



RESEARCH

Home Cooking Fires

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Key findings

Cooking is such a routine activity that it is easy to forget that the high temperatures involved can easily start a fire. During 2017–2021, cooking was the leading cause of reported homeⁱ fires and home fire injuries and the second leading cause of home fire deaths.ⁱⁱ

Cooking caused an average of 158,400 reported home structure fires per year (44 percent of all reported home fires in the US). These fires resulted in an average of 470 civilian deaths (18 percent of all home fire deaths) and 4,150 civilian injuries (42 percent of all reported home fire injuries) annually.

Ranges or cooktops were involved in 53 percent of the reported home cooking fires, 88 percent of cooking fire deaths, and 74 percent of cooking fire injuries. Households with electric ranges had a higher risk of cooking fires and associated losses than those with gas ranges.

Unattended cooking was the leading factor contributing to cooking fires and casualties. Clothing was the item first ignited in less than one percent of these fires, but clothing ignition led to 7 percent of the home cooking fire deaths.

More than one-quarter of the people killed by cooking fires were asleep when they were fatally injured. More than half of the non-fatal injuries occurred when people tried to control the fire themselves.

Unless otherwise specified, the statistics presented in this report are estimates derived from the United States Fire Administration's National Fire Incident Reporting System (NFIRS) and NFPA's annual fire experience survey.

For more detailed information, see *Home Cooking Fires: Supporting Tables*. See *Non-Fire Cooking Burn Injuries* to learn more about this related topic.

Trends in cooking fires and cooking fire casualties

Data indicates that the number of reported cooking fires started to decline in 1981 and then plateaued before falling again in the 1990s. NFIRS 5.0, first introduced in 1999, made it much easier to document minor cooking fires (referred to as *confined fires*) that did not spread beyond the pan, oven, or other container in which the fire started.ⁱⁱⁱ During the transition years of 1999–2001 — when NFIRS 5.0 was being introduced — less than half of the fire data was collected using the new rules and definitions. Consequently, those estimates were omitted from the trend graphs.

The use of NFIRS 5.0 was accompanied by an increase in reported cooking fires. After leveling off for a few years, the reported number of cooking fires hit consecutive new highs in 2012–2015. In 2016–2018, these fires fell below the 2014 and 2015 levels, but they remained historically high. In 2021, the number of reported cooking fires dropped to the lowest level seen since 2005. Changes to NFIRS may have influenced some of these trends.¹ See Figure 1.

There were fewer cooking fire deaths in 2017–2021 than in 1980–1984. However, it appears that less progress has been made toward reducing deaths from home cooking fires than deaths from most other fire causes. See Figure 2.

ⁱ The term *home* encompasses one- or two-family homes, including manufactured homes and apartments or other multifamily housing.

ⁱⁱ Death and injury estimates exclude firefighter casualties.

ⁱⁱⁱ Causal information is not required for structure fires of the six confined fire incident types, including confined cooking fires, although it is sometimes provided. Structure fires that do not have these incident types are referred to as *non-confined fires*, even though fire spread is sometimes limited to the object of origin. In this analysis, confined cooking fires were analyzed separately from non-confined fires and the results were summed.

Figure 1. Reported home cooking fires^{iv} by year: 1980–2021

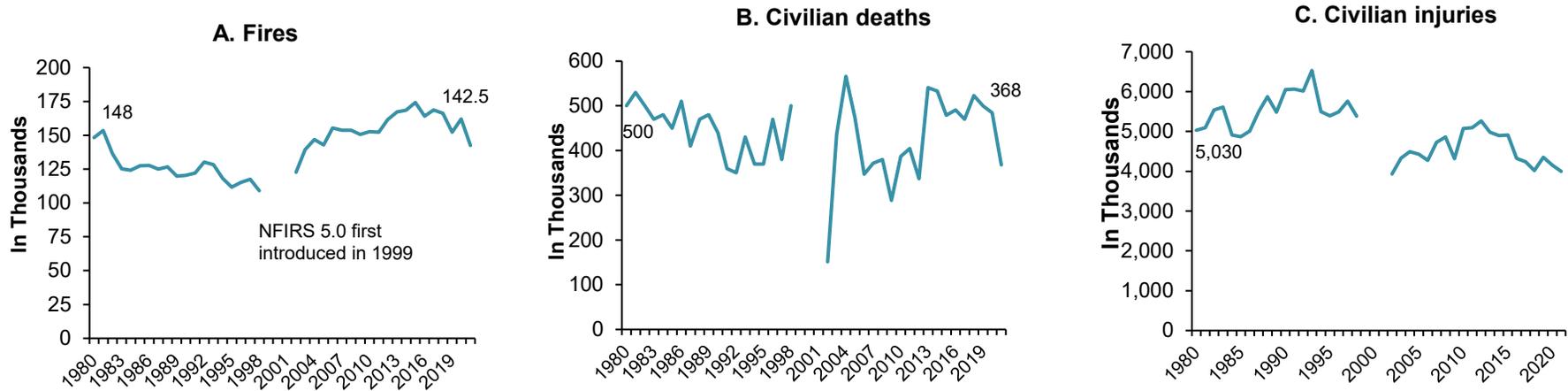
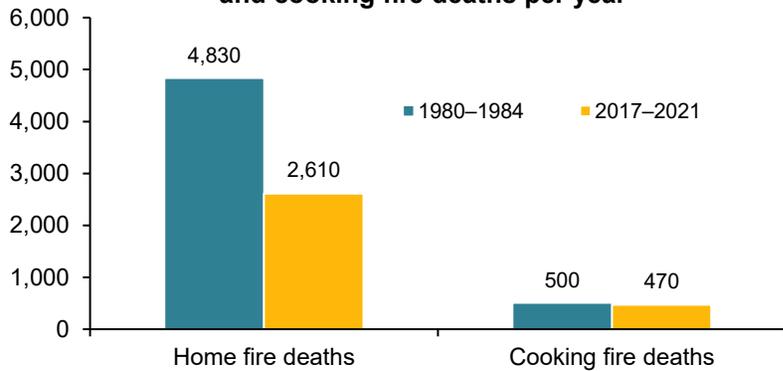


