Home Cooking Structure Fires in Four Canadian Jurisdictions

Analyses of the National Fire Information Database, 2005 to 2014

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Executive Summary

Home cooking structure fires are a significant, yet preventable, public-safety problem.

Analyses of the National Fire Information Database (NFID), which collected and standardized roughly a decade of fire records from seven Canadian jurisdictions (including six provinces and the Canadian Armed Forces), revealed that cooking fires as a percentage of all "determined" home fires did not appear to be lessening from year to year, with cooking equipment consistently leading the list of home fire ignition sources in Manitoba, British Columbia and Ontario (2009 and onwards), and comprising the second largest source of ignition in Alberta, after smoker's material and open flame.

More research is needed to better understand home cooking fires, their negative outcomes and associated risks, especially considering the extent and seriousness of many of these fires, their real and potential impact on life safety, health and wellbeing, their strain on local resources and weighty costs to the overall economy, and the mounting empirical evidence indicating that cooking fires and cooking fire victims are not distributed evenly across population subgroups or geographical domains.

Focusing on a total of 27,215 reported cooking fire incidents and 3,729 cooking fire casualties for the provinces of Ontario, Manitoba, Alberta and British Columbia, the present study undertook secondary analyses of the NFID data for the ten-year period covering 2005 to 2014 to establish the prevalence, causes, circumstances and the fatality, injury and economic impacts of home cooking structure fires in each jurisdiction separately.

Specifically, for the period from 2005 to 2014, there were 14,194 reported home structure fires caused by cooking in Ontario. These fires caused 74 civilian deaths, 1,747 reported civilian fire injuries, 173 firefighter casualties, and for the years between 2005 and 2008, property and contents losses estimated at approximately $100 million in damage.

From 2005 to 2014, cooking equipment was involved in a total of 3,250 reported home structure fires in Manitoba, which caused 22 civilian deaths, 608 civilian injuries, and an estimated $66 million in direct property and contents damage.

Alberta's 3,596 reported home cooking structure fires were responsible for 20 civilian deaths, 428 civilian injuries and 16 firefighter casualties between 2005 and 2014. Direct property damage from these cooking fires was estimated at $192,936,915.

Cooking equipment was involved in 6,175 reported home structure fires in British Columbia during the 10-year window of observation. These fires caused 15 civilian deaths, 605 civilian injuries, 21 firefighter casualties, and nearly $166 million in property and contents losses.

Having established the large contribution made by fires originating in cooking equipment to total fire losses in these four jurisdictions, this study sought to characterize the cooking fire problem separately in each province by analyzing fire incident data through seven separate lenses, including:

- Fire incident characteristics;
- Property characteristics;

- Fire protection features;
- Circumstances contributing to the outbreak of fire;
- Factors related to the origin and spread of fire;
- Fire loss details; and
- Discovery of fire and actions taken.

The results yielded key insights into the causes and circumstances contributing to the outbreak and escalation of home cooking fires in the reporting jurisdictions. Some findings of the study included:

- More than half of home cooking structure fires occurred in one and two-family dwellings.
- The vast majority of homes that experienced cooking fires did not have sprinklers installed.
- Automatic fire detection systems were available in nearly eight-tenths of home cooking fires in Manitoba (79.6%) compared to slightly less than a quarter in Alberta (23.7%).
- In over one out of every ten cooking fires in Ontario and Alberta, there was no fire detection device present at the time of the cooking fire incident.
- The stovetop was involved in roughly eight out of every ten cooking fires.
- Flammable and combustible liquids, mostly fats, cooking oil, or related substances, were the materials ignited first in roughly one-half of cooking fires in Alberta (56.5%) and Ontario (50.0%), over four-tenths of incidents in British Columbia (45.7%), and approximately four-tenths of cooking fires in Manitoba (38.8%).
- Unattended equipment was the leading contributing factor in home cooking fires in Ontario, whereas human failing (e.g., distracted, preoccupied; ignorance of hazard) accounted for three-quarters and one-half of cooking fires in British Columbia and Alberta, respectively, and misuse of material ignited (e.g., overheated cooking oil, grease, wax) accounted for three-quarters of cooking fires in Manitoba.
- The kitchen was the area of origin in the vast majority of home cooking fire incidents.
- Two out of every ten cooking fires in Alberta caused burning or charring that spread beyond the room of origin compared to one in every ten cooking fires in Ontario and British Columbia.
- In one-quarter and one-third of cooking fires in British Columbia and Alberta, respectively, the cooking fire caused damage that spread beyond the room of origin.
- Fourteen per cent of cooking fires in Manitoba resulted in at least one casualty compared to approximately 11 per cent in Ontario and Alberta, and 8.7 per cent in British Columbia.
- Visual sighting and other means of personal detection were the most common means by which cooking fire incidents were first detected.
- Telephone tie-line to the fire department was the most common means by which the fire department was first notified in British Columbia, Ontario and Manitoba, whereas telephone direct to the fire department and telephone tie-line to the fire department were the two most common means by which the fire department was notified about cooking fires in Alberta.
- Where known, the majority of home cooking fires were either extinguished by the fire department or the occupant.
- Hand fire extinguishers were used by occupants to put out the fire in a quarter of cooking fires in British Columbia, Alberta and Manitoba.

- Where determined, the alarm was present and activated in the majority of cooking fire incidents in British Columbia, Manitoba and Ontario, compared to fewer than four-tenths in Alberta (38.5%).
- Where a smoke alarm was present, occupants evacuated safely upon the smoke alarm activation in three-quarters of cooking fires in Ontario and Alberta, and six-tenths of incidents in British Columbia.

The study also sought to examine the relationships between measures of fire loss and selected behavioural and environmental risk factors. Some key findings included:

- As the extent of fire spread and damage increased so did the risk that the cooking fire will result in at least one fire casualty.
- Dollar loss per fire increased as the extent of fire spread and extent of fire damage increased.
- Cooking fires that spread beyond the room of origin were considerably more likely to require firefighter intervention, a pattern observed for extent of fire spread and extent of damage.
- In Ontario, Alberta and British Columbia, cooking fires requiring some form of action or intervention to combat the fire, especially extinguishment by the occupant, were more likely to result in at least one casualty. In Manitoba, however, cooking fires extinguished by the fire department were more likely to involve at least one casualty.
- Oven fires were significantly more likely to cause charring and damage that remained confined to the object of origin, and were less likely to spread beyond the room of origin.
- Cooking fires that caused burning or charring and damage that spread beyond the room of origin were more likely to involve building components as the materials first ignited.
- Act or omission also had statistically significant associations with extent of fire spread, extent of damage and flame spread, but the nature of the relationships varied by province.
- Cooking fires that occurred in the kitchen were less likely to cause burning or charring and damage that spread beyond the room of origin in Ontario, Alberta and British Columbia.
- The results also revealed statistically significant associations between extent of fire casualties and igniting object, material first ignited, act or omission and area or room of origin.

To prevent deaths and injuries resulting from home cooking fires, it is helpful to know more about the victims of these fires. Therefore, additional details were also provided about cooking fire casualties and victims' demographic and behavioural profiles, including age and sex, nature of casualties, cause, condition and action of casualty, time of day of casualty, igniting object involved in casualty and smoke alarm performance. Key findings included:

- Civilians consistently represented the vast majority of home cooking fire casualties.
- Minor injury was the most likely casualty outcome of cooking fires in Ontario and Alberta, whereas, in British Columbia, light injury was the most likely casualty outcome.
- Fatal and non-fatal cooking fire casualties were more frequently adults between the ages of 18 and 64 years, though, in Ontario, 46 per cent and 42 per cent of cooking fire fatalities were adults 18 and 64 years and senior citizens, respectively.
- The sex distribution of home cooking fire victims for fatal and non-fatal fire casualties revealed differences across the reporting jurisdictions; however, serious cooking fire casualties were more frequently males.

- Where determined, the victims were awake and had no physical or mental impairment at the time of the cooking fire, a pattern observed for all types of injuries, irrespective of severity.
- Smoke inhalation was the most frequently reported cause of fatal cooking fire casualties in Alberta and British Columbia, whereas burns (or scalds) caused most commonly serious injuries in Alberta, British Columbia and Ontario.
- Entering or remaining in the home for firefighting or extinguishment purposes was the leading action of casualty in nearly all categories of cooking fire injuries.
- In both Alberta and British Columbia, roughly four out of every ten cooking fire civilian injuries, for nearly all categories of fire injuries, occurred between 12:00 pm and 6:00 pm.
- The stovetop was involved in the vast majority of civilian fatal and non-fatal casualties.
- In close to six-tenths of fatalities in Alberta (58.8%) compared to two-tenths in Ontario (21.4%), there was no smoke alarm device present.

The bivariate relationships between nature of casualties (i.e., extent of death, serious injury, light injury or minor injury) and selected demographic, behavioural and environmental risk factors were also examined in detail. The analyses yielded some interesting results:

- In Ontario and Alberta, the proportion of fatal cooking fire casualties was higher for senior citizens compared to their younger counterparts, whereas, in British Columbia, both civilians aged 65 years and older and children 11 years and under were more frequently victims of fatal cooking fire casualties.
- In Alberta, the proportion of fatal cooking fire casualties was higher for females, while, in British Columbia, the proportion of cooking fire deaths was higher for males.
- Burns were more frequently the reported cause of serious injuries in Ontario, Alberta, and British Columbia while, in Alberta, fatalities were most commonly due to smoke inhalation.
- Impairment by alcohol, drugs or medication was one of the most frequently reported conditions of cooking fire fatalities and serious injuries.
- Did not act and injured while attempting to escape were the two most commonly reported actions of cooking fire fatalities.
- In both Alberta and British Columbia, cooking fires that occurred late at night, between midnight and 6:00 am, were more likely to result in fatal civilian casualties.
- In Ontario, the highest proportions of serious injuries occurred when open, portable fired broilers and deep fat fryers were involved in ignition, whereas in Alberta and British Columbia, stovetop-heated deep-fat fryer fires resulted in the highest proportion of serious injuries.
- Compared to cooking fires where a smoke alarm was present and activated, cooking fires that occurred in homes that had no smoke alarm present were significantly more likely to result in civilian fatalities, a pattern observed in both Ontario and Alberta.

The data analyzed in this report revealed some important patterns and trends in home cooking structure fires in the four reporting jurisdictions that can inform future resource allocation, prevention efforts, and fire education programs.

1. Problem Statement

1.1. HOME COOKING FIRES COVERAGE ON THE NEWS: KITCHEN FIRES SPARK GREAT CONCERN

On the evening of Sunday June 4, 2017, a neighbour who lives next door called 9-1-1 to report a fire in a four-level split house in north Edmonton. Crews arrived a few minutes later, and found two teenagers in the upstairs bedrooms of the home. Firefighters had to rescue them through their bedroom windows, and performed CPR on both youths before paramedics arrived. The teens, a girl aged 11 and a boy aged 16, were taken to hospital in serious condition, suffering from smoke inhalation. A man in the home was also taken to hospital with injuries to his airway and carbon monoxide poisoning. A woman escaped without any injuries. Fire crews went on aggressive fire attack, containing the fire to the kitchen and having it under control within 20 minutes although by then smoke had already spread throughout the home and fire damage had already had its effect. The kitchen and the main floor of the house sustained heavy fire damage. The rest of the house sustained heavy smoke damage, and was uninhabitable. The fire caused about $500,000 in damage to the house and its contents. The Fire Investigator determined the fire was caused by over-heated cooking oil, which was left unattended for few minutes. A pan with cooking oil on the stovetop burst into flames igniting the kitchen cabinets. Both siblings died from injuries sustained in this kitchen fire (Bartko [Global News], 2017; Bartko & Ramsay [Global News], 2017; Mertz [Global News], 2017; Neufeld [CBC News], 2017).

Similarly, the cause of a home fire that left a 10-year-old boy dead and five others injured in a Scarborough townhome on Saturday March 28, 2015 was the result of unattended cooking. When firefighters arrived just before 6 am, the townhouse was already engulfed in flames. The fire, which began on the kitchen stove, spread through the staircase to the second floor of the townhome, trapping the victims. The boy was rushed to hospital where he was pronounced dead. The boy's mother and sister suffered serious injuries as a result of the blaze, while the father and two other children suffered minor injuries (Frisk [Global News], 2015).

Unfortunately, as it is further illustrated in Table 1, the fire losses associated with these two particular cooking fires were not the outcome of isolated, exceptional fire incidents. While the selected home cooking fire examples summarized in Table 1 do not represent a random sample of all reported kitchen and cooking area fires nationally and therefore may not reflect the most "typical" circumstances, causes and outcomes of these fires, they do provide useful illustrations of what could happen or cooking fires' potentiality. Cooking has long been the leading cause of home structure fires and home fire injuries in the country and internationally. While the impacts of home cooking structure fires varied, as can be seen in Table 1, many caused property damage that ranged from the minor to the severe. A number of these fires also caused injuries and deaths. Particularly, as will be further demonstrated in the present study, unattended cooking-oil fires were quite prevalent and dangerous because the ignition of hot oil in a pan can occur very quickly when not being monitored closely, happening with surprising speed (e.g., Wijayasinghe & Makey, 1997).

TABLE 1. COVERAGE OF SELECTED HOME COOKING FIRES IN CANADIAN NEWS OUTLETS

		Losses				
Province	**Date**	**Death**	**Injury**	**Property Damage**	**Description**	**Link**
ON	Tuesday, October 17, 2017	No	Yes	Yes	As a result of an early morning fire at a duplex, a woman was sent to hospital in critical condition suffering from smoke inhalation. The fire was caused by unattended cooking in the building's upstairs unit around 5:30 a.m., causing more than $95,000 in damages.	http://www.cbc.ca/news/canada/windsor/windsor-woman-in-critical-condition-after-fire-causes-95k-in-damage-1.4357984
ON	Thursday, August 17, 2017	No	Yes	Yes	Fire Department responded to a cooking fire in the kitchen of a home in Old South London around 5.30 p.m. Crews contained the blaze, but damage to the kitchen was extensive. The host was taken to hospital for smoke inhalation.	https://globalnews.ca/news/3679104/occupant-and-pets-uninjured-following-old-south-kitchen-fire/
ON	Sunday, June 11, 2017	No	No	Yes	Ottawa Firefighters were called to a high-rise apartment in Little Italy after a kitchen fire broke out late afternoon. Crews extinguished the fire, with damage contained to a single unit. Two displaced adults received victims' assistance; their unit was left uninhabitable.	http://www.cbc.ca/news/canada/ottawa/kitchen-fire-loretta-avenue-1.4156002
ON	Sunday, January 15, 2017	No	Yes	Yes	Thunder Bay Fire Rescue responded to a kitchen house fire early Sunday morning. Firefighters brought the fire under control; a female occupant was sent to hospital as a precaution. The cause of the fire was unattended cooking which caused extensive damage to the kitchen.	http://www.netnewsledger.com/2017/01/16/empress-street-fire-unattended-cooking-cause/
ON	Saturday, January 2, 2016	No	No	Yes	Just before 8:30 p.m., Ottawa Fire crews responded to a row home complex kitchen fire in the city's east end that left six people displaced and $40,000 in damages.	http://ottawa.ctvnews.ca/six-people-displaced-after-kitchen-fire-in-ottawa-s-east-end-1.2721511
ON	Friday, December 11, 2015	No	Yes	Yes	Leamington Fire Service crews responded to a house fire at 1 p.m. Blaze was quickly brought under control, with damage estimated at $150,000. The fire was caused by careless cooking. Two people were taken to hospital with minor injuries.	http://windsor.ctvnews.ca/house-fire-in-leamington-sends-two-to-hospital-1.2697026

TABLE 1. CONTINUED

Province	Date	Losses			Description	Link
		Death	Injury	Property Damage		
ON	Tuesday, October 8, 2013	No	Yes	Yes	Firefighters arrived to a burning rooming house in Toronto's west end at 7:50 a.m. A man and woman were rushed to hospital with life-threatening injuries, after being trapped on the third floor. The blaze started while a resident was cooking in the main-floor kitchen and left a pot unattended. When firefighters arrived, the kitchen was engulfed; flames spread quickly to the rest of the house. There was no sign of functioning smoke detectors.	http://toronto.ctvnews.ca/two-people-in-life-threatening-condition-after-rooming-house-fire-1.1488574
ON	Monday, February 4, 2013	No	No	Yes	Windsor Fire and Rescue Services Officers determined careless cooking was to blame for a house fire that caused $250,000 in damages.	http://windsor.ctvnews.ca/careless-cooking-causes-tecumseh-house-fire-1.1142231
ON	Not specified	No	No	Yes	Ottawa Fire Crews battled two kitchen fires in opposites ends of the city last night. An unattended pot on the stove caused $30,000 damage in the north end. Meanwhile, in the west end, a neighbour called 9-1-1 after noticing smoke in a nearby house. An unattended pot left on the stove also caused the second blaze.	http://www.ctvnews.ca/video?clipId=939696
QC	Sunday, October 8, 2017	Yes	No	Yes	A 37-year-old woman and her one-year-old twin girls were pronounced dead in hospital after an early-morning kitchen fire. It took firefighters about an hour to put out the flames. The fire was accidental caused by a cooking fire. Building's smoke detector wasn't working.	https://www.firefightingincanada.com/headlines/fatal-quebec-fire-believed-to-be-accidental-25274
NB	Monday, March 27, 2017	No	Yes	Yes	Firefighters responded to a kitchen fire at a Fredericton 3-storey building shortly after 6 p.m. that sent 1 person to hospital. The fire was caused by grease fire that was contained to the kitchen area. The remainder of the apartment suffered smoke damage.	http://www.cbc.ca/beta/news/canada/new-brunswick/fire-hospital-fredericton-kitchen-1.4043567

TABLE 1. CONTINUED

		Losses				
Province	**Date**	**Death**	**Injury**	**Property Damage**	**Description**	**Link**
MB	Tuesday, August 22, 2017	No	Yes	Yes	Winnipeg Firefighters responded to a kitchen fire on a suite in an apartment complex around 8:20 p.m. A female host was taken to hospital in unstable condition with smoke inhalation and burns. A second woman, a neighbour who attempted to extinguish the fire, was also taken to hospital and treated for smoke inhalation. The fire began while the host was cooking a steak.	http://www.cbc.ca/news/canada/manitoba/apartment-fire-injures-women-1.4258468
MB	Sunday, January 1, 2017	No	No	Yes	Starting at 10:30 a.m., a kitchen fire forced three families from their homes in East Kildonan. The fire was caused due to careless cooking: The host left the kitchen with a pot of cooking oil before cabinets caught fire. Fire spread quickly to neighbouring homes. Because of its violent nature, Winnipeg Fire Paramedic Service crews were not able to enter, combating the fire from the outside. The house where the fire began was a complete loss.	http://winnipeg.ctvnews.ca/firefighters-say-careless-cooking-caused-housefire-in-east-kildonan-1.3223774
MB	Tuesday, January 1, 2013	No	Yes	Yes	Around 4:30 a.m., RCMP and fire and emergency crews responded to a fire that caused extensive damage to a home in Gimli, Winnipeg. Two people, an 18-year-old man and his father, were in critical condition after the fire. The cause of the blaze was accidental, attributed to "careless cooking".	http://winnipeg.ctvnews.ca/nine-people-escape-burning-gimli-home-father-and-son-being-treated-at-intensive-care-unit-1.1098313
BC	Sunday, November 26, 2017	No	No	Yes	Crews responded to a Victoria kitchen house fire at night. The fire was caused by an unattended pan, with loss estimated at $100,000 due to significant smoke and water damage.	http://www.timescolonist.com/news/local/victoria-house-heavily-damaged-in-kitchen-fire-1.23105161

