

Circumstances surrounding unintentional fire-related deaths, 2011 to 2020

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Fatal fires are tragic events that are devastating individually, to families and within communities. From 2011 to 2020, there were approximately 220 fire-related deaths in Canada each year. The vast majority of these fire-related deaths were classified as unintentional (accidents) (81%). Smaller proportions of these deaths were classified as either intentional (15%), such as suicides and homicides, or were undetermined (4%), where the classification of the manner of death (i.e., accident, homicide or suicide) could not be determined following investigation.

Understanding the circumstances surrounding unintentional fire-related deaths in Canada is a valuable starting point towards implementing preventative measures that can reduce harm to Canadians. Although the circumstances or details surrounding the death are not always known, insights can be obtained from findings reported by coroners and medical examiners who investigate these tragic events. The results in this report are based on new insights released today from the Canadian Coroner and Medical Examiner Database (CCMED) covering the period from 2011 to 2020.

Residential fires are the leading type of unintentional fire-related death in Canada

Residential fires are the leading type of unintentional fire-related death in Canada. While the proportion of all fires that occur in residential structures is relatively small (31%) according to the National Fire Information Database, fire-related deaths occurring in private homes, long-term care facilities, temporary dwellings (e.g., hotels, trailers, tents) or elsewhere on residential property (92%) represented the vast majority of all unintentional fire-related deaths from 2011 to 2020.

According to previous research, the risk factors for fatal residential fires are different than those associated with nonfatal residential fires. While nonfatal residential fires were commonly linked to cooking or fires starting in the kitchen and electrical failure, some of the risk factors most often associated with fatal residential fires, according to previous studies, are the consumption of drugs or alcohol, improperly discarded cigarettes, living alone, being asleep at the time of the fire, older age, male sex, and the fire occurring in a mobile home. In order to prevent injury and death from fires, Health Canada recommends having a clear and well-practised escape plan, a suitable number and placement of smoke alarms in working order, and a working fire extinguisher in the home.

Males and adults aged 45 and older are more likely to die in a residential fire

Unintentional residential fire-related deaths affect people of both sexes and all ages, however, men and older adults are overrepresented. From 2011 to 2020, males were 1.5 times more likely than females to die in an unintentional residential fire. This trend is consistent with previous research on fire-related death rates in Canada and internationally.

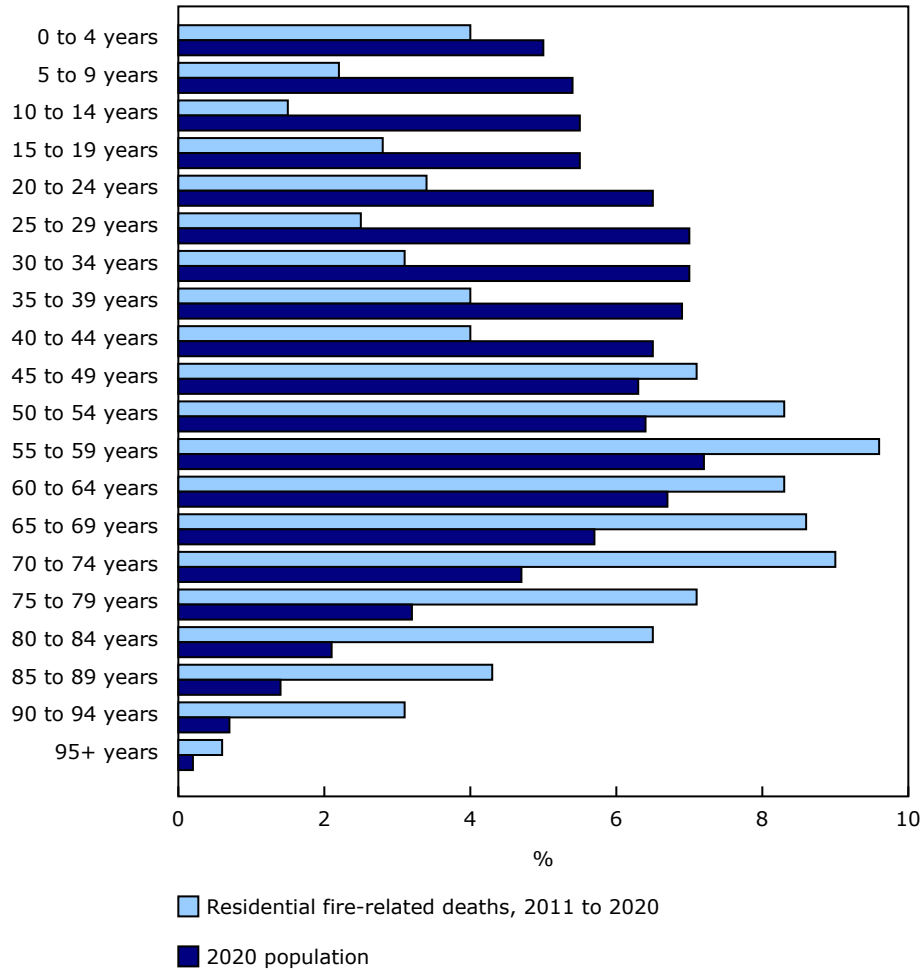
Older adults are also at a greater risk of fire-related death than their younger counterparts. From 2011 to 2020, the rates of unintentional residential fire-related death were higher than the Canadian average (4.3 deaths per 100,000 people) in each selected age group above 44 years.