Figure 2. Change in average home fire deaths and cooking fire deaths per year



Reported home cooking fires in 2017–2021

During 2017–2021, local fire departments responded to an estimated average of 158,400 home cooking fires per year. These fires caused an average of 470 civilian deaths; 4,150 civilian injuries; and \$1.15 billion in direct property damage annually. Cooking caused two in five reported home fires (44 percent) and home fire injuries (42 percent) and one in five home fire deaths (18 percent). Cooking was the leading cause of reported home fires and home fire injuries and the second leading cause of home fire deaths.

^{iv} Estimates for the NFIRS transition years of 1999–2001 are unstable and not shown. NFIRS 5.0, first introduced in 1999, originally defined the equipment involved in ignition (EII) as the piece of equipment that provided the principal heat source that caused ignition if the equipment malfunctioned or was used improperly. Change 290 in the specification changes and corrections, effective in 2006, amended the definition to include any equipment that was the principal heat source. Beginning in 2012, Change 337 required the EII data element to be completed if the heat source or other factor contributing to ignition indicated some type of operating equipment was involved. This was removed, effective with the 2015 data.

Causes and circumstances of home cooking fires

Unattended cooking was by far the leading factor in cooking fires and cooking fire casualties. See Figure 3. Abandoned or discarded materials, which may have been related to unattended cooking, ranked second in the causes of cooking fires and fourth in cooking fire deaths and injuries.

In another common scenario, combustible materials such as wrappers, potholders, or clothing caught fire when they were left by or came too close to hot cooking equipment.

More than one-quarter of the fatal cooking fire victims and nearly 40 percent of the non-fatally injured were in the area of origin when the fire began. See Figure 4. With unattended cooking being the leading cause of cooking fires and cooking fire casualties, it is not surprising

that more than one-quarter of the fatalities were involved in the ignition but not in the area of origin. These were likely cooks who left the room. Some types of cooking, such as frying, broiling, and boiling, need continuous attention. When simmering, baking, or roasting, cooks should stay in the home and check on the cooking regularly.

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A fatal fire in a Pennsylvania second-story apartment began when a male occupant fell asleep in an adjacent room while cooking oil was being heated on the kitchen stove. After the oil ignited, it spread to the cabinets and throughout the kitchen and entered a decay stage by the time the fire department arrived.²

Figure 3. Leading factors in home cooking fires and home cooking fire deaths: 2017–2021