TABLE 1. CONTINUED

		Losses				
Province	**Date**	**Death**	**Injury**	**Property Damage**	**Description**	**Link**
BC	Thursday, May 4, 2017	No	Yes	Yes	Kelowna Fire Department reported to a grease fire that erupted on the stove. A male, senior host attempted to extinguish the blaze by putting water on the grease fire. Fire damage was contained to the kitchen, yet smoke filled the entire townhome. Paramedics checked the individual, who refused to be taken to hospital.	https://globalnews.ca/news/3428496/kelowna-senior-attempts-to-douse-kitchen-fire/
BC	Thursday, September 15, 2016	No	Yes	Yes	A Surrey kitchen fire that started due to a "cooking accident" sent mother and baby to hospital suffering from minor smoke inhalation. While the damage to the house was mostly contained to the kitchen, due to heavy smoke in the rest of the house, the family was not allowed to return for some time.	http://www.cbc.ca/news/canada/british-columbia/surrey-kitchen-fire-sends-mother-and-baby-to-hospital-1.3763024
BC	Saturday, March 26, 2016	No	No	Yes	A fire caused $50,000 damage to a house in Victoria. The host put a pot of oil on the stove, forgot about it and went out to meet friends for a couple of hours. Upon his return, he was met with a considerable amount of smoke inside the house. The host attempted to extinguish the fire. Concerned that the fire made its way into the attic, he left the residence and called 9-1-1. The fire was almost extinguished by the time fire trucks arrived at 10:12 p.m. While structurally the house was still sound, all contents had to be cleaned or replaced. This fire resulted due unattended cooking.	http://www.timescolonist.com/news/local/victoria-area-fires-prompt-warning-not-to-leave-cooking-unattended-1.2218803
BC	Sunday, October 11, 2015	No	No	Yes	The Kelowna Fire Department responded to a kitchen fire in a unit of an apartment building on downtown around 4:30 p.m. The fire was caused accidentally when items were left unattended in an oven.	https://globalnews.ca/news/2272217/kelowna-apartment-kitchen-fire/

TABLE 1. CONTINUED

		Losses				
Province	**Date**	**Death**	**Injury**	**Property Damage**	**Description**	**Link**
PE	Monday August 29, 2017	No	No	No major damage	Charlottetown Fire Crews responded to two fire alarms over lunch hour Monday and one at suppertime. Careless cooking behaviours (e.g., pots that had boiled dry; leaving kitchen while cooking) were responsible for these three fires.	http://www.cbc.ca/news/canada/prince-edward-island/pei-charlottetown-3-cooking-fires-smoke-bryan-1.4267145
SK	Sunday, December 10, 2017	No	Yes	Yes	At around 9.30 p.m., Saskatoon firefighters respondent to a cooking fire originating from burning oil spilling out of a pot. The male occupant burned his hands carrying the burning pot of oil outside.	https://globalnews.ca/news/3907936/cooking-oil-fire-saskatoon/
SK	Monday, October 16, 2017	No	No	Yes	Firefighters responded to a kitchen fire in Saskatoon's west end. The fire was accidental, caused by an unattended pot of hot cooking oil. Damage was estimated at $30,000.	http://saskatoon.ctvnews.ca/kitchen-fire-causes-30-000-in-damages-1.3633822
SK	Tuesday, January 06, 2015	Yes	No	Yes	Early morning, Regina's fire and police officials responded to an intense and tough to fight house fire just east of downtown that claimed the lives of a woman and a baby boy. Firefighters pulled the victims from the home. Both were pronounced dead in hospital. A pot left on the stove was the cause of the fire.	http://www.cbc.ca/news/canada/saskatchewan/fire-claims-lives-of-woman-baby-boy-in-regina-1.2890845
AB	Tuesday, July 18, 2017	No	No	Yes	Firefighters were called to a south-east Calgary townhouse complex at 5:30 p.m. by a resident who heard a smoke detector going off next door. Firefighters arrived to find flames coming from the front two main-floor windows of the unit. Fire Crews were able to put out the fire, but it destroyed the townhouse unit where it originated and damaged two neighbouring suites, forcing three families from their homes. Cooking left unattended caused the fire: A male host started dinner and then stepped outside while cooking was still happening in the suite.	https://globalnews.ca/news/3608572/red-cross-helping-calgary-family-displaced-by-erin-woods-kitchen-fire/

Considering the propensity for home cooking structure fires in Canada, their emotional, social and economic detrimental effects, and their real and potential impact on life safety, health and wellbeing, home cooking fires and their associated losses have not yet received the attention they deserve (e.g., Clark, Smith & Conroy, 2014: Jennings, 2013). Possibly, the sparsity of research dealing with this area is, largely, because the fatalities, injuries and property damage associated with them represent a "diffuse disaster" (see, for examples, Rhodes & Reinholtd, 1998; Ward, 2004), that is, a public safety hazard that, due to its ongoing and insidious nature as well as its "small-scale" day-to-day fire-loss rate, is not widely recognized as serious. To complicate matters, at least in the case of Canada, the lack of a reliable, on-going source of fire data, as will be further elaborated below, makes it difficult to assess "where the problems are, whom they affect, and where programmatic and prevention activities should be directed" (Teutsch & Churchill, 2000: p. 6).

Reducing home cooking structure fires clearly benefits the common good. The launching of the National Fire Information Database (NFID) is an important starting point to address gaps in home cooking fire knowledge to assess their overall contribution, negative outcomes and associated risks. The findings will hopefully inform development of improved fire-safety and public education initiatives. The benefits of making strategic and operational decisions informed and supported by empirical data are considerable for the design, targeting and dissemination of more effective and relevant messaging. That is, the development, implementation and assessment of public awareness and public education programs and initiatives that to achieve the best outcomes account and work with what actually caused these cooking fires in the first place, keeping in mind that different groups in the population have differential fire risks, and suffer greater consequences following cooking fire incidents, due not only to their higher propensity to certain unsafe cooking practices but also "much wider issues of social equity" (Brennan, 1999: p. 310; for a recent metatheoretical review, see also Clark, et al., 2014).

1.2. FIRE STATISTICS COLLECTION IN CANADA AND ITS IMPLICATION FOR FIRE RESEARCH

Home fires remain a significant public-safety hazard. Despite important advances in fire prevention, structure fires, especially home fires, remain an area of critical concern, dominating the North American fire problem (e.g., Council of Canadian Fire Marshals & Fire Commissioners, 2007; Frattaroli, et al., 2012; International Association of Fire Chiefs, 2013; Jennings, 2013; Statistics Canada, 2017a). Responsible for fatalities, injuries, and significant financial costs associated with treatment of burn injuries and property damage (e.g., Asgary, Ghaffari, & Levy, 2010; Banfield, Rehou, Gomez, Redelmeier, & Jeschke, 2015; Barnett, 2008; Bounagui & Bénichou, 2005; Chhetri, Corcoran, Stimson, & Inbakaran, 2010; DiGuiseppi, Edwards, Godward, Roberts, & Wade, 2000; Frattaroli, et al., 2012; McCormick, 2009; Parmer, Corso, & Ballesteros, 2006), fire statistics continue to identify cooking as the leading source of home structure fires in the United States (e.g., Ahrens, 2017, 2015, 2013; Ahrens, Hall, Comoletti, Gamache, & LeBeau, 2007; Federal Emergency Management Agency, 2013; Greene, 2009; Hall, 2006, 2008) and Canada (e.g., Alberta Office of the Fire Commissioner, 2013, 2015; Bounagui & Bénichou, 2007; Canadian Association of Fire Chiefs, 2012; Emergency Management BC Office of the Fire Commissioner, 2013; Jurdi-Hage, Giblett, & Prawzick, 2017; McCormick, 2009; Ontario Office of the Fire Marshal, 2009, 2013; Ontario Ministry of Corrections and

Community Services, 2017; Wijayasinghe, 2011, 2012; Wijayasinghe & Makey, 1997). These fires were not necessarily the result of equipment malfunction. Instead, most of these cooking fires were caused by hosts not paying due attention to a rather dangerous situation due to errors or negligence and risky cooking habits or activities (e.g., Ahrens, 2017, 2015, 2013; Ahrens, et al., 2007; Jurdi-Hage, et al., 2017; McCormick, 2009; Rhodes & Reinholtd, 1998; Wijayasinghe, 2011; Xiong, Bruck, & Ball, 2014), and thus were entirely preventable (e.g., Miller & Beever, 2005).

Particularly, in fires involving cooking equipment, hosts are more likely to be intimately involved in interactions with fire both its causation, and in its spread through a set of circumstances precipitated by "acts" (something is done) or "omissions" (something which has not been done). Various studies have established that unsafe cooking practices and inappropriate, potentially dangerous intervention behaviours affect home cooking fire ignition, extent of spread and negative outcomes (e.g., Jurdi-Hage, et al., 2017; McCormick, 2009; Rhodes & Reinholtd, 1998). Hosts can contribute to fire ignition in a variety of ways, many of which are inadvertent or are the result of a lack of knowledge about the real dangers of fire, including, for example, neglecting to maintain cooking equipment and safety systems, such as smoke alarms, misusing cooking equipment due to intoxication, sleepiness or being distracted; or deliberately leaving cooking unattended due to a lack of knowledge about fire risks (e.g., Brennan, 1999; McCormick, 2009; Miller & Beever, 2005; Rhodes & Reinholtd, 1998). It is, therefore, important to identify the behavioural factors and circumstances underlying these events.

To understand the state of the home cooking fire problem in Canada, a consistent and cohesive single database of fire data and statistics is needed. While Canada has had a long history of data collection (for a thorough review, see Maxim, Plecas, & Garis, 2013), a major area of concern continues to be the lack of uniformity in data collection. Due to general federal funding cutbacks, a lack of a legislated federal mandate for collection and reporting of fire statistics, and a dispersed user group, Canada does not have yet an ongoing national fire information database (Maxim, et al., 2013), leading to important gaps in state of Canadian fire research (Bounagui & Bénichou, 2005; Garis, 2014; Garis & Mark, 2011, 2015; TriData, 2009). A unified data source will allow Canada to gain a national perspective on fire incidents. The Canadian Code Structure on Fire Loss Statistics (CCS) was developed to provide a standard set of definitions and code sets to be used across the country; however, in practice, jurisdictions comply with the CCS to varying degrees in terms of the data collected, variable names, code values, descriptions and levels of detail provided (Bounagui & Bénichou, 2005: p. 9; Statistics Canada, 2016: p. 4, 7; Wijayasinghe, 2011). As a result, the type and amount of data collected by each jurisdiction vary depending on the operational requirements and resources of individual fire departments (Statistics Canada, 2016: p. 4, 2017b: p. 1).

Fire safety practices and regulations vary widely across Canada. For example, every province and municipality compile their fire data differently. This is because the collection of information relating to fire and other emergency incidents in Canada is "decentralized," being the responsibility of local governments (Garis, 2014). Each of the Fire Commissioner's and Fire Marshal's Offices across the country determines the type of data to be collected from the fire services in their jurisdictions (Statistics Canada, 2017c: p. 10). Local fire departments are then tasked with the collection of information regarding the cause, origin and circumstances of each fire and emergency incident that fire crews attend to (Maxim, et al., 2013). This requirement is in place, in part, to track fire patterns

and trends and prevent future fire losses through continuous improvement in codes and standards, training, and public education programs and as a measure of accountability to local municipalities. Local departments are also asked to submit records/reports of their fire-related activities to the provincial and territorial governments to aid Fire Commissioners/Fire Marshals in the development and maintenance of fire code enforcement, for investigating origin and cause of fires and to assist in making informed decisions and policies (ibid: p. 4). Local fire departments in Canada differ in resource availability and their ability to collect data methodically. There are some departments that are larger centres, staffed by full-time firefighters. However, smaller fire departments have limited resources and often operate with members who are volunteers and assist in emergency incidents. Volunteer firefighters have less time and may not be adequately trained to collect and maintain proper fire incident reporting systems (ibid: p. 2; see also, Haynes, 2016: p. 2; TriData, 2009: p. 7). Lack of systematic Canadian data on fires, their losses and associated risk factors makes it difficult to recognize trends and patterns, allocate resources effectively, and develop appropriate strategies to prevent or mitigate fire incidents. After all, "[t]he collection of fire incident data is an important task as the fire statistics can be used to assess how life safety is being affected year after year in Canada. It also motivates corrective actions to be taken and identifies key areas requiring further research" (Bounagui & Bénichou, 2005: p. 1).

1.3. GAINING NATIONAL AND INTERNATIONAL PERSPECTIVES ON THE HOME COOKING FIRE PROBLEM

Although it is difficult to capture a national picture of the extent and severity of the problem due to the lack of uninterrupted, nationally-representative, and reliable fire statistics in Canada, existing evidence regarding residential fire emergencies consistently point to home cooking fires as a serious concern to the Canadian public with significant costs to human lives and wellbeing, private property and the overall economy (e.g., Alberta Office of the Fire Commissioner, 2013, 2015; Bounagui & Bénichou, 2007; Jurdi-Hage, et al., 2017; Emergency Management BC Office of the Fire Commissioner, 2013; McCormick, 2009; Ontario Office of the Fire Marshal, 2009, 2013; Ontario Ministry of Corrections and Community Services, 2017; Wijayasinghe, 2011, 2012; Wijayasinghe & Makey, 1997). A full national perspective has not been identified since the *2002 Fire Losses in Canada* annual report published by the Council of Canadian Fire Marshals and Fire Commissioners (CCFMFC). In 2002, approximately 54,000 fires were reported in Canada, resulting in over 300 fatalities, 2,500 fire injuries, and billions of dollars in property losses. Home fires accounted for the largest share of these fires, resulting in more than 22,000 fires or 41 per cent of the Canadian total, and 250 deaths, fully 82 per cent of the entire national fire fatality rate in 2002 (CCFMFC, 2007: p. 1). Home fires incurred over seven hundred million dollars in property damages in 2002, almost half of the nation's total loss hence putting a considerable strain on local resources (ibid). In a review of international fire fatality trends based on analyses of data for the year 2007 or the most recent year available, Canada ranked 12th among the 24 industrialized nations studied, with a fire fatality rate of 10.7 fatalities per million population, a rate five times that of Switzerland, the country with the lowest fatality rate among the countries examined (Federal Emergency Management Agency, 2011: p. 2).

Research consistently points to cooking as one of the leading factors, if not the leading factor, contributing to home fires across Canada (e.g., Canadian Association of Fire Chiefs, 2012; Jurdi-Hage,

et al., 2017; McCormick, 2009; Wijayasinghe, 2011, 2012; Wijayasinghe & Makey, 1997). In 2002, CCFMFC (2007) identified cooking equipment (stove, range, food warming appliance) as a significant source of ignition of fires nationally, leading to 5,541 home fire incidents, falling behind only smokers' material and open flame (p. 1), and resulting in direct property loss of $81 million (p. 26). Most of that property damage occurred from cooking fires in one-to-two family dwellings (ibid: p. 8). Based on comparable fire data from British Columbia, Alberta and Ontario for the period from 1995 to 2003, Bounagui and Bénichou (2007) found that home fires originated most frequently in the kitchen and cooking areas (25.8%) and accounted for 16.1 per cent of the 1,327 residential fire deaths (p. 1). These cooking fires often involved the top burner areas of the stove – causing the most fires (18.4%) and most injuries (23.6%), and responsible for 10 per cent of deaths, in which cooking oil or fat was most frequently the material first ignited (ibid: p. 3, 5). Based on analyses of fire data for 2007 in British Columbia, Alberta, Manitoba, Ontario, New Brunswick, and Nova Scotia, for 2008 in Saskatchewan, for the period from 2003 to 2007 in Northwest Territories, and for the period from 2006 to 2008 in the Department of National Defence, Wijayasinghe (2011, 2012) found that cooking fires accounted for the largest percentage of home fires and fire injuries, with kitchen being the leading area of origin for home fires (22%) and civilian home fire injuries (29%) .

Research completed by McCormick (2009) and Emergency Management BC Office of the Fire Commissioner (2013) found that home cooking fires largely dominated the fire problem in British Columbia. For example, an analysis of close to 5,000 structure fires between 1988 and 2007 in the City of Surrey showed that home fires accounted for three-quarters of all fires in the city, and regardless of community, cooking consistently appeared as the leading cause of fires accounting for 40 per cent of home fires (McCormick, 2009: p. 20, 35, 54). Ignorance of hazard and distraction were the most commonly reported causes behind these fires. Paralleling these findings, statistical analysis of fire incidents for 2012 showed that cooking was the leading cause of reported home fires and fire related injuries in British Columbia (Emergency Management BC Office of the Fire Commissioner, 2013: p. 5).

Over the five-year period from 1988 to 1992, cooking equipment accounted for three-tenths of home fires in Alberta, consistently leading the list of home fire ignition sources and accounting for the majority of home fire injuries in this province (Wijayasinghe & Makey, 1997: p. 140, 142, 158). Cooking oil comprised the material first ignited in over two-thirds of all cooking-equipment-related fires, with the most frequent ignition scenario being "overheated cooking oil in a pot or pan on a stovetop" (ibid: p. 140). Based on more recent data, out of 773 cooking fires in Alberta which comprised roughly 25 per cent of determined home fires for the years 2011 and 2012, ignition of cooking oil accounted for a quarter of stovetop cooking fires in both 2011 and 2012, and for 65 per cent in 2011 and 38 per cent in 2012 of stovetop cooking injuries (Alberta Office of the Fire Commissioner, 2013: p. 13, 14). For the years 2013 and 2014, the Alberta Office of the Fire Commissioner (2015) reported that cooking fires continued to be one of the leading "known" causes of home fires and injuries in the province, with overheated cooking oil fires, which comprised nearly three-tenths of all cooking fires, accounting for 208 fire incidents, 2 civilian deaths, 27 civilian injuries, and an estimated $7,429,932 in direct property damage (p. 4). During the same two-year period, other cooking fires accounted for 526 fire incidents, 5 deaths, 56 injuries and direct property damage estimated at $31,135,982 (ibid).

Similarly, based on analysis of fire losses for the 10-year period between 1998 and 2007, the Ontario Office of the Fire Marshal (2009) identified cooking equipment as the number one cause of home fires in the province, reporting that cooking fires accounted for nearly a quarter of all preventable home fires, was the leading cause of home fire injuries, and was the second most common cause of home fire fatalities. Analysis of the 2005-2006 Ontario Stovetop Fire Survey revealed that unattended cooking accounted for 69 per cent of home fires, and distracted or forgetful behaviour accounted for 51 per cent of unattended cooking fires (Ontario Office of the Fire Marshal, 2009: p. 3). Analysis of fire incident data for the year 2011 revealed paralleling findings in Ontario, with cooking found to be the number one cause of home fires in the province (Ontario Office of the Fire Marshal, 2013). While there was a slight decline in the number of home structure fires ignited by cooking equipment, a similar pattern of results was revealed in Ontario for the period from 2011 to 2015, with cooking fires (18%) identified as the single largest cause of home fires during this period as well (Ontario Ministry of Corrections and Community Services, 2017).

For the tenth year in a row, home cooking fires topped the list of unintentional home fires in the City of Regina, Saskatchewan – amounting to half of all unintentional structure fire incidents. Between 2009 and 2015, cooking-related fires caused 39 per cent of the city's structure fires with over $8 million in damages. In 2014, the rate of structure fires caused by careless cooking climbed to the highest number observed since at least 1992, causing 53 per cent of the city's structure fires, and resulting in considerable property damage (Jurdi-Hage, et al., 2017). Regina Fire & Protective Services (RFPS) partnered with the University of Regina's Community Research Unit to research the types of behaviours and sequence of events leading to the outbreak and spread of home cooking fires to develop sound recommendations for behavioural mitigation strategies that will reduce such fires and their resultant outcomes (ibid). An important contribution of this collaborative partnership was that it extended existing knowledge of human behaviour in residential fires by investigating the interaction between host involved, fire hazard agent and environment in more detail, thus effectively addressing the human dimension of home cooking fires. Drawing on analysis of primary data from 884 surveys collected on-scene by RFPS Suppression and Rescue Officers over the course of a two-year period (2014-2015), Jurdi-Hage et al. (2017) found that most home cooking fire incidents occurred because the host was distracted while preparing the meal or forgot that something was on the stovetop.