According to previous research, older persons are at greater risk of residential fire-related death. Results from the CCMED show that nearly one-third of unintentional residential fire-related deaths in Canada involved people 70 years and older, while this same age group represented one-eighth of the population in 2020. Findings from the 2017 Canadian Survey on Disability indicate that disabilities (e.g., cognitive disabilities, mobility disabilities) are more common among seniors. These disabilities may affect a person's ability to react to or escape from a fire.

From 2011 to 2020, a coroner or medical examiner reported a mobility-related (e.g., use of crutches, wheelchair or other) or cognitive (e.g., dementia) impairment in 14% of unintentional residential fire-related deaths. In just over half of these cases, the individual was aged 70 and older.



Chart 1
Proportion of unintentional residential fire-related deaths compared to the proportion of the population, by age group

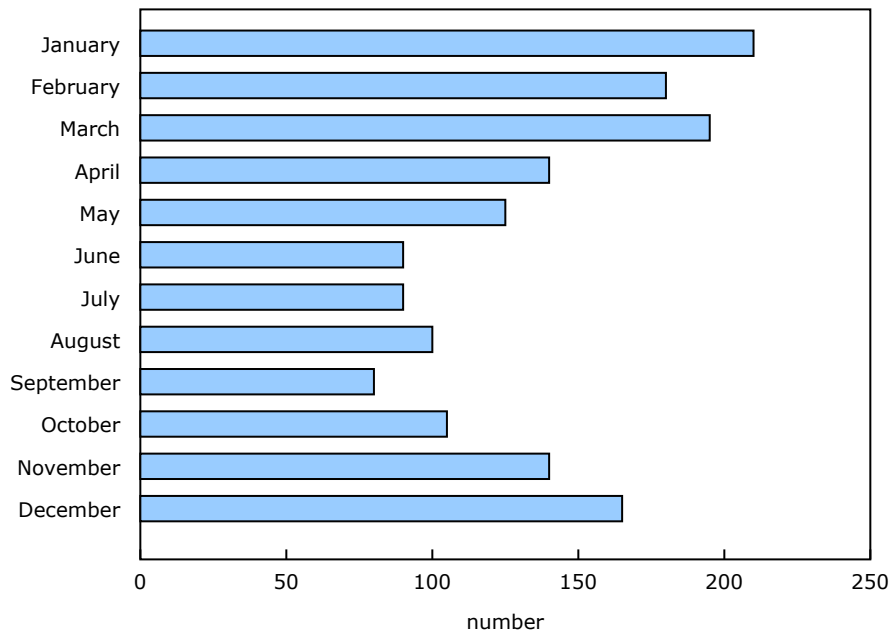


Note(s): Data were not available for all jurisdictions for all years (see Note to readers).
Source(s): Canadian Coroner and Medical Examiner Database, 2011 to 2020 (5125), and table 17-10-0005-01.