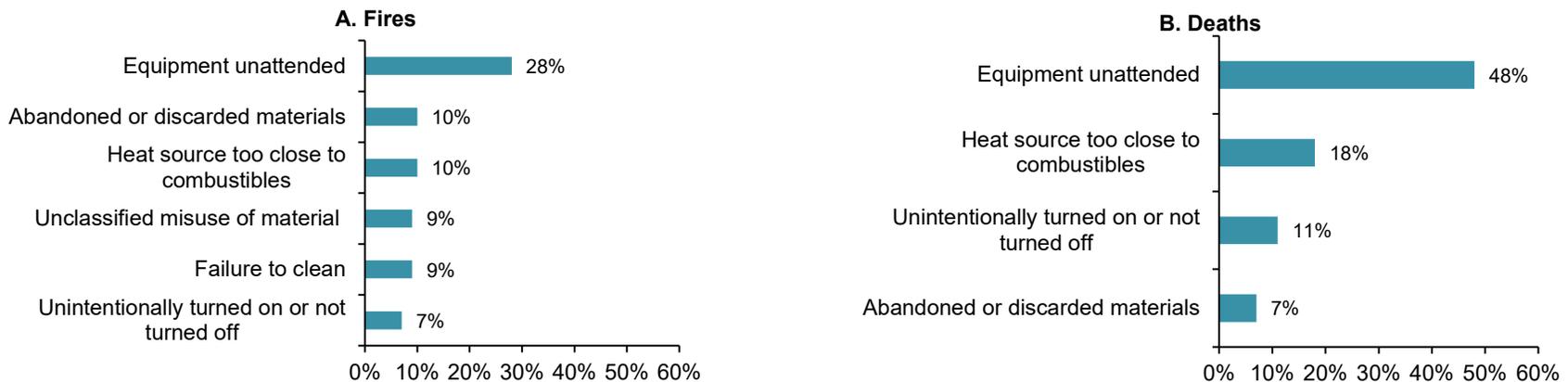
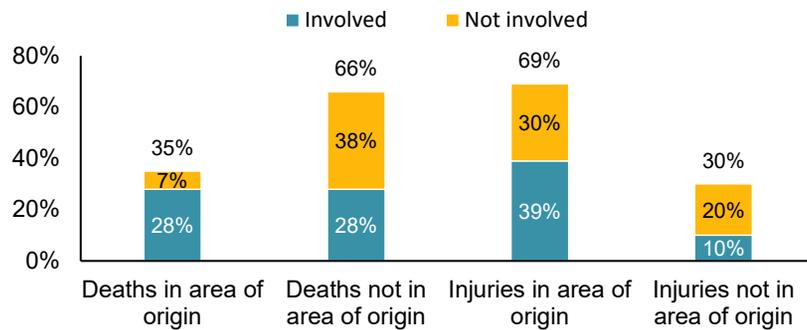


Figure 4. Home cooking fire casualties in or not in area of origin and involved in ignition: 2017–2021



Not surprisingly, more than two-thirds (66 percent) of the home cooking fires began with the ignition of cooking materials, including food, fat, and grease. Cooking oil, fat, grease, and related substances were the items first ignited in half (51 percent) of the home cooking fires that began with cooking materials. More than half (53 percent) of the civilian deaths and three-quarters of the civilian injuries (75 percent) and direct property damage (78 percent) associated with cooking material or food ignition resulted from these cooking oil or grease fires.

Death and injury rates per 1,000 fires were higher for food or cooking material fires that began with the ignition of cooking oil, as was the average loss per fire. Injury rates and average losses were also higher for fires that began with fat, grease, butter, or lard. The frequency and increased risk of oil and grease fires indicate a need for increased consumer awareness on how to deal with these fires. Flames from a small oil or grease fire can be smothered by sliding a lid over the pan and turning off the burner. The pan should be kept covered until it is completely cool.

Although clothing was the item first ignited in less than one percent of the reported home cooking fires, clothing ignition led to 7 percent of the home cooking fire deaths.

An elderly male died as a result of burn injuries suffered when a burner on his kitchen stove ignited his clothing as he prepared food. On arrival, crews encountered light-colored smoke and limited visibility inside the apartment, which was located on the third floor of a large apartment building. Proceeding into the unit, they found the victim, already deceased, on the kitchen floor, with smoldering materials on and near him.³

Most reported cooking fires were small. Four out of five (80 percent) were confined to the object or pan of origin. Four percent of the cooking fire deaths and more than one-third (35 percent) of the reported cooking fire injuries resulted from these small fires. Over one-quarter (28 percent) of the home cooking fire deaths and 82 percent of the home cooking fire injuries resulted from the 97 percent of fires that were confined to the room in which the fire began.

Less than one-third (31 percent) of the reported home fires were in apartments or other multifamily housing, yet these properties accounted for almost half (47 percent) of the reported home cooking fires. Cooking caused 37 percent of the fires in one- or two-family homes and 72 percent of the fires in apartments or other multifamily homes; see Tables 1A and 1B of the Home Structure Fires Supporting Tables for more information.⁴

Minor fires in properties with monitored fire alarm systems may be more likely to trigger a fire department response, and such systems are more common in apartments than in one- or two-family homes. More than three of every five apartment fires were cooking fires that did not spread.

When did cooking fires occur?

Not surprisingly, cooking fires peaked between 5:00–8:00 p.m. when people were likely preparing dinner. Seventeen percent of the fires reported between 11:00 p.m.–7:00 a.m. accounted for 19 percent of the deaths. Sleep and possible alcohol or drug impairment were more common factors in these late-night fires. See Figure 5. Cooking while overtired or under the influence is dangerous.

It is possible that many of the fires coded with “unattended or unsupervised person” were caused by unattended cooking. The NFIRS 5.0 Complete Reference Guide notes that “unattended or unsupervised person” includes latchkey situations whether the person involved is young or old and situations where the person involved lacked supervision or care.”⁵ This additional detail is generally not available to firefighters when they complete their incident reports online.