Home cooking structure fires are a pressing public safety concern in other industrialized nations as well. For example, the Department for Communities and Local Government (2014) reported that misuse of cooking appliances was the ignition source in more than half of all "accidental" home fires in the United Kingdom. The Swedish fire brigades responded to about 6,000 home fires in 2008 (Swedish Civil Contingencies Agency, 2009: p. 17). When the direct fire cause was examined, it was found that 17 per cent of all home fires were caused by cooking appliances being left on, being one of the two largest direct fire causes along with chimney fires (ibid: p. 18). Fire risks associated with cooking appliances being left on were higher for blocks of flats (30%) than detached houses (5%) (ibid: p. 18). In New Zealand, nearly one-third of classified structure fires were caused by cooking equipment (New Zealand Fire Service, 2010: Table 14). Analysis of Australian fire incident data identified the kitchen and cooking area within the household as the most significant area of home structure fire origins with close to half of unintentional home fires (47%) and home fire injuries

(46%) being the result of cooking fires (Fire & Rescue New South Wales, 2016: p. 1). Unattended cooking was identified as the leading cause contributing to cooking fires in Australia (ibid: p. 3).

American research has consistently identified careless cooking as a leading ignition source of home fires (e.g., Ahrens, 2017, 2015, 2013; Ahrens, et al., 2007; Federal Emergency Management Agency, 2013; Greene, 2009; Hall, 2006, 2008). For example, in 2005, cooking equipment was involved in approximately 150,000 residential fires in the United States, accounting for 40 per cent of all residential fires, and resulting in close to 5,000 injuries, 500 fire fatalities, and almost $880 million dollars in property losses (Hall, 2008: p. i). More recent American national estimates for the five-year period from 2009 to 2013 corroborated past trends, showing that cooking continued to be the most common cause of reported home structure fires and home structure fire injuries and one of the leading causes of home fire deaths (Ahrens, 2015: p. ix). Specifically, cooking equipment was involved in almost half of reported home fires over the five-year period, accounting for 45 per cent of home fires and causing an average of 430 civilian deaths per year, and $1.1 billion in direct property damage per year (ibid: p. 1). Similarly, in the five-year-period from 2011 to 2015, cooking equipment was involved in an estimated average of 170,000 home structure fires per year in the United States, representing almost half (47%) of reported home structure fires, 20 per cent of home fire deaths, 45 per cent of reported home fire injuries and $1.2 billion in direct property damage per year (Ahrens, 2017: p. 1). Ranges or cooktops were involved in the majority of these fires and losses, with unattended cooking being by far the leading contributing factor in cooking fires and fire casualties (ibid: p. 8).

1.4. AT HIGH RISK POPULATIONS

International research on home cooking structure fires provide convincing empirical evidence showing these events are not an isolated issue in a single nation but a significant worldwide problem. What is needed is the adoption of a risk management approach which involves a more thorough and in depth understanding of the nature of the risks communities face (Rhodes & Reinholtd, 1998: p. 39). It is with an understanding of the risks that communities face, including particular populations that are most vulnerable, that fire services can build effective fire prevention strategies (ibid). A mounting body of research has substantiated that certain groups are at an elevated risk of experiencing fires and their negative outcomes, and suffer greater consequence following fire incidents. Fire victim profiles indicate that in Canada (e.g., BC Coroners Service, Ministry of Justice, 2012; CCFMFC, 2007; Jurdi-Hage, et al., 2017; Wijayasinghe, 2012), as in many western industrialized nations (for literature reviews, see Ballard, Koepsell, & Rivara, 1992; Clark et al., 2014; Federal Emergency Management Agency, 1997; Jennings, 2013, 1999; Harpur, Boyce, & McConnel., 2014; Miller & Beever, 2005; Rhodes & Reinholtd, 1998; Warda, Tenenbein, & Moffatt, 1999), young children, senior citizens, men and low-income individuals are particularly vulnerable to home fires. Increased vulnerability to fire is determined by a variety of social, environmental, and personal factors which interact with each other and can have a direct and negative impact on the ability of vulnerable groups to access fire emergency safety equipment and information related to fire awareness, prevention and safety, and their ability to recover after experiencing home fires (e.g., Taylor-Butts, 2015). It is important to acknowledge that inequality within society creates specific fire vulnerabilities that must be addressed using an analytical framework that recognizes “the

interconnections between micro-level of individual action and the macro-level of social structures" (Clark et al., 2014: p. 14).

Age is an important risk factor, with very young children and the elderly being the groups most at risk of fire-related casualties due to factors such as reduced physical and cognitive resources (Bruck, Thomas, & Ball, 2007). Various studies and meta reviews have established that children, especially those under age of 5, are at increased risk of home fire deaths (e.g., Flynn, 2010; Warda, et al., 1999). In Canada, based on retrospective analyses of data from 34 children and youth under the age of 19 years who died in 22 residential fire circumstances during the period from 2005 to 2014, a study prepared by the British Columbia Child Death Review Panel found that children under ten were at highest risk of home fire casualties, and that fire-fatality risk increased when they were in situations of substandard housing, overcrowding and less adult supervision (British Columbia Coroners Service, 2016: p. 14). However, the Canadian evidence is far from consistent. For example, analysis of data on residential structure fire deaths in British Columbia from 2007 to 2011 showed a slightly different pattern, with "younger children showing a lower than average rate of residential fire death, 3.6 per million, while those aged 55 to 84 years had a higher than average rate, between 12.0 and 21.0 per million (the overall average rate was 7.4)" (BC Coroners Service, 2016: p. 7). In turn, secondary analyses of coroner's case files for 60 accidental home fire deaths involving children younger than 16 years of age in Ontario for the period from 2001 to 2006 revealed that the highest incidence of fire deaths occurred in children younger than 6 years of age, peaking in the 2-to 4-year-old age group (Chen, Bridgman-Acker, Edwards, & Lauwers, 2011: p. e172). Daytime fires were primarily caused by unsupervised fire play and stove fires, whereas nighttime fires were most commonly due to electrical failures or unattended candles (ibid). More recent fire data corroborated this pattern. For example, statistics for the period from 2000 to 2009 revealed that, out of 91 home fire deaths involving children in Ontario, the highest number of deaths occurred in the 3 to 5 years age group (Ontario Office of the Fire Marshal, 2011). Similarly, for the period from 2006 to 2015, roughly six-tenths of child deaths were between the ages of 0 and 9, and cooking was the ignition source in 14 per cent out of the 42 home fire deaths involving children in the province, excluding fire deaths on First Nations and Federal properties (Office of the Fire Marshal and Emergency Management [Ontario], 2016). In their retrospective study of residential fire deaths involving children in Ontario, Chen and colleagues (2011) found that smoke alarm functionality, fire play, fire escape behaviour, and a history of Children's Aid Society involvement were significant risk factors for pediatric fire death in the province (p. e175).

Young children are at more risk due to their emotional, cognitive and physical immaturity, not knowing how to intervene to properly prevent and mitigate a fire, and are more likely to partake in unsafe actions or activities. Not only are children at greater risk during an active fire situation, but they are also more likely to be unresponsive to sounding home smoke alarms, with studies under both naturalistic conditions or experimentally controlled conditions, suggesting that less than one-third wake up to their home smoke alarm within three minutes (e.g., Bruck, 1999, 2001; Bruck & Bliss, 2000; Bruck & Thomas, 2012; Bruck, Reid, Kouzma, & Ball, 2004;). For example, based on analysis of 123 Australian school-aged children who had smoke alarms, which were placed close to their beds, set off for 30 s, Bruck and Thomas (2012) found that 78 per cent of children who had been asleep between 1 to 3 hours slept through the sounding alarm; that is, only 22 per cent awoke (p.

345). The results were more significant when they examined children between ages 5 to 10 as younger children were 87 per cent more likely to sleep through the sounding alarm, compared to 56 per cent of children 11 to 15 years (ibid). Of those who woke up, less than two-thirds recognized the sound as a smoke alarm and only about half knew they should evacuate (p. 346).

Canadian seniors have been found to have a disproportionally higher fire fatality rate than that of the national average. For example, Wijayasinghe (2012) found that seniors between the ages of 75 and 89 exhibited fire fatalities 2.5 times higher than the national average while seniors aged 90 and older were five times more likely than the average Canadian to die because of fire related outcomes. In Ontario, the Office of the Fire Marshal (2009) found seniors represented 41 per cent of stovetop cooking fatalities in the province (p. 22). Similar findings were reported in other industrialized nations such as the United States (Ahrens, 2013: p. 16, 2015: p. 13), and Northern Ireland (Harpur, et al., 2014: p. 1144). The vulnerability of seniors to fire is due to various factors associated with old age – for example, limited mobility, vision or hearing loss, and mental disabilities – many of which commonly exist in combination and compound each other's effects (e.g., Barnett, 2008; Brennan, 1999; Bruck, Thomas, & Kritikos, 2006; Miller, 2005; Harpur, et al. 2014; Warda, et al., 1999; Wijayasinghe, 2012). In addition to physical vulnerabilities, many seniors face high fire risk because they live alone, which means they cannot rely on assistance from another individual to detect fire cues promptly or respond appropriately (e.g., Barnett, 2008; Warda, et al., 1999). In Canada, approximately one-quarter (24.6 percent) of seniors aged 65 and older lived alone in 2011 (Statistics Canada, 2012: p. 2). Close to one-third of senior women aged 65 and over were living alone in 2011, compared to only 16 per cent of men (ibid: p. 2). The 2011 Census data also showed that as seniors got older, the proportion of individuals living alone increased: Among women aged 80 to 84, 40 per cent were living alone, compared to about 19 per cent of men at this age group (Statistics Canada, 2012: p. 3). Also, findings from the 2010 Canadian General Social Survey showed that individuals aged 65 and older spent the most time cooking of all Canadians increasing their exposure to fire hazard risk, with individuals 65 to 74 and those 75 and over spending on average 50 to 70 and 55 to 80 minutes daily cooking over a seven-day week, respectively (Statistics Canada, 2011: p. 18-19).

Cooking fires and fatal and non-fatal casualties are experienced differently by *gender*, with men being frequently cited in the literature as having higher rates of injury and fatality in home fires (e.g., Ahrens, et al., 2007; BC Coroners Service, Ministry of Justice, 2012; Brennan & Thompson, 2001a,b; Stokes, Molano, & Nana, 2011). For example, based on analysis of Canadian fire data collected in 2002, 174 men died because of fire-related incidents, accounting for 57 per cent of the total fire fatalities that year (CCFMFC, 2007: p. 26). Males' socialization into risk taking behaviours, such as engaging in careless cooking activities and attempting to fight the fire once in progress, may account for their higher fire casualty risks. Their casualty-fire vulnerability can also be impacted by presence of any sort of inhibition whether it be medication, alcohol or drugs which can alter judgement and ability to respond promptly and appropriately to the fire incident (e.g., Bruck, Ball, & Thomas, 2011; Miller & Beever, 2005; Stokes, et al., 2011; Warda, et al., 1999; Xiong, Bruck, & Ball, 2015;). Examining Alberta's cooking oil fire casualties for the period from 1988 to 1992, Wijayasinghe and Makey (1997) found that men were more likely to enter or remain to fight the fire, save property, or rescue someone, and more males than females were asleep or impaired by alcohol, drugs, or medication at the time of the fire (p. 158). Similarly, Stokes et al. (2011) found that the majority of home fire victims

impaired by alcohol were males in their early 20s and in the 40 to 50 years age group (p. 24). In turn, based on secondary analysis of Australian coroners' fire fatality records for the state of Victoria for the period from 1998 to 2006, Bruck, Ball, and Thomas (2011) found a three times greater odds of a male fire fatality associated with a positive blood alcohol concentration than a female fire fatality (p. 733). Karter and Miller (1990, 1994) also found male fire victims were more often intoxicated than female victims. Being intoxicated is a well-established predictor of fire vulnerability affecting fire ignition, responsiveness to fire cues, and effective escape behaviours due to impaired judgement and decision-making as well as its impact on physical coordination, reaction time and performance (e.g., Ahrens, et al., 2007; Barillo & Goode, 1996; Hall, 2006; Howland & Hingson, 1987; Miller, 2005; Stokes, et al., 2011).

Socioeconomic status is another key predictor of fire vulnerability. In their meta-reviews, Jennings (2013) and Warda and colleagues (1999) found socioeconomic status a significant "non-modifiable" risk factor of both fatal and non-fatal home fire casualties (see also, Barnett, 2008; Duncanson, Woodward, & Reid, 2002; Miller, 2005; Miller & Beever, 2005). Residents of low socio-economic areas are at greater risk, primarily due to increased likelihood of occupying residences that are of poor quality; lack of information about fire risk and fire safety because of physical or social isolation; and limited resources with which to ensure the safety of their homes (Chhetri, et al., 2010; Duncanson, et al., 2002; Rhodes & Reinholtd, 1998). For example, in a Canadian study using data from the 2014 Survey of Emergency Preparedness and Resilience (SEPR), Taylor-Butts (2015) found that a smaller percentage of low-income individuals reported having multiple fire prevention devices, including, but not limited to: smoke detector, carbon monoxide detector, and a fire extinguisher compared to higher-income individuals (p. 11). Also, research suggests that low-income individuals are more likely to live in rental properties, which tend to be associated with higher fire risks. Analysis of the 2014 Canadian SEPR revealed that renters, compared to Canadian home owners, were more likely to live in homes that engaged in fewer emergency preparedness behaviours, being significantly less likely to have all three fire safety devices in their homes (Taylor-Butts, 2015: p. 3, 12). Some Canadian studies revealed differential fire risks by community or neighbourhood of residence. For instance, McCormick (2009) found that particular areas of Surrey, British Colombia were at greater risk of home fires. Similar results were found by Jurdi-Hage and colleagues (2017) in Regina, Saskatchewan. Both these studies identified higher fire incidence rates in lower income neighbourhoods. For instance, in Regina, the greatest number of home cooking incidents occurred in the most economically depressed area of the city, the "Central Zone." When grouping the research project data by metropolitan area, a quarter (25.3%) of these cooking fire incidents happened in North Central, one the most economically depressed areas of the city (Jurdi-Hage, et al., 2017: p. 77, 135). A study in New Zealand based on aggregate data for the period from 1993 to 1998 also revealed that fatal unintentional home fires occurred disproportionately in homes in the most socioeconomically deprived mesh-blocks (Duncanson, et al., 2002).

In Canada, home fire risks are quite high in *Aboriginal communities* (e.g., BC Coroners Service, Ministry of Justice, 2012; Canadian Mortgage & Housing Corporation, 2007; Garis, Hughan, McCormick, & Maxim, 2016) as well as among recent immigrants (e.g., Jurdi-Hage, et al., 2017) compared to the Canadian average due to their lack of economic and social capital. A report prepared by the Canadian Mortgage and Housing Corporation (2007) reported that per capita fire incidence

rate, fire fatal and non-fatal casualty rates, and fire property damage per unit were much higher in Aboriginal communities compared to the Canadian average. Similarly, for the period from 1991 to 2001, fire-related fatality rates were found to be 9.4 times higher for Status First Nations individuals compared to other residents in British Columbia, and this trend did not appear to be slowing down (Gilbert, Dawar, & Armour, 2006: p. 302). A more recent report summarizing all "accidental" home structure fatalities in British Columbia from 2007 to 2011 found that individuals of Aboriginal identity had four times the estimated residential fire death rate in the province, and four out of every ten Aboriginal victims died in fires on Federal Reserve land (BC Coroners Service, Ministry of Justice, 2012: p. 5). In addition, Aboriginal fire fatal victims were found to be 20 years younger on average than non-Aboriginal victims (ibid: p. 5). Economic inequality has a significant impact on Indigenous groups fire vulnerability. According to a study commissioned by the Aboriginal Affairs and Northern Development Canada (2013), men and women belonging to Aboriginal groups had lower income and earnings than British-origin people (p. 1). Using data from the 2011 National Household Survey (NHS), a Statistics Canada (2015) study revealed Aboriginal populations made less money than non-Aboriginal population, with a median after-tax income of $7,000 less than their non-Aboriginal counterparts in 2010 (p. 26). As has been discussed earlier, lower income often results in poorer housing conditions, and this trend is seen in many Aboriginal populations. The 2011 NHS revealed that Aboriginal individuals were more likely to live in houses that were classified by residents as in need of major repair than non-Aboriginal populations, especially among First Nations living on reserve, and Inuit living in Inuit Nunangat (Statistics Canada, 2015: p. 15). Additionally, Aboriginal people were more likely to live in overcrowded housing than their non-Aboriginal counterparts (ibid: p. 14). Fire safety devices are still lacking in many First Nations homes. For example, according to statistics provided by the Manitoba Office of the Fire Commissioner (2016), smoke alarms were not present in 23 per cent (18 out of 79) of house fires in Manitoba First Nations communities in 2014, compared to just eight per cent of home fires outside of First Nations communities that same year (*cited in* Nicholson, Kubinec, & Marcoux [CBC News], 2016).

While fire risk data on Canadian *recent immigrants* is still sparse, comparison with census data suggests that, in the City of Regina, Saskatchewan, overseas-born newcomers had a relative incidence risk 1.8 times that of the city's Canadian-born population (Jurdi-Hage, et al., 2017: p. 48). Recent immigrants were not only more vulnerable to careless cooking in terms of numbers of incidents experienced as a proportion of their population base, but also in terms of the incident outcome as defined by the actions taken by firefighters and the escalation and severity of the home cooking fire incident (ibid: p. 132). For example, non-Canadian born hosts were more likely to require firefighter intervention compared to their Canadian counterparts, after holding other variables constant. They were also significantly more likely to experience home cooking fire incidents that escalated. A number of factors could account for the high fire risk incidence and negative fire outcomes of immigrant populations, including: language barriers; cultural differences between origin and host countries; unfamiliarity with electric stovetops and a lack of understanding of the potential dangers associated with them; likelihood of living in overcrowded and poor-quality housing; differences in building construction between country of origin and host country; and lack of knowledge about existent fire-safety information or inability to access it due to social isolation or language and cultural barriers (e.g., National Fire Protection Association, 2016; Taylor-Butts, 2015). For instance, based on an analysis of data from the 2014 SEPR in Canada, Taylor-Butts (2015) found that recent immigrants

(24%) were significantly less likely to live in households equipped with all three fire safety devices, that is, a working smoke detector, carbon monoxide detector and fire extinguisher, compared to more established immigrants (44%) and those born in Canada (44%) (p. 12). Similarly, immigrants, both recent and more established, were less likely to have large social support networks they could rely on in an emergency, compared to non-immigrants (ibid: p. 20).

2. Importance of the Study and Objectives

Home cooking structure fires are a significant, yet preventable, public-safety problem in Canada and internationally. More research is needed to better understand the causes and circumstances contributing to the outbreak and escalation of home cooking fires as well as their outcomes on life safety, health and wellbeing, including their significant contribution to fire losses and injury and their economic impact. To be effective, cooking fire prevention strategies need to target those populations at highest risk, and the circumstances that are most likely to result in the onset and escalation of cooking fire incidents. Despite recent progress, the state of Canadian fire research continues to be underfunded and isolated within disciplines, frustrating broader application of findings to actual preventive and mitigation activities nationally (e.g., TriData, 2009). While most industrialized nations – including the United States, Australia, New Zealand, and the United Kingdom – have nationally unified, coordinated and standardized fire reporting systems to inform resource allocation, prevention efforts, and civilian fire education programs, Canada does not have yet a cohesive national database of fire statistics, with existing data being incomplete, inconsistent and not comparable (e.g., Maxim, et al., 2013).

Analyses of the newly formed National Fire Information Database (NFID), which collected and standardized roughly a decade of fire records from seven Canadian jurisdictions (including six provinces and the Canadian Armed Forces), offers a key opportunity to establish the contribution made by fires originating in cooking equipment to total fire losses in Canadian homes, including deaths, injuries and property damage. Funded by the Canadian Safety and Security Program, a federal program delivered by the Defence Research and Development Canada's Centre for Security Science in partnership with Public Safety Canada, data from this pilot project will help characterize the cooking fire problem by identifying the most frequent ignition scenarios, the most common materials ignited in cooking equipment fires, the most significant area of home cooking structure fire origins, and the demographic, behavioural, and environmental factors associated with these fires. The data will also provide insights on how occupants became aware of these fires, including the role played by smoke alarms, and the types of actions occupants took to put out the fires. Systematic collection and analyses of cooking fire data to understand cooking fire dynamics and actual and potential threats to safety will help inform public education programs to modify behaviour, and identify key areas requiring attention.