The colder months saw more than twice as many unintentional residential fire-related deaths as the warmer months

Unintentional residential fire-related deaths are more common in the winter. During the 2011 to 2020 period, the number of residential fire-related deaths tended to increase in the early fall, peaking in the winter months, subsequently decreasing in early spring. The four-month period from December to March saw over twice as many residential fire-related deaths as the four-month period from June to September. During the colder months, there is increased use of heaters and wood-burning stoves. Additionally, people remain indoors for longer periods of time, leading to an increased frequency of indoor smoking and use of candles.

Chart 2
Average number of unintentional residential fire-related deaths by month, 2011 to 2020



Note(s): Data were not available for all jurisdictions for all years (see Note to readers).
Source(s): Canadian Coroner and Medical Examiner Database, 2011 to 2020 (5125).

The majority of unintentional residential fire-related deaths were a result of smoke inhalation

The majority (68%) of residential fire-related deaths were a result of smoke inhalation alone, while 10% were reported to be caused by both smoke inhalation and burns, and 17% were due to burns alone. Smoke inhalation leads to asphyxia, a condition where the body's supply of oxygen is deprived. Unlike deaths due to smoke inhalation which are often immediate, deaths reported to be caused by burns often involved the individual surviving the fire, but succumbing later to complications of the burns (e.g., infection, sepsis, organ failure). In 2% of fatal residential fires, the death was attributed to another cause, such as blunt force trauma from falling debris, a jump, a fall, or an explosion. The cause of death was unknown or not specified in 3% of deaths.

At least one modifiable risk factor was present in approximately half of unintentional residential fire-related deaths

Coroners and medical examiners may include additional circumstance information in the reports submitted to the CCMED, but the level of detail provided in the report varies by death investigator and by jurisdiction.

In addition to providing information on demographics and causes of death, the findings more commonly reported by coroners and medical examiners investigating residential fire-related deaths include: residence type, source of ignition, consumption of alcohol or drugs, and presence of working smoke alarms. From 2011 to 2020, at least one of these more commonly reported modifiable risk factors (i.e., alcohol/drug consumption prior to the event, non-functional smoke alarm, and cigarette smoking as a source of ignition) was reported in approximately half of unintentional residential fire-related deaths investigated by a coroner or medical examiner.

The presence of a risk factor is considered "not specified" when the information for a given risk factor is missing from the coroner or medical examiner report, while the absence of a risk factor can only be considered when the coroner or medical examiner has indicated that a given factor was not present.

Unintentional residential fire-related deaths occurred in various residence types or outdoors on residential property

Unintentional residential fire-related deaths occurred in both permanent and temporary residence structures or outdoors on residential property. From 2011 to 2020, 46% of residential fire-related deaths occurred in a house (e.g., single, semi-detached, row house, cottage, or mobile home), 23% in a multi-dwelling unit (e.g., apartment building, long-term care facility or hotel), 4% in a moveable dwelling (e.g., recreational vehicle, trailer), and 3% in other types of temporary shelter (e.g., tent) or outdoors on residential property.

At least 1 in 7 unintentional residential fire-related deaths occurred in residences without a working smoke alarm

Smoke alarms save lives. From 2011 to 2020, at least 14% of unintentional residential fire-related deaths occurred in homes where the smoke alarm was either missing (8%) or non-functional (6%). It's possible these percentages are even higher since the presence or functionality of a smoke alarm could not always be confirmed following an investigation if the damage to the home was too significant. Overall, from 2011 to 2020, information on smoke alarms was either not specified, unknown or not applicable in 71% of unintentional residential fire-related fatalities submitted to the CCMED. According to Health Canada, having the recommended number of functional smoke alarms in the correct places in a home can significantly reduce the risk of fire-related injury or death.

At least 1 in 5 unintentional residential fire-related deaths were caused by cigarettes or other smoking materials

A dropped cigarette is a risk factor for unintentional residential fire-related deaths. According to a Health Canada report using data collected by the Canadian Association of Fire Chiefs, fires started by cigarettes resulted in more deaths than fires started by other sources.