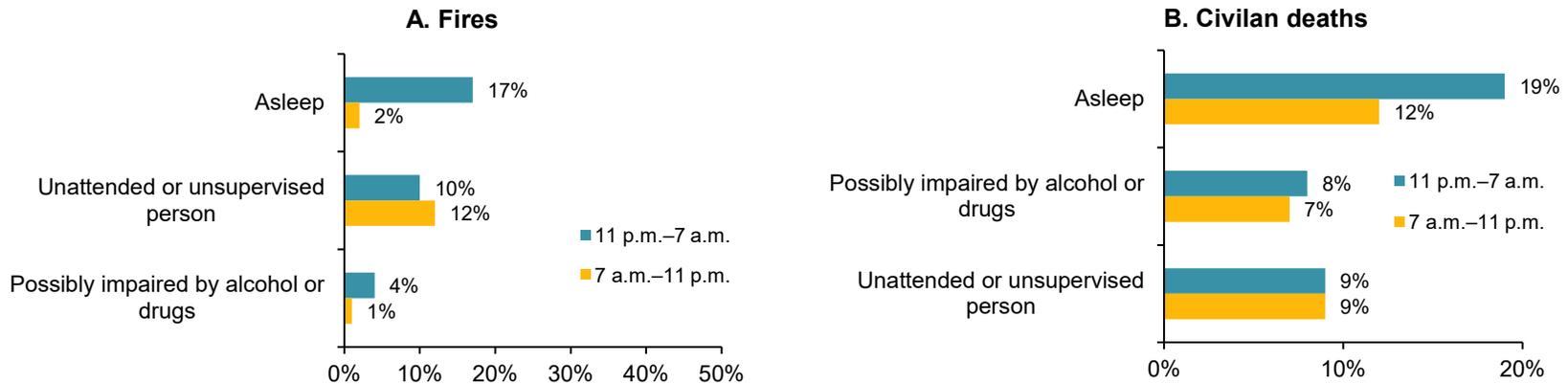
Table A shows that Thanksgiving is by far the leading day for home cooking fires. Christmas and Christmas Eve, holidays associated with

food, ranked second. Cooking increases during holiday celebrations, and guests, television, and other activities can distract attention from the kitchen.

Table A. Leading Dates on Average: 2017–2021 Home Cooking Fires Reported to US Fire Departments

Date	Fires	Percent Above Average Daily Fires
November 22 (Thanksgiving)	1,470	(240%)
December 24 (Christmas Eve)	740	(72%)
December 25 (Christmas Day)	740	(71%)
Easter	670	(54%)
November 21 (Day Before Thanksgiving)	600	(40%)
Daily average: 2017–2021	430	

Figure 5. Human factors contributing to ignition in home cooking fires by time of day: 2017–2021



Victims of cooking fires

From 2017 to 2021, more than half (58 percent) of the people who died in cooking fires were 55 years of age or older. The 65–74 age group accounted for the largest share of home cooking fire deaths.

See Figure 6.

People 85 and older had a risk of dying in a cooking fire 5.5 times higher than the overall population. A 2018 NFPA analysis of home fire victims of all causes found that home fire victims who were 85 and older were more likely to have died in a fire caused by cooking than by any other cause.⁶

Young adults aged 25–34 were at the highest risk of non-fatal cooking injuries. There was much less variation in risk in the injury age distribution. Only 32 percent of those injured were 55 or older.

Compared to those who were injured and survived home cooking fires, those who died were more likely to have been asleep, trying to escape, or unable to act to save themselves, possibly due to disability or impairment. In contrast, more than half of those who were non-fatally injured were trying to control the fire themselves. See Figure 7.