Focusing on 27,215 reported fire incidents and 3,729 cooking fire casualties for the provinces of Ontario, Manitoba, Alberta and British Columbia, the present study analyzed data from the NFID for the ten-year period covering 2005 to 2014 to describe home cooking structure fires by examining:

i. causes and circumstances of the ignitability of home cooking fires and determine how prevalent these behavioural and environmental risk factors are in the reporting provinces;

ii. presence and performance of fire detection and fire protection devices, and the impact of smoke alarm activation on occupant(s) response and evacuation;

iii. extent of cooking fire spread and severity, damage caused and dollar amount of loss;

iv. initial detection or means by which cooking fires were first detected;

v. nature of action taken and method(s) of control used to extinguish cooking fires and relate these to casualties sustained by occupants; and

vi. civilian cooking fire-related injuries and deaths and demographic, behavioural and environmental risk factors that affected the likelihood that a home cooking fire would result in injury or death.

3. Data and Methods

3.1. NFID – DATABASE OVERVIEW

The Canadian Centre of Justice Statistics (CCJS), a division of Statistics Canada, worked with the Canadian Association of Fire Chiefs (CAFC) and the Council of Canadian Fire Marshals and Fire Commissioners (CCFMFC) to develop the capacity to collect, compile and analyze fire incident information on a national basis. In April 2017, CCJS delivered the NFID database to the CAFC, after standardizing fire and loss data by transforming jurisdictional data to the NFID standard to allow comparability across the participating jurisdictions and to provide a national picture using common codes and reporting standards (Statistics Canada, 2017c: p. 6, 8, 14). While the type and extent of data collected and captured by each jurisdiction varied, seven jurisdictions contributed fire-related data for the pilot NFID project within the timeframe allocated for data collection: New Brunswick, Ontario, Manitoba, Saskatchewan, Alberta, British Columbia and the Canadian Armed Forces. These jurisdictions represented 74 per cent of the Canadian population (on June 1, 2014) (Statistics Canada, 2017a: p. 2), and together contributed a total of 467,929 incident records and 15,326 victim records (Statistics Canada, 2017d: p. 2). The database includes fire data for the period from 2005 to 2015; however, not all participating jurisdictions were able to provide the complete 11 years of fire incident and victim information due to either system constraints or data unavailability. Also, it is important to note that there was an unknown level of underreporting of fire incidents across the country (Statistics Canada, 2017d). Hence, the NFID is limited to fires that were reported by local fire departments to their respective Fire Commissioner's/Fire Marshal's Offices within the legislated

timeframe for each calendar year. Any analysis undertaken using the NFID should acknowledge that the data does not necessarily represent a complete listing of all fire incidents in the reporting provinces.

Only British Columbia, Alberta, Manitoba, and Ontario provided at least 10 years of data for both fire incidents and victims. It is for this reason that the information in this report covered data on fire incidents and fire losses for the period from 2005 to 2014 for these four jurisdictions only, for a total of 417,957 fire incidents and 14,236 fire casualties. Table 2 summarizes the number of incident and victim records in the NFID by jurisdiction and year. New Brunswick did not provide information related to the type of property, and data related to deaths and persons injured as a result of fire incidents were not provided by the Canadian Armed Forces. Saskatchewan only provided data for the period from 2012 to 2015, and there was a comparatively higher degree of underreporting for this province. Prince Edward Island and the Northwest Territories were not able to contribute data as record keeping in these jurisdictions has posed significant challenges.

3.2. UNITS OF ANALYSIS

There are two basic units of analysis for the NFID – incidents and victims. Both files contain a derived unique key which was used to link between the two files. To meet the objectives of this study, the incident file with a single record for each fire incident, and the victim/casualty file with a single record for each victim/casualty were accessed. As such, both home cooking fire incidents and victims of home cooking fires were examined separately as units of analysis.

3.3. DATA REQUIREMENTS

The focus of the analyses presented in the next section is on all reported home cooking[1] structure fire incidents, irrespective of severity or extent of fire spread or whether there were serious injuries, deaths and/or significant property damage, an area that has been largely ignored in the past (for a review, see Jurdi-Hage, et al., 2017; also, see Xiong, Bruck, & Ball, 2014, 2015, 2016). All incidents with a code indicating residential[2] fires involving cooking equipment[3] in the kitchen or cooking area were examined. These selective criteria are in line with the definition used in previous, published empirical research on home cooking fires, in which fires involving cooking equipment are defined as any incident large or small that resulted in unwanted flames or smoke, and could have caused damage

[1] "Cooking" refers to food preparation through application of heat.

[2] Structures where persons commonly reside for living purposes, either on a permanent or temporary basis, are defined as "residential structures." Residential fires refer to incidents where a fire originates in a house, apartment or other residence where the occupant/host lives. Residential fires were selected from the variables "major occupancy" to include only incidents with the codes for "residential use" (codes 03 and 31 through 39) and "property classification" (all 3000's code under residential property).

[3] When cooking equipment is described as a cause, it means that the cooking equipment provided the heat that started the fire. The "igniting object" variable was used to identify incidents associated with cooking equipment (i.e., codes 020, 030, 040, 050, 060, 070, 071, 072, 073, 080, 110, 120, 130, 140, 150, 160, 170, 180, and 190).

TABLE 2. NUMBER OF REPORTED FIRE INCIDENTS AND FIRE CASUALTIES, 4 JURISDICTIONS, NFID, 2005 TO 2014

	Reporting Jurisdiction				
Year	Ontario	Manitoba†	Alberta	British Columbia	Total
			Fire Incidents		
2005	28790	5316	5120	7250	46476
2006	25909	6090	5024	8073	45096
2007	27048	5986	5078	7846	45958
2008	21916	5471	5504	8092	40983
2009	23967	5529	4989	8720	43205
2010	24331	5804	5084	7305	42524
2011	21610	5170	7424	6635	40839
2012	24495	5328	5993	7055	42871
2013	19164	3754	5734	6676	35328
2014	18725	3624	5735	6593	34677
Total	**235955**	**52072**	**55685**	**74245**	**417957**
			Fire Casualties		
2005	1030	35	284	230	1579
2006	822	24	269	224	1339
2007	936	38	228	215	1417
2008	757	26	273	266	1322
2009	973	29	233	253	1488
2010	942	27	232	223	1424
2011	868	38	211	247	1364
2012	939	27	221	302	1489
2013	942	15	181	292	1430
2014	899	12	198	275	1384
Total	**9108**	**271**	**2330**	**2527**	**14236**

Note. †Between 2005 and 2014, Manitoba's fires resulted in 2,741 civilian casualties, yet the victim file contained detailed information on only 271 civilian casualties. All reported deaths (*n*= 193) were investigated and thus these additional fire casualty data elements were available for fatal fires, yet additional information was not recorded for the vast majority of civilian injuries in the province.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

to life or property if left unchecked (e.g., Ahrens, 2017, 2015, 2013; Ahrens, et al., 2007)[4].

Tables 3 through 5 summarize record counts for: i) structure fire incidents, ii) home structure fire incidents, and iii) home fires by selected source of ignition, respectively, separately for each of the four jurisdictions and by year.

Out of a total of 417,957 fire incidents, there were 204,499 structure fires (Table 3). Among the provinces, Alberta (59%) reported the largest overall proportion of structure fires during the period of examination while Manitoba (38%) reported the lowest overall. It should be noted that structure fires rose steadily in Manitoba to account for roughly five out of every ten fire incidents in 2014.

TABLE 3. NUMBER OF REPORTED STRUCTURE FIRE INCIDENTS, 4 JURISDICTIONS, NFID, 2005 TO 2014

	Reporting Jurisdiction				
Year	**Ontario**	**Manitoba**	**Alberta**	**British Columbia**	**Total**
2005	15490	2065	2818	3124	23497
2006	14841	2131	2891	3413	23276
2007	15338	2042	3066	3545	23991
2008	13318	1946	3361	3668	22293
2009	11108	1974	3094	3609	19785
2010	10546	2090	3080	3212	18928
2011	9583	2061	4530	3151	19325
2012	9834	2034	3352	3258	18478
2013	9266	1681	3224	3303	17474
2014	9220	1790	3227	3215	17452
Total	**118544**	**19814**	**32643**	**33498**	**204499**

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

[4] The NFID pilot project did not include information on certain incidents that were not considered fires. An example includes "overheat" incidents (e.g., overcooked roast in the oven), characteristic of events in which removal of the heat source would stop the alteration process, thus successfully preventing ignition. This criterion restricted fire incidents to those which caused, or had the potential to cause negative outcomes, if left unattended (Statistics Canada, 2017b: p. 135).

Of structure fires that occurred between 2005 and 2014, 126,463 (62%) were residential fires (Table 4), or home fires comprised six out of every ten structure fire incidents. This proportion was fairly consistent among the four provinces and over the ten-year period.

TABLE 4. NUMBER OF REPORTED HOME STRUCTURE FIRE INCIDENTS, 4 JURISDICTIONS, NFID, 2005 TO 2014

	Reporting Jurisdiction				
Year	**Ontario**	**Manitoba**	**Alberta**	**British Columbia**	**Total**
2005	8575	1263	1617	2132	13587
2006	8168	1223	1535	2306	13232
2007	8743	1166	1824	2371	14104
2008	7906	1106	1955	2513	13480
2009	6986	1168	1851	2487	12492
2010	6639	1216	1905	2197	11957
2011	6199	1191	3167	2247	12804
2012	6280	1102	2120	2310	11812
2013	6024	1017	2099	2434	11574
2014	5951	1097	2118	2255	11421
Total	**71471**	**11549**	**20191**	**23252**	**126463**

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Among home structure fire incidents across the four jurisdictions, cooking equipment accounted for a total of 27,215 of all home fires (Table 5). Where determined, cooking equipment was consistently one of the most common sources of ignition in home structure fires over the ten-year study period. For example, cooking equipment was the leading source of ignition in Manitoba, British Columbia and Ontario (2009 and onwards), whereas in Alberta cooking equipment was the second most common source of ignition, after smoker's material and open flame. Cooking equipment as the source of ignition in home structure fires did not appear to be decreasing in either British Columbia or Ontario, instead the cooking fire problem's share of total home fires increased somewhat consistently over the ten-year period. In Manitoba, a declining trend was observed between 2005 and 2008, at which point it levelled off at one-third of home fires till 2011, then from 2012 and onwards, the cooking fire problem's share of total home fires went up, with cooking equipment as the source of ignition accounting for 38 per cent of "determined" home fires in 2014. Except for a dip in 2011,

TABLE 5. HOME STRUCTURE FIRES BY SELECTED SOURCES OF IGNITION, 4 JURISDICTIONS, NFID, 2005 TO 2015

	Reporting Jurisdiction								
	Ontario		Manitoba		Alberta		British Columbia		
Year	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Total
					Cooking equipment				
2005	1556	24.8	419	40.9	300	22.4	458	29.5	2733
2006	1581	26.7	362	37.6	309	24.0	472	28.2	2724
2007	1487	24.4	329	35.4	308	21.2	521	30.5	2645
2008	1480	27.2	293	32.4	356	22.5	584	31.2	2713
2009	1491	29.2	304	32.2	335	23.0	614	33.7	2744
2010	1458	30.3	335	33.5	382	26.6	611	36.0	2786
2011	1258	29.1	300	32.3	405	19.1	660	38.7	2623
2012	1276	29.5	302	34.5	388	25.0	724	40.7	2690
2013	1270	30.4	274	35.9	401	24.8	791	42.1	2736
2014	1337	31.6	332	38.2	412	25.8	740	41.3	2821
Total	**14194**	**28.0**	**3250**	**35.3**	**3596**	**23.3**	**6175**	**35.3**	**27215**
					Smoker's material and open flame				
2005	1826	29.1	241	23.5	418	31.3	381	24.5	2866
2006	1691	28.5	259	26.9	440	34.2	420	25.1	2810
2007	1801	29.6	252	27.1	464	31.9	413	24.2	2930
2008	1526	28.0	264	29.2	517	32.7	442	23.6	2749
2009	1330	26.1	259	27.4	444	30.5	458	25.2	2491
2010	1248	25.9	270	27.0	383	26.7	397	23.4	2298
2011	1085	25.1	267	28.7	666	31.5	345	20.2	2363
2012	1172	27.1	243	27.7	476	30.7	388	21.8	2279
2013	1034	24.8	175	22.9	496	30.7	418	22.2	2123
2014	977	23.1	168	19.3	476	29.8	410	22.9	2031
Total	**13690**	**27.0**	**2398**	**26.1**	**4780**	**31.0**	**4072**	**23.3**	**24940**
					Heating equipment				
2005	1337	21.3	135	13.2	172	12.9	377	24.3	2021
2006	1214	20.5	115	11.9	144	11.2	361	21.6	1834
2007	1278	21.0	127	13.7	147	10.1	324	19.0	1876
2008	1066	19.6	112	12.4	183	11.6	380	20.3	1741
2009	975	19.1	114	12.1	174	12.0	299	16.4	1562
2010	848	17.6	89	8.9	144	10.0	251	14.8	1332
2011	802	18.6	103	11.1	155	7.3	287	16.8	1347
2012	756	17.5	82	9.4	163	10.5	233	13.1	1234
2013	754	18.1	85	11.1	128	7.9	247	13.1	1214
2014	698	16.5	106	12.2	121	7.6	234	13.1	1159
Total	**9728**	**19.2**	**1068**	**11.6**	**1531**	**9.9**	**2993**	**17.1**	**15320**

TABLE 5. CONTINUED

	Reporting Jurisdiction								
	Ontario		Manitoba		Alberta		British Columbia		
Year	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Total
					Electrical equipment				
2005	888	14.1	126	12.3	163	12.2	182	11.7	1359
2006	771	13.0	113	11.7	145	11.3	213	12.7	1242
2007	834	13.7	121	13.0	188	12.9	252	14.7	1395
2008	779	14.3	142	15.7	251	15.9	249	13.3	1421
2009	687	13.5	146	15.5	258	17.7	246	13.5	1337
2010	665	13.8	160	16.0	222	15.4	241	14.2	1288
2011	624	14.5	128	13.8	244	11.5	239	14.0	1235
2012	609	14.1	125	14.3	242	15.6	237	13.3	1213
2013	610	14.6	118	15.4	247	15.3	244	13.0	1219
2014	588	13.9	136	15.7	260	16.3	224	12.5	1208
Total	**7055**	**13.9**	**1315**	**14.3**	**2220**	**14.4**	**2327**	**13.3**	**12917**
					Appliances and equipment				
2005	347	5.5	53	5.2	85	6.4	89	5.7	574
2006	357	6.0	56	5.8	66	5.1	110	6.6	589
2007	362	5.9	45	4.8	83	5.7	103	6.0	593
2008	329	6.0	44	4.9	78	4.9	121	6.5	572
2009	326	6.4	54	5.7	75	5.2	121	6.6	576
2010	319	6.6	60	6.0	72	5.0	95	5.6	546
2011	304	7.0	47	5.1	90	4.3	111	6.5	552
2012	267	6.2	36	4.1	103	6.6	103	5.8	509
2013	301	7.2	40	5.2	106	6.6	106	5.6	553
2014	328	7.8	48	5.5	73	4.6	112	6.3	561
Total	**3240**	**6.4**	**483**	**5.2**	**831**	**5.4**	**1071**	**6.1**	**5625**
					Total (excludes unknown, undetermined, not applicable, not available, & miscellaneous)				
2005	6276	12.4	1024	11.1	1337	8.7	1552	8.9	10189
2006	5929	11.7	964	10.5	1287	8.3	1671	9.6	9851
2007	6090	12.0	930	10.1	1453	9.4	1709	9.8	10182
2008	5451	10.7	903	9.8	1580	10.2	1869	10.7	9803
2009	5105	10.1	944	10.3	1455	9.4	1820	10.4	9324
2010	4816	9.5	1001	10.9	1437	9.3	1698	9.7	8952
2011	4316	8.5	929	10.1	2116	13.7	1706	9.8	9067
2012	4332	8.5	876	9.5	1553	10.1	1779	10.2	8540
2013	4171	8.2	764	8.3	1615	10.5	1879	10.8	8429
2014	4229	8.3	869	9.4	1595	10.3	1791	10.2	8484
Total	**50715**		**9204**		**15428**		**17474**		**92821**

Note. Counts will not add to the total because only selected categories were presented here.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Alberta's cooking equipment share to home structure fires remained fairly consistent over the ten-year period, accounting for roughly a quarter of all home fires where the source of ignition was determined. The focus of the analyses that will follow relates to home cooking structure fires only.

3.4. VARIABLES

NFID contains a wealth of information on the characteristics of fire incidents and casualties. To meet the study's objectives, several variables from the following sections of the NFID data were used (Statistics Canada, 2017b: p. 2, 6):

(a) fire incident characteristics (e.g., reporting jurisdiction, year, month of year, date of month, day of week, hour of the day);

(b) property description (e.g., property classification, number of occupants);

(c) fire protection features (e.g., sprinkler protection, automatic fire detection system, fire detection devices);

(d) circumstances contributing to outbreak of fire (e.g., igniting object, fuel or energy associated with igniting object, energy causing ignition, material first ignited, act or omission);

(e) factors related to origin and spread of fire (e.g., area of origin, flame spread: interior finish, horizontal openings and vertical openings, smoke spread avenues);

(f) fire loss details (e.g., extent of fire, extent of damage, number of casualties, property and contents loss caused by fire);

(g) discovery of fire and actions taken (e.g., how fire was initially detected, transmission of alarm to fire department, action taken, method of fire control and extinguishment, performance of smoke alarm device, impact of smoke alarm activation on occupant(s) response and evacuation); and

(h) civilian fire casualties (e.g., age of victim, sex of victim, status of victim, nature of casualties, probable/possible cause, class of victim, condition of casualty, action of casualty).

3.5. STATISTICAL ANALYSES

IBM SPSS Statistics 23 and Stata 15 were used for data management and analyses. Analyses was performed separately for each jurisdiction. Despite efforts to standardize the data, there were still important differences in data elements reported to the NFID and code choices used within variables that justified performing and reporting the analyses separately for each jurisdiction. Some tables contain a relatively high proportion of unknown, undetermined and unclassified values. To aid in the interpretation of results, these counts were removed from the calculation of proportions reported in the text. Because the proportions of known values were artificially inflated, caution should be exercised in the interpretation of the information obtained from these tables.

4. Key Findings

4.1. FIRE INCIDENT CHARACTERISTICS

Year of incident

Table 6 summarizes the distribution of reported home cooking structure fires by year for each province.

During the 2005 to 2014 period, the proportion of reported home structure fires involving cooking equipment rose quite consistently from year to year in Alberta and British Columbia. While the distribution of cooking fires fluctuated to some extent over the ten-year study period in Ontario and, particularly in, Manitoba, the general trend in these two provinces was one of slight decline.

TABLE 6. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY YEAR OF INCIDENT, 4 JURISDICTIONS, NFID, 2005 TO 2014

Year of Incident	Ontario		Manitoba		Alberta		British Columbia	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
2005	1556	11.0	419	12.9	300	8.3	458	7.4
2006	1581	11.1	362	11.1	309	8.6	472	7.6
2007	1487	10.5	329	10.1	308	8.6	521	8.4
2008	1480	10.4	293	9.0	356	9.9	584	9.5
2009	1491	10.5	304	9.4	335	9.3	614	9.9
2010	1458	10.3	335	10.3	382	10.6	611	9.9
2011	1258	8.9	300	9.2	405	11.3	660	10.7
2012	1276	9.0	302	9.3	388	10.8	724	11.7
2013	1270	8.9	274	8.4	401	11.2	791	12.8
2014	1337	9.4	332	10.2	412	11.5	740	12.0
Total	**14194**		**3250**		**3596**		**6175**	

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Month of year

There was no particular pattern evident in the distribution of home cooking structure fires over the 12 months of the year. With the slight exceptions of dips in February in both Ontario and Alberta, and the month of November in British Columbia, there was relatively little variation in frequency of reported home cooking structure fires by month.

