All Structure Fires	Kitchen Fires
\$ Loss/Fire	\$5,832	\$14,252	\$4,736
Fatalities/1,000 Fires	2.4	5.1	2.0
Injuries/1,000 Fires	12.5	30.5	31.9

Source: NFIRS 5.0 only

The lower rates of death and dollar loss among kitchen fires may be related to their leading cause, which is cooking. Many cooking fires are confined to the cooking range or oven where they started and do not grow large enough to be fatal or cause serious property damage, although even small cooking fires cause injuries.

WHERE FIRES OCCUR

Kitchen fires typically take place in fixed structures, with 89% occurring on residential property, 4% on public assembly property (including restaurants), and 2% in both institutional and commercial properties.³ Among residential kitchen fires in 2002, 59% occurred in one- or two-family homes and 35% occurred in apartments, condominiums, or other multifamily residences.

CAUSES

The leading cause of kitchen fires was cooking, followed by other heat or flame and appliance fires, as Figure 2 indicates. Since kitchens are primarily used for cooking—and cooking most often requires heat—this is to be expected. For all 2002 structure fires, cooking was also the leading cause, involving 36% of fires, followed by heating (17%) and open flame, sparks, or embers (10%).

FIGURE 2. LEADING CAUSES OF KITCHEN FIRES

Cause	Percent
Cooking	88.8
Other Heat, Flame, Spark	2.9
Appliances, Air Conditioners	2.1

Source: NFIRS 5.0 only

Factors Contributing to Ignition

In 28% of kitchen fires, no specific factor lead to ignition (Figure 3). This indicates that there is an inherent risk of fire from cooking activities and such fires occur under normal circumstances. The leading factor of ignition in kitchen fires was unattended equipment (19%), such as people leaving food in the oven or on the stove and forgetting about it, followed by misuse of material or product (7%). Additional factors leading to ignition included combustibles being too close to a heat source, discarded flammable materials, or appliances accidentally turned on or not turned off after use.

FIGURE 3. LEADING IGNITION FACTORS IN KITCHEN FIRES

Ignition Factor	Percent of Fires
None	28.4
Equipment unattended	19.3
Misuse of material or product	7.1

Source: NFIRS 5.0 only

MATERIAL IGNITED

In most kitchen fires (51%), cooking materials, including food, were the material first ignited. More specifically, oil, fat and grease were the leading types of material ignited in kitchen fires (37%), as Figure 4 shows. This is not surprising as oil and grease are highly flammable and can splatter or spill during cooking. Other foods or starches were the second most common material ignited (14%), followed by plastics (10%) such as appliance casings, cooking utensils, or wiring. Although not statistically severe in 2002, loose or flammable clothing worn near open flame cooking sources has the potential to ignite and cause injury.

FIGURE 4. MATERIAL FIRST IGNITED IN KITCHEN FIRES

Material First Ignited	Percent of Fires
Oil, fat, grease, etc.	37.0
Food, starch, flour	13.5
Plastic	10.3

Source: NFIRS 5.0 only

EQUIPMENT INVOLVED

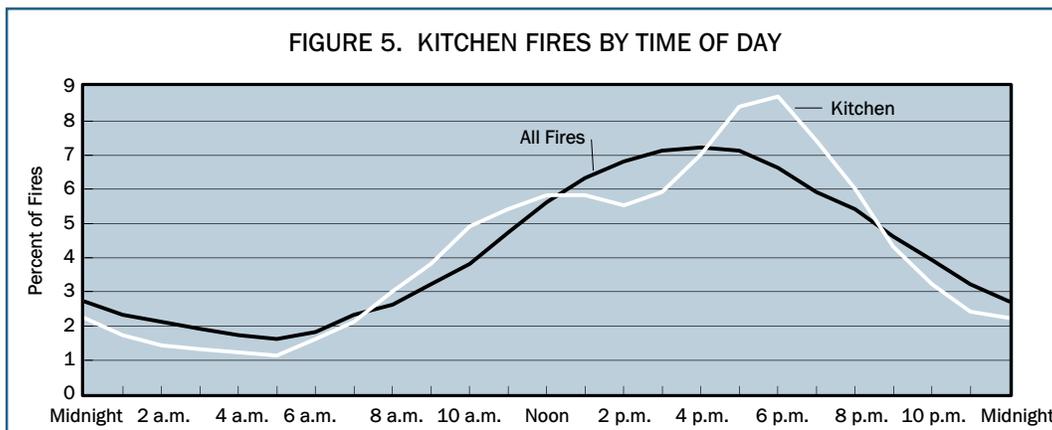
The type of equipment involved in kitchen fires varied for residential kitchens vs. non-residential kitchens (including restaurant, institutional, and commercial kitchens). In residential kitchen fires, 29% occurred on a cooking range compared with 14% for non-residential kitchens. A notable proportion of non-residential kitchen fires occurred in deep fat fryers (13%), compared with less than 1% for residential kitchens. All kitchens had a similar proportion of oven fires (nearly 6%). No equipment was reported for 41% of residential kitchen fires and 34% of non-residential kitchen fires, reflecting the high proportion of cooking fires that were confined to the oil or food first ignited.

WHEN FIRES OCCUR

Kitchen fires follow no seasonal or monthly trend; they occurred steadily throughout 2002, with a slight decrease in the summer months. This might be explained by a decrease in kitchen cooking during the summer, as many people barbecue outdoors or are on vacation.