Figure 6. Home cooking fire deaths and injuries by age group: 2017–2021

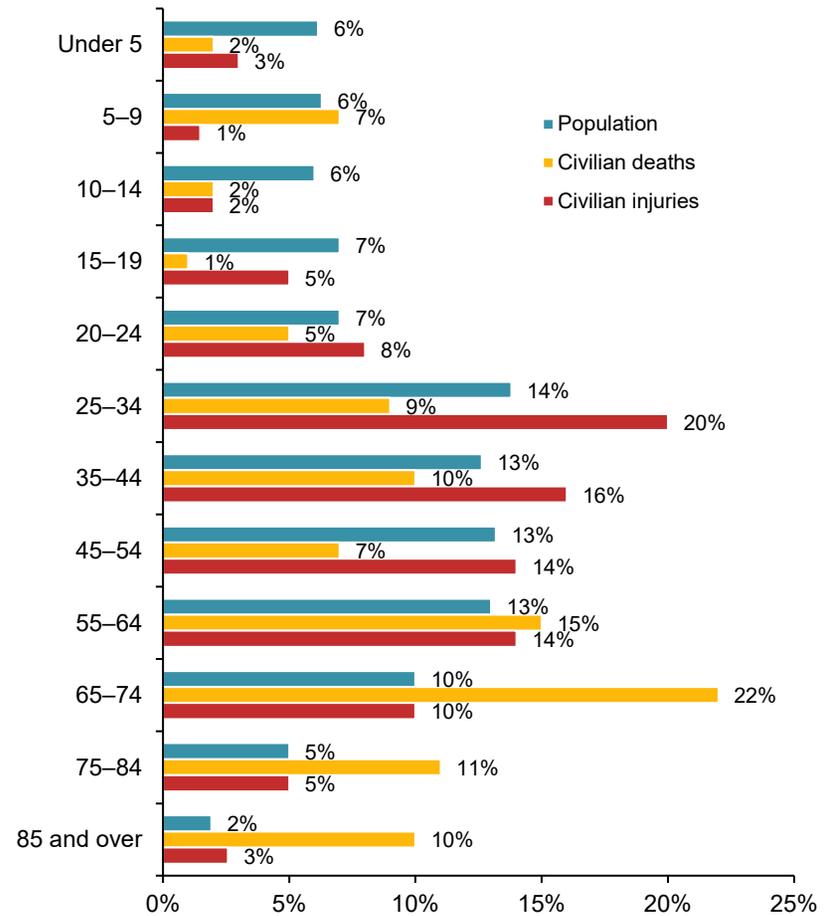
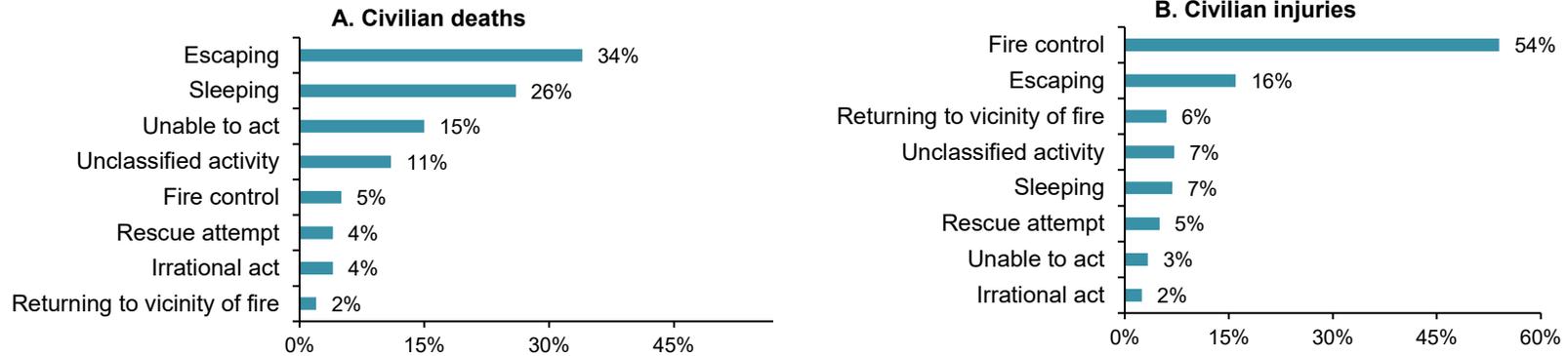


Figure 7. Activity when injured in home cooking fires: 2017–2021



Smoke alarms in home cooking fires

It is easy to assume that cooks are awake and nearby when cooking fires occur. However, Figure 4 shows that two-thirds (66 percent) of cooking fire fatalities were not in the area of origin, although more than one-quarter (28 percent) were involved in the ignition. A working smoke alarm is necessary to alert those outside the kitchen of a fire.

Smoke alarms were more likely to be present and operating at fires caused by cooking than at all other home fires. Some of this difference is likely due to fire department responses triggered by monitored smoke detection systems activated by minor cooking fires. Without such monitoring, many of these situations would likely have been handled by the occupants without fire department assistance. This is particularly true of apartment buildings, which are more likely to have smoke detection systems than one- and two-family homes.