TABLE 7. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY MONTH OF INCIDENT, 4 JURISDICTIONS, NFID, 2005 TO 2014

Month of Incident	Ontario		Manitoba		Alberta		British Columbia	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
January	1013	7.1	279	8.6	283	7.9	516	8.4
February	946	6.7	242	7.4	233	6.5	466	7.5
March	1132	8.0	251	7.7	295	8.2	500	8.1
April	1203	8.5	287	8.8	290	8.1	510	8.3
May	1407	9.9	299	9.2	355	9.9	570	9.2
June	1313	9.3	269	8.3	356	9.9	541	8.8
July	1292	9.1	274	8.4	302	8.4	576	9.3
August	1229	8.7	285	8.8	314	8.7	562	9.1
September	1207	8.5	298	9.2	272	7.6	530	8.6
October	1245	8.8	253	7.8	322	9.0	504	8.2
November	1109	7.8	242	7.4	308	8.6	427	6.9
December	1098	7.7	271	8.3	266	7.4	473	7.7
Total	**14194**		**3250**		**3596**		**6175**	

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Date of month of incident

Especially in Ontario and British Columbia, the proportion of home cooking structure fires occurring on different days of the month were fairly evenly distributed.

TABLE 8. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY DAY OF MONTH, 4 JURISDICTIONS, NFID, 2005 TO 2014

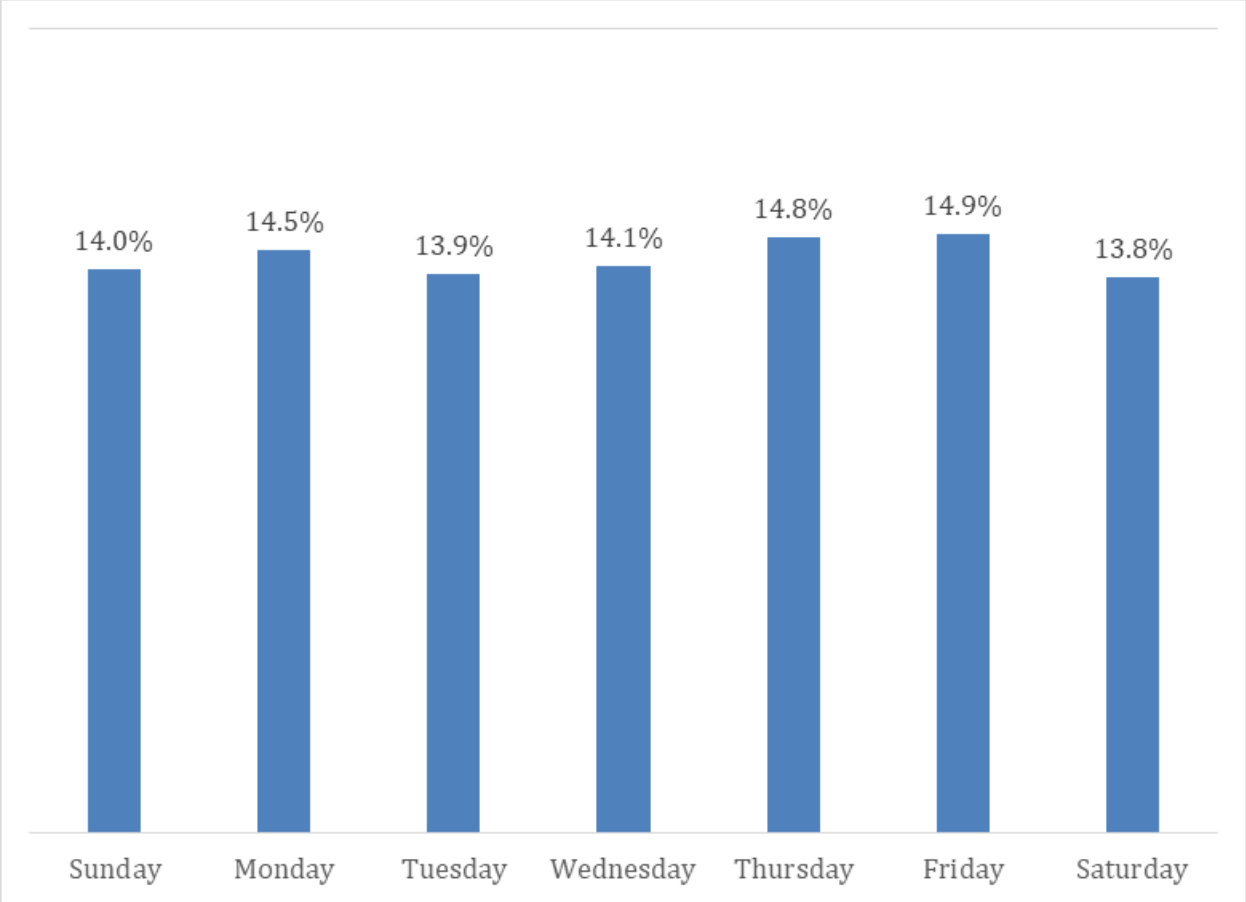
Day of Month	Ontario		Manitoba		Alberta		British Columbia	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
1	479	3.4	132	4.1	142	3.9	190	3.1
2	460	3.2	90	2.8	124	3.4	210	3.4
3	438	3.1	107	3.3	121	3.4	212	3.4
4	455	3.2	104	3.2	111	3.1	173	2.8
5	464	3.3	106	3.3	133	3.7	218	3.5
6	464	3.3	138	4.2	118	3.3	228	3.7
7	454	3.2	109	3.4	117	3.3	204	3.3
8	459	3.2	91	2.8	131	3.6	188	3.0
9	440	3.1	100	3.1	136	3.8	185	3.0
10	469	3.3	114	3.5	124	3.4	227	3.7
11	480	3.4	101	3.1	125	3.5	192	3.1
12	486	3.4	89	2.7	142	3.9	220	3.6
13	473	3.3	103	3.2	124	3.4	204	3.3
14	470	3.3	110	3.4	92	2.6	202	3.3
15	438	3.1	114	3.5	101	2.8	196	3.2
16	475	3.3	112	3.4	107	3.0	190	3.1
17	462	3.3	97	3.0	119	3.3	190	3.1
18	474	3.3	103	3.2	106	2.9	211	3.4
19	484	3.4	111	3.4	113	3.1	188	3.0
20	456	3.2	90	2.8	107	3.0	207	3.4
21	481	3.4	81	2.5	113	3.1	228	3.7
22	486	3.4	110	3.4	99	2.8	162	2.6
23	519	3.7	94	2.9	111	3.1	186	3.0
24	464	3.3	112	3.4	122	3.4	219	3.5
25	458	3.2	112	3.4	113	3.1	196	3.2
26	468	3.3	128	3.9	91	2.5	201	3.3
27	446	3.1	104	3.2	147	4.1	207	3.4
28	455	3.2	106	3.3	132	3.7	216	3.5
29	424	3.0	122	3.8	115	3.2	199	3.2
30	436	3.1	99	3.0	94	2.6	202	3.3
31	277	2.0	61	1.9	66	1.8	124	2.0
Total	**14194**		**3250**		**3596**		**6175**	

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Day of week of incident

Information on the day of the week of incident was only available for one province. There was no particular pattern evident in the distribution of home cooking structure fires over the seven-day week in Alberta.

FIGURE 1. PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY DAY OF THE WEEK OF INCIDENT, ALBERTA, NFID, 2005 TO 2014



Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Hour of the day

Reported home fires involving cooking equipment peaked between 5:00 pm and 7:00 pm in Alberta (18.9%), British Columbia (17.1%), and Manitoba (17.0%), which coincide with dinner cooking times.

Interestingly, roughly over one out of every ten home cooking fires in Manitoba occurred between midnight and 1:00 am.

TABLE 9. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY ALARM TIME OF INCIDENT, 3 JURISDICTIONS, NFID, 2005 TO 2014

	Manitoba		Alberta		British Columbia	
Alarm Time of Incident	Freq.	Percent	Freq.	Percent	Freq.	Percent
Midnight- 12:59 a.m.	364	11.2	237	6.6	–	–
1:00-1:59 a.m.	59	1.8	56	1.6	122	2.0
2:00-2:59 a.m.	63	1.9	41	1.1	70	1.1
3:00-3:59 a.m.	52	1.6	48	1.3	73	1.2
4:00-4:59 a.m.	38	1.2	35	1.0	58	0.9
5:00-5:59 a.m.	44	1.4	33	0.9	46	0.7
6:00-6:59 a.m.	41	1.3	42	1.2	65	1.1
7:00-7:59 a.m.	58	1.8	56	1.6	77	1.2
8:00-8:59 a.m.	63	1.9	64	1.8	136	2.2
9:00-9:59 a.m.	96	3.0	93	2.6	172	2.8
10:00-10:59 a.m.	100	3.1	130	3.6	259	4.2
11:00-11:59 a.m.	163	5.0	154	4.3	316	5.1
Noon -12:59 p.m.	163	5.0	245	6.8	391	6.3
1:00-1:59 p.m.	136	4.2	196	5.5	416	6.7
2:00-2:59 p.m.	145	4.5	224	6.2	350	5.7
3:00-3:59 p.m.	185	5.7	233	6.5	407	6.6
4:00-4:59 p.m.	201	6.2	272	7.6	459	7.4
5:00-5:59 p.m.	289	8.9	374	10.4	525	8.5
6:00-6:59 p.m.	263	8.1	305	8.5	531	8.6
7:00-7:59 p.m.	217	6.7	252	7.0	503	8.1
8:00-8:59 p.m.	169	5.2	198	5.5	348	5.6
9:00-9:59 p.m.	143	4.4	154	4.3	253	4.1
10:00-10:59 p.m.	110	3.4	92	2.6	177	2.9
11:00-11:59 p.m.	88	2.7	62	1.7	151	2.4
System missing	–	–	–	–	270	4.4
Total	**3250**		**3596**		**6175**	

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

4.2. PROPERTY DESCRIPTION

Consistent across the four reporting provinces, more than half of home cooking structure fires occurred in one and two-family dwellings[5] (Table 10). The vast majority of one and two-family home cooking fires in Manitoba (99.2%), Alberta (85.6%) and British Columbia (99.1%) occurred with one to ten occupants present in the home at the time of the fire (data not shown)[6]. Of these one and two-family dwelling cooking fires, the majority (ranging from 82% in British Columbia to 91% in Manitoba) occurred in a year-round use single-family dwelling, a finding consistent across the four provinces (data not shown).

TABLE 10. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY PROPERTY CLASSIFICATION, 4 JURISDICTIONS, NFID, 2005 TO 2014

Property Classification	Ontario		Manitoba		Alberta		British Columbia	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
One and two-family dwelling	7658	54.0	1865	57.4	2282	63.5	3463	56.1
Apartment, tenement, flat, townhouses, and condominium	6189	43.6	1242	38.2	1156	32.1	2334	37.8
Miscellaneous	347	2.4	143	4.4	158	4.4	378	6.1
Total	**14194**		**3250**		**3596**		**6175**	

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Approximately four-tenths of cooking fires occurred in apartments, tenements, flats, townhouses, or condominiums[7] in Manitoba (38.2%) and British Columbia (37.8%). The proportion of cooking fires that happened in this property classification was slightly higher in Ontario at nearly 44 per cent. In Alberta, close to one-third (32.1%) of cooking fires occurred in apartments, tenements, flats, townhouses, or condominiums.

Though there was a variable on the NFID on the category of the ownership controlling the property involved in the fire incident for the province of Ontario, the overwhelming majority of incidents (97.2%) were entered as "unknown" or "unclassified," rendering the remainder determined values of little use.

[5] This category includes "private dwelling occupied by members of one or two families with rooms rented to not more than three outsiders" (Statistics Canada, 2017b: p. 26).
[6] The majority of incidents for this variable were coded as "cannot be determined" in Ontario.
[7] This category describes "properties that provide living quarters for families living independent of each other with independent cooking facilities, whether designated as apartment houses, tenements, garden apartments, townhouses, row houses, or by other names" (Statistics Canada, 2017b: p. 26).

4.3. FIRE PROTECTION FEATURES

Sprinkler protection

The analyses presented in Table 11 were based on data for the years 2009 to 2014 only; Ontario had an unusual large number of missing cases for the period prior to 2009. Appendix Table A summarizes the results for the entire ten-year study period.

Though the proportion varied somewhat across the provinces, the vast majority of residences that experienced cooking fires between 2009 and 2014 did not have sprinklers installed.

TABLE 11. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY PRESENCE OF SPRINKLER PROTECTION, 4 JURISDICTIONS, NFID, 2009 TO 2014

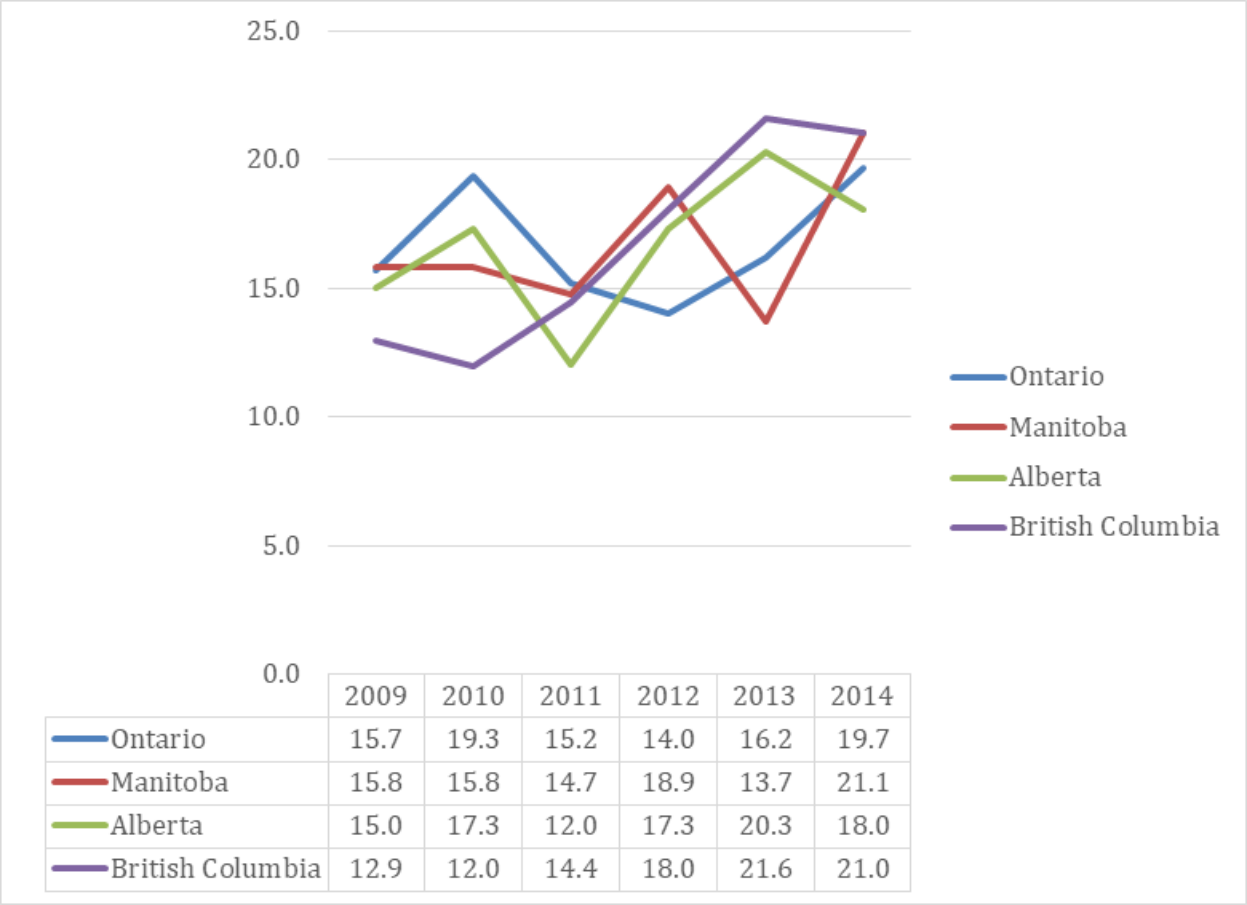
Sprinkler Protection	Ontario		Manitoba†		Alberta†		British Columbia†	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
No sprinkler protection present	6776	83.8	1412	76.7	1515	83.1	2418	58.5
Sprinkler protection present	600	7.4	95	5.2	133	7.3	727	17.6
Cannot be determined	714	8.8	335	18.2	176	9.6	987	23.9
Total	**8090**		**1842**		**1824**		**4132**	

Note. †*Not applicable* cases were excluded from the analyses presented here for Manitoba (*n*= 5), Alberta (*n*= 499) and British Columbia (*n*= 8). – Information was unavailable, or code choice was not used in a specific jurisdiction.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

After excluding the "not applicable" and "cannot be determined" incidents, sprinkler systems were available in approximately a quarter of home cooking fires in British Columbia (23.1%), compared to only 8.1 per cent in Ontario and Alberta, and just 6.3 per cent in Manitoba.

While far from consistent across the period of observation – the notable exception being British Columbia where presence of sprinkler protection rose in a fairly consistent manner from year to year, home cooking fires that occurred in 2014 were more likely to have a sprinkler system present than those than happened in 2009 across the four provinces (Figure 2).

FIGURE 2. PRESENCE OF SPRINKLER PROTECTION IN REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY YEAR OF INCIDENT, 4 JURISDICTIONS, NFID, 2009 TO 2014



	2009	2010	2011	2012	2013	2014
Ontario	15.7	19.3	15.2	14.0	16.2	19.7
Manitoba	15.8	15.8	14.7	18.9	13.7	21.1
Alberta	15.0	17.3	12.0	17.3	20.3	18.0
British Columbia	12.9	12.0	14.4	18.0	21.6	21.0

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Automatic fire detection system

After excluding the "not applicable" and "cannot be determined" incidents, automatic fire detection systems were available in approximately eight-tenths of home cooking fires in Manitoba (79.6%) compared to slightly less than a quarter in Alberta (23.7%) between 2005 and 2014.

Of the residences involved in a cooking fire that had an automatic fire detection system installed, the vast majority had a single stage central alarm (Manitoba = 75.1%; Alberta = 94.2%). Of these, only one-third (33.8%) in Manitoba and roughly three-tenths (28.4%) in Alberta were connected to a remote monitoring agency.