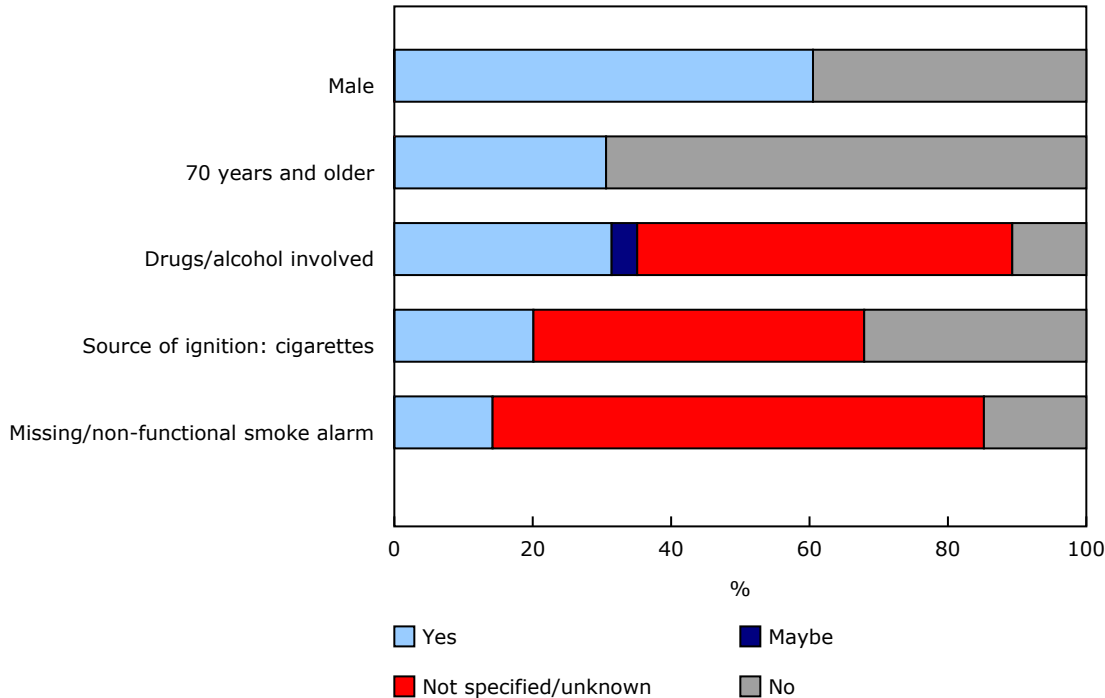
From 2011 to 2020, the coroner or medical examiner reported that the fire was ignited by a cigarette, cigarette lighter, pipe or other material used for smoking in at least 20% of residential fire-related deaths. Other fatal residential fires were caused by a cooking (10%) or electrical (8%) incident, candles or other open flames (7%), a heating device (5%), or from other sources (2%). The initial source of fire was undetermined or unspecified in 48% of cases. This information is more likely to be undetermined or unknown when there is significant damage to a structure.

The consumption of alcohol, cannabis, or illicit drugs was reported in nearly one-third of unintentional residential fire-related deaths among persons aged 15 and older

The consumption of alcohol or drugs is a risk factor for residential fire-related death. In 31% of unintentional residential fire-related deaths among persons aged 15 and older, the coroner or medical examiner reported the consumption of alcohol, cannabis or illicit drugs. In 4% of deaths, the coroner or medical examiner reported the presence of open containers of alcohol or drug-related paraphernalia at the scene of the fire. Alcohol or drug intoxication may impair judgment and coordination, which may increase the risk of unintentionally starting, or of having difficulty reacting to (e.g., ability to wake up) and escaping from a fire. The consumption of substances was more commonly reported among males (37%) than females (22%).

In 11% of residential fire-related deaths, there were no reports of alcohol or drug consumption. The consumption of alcohol or drugs was not specified in 54% of cases.

Chart 3
Select factors more commonly reported by a coroner or medical examiner investigating unintentional residential fire-related deaths



Note(s): "Drugs/Alcohol involved" was indicated when the coroner or medical examiner (C/ME) reported that the decedent had consumed alcohol or drugs prior to the event. "Source of ignition: cigarettes" was indicated when the C/ME reported that the source of ignition for the event was a cigarette or other smoking materials. "Missing/non-functional smoke alarm" was indicated when the C/ME reported that the smoke alarm was either missing or non-functional. Data were not available for all jurisdictions for all years (see Note to readers).

Source(s): Canadian Coroner and Medical Examiner Database, 2011 to 2020 (5125).