When analyzed by time of day, a noticeable peak in kitchen fires occurred in the 6 p.m. hour, as shown in Figure 5. The fact that the highest percentage of fires occur during the hour when many people prepare dinner is not surprising. This is consistent with the leading cause of kitchen fires—cooking. The fires are least prevalent in the late night/early morning hours, when people are asleep.

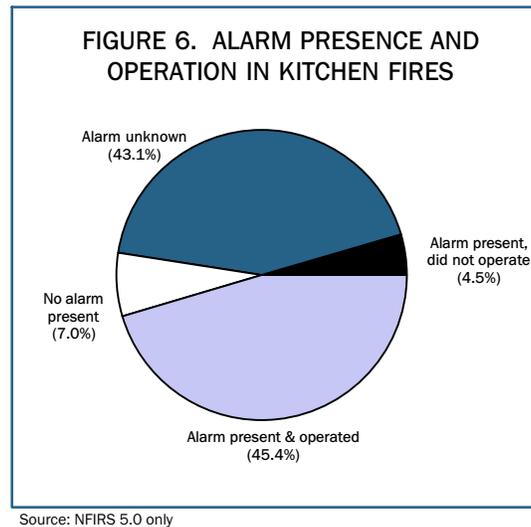
FIGURE 5. KITCHEN FIRES BY TIME OF DAY



Source: NFIRS 5.0 only

SMOKE ALARM PRESENCE AND OPERATION

In 45% of all kitchen fires, a smoke alarm was present and operating in the vicinity of the fire, as illustrated in Figure 6. No alarm was installed in 7% of fires. The fact that alarms were installed in a large proportion of homes with kitchen fires may partly explain the lower rates of death and property loss. However, in 43% of kitchen fire incidents, the presence of an alarm was not reported and is considered unknown. Among structure fires generally, an alarm was known to be present and operational in only 29% of fires in 2002, and no alarm was present in 21% of incidents.



EXAMPLES

February 2004: A kitchen fire in a Daly City, CA apartment injured one man and caused \$20,000 in property loss. The injured man was cooking something on the stove when the fire erupted, and his life was potentially saved by a garden-hose-wielding neighbor, who helped officials fight the blaze.⁴

January 2004: A structure fire in Billings, MT was caused by a rangetop that was left on and unattended. The fire resulted in \$65,000 in damage. No one was injured, although the family cat perished.⁵

February 2004: The Clarington, WV fire chief was injured when he fell through the floor of a burning building while trying to fight a blaze. The structure caught fire because of electrical problems in the kitchen.⁶

CONCLUSION

Many kitchen fires, typically cooking fires, are preventable. Individuals can adopt measures that reduce the risk of such fires. First, care should be taken when cooking with oil, butter, or other greasy foods, which are highly flammable and can easily splatter or spill from pots and pans. Cooking aids are available to limit grease splattering, and individuals should be warned not to extinguish such fires with water, which reacts violently when poured on hot grease or oil. Small grease fires can be extinguished by placing a cover on the pan or smothering the fire with baking soda. Loose fitting, long-sleeved clothing such as bathrobes should not be worn while cooking, as the cloth may ignite and potentially cause serious injuries.

The fact that the leading ignition factor in kitchen fires is unattended equipment should serve as a reminder to keep an eye on cooking materials. By simply double-checking that all dials on stoves and ovens are off when cooking concludes, people can prevent many fires. Individuals should also be cautious when leaving cooking materials for any period of time, such as answering the telephone.

Fire extinguishers should be within easy reach of kitchen occupants. Many cooking fires occur under normal cooking conditions and cannot be anticipated. Extinguishers can prevent small fires from spreading and are especially effective on fires that cannot be doused by water—such as grease fires.

Finally, all homeowners and renters should ensure that smoke alarms are installed and are operating properly. Smoke alarms are an inexpensive and effective way of detecting fires before they get out of control.

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Notes:

- ¹ Distribution statistics are based on data from the National Fire Incident Reporting System (NFIRS 2002). At the time of this report, NFIRS is continuing to transition from version 4.1 to 5.0. Due to issues related to accurately converting version 4.1 data to version 5.0, this report is based on data reported only in version 5.0.
- ² Kitchen loss estimates are based on 2002 NFIRS data and national structure fire loss estimates from NFPA's *Fire Loss in the United States During 2002*.
- ³ For purposes of this report, confined cooking fires (incident type 113) are presumed to occur in the kitchen. NFIRS Version 5.0 does not require detailed data for confined fires, and most were reported without area of origin data. Where data are available, a small percentage of confined cooking fires (7%) occurred outside of the kitchen (e.g., outdoor patios, bedrooms). It is assumed that this small proportion of non-kitchen incidents will not significantly affect the fire patterns described in this report.
- ⁴ "Kitchen fire does damage," *San Mateo County Times*, February 9, 2004, <http://www.sanmateocountytimes.com/Stories/0,1413,87~11268~1944880,00.html>
- ⁵ "Kitchen fire damages Billings home, kills cat," *Billings Gazette*, January 30, 2004, <http://www.billings-gazette.com/index.php?t=1&display=rednews/2004/01/29/build/local/50-catburned.inc>
- ⁶ "Blaze destroys Clarington Family's Home," *The Intelligencer*, February 7, 2004.