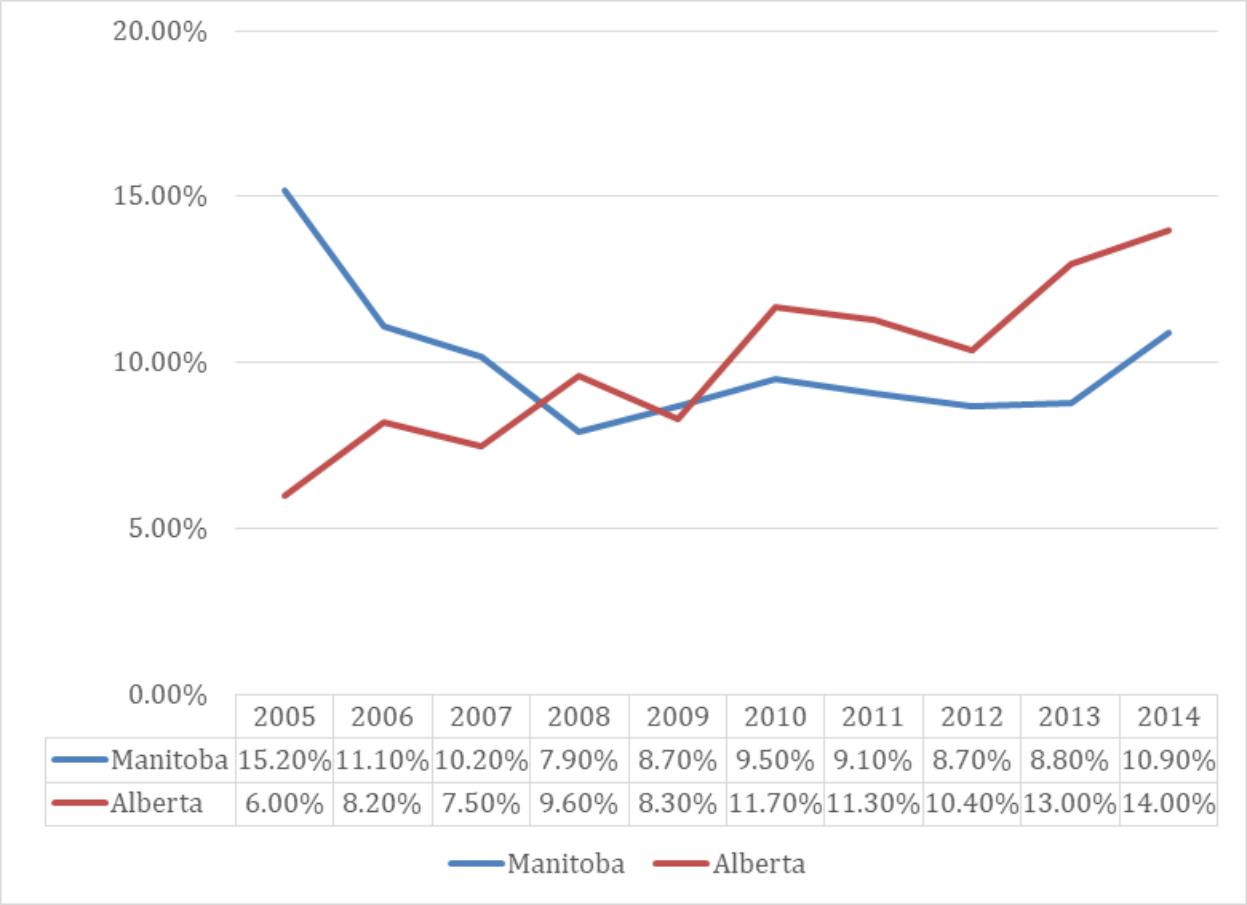
TABLE 12. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY PRESENCE OF AUTOMATIC FIRE DETECTION SYSTEM, 2 JURISDICTIONS, NFID, 2005 TO 2014

	Manitoba†		Alberta†	
Automatic Fire Detection System	**Freq.**	**Percent**	**Freq.**	**Percent**
No central alarm	487	15.0	2208	66.9
Single stage central alarm	947	29.2	461	14.0
Single stage central alarm, connection to remote monitoring agency	484	14.9	183	5.5
Two stage central alarm	287	8.8	13	0.4
Two stage central alarm, connection to remote monitoring agency	188	5.8	11	0.3
Central alarm with voice	–	–	1	0.0
Central alarm with voice, connection to remote monitoring agency	–	–	15	0.5
Cannot be determined	853	26.3	407	12.3
Total	**3246**		**3299**	

Note. †*Not applicable* cases were excluded from the analyses presented here for Manitoba (*n*= 4) and Alberta (*n*= 297). – Information was unavailable, or code choice was not used in a specific jurisdiction.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

While far from a smooth trend across the ten years of observation, Alberta homes that experienced cooking fires in 2014 were 2.3 times more likely to have an automatic fire detection system present compared to residences that experienced fires involving cooking equipment in 2005 (Figure 3). In Manitoba, however, the general trend was one of decline.

FIGURE 3. PRESENCE OF AUTOMATIC FIRE DETECTION SYSTEM IN REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY YEAR OF INCIDENT, 2 JURISDICTIONS, NFID, 2005 TO 2014



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Manitoba	15.20%	11.10%	10.20%	7.90%	8.70%	9.50%	9.10%	8.70%	8.80%	10.90%
Alberta	6.00%	8.20%	7.50%	9.60%	8.30%	11.70%	11.30%	10.40%	13.00%	14.00%

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Fire detection devices

Only Ontario and Alberta provided information on presence or absence of fire detection devices. Because Ontario had an unusual large number of missing cases for the years prior to 2009, the analyses presented in Table 13 were restricted to data for the years 2009 through 2014 only. Appendix Table B summarizes the full set of results for the entire period from 2005 to 2014.

In both jurisdictions, the vast majority of homes that experienced cooking fires during the period of observation had a fire detection device present at the time of the fire. However, after excluding the "cannot be determined" incidents, the proportion of homes involved in cooking fires that had no fire detection device present at the time of the incident stood at over one-tenth in Ontario (14.1%) and Alberta (12.0%).

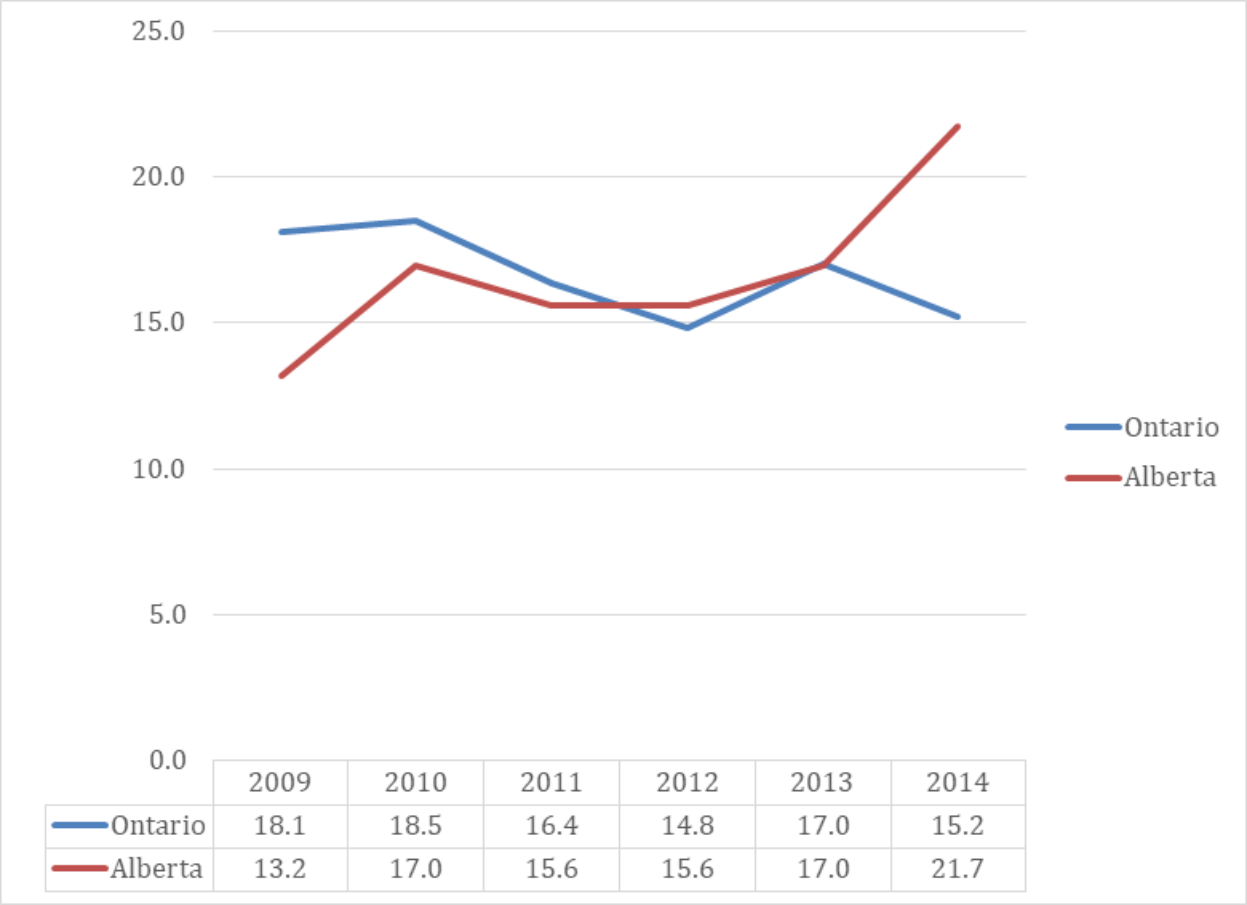
TABLE 13. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY FIRE DETECTION DEVICES, 2 JURISDICTIONS, NFID, 2009 TO 2014

	Ontario		Alberta†	
Fire Detection Devices	**Freq.**	**Percent**	**Freq.**	**Percent**
Smoke detectors	6338	78.3	1461	69.6
Smoke detectors, heat detectors and smoke detectors in return air ducts	–	–	57	2.7
Heat detectors and smoke detectors in return air ducts	–	–	3	0.1
Heat detectors	–	–	3	0.1
Smoke detectors and specialty detectors	–	–	25	1.2
Heat detectors, smoke detectors and specialty detectors	–	–	7	0.3
No detection devices	1039	12.8	212	10.1
Cannot be determined	713	8.8	330	15.7
Total	**8090**		**2098**	

Note. †*Not applicable* cases were excluded for Alberta (*n*= 225). – Information was unavailable, or code choice was not used in a specific jurisdiction.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

The proportion of home cooking fires in which a fire detection device was not present was lower in the most recent year of data available in Ontario (Figure 4); however, in Alberta, the proportion of homes involved in cooking fires that had no fire detection device present at the time of the incident was 1.6 times higher for the year 2014 compared to homes that experienced cooking fires in 2009.

FIGURE 4. ABSENCE OF FIRE DETECTION DEVICES IN REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY YEAR OF INCIDENT, 2 JURISDICTIONS, NFID, 2009 TO 2014



	2009	2010	2011	2012	2013	2014
Ontario	18.1	18.5	16.4	14.8	17.0	15.2
Alberta	13.2	17.0	15.6	15.6	17.0	21.7

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

4.4. CIRCUMSTANCES CONTRIBUTING TO OUTBREAK OF FIRE

Igniting object

The igniting object refers to the cooking equipment that brought about ignition. Overall, after excluding unclassified and unknown incidents, the stovetop, involving fires on deep-fat fryers or pots, pans, and other circumstances, was involved in eight out of every ten cooking fires in Alberta (80.7%). Similarly, the stovetop was involved in three-quarters of home cooking fires in Manitoba (78.2%), British Columbia (77.5%) and Ontario (73.8%). Seven-tenths of stovetop fires involved pans heated on the stovetop in Manitoba (70.3%) compared to roughly over four-tenths in Alberta (43.0%) and British Columbia (46.4%). Cooking fires that began in deep-fat fryers or pots heated on stovetops were more common in Alberta (26.6%) and British Columbia (19.7%), accounting for one-third (33.3%) and a quarter (25.5%) of all stovetop cooking fires in these two provinces, respectively.

TABLE 14. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY IGNITING OBJECT, 4 JURISDICTIONS, NFID, 2005 TO 2014

	Ontario		Manitoba†		Alberta†		British Columbia†	
Igniting Object	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**
Stove, range, top burner area - fire in pan	9849	69.4	1759	54.2	1240	34.5	2146	34.8
Stove, range, top burner area - involving fire in pot used as a deep fat fryer	–	–	109	3.4	953	26.5	1180	19.1
Stove, range, top burner area - other circumstances	–	–	633	19.5	692	19.3	1302	21.1
Oven of stove, range	1772	12.5	405	12.5	255	7.1	690	11.2
Deep fat fryer - separate appliance	380	2.7	22	0.7	28	0.8	21	0.3
Open fired broiler, portable type (e.g., barbecue)	1135	8.0	112	3.4	247	6.9	330	5.3
Other tabletop cooking appliances (e.g., microwave, toaster, etc.)	211	1.5	158	4.9	162	4.5	306	5.0
Unclassified or unknown	847	6.0	50	1.5	15	0.4	198	3.2
Total	**14194**		**3248**		**3592**		**6173**	

Note. †*System missing* cases were excluded from the analyses presented here for Manitoba (*n*= 2), Alberta (*n*= 4) and British Columbia (*n*= 2). – Information was unavailable, or code choice was not used in a specific jurisdiction.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

The oven was involved in roughly over one out of every ten cooking fires in Ontario (13.3%), Manitoba (12.7%), and British Columbia (11.5%). The proportion of oven cooking fires was lowest in Alberta at 7.1 per cent.

Fuel or energy associated with igniting object

The igniting object was powered by electricity, or electricity was the energy associated with the igniting object, in seven-tenths of home cooking fires in Ontario, and roughly eight-tenths of cooking fires in Manitoba, Alberta and British Columbia, after excluding the "not applicable" and "cannot be determined" incidents.

TABLE 15. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY FUEL OR ENERGY ASSOCIATED WITH IGNITING OBJECT, 4 JURISDICTIONS, NFID, 2005 TO 2014

Fuel or Energy Associated with Igniting Object	Ontario†		Manitoba		Alberta		British Columbia	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
Electricity	9232	67.2	2458	75.6	2681	74.6	4846	78.5
Fuel gases or other fuels	4012	29.2	548	16.9	699	19.4	944	15.3
Cannot be determined	497	3.6	244	7.5	216	6.0	385	6.2
Total	**13741**		**3250**		**3596**		**6175**	

Note. †*Not applicable* cases were excluded from the analyses presented here for Ontario (*n*= 453).
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Energy causing ignition

In the majority of cooking fires across the three reporting provinces, the energy causing ignition was a "hot object" or direct heat by conduction or radiation, with no direct contact with flames.

TABLE 16. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY ENERGY CAUSING IGNITION, 3 JURISDICTIONS, NFID, 2005 TO 2014

Energy Causing Ignition	Manitoba		Alberta		British Columbia	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Spark or direct flame	204	6.3	489	13.6	657	10.6
Hot object (direct heat by conduction or radiation, no direct contact with flames)	2840	87.4	2516	70.0	4794	77.6
Other	83	2.6	426	11.8	149	2.4
Cannot be determined	123	3.8	165	4.6	575	9.3
Total	**3250**		**3596**		**6175**	

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Material first ignited

Material first ignited refers to the actual material ignited that brought about the fire condition.

After excluding unknown, undetermined, not applicable, and not available incidents, flammable and combustible liquids were the materials ignited first in roughly one-half of cooking fires in Alberta (56.5%) and Ontario (50.0%), over four-tenths of incidents in British Columbia (45.7%), and approximately four-tenths of cooking incidents in Manitoba (38.8%). Fats, cooking oil, or related substances were the type of material first ignited in the overwhelming majority (over 95%) of fire incidents resulting from the ignition of flammable and combustible liquids across the four provinces (data not shown). Agricultural products, mostly food (including both starch and proteins), were the type of material first ignited in a quarter of cooking fires in British Columbia.

TABLE 17. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY MATERIAL FIRST IGNITED, 4 JURISDICTIONS, NFID, 2005 TO 2014

Material First Igniting	Ontario		Manitoba		Alberta		British Columbia	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
Building components (e.g., walls)	786	5.5	67	2.1	275	7.6	147	2.4
Furniture, furnishings	862	6.1	39	1.2	45	1.3	50	0.8
Clothing, textiles (e.g., oven mitt and potholder)	424	3.0	121	3.7	115	3.2	189	3.1
Wood, paper products (e.g., paper towel)	663	4.7	159	4.9	197	5.5	287	4.6
Flammable liquids, combustible liquids (e.g., cooking oil, fat)	6882	48.5	1199	36.9	1896	52.7	2427	39.3
Flammable gases (e.g., propane)	542	3.8	24	0.7	76	2.1	83	1.3
Chemicals, plastics, metals	15	0.1	196	6.0	296	8.2	487	7.9
Agricultural, forestry products	30	0.2	14	0.4	120	3.3	1340	21.7
Miscellaneous	3555	25.0	1274	39.2	336	9.3	297	4.8
Unknown, undetermined, NA, not available	435	3.1	157	4.8	240	6.7	868	14.1
Total	**14194**		**3250**		**3596**		**6175**	

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Act or omission

The elements of human behaviour commonly associated with cooking fires are categorized under acts or omissions, and include a variety of unsafe human behaviours that increase not only the risk of fire but also the risk of injury, death, and spread of fire to adjacent combustibles.

There are differences across the provinces, partly, due to variability in code choice(s) used.

After excluding all unknown, undetermined, not applicable and not available incidents, misuse of equipment, particularly unattended equipment (53.7%), was the leading contributing factor in home cooking fires in Ontario; however, the code choice "unattended equipment" was not used in the other three reporting provinces. Human failing, which refer to instances where the onset of the cooking fire was related to circumstances related to a person or persons, accounted for 74.4 per cent and 51.3 per cent of cooking fires in British Columbia and Alberta, respectively. In Manitoba, misuse of material ignited accounted for approximately three-quarters of all cooking fires (73.3%), whereas human failing accounted for an additional 15.8 per cent.

Among the circumstances related to misuse of material ignited, the code choice "overheated cooking oil, grease, or wax" accounted for three out of every ten cooking fires in Manitoba (30.8%) and Alberta (29.6), and over one out of every ten cooking fires in British Columbia (14.1%). Information for this code was not reported in Ontario. Combustible placed too close to the heat source accounted for five per cent of cooking fires in Manitoba (5.0%) and Alberta (5.6%), 2.8 per cent of cooking fires in Ontario and 1.9 per cent of cooking fires in British Columbia. The other circumstances associated with misuse of material ignited were responsible for 37.6 per cent and 13.2 per cent of cooking fires in Manitoba and Ontario, respectively.

Among the human failing sub-categories, the code choice "distracted, preoccupied" accounted for one-third and two-tenths of cooking fires in British Columbia (34.5%) and Alberta (21.5%), respectively, whereas ignorance of hazard was the contributing human factor in over one out of every ten cooking fires in British Columbia (14.0%) and Alberta (11.7%). Falling asleep or being fatigued accounted for 5.2 per cent of cooking fire in Manitoba, 2.9 per cent of cooking fires in British Columbia, and 1.8 per cent of cooking fires in Alberta. Suspected impairment as a contributing human factor accounted for 4.2 per cent, 3.1 per cent, and 2.6 per cent of cooking fires in Manitoba, British Columbia and Alberta, respectively.

Mechanical, electrical failure, or malfunction, which refer to the omission to maintain mechanical or electrical equipment properly, were responsible for fewer than five per cent of all cooking fires in Ontario, Manitoba and British Columbia, and six per cent of all cooking fires in Alberta.

In Ontario, 4.4 per cent of cooking fires were due to construction, design or installation deficiency (e.g., installing equipment too close to combustibles), whereas misuse of source of ignition (e.g., child-11 years of age or younger) accounted for approximately five per cent of cooking fires in the province.

Incendiary fires were not very prevalent in the reporting jurisdictions, with the highest proportion found in Manitoba comprising less than three per cent of all determined home cooking fires.

TABLE 18. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY ACT OR OMISSION, 4 JURISDICTIONS, NFID, 2005 TO 2014

	Ontario		Manitoba		Alberta		British Columbia	
Act or Omission	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**
Mechanical/electrical failure/malfunction	607	4.3	133	4.1	212	5.9	220	3.6
Construction, design or installation deficiency	584	4.1	9	0.3	21	0.6	28	0.5
Misuse of source of ignition	653	4.6	27	0.8	42	1.2	65	1.1
Misuse of material ignited								
- Overheated cooking oil, grease, wax	–	–	1000	30.8	1042	29.0	826	13.4
- Combustible placed too close to heat	369	2.6	161	5.0	198	5.5	114	1.8
- Improper storage	259	1.8	3	0.1	10	0.3	16	0.3
- Other	1491	10.5	1219	37.5	66	1.8	47	0.8
Misuse of equipment								
- Equipment unattended	7110	50.1	–	–	–	–	–	–
- Lack of maintenance	255	1.8	49	1.5	–	–	50	0.8
- Other	245	1.7	18	0.6	50	1.4	43	0.7
Human failing								
- Asleep/fatigued	–	–	169	5.2	64	1.8	171	2.8
- Temporary loss of judgement	–	–	25	0.8	30	0.8	137	2.2
- Physical or mental disability	–	–	7	0.2	7	0.2	41	0.7
- Accident	–	–	11	0.3	181	5.0	–	–
- Suspected impairment	–	–	136	4.2	91	2.5	179	2.9
- Ignorance of hazard	–	–	–	–	414	11.5	820	13.3
- Distracted, preoccupied	–	–	96	3.0	757	21.1	2022	32.7
- Other	–	–	68	2.1	264	7.3	990	16.0
Incendiary fires	90	0.6	85	2.6	51	1.4	72	1.2
Miscellaneous	1588	11.2	33	1.0	25	0.7	19	0.3
Unknown, undetermined, NA, not available	943	6.6	1	0.0	71	2.0	315	5.1
Total	**14194**		**3250**		**3596**		**6175**	

Note. – Information was unavailable, or code choice was not used in a specific jurisdiction.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

4.5. FACTORS RELATED TO ORIGIN AND SPREAD OF FIRE

Area of origin

The kitchen was the area of origin in the overwhelming majority of home cooking fire incidents across the four provinces.