Snapshot of unintentional fire-related deaths occurring on non-residential property

Non-residential fire-related deaths occurring in parked cars, workplaces, public spaces and rural areas represented less than 5% of all investigated unintentional fire-related deaths in Canada from 2011 to 2020. As with residential fire-related deaths, non-residential fire-related deaths were more common among males (80%) than females (20%). However, unlike residential fire-related deaths, non-residential deaths were less frequent among older adults. Instead, persons aged 30 to 59 represented the majority (73%) of non-residential fire-related deaths from 2011 to 2020. This age group represented less than 40% of the population in 2020. This trend can be explained in part by this age group accounting for the majority of persons in the workforce. At least 33% of non-residential fire-related deaths were reported to have occurred in a workplace.

Unlike residential fire-related deaths which were largely due to smoke inhalation, the leading cause of non-residential fire-related deaths was burns. Among these deaths, 47% were caused by burns, 33% by smoke inhalation, 7% from a combination of both, and 7% by blunt force trauma (e.g., an explosion or due to a fall). The consumption of alcohol or drugs was reported in over 27% of non-residential fire-related deaths, and in another 7% of deaths, coroners or medical examiners indicated that alcohol or drugs may have been consumed (e.g., open containers at the scene). Finally, the source of ignition for non-residential fire-related deaths varied and included open flames, cigarettes, a heating mechanism, electrical, and work-related equipment (e.g., grinders, engines).

Being aware of fire safety recommendations is important to reducing the risk of death or harm. A subsequent publication with information on intentional fire-related deaths and criminal incidents will be made available later this year.

Note to readers

The Canadian Coroner and Medical Examiner Database (CCMED) was developed at Statistics Canada in collaboration with the 13 provincial and territorial Chief Coroners and Chief Medical Examiners and the Public Health Agency of Canada. Currently, it combines data from all provincial and territorial databases, with the exception of Manitoba.

For the provinces and territories included in the report, data are not available for all years. Data for Nova Scotia, New Brunswick, Quebec, Ontario, Saskatchewan, Alberta, British Columbia, Yukon, and the Northwest Territories are available from 2011 to 2020. Data for Prince Edward Island are available from 2011 to 2019, data for Nunavut are available for 2011 to 2018 and data for Newfoundland and Labrador are available for 2020. All data are considered preliminary and include only closed cases. Closed cases refer to those whose investigation or inquest is complete and the cause and manner of death are final. Data for this report were extracted in October 2021.

Fire-related deaths in this report include deaths resulting from explosions and exclude deaths occurring from a transport-related event (moving vehicle). At the time this report was written, 2,190 fire-related deaths were documented in the CCMED from 2011 to 2020. Of these, 1,770 were classified as unintentional. This value was used for reporting on the circumstances surrounding unintentional fire-related deaths. CCMED data coverage varies from one variable to another. The location of the fire was not specified in 4% of fire-related deaths.

The number of records for more recent years will be lower than what may be expected as only closed cases are published. Moreover, as the source of non-response and the completeness of the available information varies both between and within jurisdictions, users are advised to exercise caution when comparing data between years and across provinces and territories.

The risk factors for nonfatal and fatal fires comes from an article in the Fire Safety Journal, "Comparative investigation of 'survival' and fatality factors in accidental residential fires" by Lin Xiong, Dorothy Bruck and Michelle Ball (Volume 73, April 2015, Pages 37-47). Another article, outlining risk factors for fatal fires, comes from the journal Injury Prevention: "House fire injury prevention update. Part 1. A review of risk factors for fatal and non-fatal house fire injury" by Lynn Warda, Milton Tenenbein and Michael E K Moffatt.

The [proportion of fires that occur in residential structures](#) comes from the National Fire Information Database (2014).

Safety recommendations to reduce injuries and death from fire come from the following Health Canada website: [Fire safety in your home](#).

Information on disabilities among seniors comes from the [2017 Canadian Disability Survey](#).

Information on cigarettes as the leading cause of fire-related death comes from a [Health Canada report](#) using data from the Canadian Association of Fire Chiefs.

Counts referenced in this report were rounded to a neighbouring multiple of five.

Definitions, data sources and methods: survey number 5125.

For more information, or to enquire about the concepts, methods or data quality of this release, contact us (toll-free 1-800-263-1136; 514-283-8300; infostats@statcan.gc.ca) or Media Relations (statcan.mediahotline-ligneinfomedias.statcan@statcan.gc.ca).