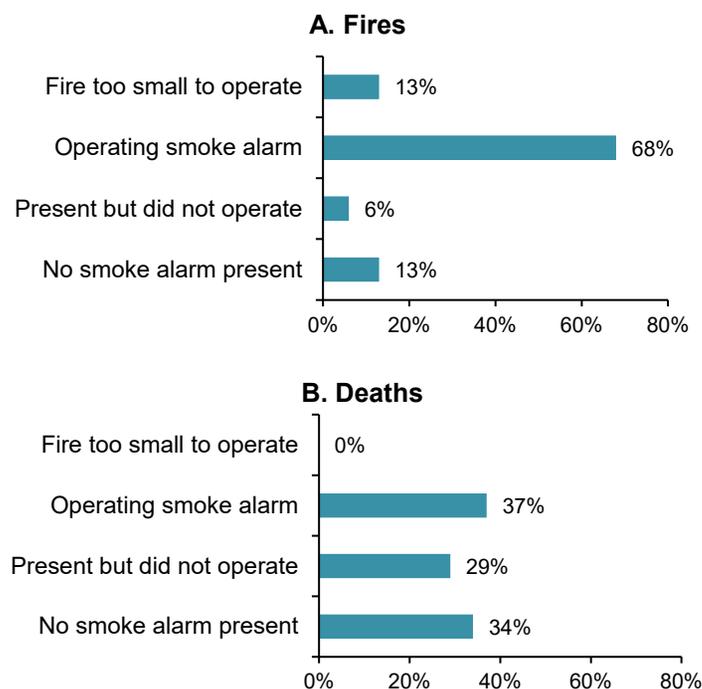
Figure 8 shows that smoke alarms were present at 88 percent of the reported home cooking fires and 76 percent of the cooking fire deaths. As noted earlier, 8 percent of the cooking fire deaths resulted from clothing ignitions. Victims in these fires may have been fatally injured before the

smoke alarm sounded. Automatic extinguishing systems (AES) were present in 12 percent of the reported home cooking fires. Only one percent of the civilian deaths occurred when AES systems were present.

When possible, smoke alarms should be installed at least 20 feet away from the kitchen range. If that is not possible, any smoke alarm 10 to 20 feet away from the stove should have a hush feature, which temporarily reduces the sensitivity of the alarm, or it should include a photoelectric sensor. Smoke alarms should not be installed within 10 feet of a cooking appliance. Additional details can be found in *NFPA 72*.

Manufacturers of smoke alarms and smoke detectors who wish to obtain or maintain UL certification of their products are required to ensure their products can distinguish between normal cooking aerosols and those associated with fire by passing a cooking nuisance test. This UL requirement is designed to minimize the number of nuisance alarms triggered by cooking activities. The smoke alarms and detectors must also demonstrate greater sensitivity to smoldering and flaming polyurethane foam.⁷ This UL requirement went into effect on June 30, 2021.⁸

Figure 8. Smoke alarm status in home cooking fires: 2017–2021



the highest death rate and grease hoods had the highest injury rate per 1,000 fires, fires involving these types of equipment were less common than other types of cooking fires. See Figure 9.

Households with electric ranges had a higher risk of cooking fires and association losses than those with gas ranges. Although 64 percent of households cook with electricity,⁹ four of the five (80 percent) ranges or cooktops involved in the reported cooking fires were powered by electricity. The population-based risks are as follows:

- The rate of reported fires per million households was 2.4 times higher with electric ranges.
- The civilian fire death rate per million households was 1.9 times higher with electric ranges.
- The civilian fire injury rate per million households was 3.6 times higher with electric ranges than in households using gas ranges.
- The average fire dollar loss per household was 3.2 times higher in households with electric ranges.

See Figure 10.

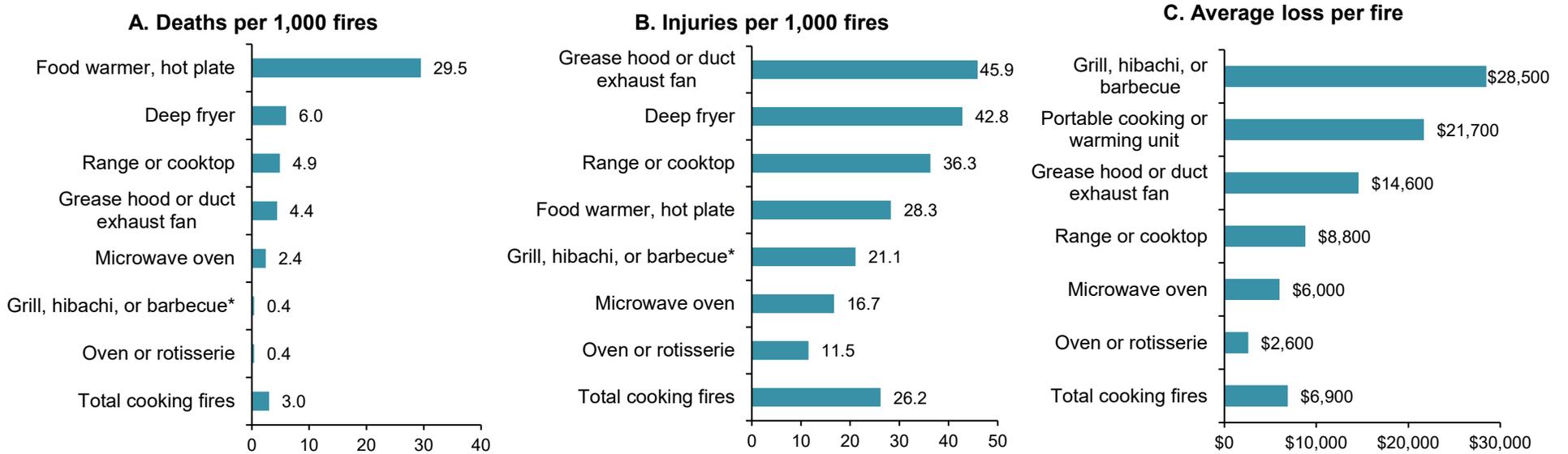
It is sometimes less obvious when an electric burner is turned on or is still hot than it is with gas burners. In addition, once turned off, it takes time for an electric burner to cool. UL 858, *Household Electric Ranges*, which took effect in June of 2018, includes requirements for electric coil ranges to prevent the ignition of cooking oil. Compliance may be demonstrated by either not igniting cooking oil in a cast iron pan or keeping the average temperature of the inside bottom surface of the pan below or equal to 725°F (385°C). All electrical coil ranges being manufactured now must meet these requirements.¹⁰ Because ranges last a long time, it could be years before these safer ranges become common in US homes.