TABLE 19. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY AREA OF ORIGIN, 4 JURISDICTIONS, NFID, 2005 TO 2014

	Ontario		Manitoba		Alberta		British Columbia	
Area of Origin	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**
Kitchen	12293	86.6	3048	93.8	3183	88.5	5679	92.0
Other	1901	13.4	202	6.2	413	11.5	496	8.0
Total	**14194**		**3250**		**3596**		**6175**	

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Flame spread areas

Only Manitoba and Alberta provided information about the routes by which flames (char) spread beyond the room or area of origin of the fire. After excluding "unclassified" and "unknown" incidents, the results revealed that flames did not spread through either vertical or horizontal openings in the vast majority of cooking fire incidents. Instead, in Alberta (47.9%) and Manitoba (28.6%), when flames did spread beyond the room or area of origin, they were more likely to expand through the interior finish of the house, especially spreading on ceilings and wall finish.

TABLE 20. PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY FLAME SPREAD AREAS, 2 JURISDICTIONS, NFID, 2005 TO 2014

	Manitoba			Alberta		
Flame Spread	**Interior Finish**	**Vertical Openings**	**Horizontal Openings**	**Interior Finish**	**Vertical Openings**	**Horizontal Openings**
Not a factor	57.5%	74.9%	74.7%	47.1%	78.2%	78.8%
Flame spread	23.0%	3.1%	4.2%	43.4%	7.5%	8.8%
Unclassified	3.9%	5.9%	5.1%	2.3%	5.1%	3.2%
Unknown	15.5%	16.1%	16.0%	7.3%	9.1%	9.2%
Total number of cases		**3250**			**3596**	

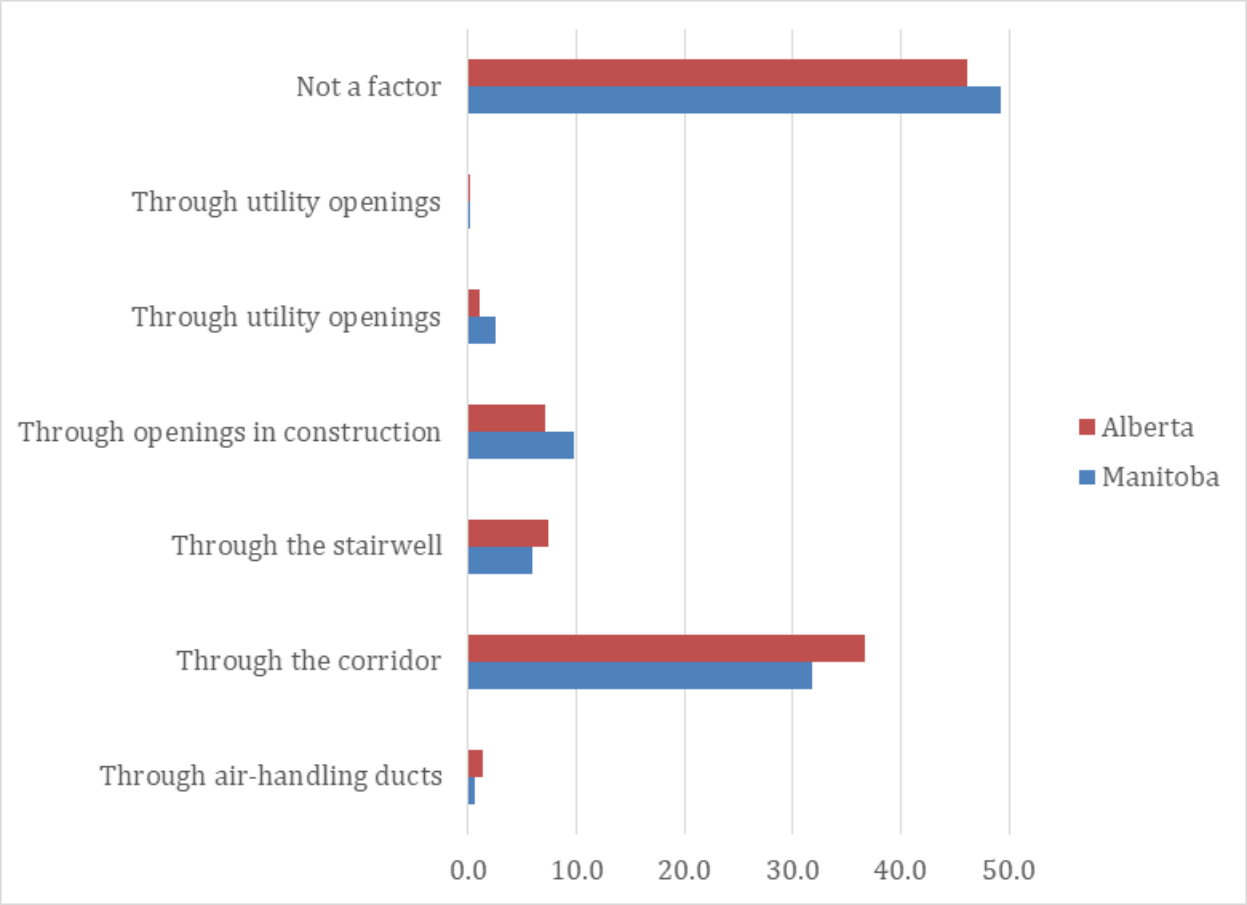
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Smoke spread areas

Again, only Manitoba and Alberta provided information on the routes by which smoke spread beyond the room or area of origin of the fire.

After removing "unclassified" and "unknown" incidents, in approximately half of home cooking fires, smoke spread beyond the room or area of origin in both Manitoba (49.2%) and Alberta (46.1%). Most smoke spread through the corridor (Figure 5).

FIGURE 5. PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY SMOKE SPREAD AVENUES, 2 JURISDICTIONS, NFID, 2005 TO 2014



Note. A total of 654 cooking fire incidents in Manitoba and 516 cooking fire incidents in Alberta were excluded because these were either "unknown" or "unclassified," bringing Manitoba's total to 2,596 and Alberta's total to 3,080.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

4.6. FIRE LOSS DETAILS

Extent of fire spread

Extent of fire spread refers to the actual extent of burning or charring, being a good indicator of the severity of the home cooking fire incident. Because there were over 6,000 missing cases prior to 2009 in Ontario, the results presented in Table 21 were based on analyses of data for the period from 2009 to 2014 for the three provinces. The omission of cooking fire incidents for the period from 2005 to 2008 did not change the overall distribution of incidents by much in either Alberta or British Columbia (Appendix Table C). Information on extent of fire spread was not available for Manitoba.

During this period, after excluding unclassified, unknown and not applicable incidents, over half (56.9%) of cooking fires in British Columbia were confined to the object of origin compared to 38.4 per cent in Ontario and only 17.9 per cent in Alberta. More than half of cooking fires in Ontario (52.3%) and six-tenths in Alberta (60.9%) were confined to the room of origin compared to one-third of cooking fires in British Columbia. Two out of every ten cooking fires in Alberta (21.1%) spread beyond the room of origin compared to approximately one in every ten cooking fires in Ontario (9.3%) and British Columbia (9.1%).

TABLE 21. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY EXTENT OF FIRE, 3 JURISDICTIONS, NFID, 2009 TO 2014

	Ontario†		Alberta†		British Columbia	
Extent of Fire	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**
Confined to object of origin	3050	37.7	380	17.5	2354	56.9
Confined to room of origin	4159	51.4	1292	59.6	1409	34.0
Spread beyond room of origin	737	9.1	448	20.7	377	9.1
Unclassified/ Unknown	139	1.7	46	2.1	–	–
Total	**8085**		**2166**		**4140**	

Note. †*Not applicable* cases were excluded for the analyses presented here for Ontario (*n*= 5) and Alberta (*n*= 252).

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Extent of damage

Extent of damage refers the total extent of damage caused by actual burning or charring, including damage caused by heat (browning, blistering, etc.), smoke, water and other extinguishing agents.

Only Alberta and British Columbia included information on extent of damage.

Damage was confined to the object of origin in four out of every ten cooking fires in British Columbia (42.3%) compared to only one out of every ten cooking fires in Alberta (13.3%).

After excluding unclassified, unknown and not applicable incidents, damage was confined to the room of origin in half of cooking fires in Alberta (50.8%) compared to one-third of cooking fires in British Columbia (32.9%).

In roughly one-quarter and one-third of cooking fires in British Columbia (24.7%) and Alberta (35.8), respectively, damage spread beyond the room of origin.

TABLE 22. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY EXTENT OF DAMAGE, 2 JURISDICTIONS, NFID, 2005 TO 2014

	Alberta‡		British Columbia†	
Extent of Damage	**Freq.**	**Percent**	**Freq.**	**Percent**
Confined to object of origin	439	13.1	2470	42.3
Confined to room of origin	1677	50.1	1923	32.9
Spread beyond room of origin	1182	35.3	1444	24.7
Unclassified/Unknown	52	1.6	–	–
Total	**3350**		**5837**	

Note. ‡ A total of 246 *not applicable* cases were excluded for Alberta. †A total of 338 *system missing* cases were excluded for British Columbia. – Information was unavailable, or code choice was not used in a specific jurisdiction.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Extent of fire casualties

Fire casualties refer to "deaths" and "persons injured" as a result of a cooking fire incident.

Fourteen per cent of cooking fires in Manitoba resulted in at least one casualty during the ten-year period under examination compared to approximately 11 per cent in Ontario and Alberta and 8.7 per cent in British Columbia (Table 23). In the vast majority of incidents where there was at least one cooking fire casualty, these tended to be non-fatal and included only one casualty (Table 24), for a total of 3,729 cooking fire casualties over the ten-year period across the four provinces.

TABLE 23. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY FIRE CASUALTIES, 4 JURISDICTIONS, NFID, 2005 TO 2014

	Ontario		Manitoba		Alberta		British Columbia	
Casualties	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**
No casualties	12645	89.1	2790	85.8	3211	89.3	5638	91.3
At least one casualty	1549	10.9	460	14.2	385	10.7	537	8.7
Total	**14194**		**3250**		**3596**		**6175**	

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

To prevent deaths and injuries resulting from home cooking fires, it is helpful to know more about the victims of these fires. Section 4.8. provides detailed information on the victims and the behaviours, actions and circumstances surrounding the casualties resulting from cooking fire incidents for Ontario, Alberta and British Columbia only.

The current study also sought to examine the nature of the relationships among the different measures of cooking fire loss.

Risk of at least one fire casualty increased as the extent of fire spread increased.[8] Compared to cooking fires that were confined to the object of origin, cooking fires that caused burning or charring that spread beyond the room of origin were 3.7 times and 2.5 times more likely to result in at least one fire casualty in British Columbia and Ontario, respectively. The bivariate association between extent of fire spread and risk of casualty was less pronounced in Alberta, except that cooking fires that were confined to the object of origin were slightly less likely to result in any fire casualty.

[8] Pearson Chi-Square (df= 2)= 103.67, p<0.001 (Ontario); 2.68, p>0.10^{ns} (Alberta); 132.30, p<0.001 (British Columbia).

TABLE 24. TOTAL NUMBER OF DEATHS, PERSONS INJURIES AND CASUALTIES RESULTING FROM THE SAME COOKING FIRE INCIDENT, 4 JURISDICTIONS, NFID, 2005 TO 2014

Number of casualties	Ontario		Manitoba		Alberta		British Columbia	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
Deaths								
No deaths	14126	99.52	3232	99.45	3579	99.53	6162	99.79
1 death	63	0.44	16	0.49	14	0.39	12	0.19
2 deaths	4	0.03	1	0.03	3	0.08	0	0.00
3 deaths	1	0.01	0	0.00	0	0.00	1	0.02
4 deaths	0	0.00	1	0.03	0	0.00	0	0.00
Injuries								
No injuries	12710	89.54	–	–	3225	89.68	5650	91.50
1 injury	1190	8.38	–	–	325	9.04	454	7.35
2 injuries	203	1.43	–	–	34	0.95	54	0.87
3 injuries	64	0.45	–	–	6	0.17	9	0.15
4 injuries	15	0.11	–	–	3	0.08	4	0.06
5 injuries	7	0.05	–	–	1	0.03	3	0.05
6 injuries	1	0.01	–	–	1	0.03	1	0.02
7 injuries	2	0.01	–	–	0	0.00	0	0.00
8 injuries	1	0.01	–	–	0	0.00	0	0.00
9 injuries	1	0.01	–	–	0	0.00	0	0.00
10 injuries	0	0.00	–	–	1	0.03	0	0.00
Total Casualties								
No casualties	12645	89.09	2790	85.85	3211	89.29	5638	91.30
1 casualty	1249	8.80	355	10.92	335	9.32	465	7.53
2 casualties	207	1.46	68	2.09	38	1.06	53	0.86
3 casualties	65	0.46	23	0.71	5	0.14	11	0.18
4 casualties	16	0.11	8	0.25	4	0.11	4	0.06
5 casualties	7	0.05	2	0.06	1	0.03	3	0.05
6 casualties	1	0.01	2	0.06	1	0.03	1	0.02
7 casualties	2	0.01	1	0.03	0	0.00	0	0.00
8 casualties	1	0.01	0	0.00	0	0.00	0	0.00
9 casualties	1	0.01	1	0.03	0	0.00	0	0.00
10 casualties	0	0.00	0	0.00	0	0.00	0	0.00
11 casualties	0	0.00	0	0.00	1	0.03	0	0.00
Total	**14194**		**3250**		**3596**		**6175**	

Note. – Information was unavailable.

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

TABLE 25. COOKING FIRE CASUALTIES BY EXTENT OF FIRE SPREAD, 3 JURISDICTIONS, NFID, 2009 TO 2014

	ON (*n* = 7946)		AB (*n* = 2120)		BC (*n* = 4140)	
Extent of Fire	**No casualties**	**At least one casualty**	**No casualties**	**At least one casualty**	**No casualties**	**At least one casualty**
Confined to object of origin	92.20%	7.80%	91.80%	8.20%	95.80%	4.20%
Confined to room of origin	85.70%	14.30%	88.90%	11.10%	86.20%	13.80%
Spread beyond room of origin	80.90%	19.10%	89.70%	10.30%	84.40%	15.60%
Total	**87.70%**	**12.30%**	**89.60%**	**10.40%**	**91.50%**	**8.50%**

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Compared to cooking fires that were confined to the object of origin, cooking fires that caused damage that spread beyond the room or area of origin were 4.6 times more likely to result in at least one fire casualty in British Columbia.[9] The nature of the relationship between extent of damage and risk of casualty was not as straightforward in Alberta. However, as it would be expected, cooking fires that caused damage that spread beyond the object of origin yet remained confined to the room of origin were approximately 1.4 times more likely to cause at least one casualty compared to cooking fire incidents that caused damage that remained confined to the object of origin.[10]

TABLE 26. COOKING FIRE CASUALTIES BY EXTENT OF DAMAGE, 2 JURISDICTIONS, NFID, 2005 TO 2014

	Alberta (*n* = 3298)		British Columbia (*n* = 5837)	
Extent of Damage	**No casualties**	**At least one casualty**	**No casualties**	**At least one casualty**
Confined to object of origin	90.90%	9.10%	96.80%	3.20%
Confined to room of origin	87.50%	12.50%	87.40%	12.60%
Spread beyond room of origin	90.20%	9.80%	85.30%	14.70%
Total	**88.90%**	**11.10%**	**90.90%**	**9.10%**

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

[9] Pearson Chi-Square (*df*= 2)= 184.29, *p*<0.001 (British Columbia).
[10] Pearson Chi-Square (*df*= 2)= 7.18, *p*<0.05 (Alberta).

Dollar loss: Total property and contents

Property loss caused by the cooking fire reflects the cost of actual damages to property in dollars. "Total loss" includes damage to both property and contents.

Ontario had an estimated $99,981,690 in direct property and contents damage associated with over six thousand home cooking fires for the period from 2005 to 2008, or an average of 24,995,422 per year (Table 27).

During the ten-year window of observation from 2005 to 2014, Alberta's 3,596 home cooking structure fires caused direct property damage estimated at approximately $193 million.

Manitoba's over three-thousand home structure fires involving cooking equipment during the ten-year study period resulted in approximately $66 million in estimated direct property and contents damage, or an average of $6,595,851 per year.

British Columbia's over six thousand cooking fires during the ten-year period of observation resulted in total direct damage of property and contents estimated at $165,757,315.

Did property dollar loss per fire increased as the extent of fire spread and damage increased?

A one-way between subjects ANOVA was conducted to compare the effect of extent of fire spread on dollar loss, measured as the cost of actual damages to property in dollars (Table 28). In addition, Tukey post hoc tests were conducted to identify significant differences between categories.

For both Alberta [$F(2, 3267)= 16.04$, $p= 0.000$] and British Columbia [$F(2, 6172)= 44.73$, $p= 0.000$], extent of fire spread had a significant effect on amount of direct property loss at the $p<0.05$ level.

In both provinces, a Tukey post hoc test revealed that the amount of damage to property in dollars was significantly higher for cooking fires that spread beyond the room of origin compared to cooking fires that were either confined to the object of origin or were confined to the room of origin. In both provinces, however, cooking fires that were confined to the object of origin did not differ significantly from those that were confined to the room of origin.

The nature of the relationship between extent of damage and dollar loss was also examined. An ANOVA with cost of actual damages to property in dollars as the dependent variable and the extent of damage as the factor was run, which again yielded significant differences in Alberta [$F(2, 3295)= 12.75$, $p= 0.000$] and British Columbia [$F(2, 5834)= 20.66$, $p= 0.000$]. In both provinces, post hoc follow-up tests showed that home cooking fires that caused damage that spread beyond the room of origin were significantly more likely to result in larger dollar amount of losses compared to cooking fires that had damage confined to either the object of origin or the room of origin. There was no significant difference between cooking fires that caused damage that remained confined to the object of origin and those that caused damage that while spreading beyond the object of origin remained confined to the room of origin.

Overall, these results do seem to suggest that the dollar loss per fire increased as the extent of fire spread and damage increased.

TABLE 27. DIRECT DAMAGE TO PROPERTY AND CONTENTS OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT, 4 JURISDICTIONS, NFID, 2005 TO 2014

	Ontario		Alberta‡		Manitoba		British Columbia†	
Year	Fire Incidents	Dollar loss	Fire Incidents	Dollar loss	Fire Incidents	Dollar loss	Fire Incidents	Dollar loss
2005	1556	23,015,163	300	7,475,503	419	5,026,401	458	6,707,756
2006	1580	23,974,860	309	7,529,910	362	5,055,664	472	9,279,675
2007	1487	26,628,621	308	10,663,931	329	6,256,061	521	12,117,081
2008	1480	26,363,046	356	13,058,641	293	6,397,547	584	9,527,133
2009	–	–	335	14,048,822	304	7,360,336	614	27,848,357
2010	–	–	382	17,276,356	335	6,451,831	611	13,750,694
2011	–	–	405	32,935,847	300	7,460,104	660	17,319,401
2012	–	–	388	46,221,399	302	8,062,622	724	13,323,998
2013	–	–	401	21,228,873	274	6,381,219	791	41,266,409
2014	–	–	412	22,497,633	332	7,506,723	740	14,616,811
Total	**6103**	**99,981,690**	**3596**	**192,936,915**	**3250**	**65,958,508**	**6175**	**165,757,315**

Note. – Information was not available for that year. ‡ Alberta's amount loss estimates refer to direct property damage only. A total of 82 cooking fire incidents were reported as system missing in Alberta, likely associated with no property losses. Years 2011 and 2012 were atypical in terms of estimated amount of direct property damage, resulting from two residential cooking structure fires in 2011 which together caused property losses estimated roughly at over $15 million, and one residential cooking fire in 2012 with direct property damage estimated at $23 million. †A total of 1,660 cooking fire incidents were reported as system missing in British Columbia, likely associated with no property or content losses. Years 2009 and 2013 were atypical in regard to dollar amount of losses, resulting from three residential cooking structure fires, each with direct property and contents damage estimated at $12,000,000.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

TABLE 28. ANOVA OF MEAN COST OF ACTUAL DAMAGES TO PROPERTY IN DOLLARS BY EXTENT OF FIRE SPREAD AND EXTENT OF DAMAGE, 2 JURISDICTIONS, NFID, 2005 TO 2014

	Aberta						British Columbia					
Factor	**N**	**Mean**	**Std. Deviation**	**F**	***df*s**	**Sig.**	**N**	**Mean**	**Std. Deviation**	**F**	***df*s**	**Sig.**
Extent of Fire				16.0	2, 3267	0.000				44.7	2, 6172	0.000
Confined to object of origin	632	16475[a]	228732				3283	6765[a]	183377			
Confined to room of origin	1984	38094[a]	523114				2261	13754[a]	38166			
Spread beyond room of origin	654	138088[b]	238420				631	99277[b]	570505			
Extent of Damage				12.7	2, 3295	0.000				20.7	2, 5834	0.000
Confined to object of origin	439	4102[a]	13493				2470	7685[a]	210983			
Confined to room of origin	1677	32161[a]	568136				1923	9581[a]	42080			
Spread beyond room of origin	1182	103189[b]	249172				1444	54205[b]	379310			

Note. Means with different superscripts indicate significant differences as indicated by Tukey post hoc tests.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

4.7. DISCOVERY OF FIRE AND ACTIONS TAKEN

How fire was initially detected

With over 6,000 missing cases prior to 2009 in Ontario, results presented in Table 29 were also restricted to analyses of data for the period from 2009 to 2014 for the four provinces to enhance jurisdictional comparability. Limiting analyses to cooking fire incidents for the period from 2009 to 2014, rather than the entire ten-year study period, did not change in any significant way the overall distribution of cases in the other reporting jurisdictions (Appendix Table D).