Equipment involved in reported home cooking fires

Ranges or cooktops were involved in more than half (53 percent) of the reported home cooking fires, 88 percent of the deaths, and 74 percent of the injuries. Ranges or cooktops had higher death and injury rates per 1,000 reported fires than most other cooking equipment.

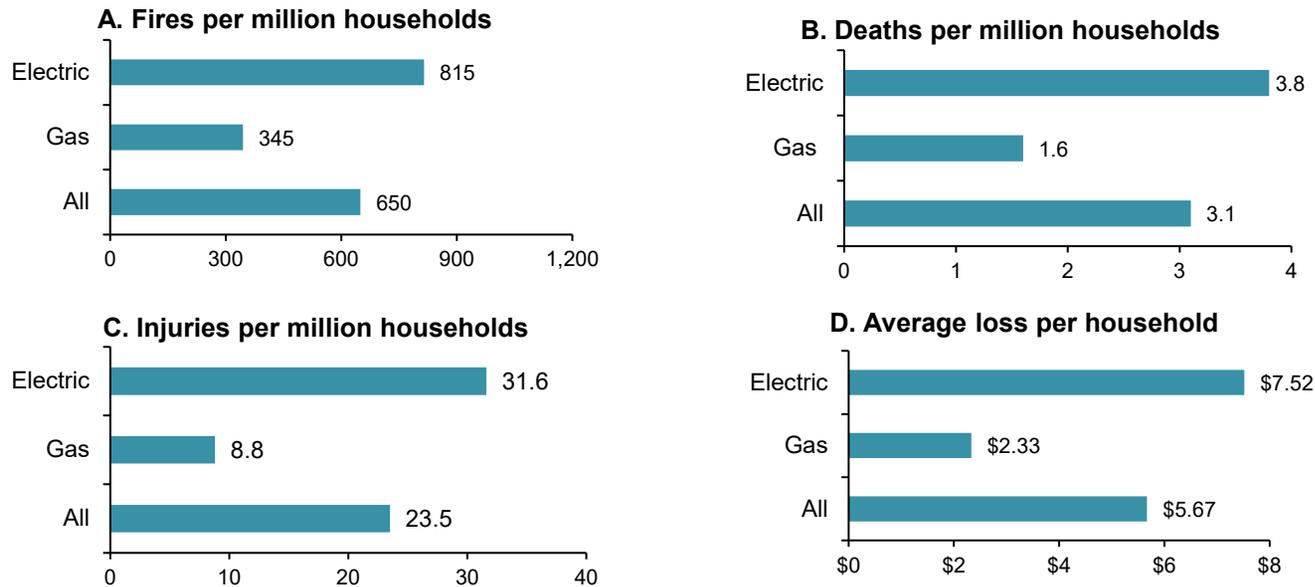
Ovens and microwave ovens had lower casualty and loss rates than most other cooking equipment. Cooking that is done in an oven or microwave oven is less likely to extend outside of the equipment. Grills and deep fryers had the highest average loss per home structure fire. Such equipment tends to be portable and may be used too close to things that can catch fire. Although food warmers and hot plates had

Figure 9. Casualty rates per 1,000 reported fires and average loss per fire by type of cooking equipment: 2017–2021



* Grill, hibachi, or barbecue fires that were coded as outside fires are not included

Figure 10. Risk related to usage of electric vs. gas ranges or cooktops: 2017–2021



Safety information

The Educational Messages Advisory Committee to NFPA’s Public Education Division developed a collection of safety tips for a wide variety of activities, including fire-safe cooking.

Fire and life safety educators can download the [NFPA Educational Messages Desk Reference](#) for consistent safety messaging.

NFPA also has [safety resources to help consumers](#) protect themselves from cooking fires. These include videos, safety tip sheets, public service announcements, and illustrated handouts in several different languages.

Since 1922, the NFPA has sponsored the public observance of [Fire Prevention Week](#). During Fire Prevention Week, children, adults, and teachers learn how to stay safe in case of a fire.

The [2023 Fire Prevention Week](#) campaign theme, “Cooking safety starts with YOU. Pay attention to fire prevention.TM” works to educate everyone about the simple but important actions they can take to keep themselves and those around them safe in the kitchen.

Additional information — Supporting Tables

See [Home Cooking Fires: Supporting Tables](#), September 2023, for more detailed information about the material presented in this report.

Methodology

The statistics in this analysis are estimates derived from the US Fire Administration’s [National Fire Incident Reporting System \(NFIRS\)](#) and the NFPA’s annual survey of US fire departments. Fires reported to federal or state fire departments or industrial fire brigades are not included in these estimates.

Only civilian (non-firefighter) casualties are included in this analysis.

NFPA’s fire experience survey provides estimates of the big picture. NFIRS is a voluntary system through which participating fire departments report detailed factors about the fires to which they respond. To compensate for fires reported to local fire departments but not captured in NFIRS, a scaling ratio was calculated and then applied to the NFIRS database using the formula below:

NFPA’s fire experience survey projections

NFIRS totals

Cooking equipment refers to equipment used to cook, heat, or warm food [NFIRS equipment involved in ignition (EII) codes 630–649 and 654]. Fires in which ranges, ovens or microwave ovens, food warming appliances, fixed or portable cooking appliances, deep fat fryers, open-fired charcoal or gas grills, grease hoods or ducts, or other cooking appliances were involved in ignition are classified as being caused by cooking equipment. Food preparation devices that do not involve heat, such as can openers or food processors, are not included here.

All fires with NFIRS incident type code 113, “Cooking fire in or on a structure and confined to the vessel of origin,” were classified as cooking fires regardless of the EII code. Fires with other confined fire incident types were excluded from the analysis. NFIRS 5.0 originally defined EII as the piece of equipment that provided the principal heat source that caused ignition if the equipment malfunctioned or was used improperly. NFPA noticed that many fires in which the EII was coded as “None (NNN)” had other causal factors that indicated equipment was a factor or that the other causal factors were completely unknown.

To compensate, NFPA treats fires in which EII = NNN and the 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])

Equipment that is totally unclassified was not allocated further. Unfortunately, equipment that is truly different can erroneously be assigned to other categories.

For more information on the methodology used for this report, see [How NFPA’s National Estimates Are Calculated for Home Structure Fires](#).

Acknowledgments

¹ NFIRS 5.0, first introduced in 1999, originally defined EII as the piece of equipment that provided the principal heat source that caused ignition if the equipment malfunctioned or was used improperly. Change 290, effective in 2006, amended the definition to include any equipment that was the principal heat source. Beginning in 2012, Change 337 required EII to be completed if the heat source or factor contributing to ignition indicated some type of operating equipment was involved. This was removed, effective with the 2015 data.

² Campbell, Richard, “Firewatch: Pennsylvania: Occupant dies in fire caused by unattended cooking,” *NFPA Journal*, March/April 2020.

³ Campbell, Richard, “Firewatch: Apartment resident dies after kitchen stove ignites clothing,” *NFPA Journal*, May/June 2019.

⁴ Hall, Shelby. *Home Structure Fires Supporting Tables*. Quincy, MA: NFPA, 2022.

⁵ US Fire Administration. *National Fire Incident Reporting System: Complete Reference Guide*. 2015, p. 4–28, 2015. Accessed at usfa.fema.gov/downloads/pdf/nfirs/NFIRS_Complete_Reference_Guide_2015.pdf on May 21, 2020.

⁶ Ahrens, Marty, “Figure 10. Home fire deaths per million population by age group and fire cause: 2011–2015 annual averages.” *Home Fire Victims by Age and Gender*. Quincy, MA: NFPA, 2018.

⁷ Kaiser, Dan, “Smoke Alarms and Smoke Detectors — New and Revised Requirements,” UL.com, 2019. Accessed at <https://www.ul.com/news/smoke-alarms-and-smoke-detectors-new-and-revised-requirements> on June 24, 2020.

⁸ “UL Extends Certification Date for Multi-Criteria Smoke Alarms,” UL.com, December 2019. Accessed at <https://www.ul.com/news/news-brief-ul-extends-effective-date-smoke-alarm-and-smoke-detector-manufacturers> on April 23, 2020.

⁹ “2015 and 2017 National — Heating, Air Conditioning, and Appliances — All Occupied Units,” [American Housing Survey \(AHS\) Table Creator](#), US Census Bureau. Accessed April 5, 2020.

¹⁰ Hopper, Howard, “What’s Cooking with Cooking: UFL, FCAC, and IAFC Considerations.” *2019 NFPA Conference and Expo*, San Antonio, TX, 2019.

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

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

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