Despite restricting the window of observation, the means by which the cooking fire incident was first detected was "unknown" for 25 per cent and 35 per cent of reported cooking fires in British Columbia and Ontario, respectively.

TABLE 29. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY INITIAL DETECTION, 4 JURISDICTIONS, NFID, 2009 TO 2014

	Ontario		Manitoba		Alberta		British Columbia†	
Initial Detection	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**
Visual sighting or other means of personal detection	4578	56.6	1135	61.5	1729	74.4	2604	63.0
Fire detection device	639	7.9	646	35.0	191	8.2	486	11.8
No initial detection (burned out before detection)	66	0.8	–	–	16	0.7	9	0.2
Unknown	2807	34.7	66	3.6	387	16.7	1033	25.0
Total	**8090**		**1847**		**2323**		**4132**	

Note. †*System missing* cases were excluded for British Columbia (*n*= 8). – Information was unavailable, or code choice was not used in a specific jurisdiction.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Where known, visual sighting and other means of personal detection were the most common means by which cooking fire incidents were first detected across the four reporting jurisdictions.

A fire detection device alerted occupants in 36 per cent of cooking fires in Manitoba. The proportion of occupants alerted to the cooking fire by a fire detection device was lower for the other three

provinces, standing at around 16 per cent in British Columbia, 12 per cent in Ontario and 10 per cent in Alberta of all cooking fires in which the means of initial detection was known.

Transmission of alarm to fire department

Where determined, telephone tie-line to the fire department, in which the reporting person direct dials another emergency agency, was the most common means by which the fire department was first notified in British Columbia (89.8%), Ontario (80.1%) and Manitoba (60.3%). Transmission of alarm to the fire department was "unknown" for a quarter (25.5%) of cooking fire incidents in Alberta. Where known, telephone direct to the fire department (52.2%) and telephone tie-line to the fire department (43.6%) were the two most common means by which the fire department was first notified about the cooking fire incident in this province.

TABLE 30. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY TRANSMISSION OF ALARM TO FIRE DEPARTMENT, 4 JURISDICTIONS, NFID, 2005 TO 2014

Transmission of Alarm to Fire Department	Ontario		Manitoba		Alberta		British Columbia	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
No alarm received	17	0.1	282	8.7	16	0.4	40	0.6
Telephone direct to fire department	2597	18.3	529	16.3	1400	38.9	178	2.9
Telephone tie-line to fire department; reporting person direct dials another emergency agency	11300	79.6	1835	56.5	1168	32.5	5234	84.8
Alerting fire device/ alarm system	121	0.9	361	11.1	55	1.5	302	4.9
Other	79	0.6	36	1.1	41	1.1	77	1.2
Unknown	80	0.6	207	6.4	916	25.5	344	5.6
Total	**14194**		**3250**		**3596**		**6175**	

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Action taken

Despite limiting the window of observation to the period from 2009 to 2014, the proportions of cases that were either "unclassified" or "unknown" remained high, especially in Alberta (Table 31). Where known, the majority of home cooking fires were either extinguished by the fire department or the occupant. For example, the proportions of cooking fires extinguished by the fire department or extinguished by the occupant were almost evenly split each standing at over four-tenths in Ontario and over one-third in British Columbia. In Manitoba, after excluding unknown and unclassified incidents, 46 per cent of cooking fires were extinguished by the occupant compared to about 35 per cent that were extinguished by the fire department. In turn, the reverse was true in Alberta, where 47 per cent of cooking fires were extinguished by the fire department compared to 33 per cent by the occupant.

TABLE 31. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY ACTION TAKEN, 4 JURISDICTIONS, NFID, 2009 TO 2014

	Ontario‡		Manitoba		Alberta		British Columbia†	
Action Taken	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**
Burned out/Minor fire	664	8.3	302	16.4	306	13.2	850	22.5
Extinguished by occupant	3435	42.7	758	41.0	569	24.5	1246	33.0
Extinguished by automatic system	33	0.4	9	0.5	34	1.5	161	4.3
Extinguished by fire department	3619	45.0	569	30.8	812	35.0	1252	33.2
Unclassified	215	2.7	172	9.3	261	11.2	59	1.6
Unknown	78	1.0	37	2.0	341	14.7	206	5.5
Total	**8044**		**1847**		**2323**		**3774**	

Note. ‡*System missing* cases were excluded for Ontario (*n*= 46). †*System missing* cases were excluded for British Columbia (*n*= 366).
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Home cooking fires classified as burned out or minor fires ranged from a low of 8.6 per cent of all determined cooking fires in Ontario to a high of 24.2 per cent of determined cooking fires in British Columbia.

The exclusion of cooking fire incidents for the period from 2005 to 2008 did not change by much the overall patterns of results in none of the reporting jurisdictions (Appendix Table E).

The nature of the relationship between action taken in response to the cooking fire and act or omission contributing to the cooking fire outbreak was also examined (Table 32).[11]

After excluding unknown and unclassified cases, cooking fires extinguished by the fire department were more likely to be associated with suspicious incidents in the three reporting provinces. There were some interesting differences as well. In Manitoba, misuse of source of ignition and suspected impairment were the second and third leading acts or omissions contributing to cooking fires that required firefighter intervention. In Alberta, temporary loss of judgement was the second leading act or omission contributing to cooking fires that required firefighter intervention. In turn, mechanical, electrical failure or malfunction, suspected impairment and ignorance of hazard stood roughly in third place as acts or omissions contributing to cooking fires that required firefighter intervention in this province. In British Columbia, construction, design or installation deficiency and physical or mental disability were the second and third leading acts or omissions contributing to cooking fires that required firefighter intervention. In turn, misuse of material ignited was the most frequently reported act or omission contributing to cooking fires that required occupant intervention in British Columbia, whereas misuse of source of ignition and misuse of material ignited most often required occupant intervention in Alberta.

Table 33 summarizes the relationship between action taken in response to the cooking fire and extent of fire spread[12] and fire damage[13] in each reporting jurisdiction for the period from 2009 to 2014, after excluding unknown and unclassified incidents.

Cooking fires that were confined to the object of origin in terms of fire spread and damage exhibited a fairly consistent pattern across the three jurisdictions: These incidents were most frequently classified as burned out or minor cooking fires and were less likely to require firefighter intervention.

In Alberta, cooking fires successfully extinguished by the occupant were more likely to remain confined to the room of origin in terms of fire spread and damage. Similarly, in British Columbia, the highest proportion of incidents with damage confined to the room of origin were those extinguished by the occupant. However, in Ontario and British Columbia, cooking fires extinguished by the occupant and those extinguished by the fire department were about equally likely to cause burning or charring that remained confined to the room of origin.

Across the reporting jurisdictions, cooking fires that caused burning or charring and damage that spread beyond the room of origin were considerably more likely to require firefighter intervention.

[11] Pearson Chi-Square= 125.79, df= 24, p<0.001 (Manitoba); 121.30, df= 26, p<0.001 (Alberta); 158.98, df= 24, p<0.001 (British Columbia).
[12] Pearson Chi-Square (df= 4)= 808.57, p<0.001 (Ontario); 213.56, p<0.001 (Alberta); 702.20, p<0.001 (British Columbia).
[13] Pearson Chi-Square (df= 4)= 243.02, p<0.001 (Alberta); 583.84, p<0.001 (British Columbia).

TABLE 32. ACTION TAKEN BY ACT OR OMISSION, 3 JURISDICTIONS, NFID, 2005 TO 2014

	Manitoba (*n* =2849)			Alberta (*n* = 2164)			British Columbia (*n* = 4740)		
Act or Omission	**Burned out/ Minor fire**	**Extinguished by occupant**	**Extinguished by fire department**	**Burned out/ Minor fire**	**Extinguished by occupant**	**Extinguished by fire department**	**Burned out/ Minor fire**	**Extinguished by occupant**	**Extinguished by fire department**
Incendiary fires	24.70%	6.50%	68.80%	13.50%	18.90%	67.60%	12.00%	36.00%	52.00%
Misuse of source of ignition	n<5	30.80%	57.70%	n<5	55.00%	35.00%	30.90%	40.00%	29.10%
Misuse of material ignited	16.70%	49.30%	34.00%	9.00%	53.50%	37.50%	12.80%	46.40%	40.70%
Mechanical/electrical failure/malfunction	14.30%	44.40%	41.30%	14.10%	31.00%	54.90%	21.90%	43.20%	34.90%
Construction, design or installation deficiency	n<5	n<5	n<5	n<5	44.40%	44.40%	n<5	33.30%	58.30%
Misuse of equipment	41.50%	28.30%	30.20%	21.70%	30.40%	47.80%	30.50%	36.60%	32.90%
Asleep/Fatigued	17.50%	39.00%	43.50%	18.90%	35.10%	45.90%	34.50%	34.50%	31.00%
Temporary loss of judgement suspected	30.00%	60.00%	n<5	n<5	n<5	61.50%	31.90%	39.70%	28.40%
Physical or mental disability	n<5	n<5	–	–	n<5	–	19.40%	35.50%	45.20%
Accident	n<5	70.00%	n<5	18.20%	45.50%	36.40%	–	–	–
Suspected impairment	17.70%	30.10%	52.20%	26.60%	20.30%	53.10%	30.10%	34.00%	35.90%
Ignorance of hazard	–	–	–	11.60%	37.10%	51.30%	20.20%	40.10%	39.70%
Distracted, preoccupied	17.10%	59.20%	23.70%	14.60%	41.10%	44.40%	21.60%	41.00%	37.40%
Other human failing	21.00%	46.80%	32.30%	23.20%	28.60%	48.20%	34.30%	28.70%	37.10%
Total	**17.50%**	**46.40%**	**36.10%**	**12.80%**	**43.90%**	**43.30%**	**22.90%**	**39.30%**	**37.80%**

Note. – Information was unavailable, or code choice was not used in a specific jurisdiction.

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

TABLE 33. EXTENT OF COOKING FIRE LOSS BY ACTION TAKEN, 3 JURISDICTIONS, NFID, 2009 TO 2014

Action Taken	Extent of Fire			Extent of Damage			Casualties	
	Confined to object of origin	Confined to room of origin	Spread beyond room of origin	Confined to object of origin	Confined to room of origin	Spread beyond room of origin	No casualties	At least one casualty
				Ontario				
Burned out/Minor fire	63.60%	34.90%	1.50%	–	–	–	93.40%	6.60%
Extinguished by occupant	42.80%	55.70%	1.60%	–	–	–	86.80%	13.20%
Extinguished by fire department	29.10%	52.90%	18.00%	–	–	–	88.50%	11.50%
Total	**38.10%**	**52.60%**	**9.30%**	**–**	**–**	**–**	**88.20%**	**11.80%**
N		***7662***			**–**		***7718***	
				Alberta				
Burned out/Minor fire	47.10%	48.50%	4.40%	39.90%	44.90%	15.20%	89.80%	10.20%
Extinguished by occupant	21.50%	75.60%	3.00%	13.00%	76.80%	10.20%	84.20%	15.80%
Extinguished by fire department	14.30%	56.00%	29.70%	11.60%	43.60%	44.80%	87.20%	12.80%
Total	**21.30%**	**64.00%**	**14.70%**	**15.50%**	**58.70%**	**25.80%**	**86.20%**	**13.80%**
N		***1188***			***1192***		***1272***	
				British Columbia				
Burned out/Minor fire	86.40%	13.00%	0.60%	73.80%	18.80%	7.40%	95.70%	4.30%
Extinguished by occupant	51.30%	45.60%	3.10%	39.10%	45.60%	15.30%	87.40%	12.60%
Extinguished by fire department	37.10%	41.40%	21.50%	31.10%	30.40%	38.40%	89.40%	10.60%
Total	**54.80%**	**35.90%**	**9.40%**	**44.90%**	**33.20%**	**21.90%**	**90.20%**	**9.80%**
N		***3304***			***3293***		***3304***	

Note. – Information was unavailable.

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

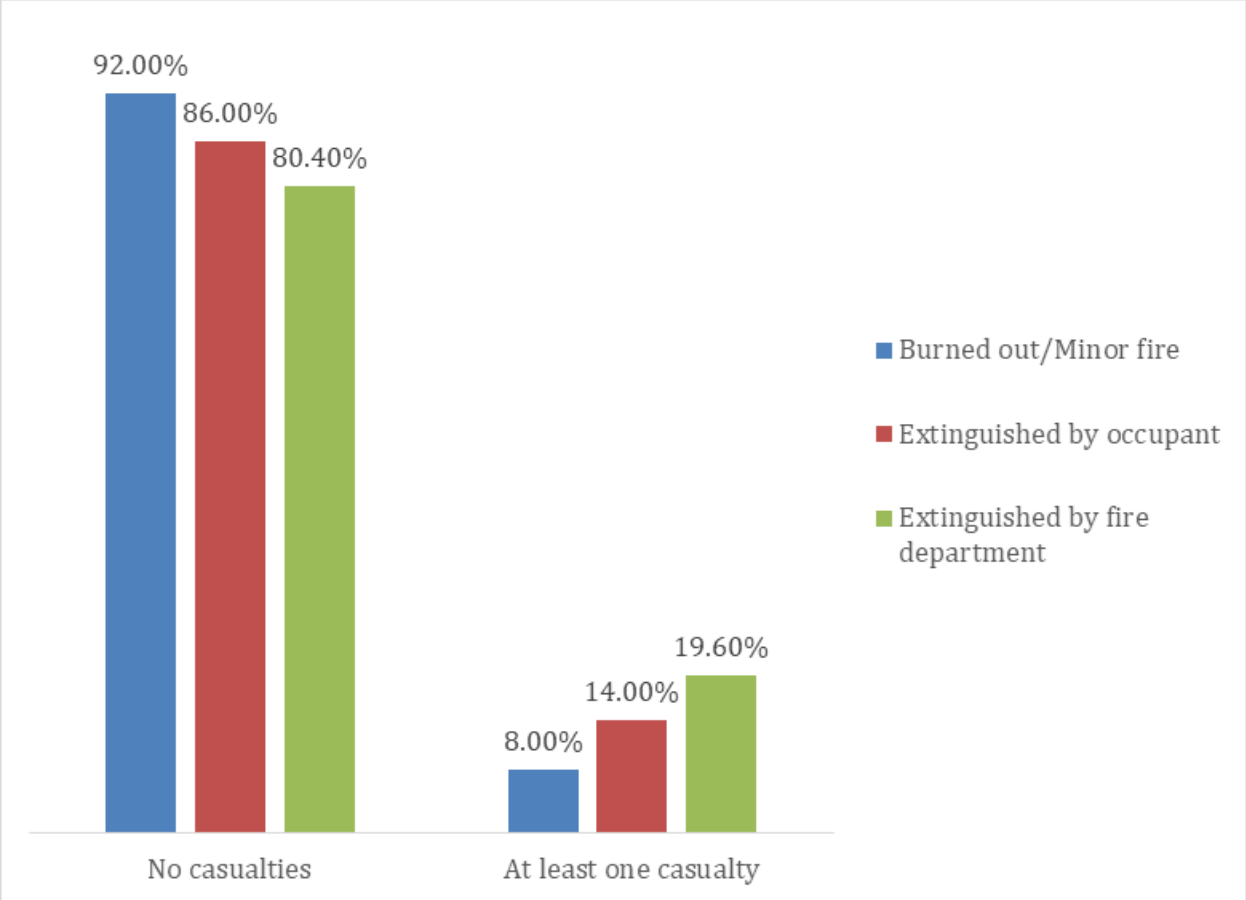
Table 33 also summarizes the relationship between action taken and fire casualties for Ontario, Alberta and British Columbia, whereas the results for Manitoba are presented separately in Figure 6.[14]

Cooking fires that were classified as burned out, or were minor in nature, were less likely to have caused any casualties as a result of the incident, especially in Ontario, Manitoba and British Columbia.

In Ontario, Alberta and British Columbia, cooking fires requiring some form of action or intervention to combat the fire, especially extinguishment by the occupant, were more likely to result in at least one casualty.

In Manitoba, however, cooking fires extinguished by the fire department were more likely to involve at least one casualty (Figure 6).

FIGURE 6. EXTENT OF COOKING FIRE CASUALTIES BY ACTION TAKEN, MANITOBA, NFID, 2009 TO 2014



Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

[14] Pearson Chi-Square (*df*= 2)= 23.55, *p*<0.001 (Ontario); 20.15, *p*<0.001 (Manitoba); 4.10, *p*>0.10[ns] (Alberta); 39.81, *p*<0.001 (British Columbia).

Method of fire control and extinguishment

Information on method of fire control and extinguishment used by occupants was not available for Ontario.

TABLE 34. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY METHOD OF FIRE CONTROL AND EXTINGUISHMENT USED BY OCCUPANTS, 3 JURISDICTIONS, NFID, 2005 TO 2014

Method of Fire Control and Extinguishment	Manitoba		Alberta		British Columbia	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Hand fire extinguisher	246	18.5	239	25.0	508	25.9
Standpipe System	2	0.2	2	0.2	3	0.2
Makeshift firefighting aids						
- Garden hose	19	1.4	22	2.3	100	5.1
- Water bucket	47	3.5	64	6.7	93	4.7
- Small water container	146	11.0	146	15.3	186	9.5
- Sand bucket	1	0.1	–	–	1	0.1
- Dry chemical and scoop	1	0.1	–	–	2	0.1
- Baking soda	33	2.5	49	5.1	87	4.4
- Smothering by covering	120	9.0	186	19.5	253	12.9
- Snow	9	0.7	6	0.6	5	0.3
- Unclassified	123	9.3	100	10.5	105	5.3
Fire department: Water	4	0.3	5	0.5	28	1.4
Fire department: Other than water	–	–	–	–	5	0.3
Sprinklers or Fixed system other than sprinklers	2	0.2	1	0.1	14	0.7
Burned out	94	7.1	62	6.5	210	10.7
Miscellaneous	141	10.6	43	4.5	257	13.1
Unknown	341	25.7	31	3.2	108	5.5
Total	**1329**		**956**		**1965**	

Note. – Information was unavailable, or code choice was not used in a specific jurisdiction.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Where known, hand fire extinguishers were used by occupants to put out the fire in a quarter of cooking fires in British Columbia (27.4%), Alberta (25.8%) and Manitoba (24.9%).

Makeshift firefighting is an action taken to control or extinguish fires by methods other than the use of fire extinguishers. Makeshift firefighting aids were used by occupants to control and extinguish the fire in about 62 percent, 51 per cent, and 45 per cent of home cooking fires in Alberta, Manitoba and British Columbia, respectively.

Specifically, in Alberta, two-tenths of occupants smothered cooking fires compared to one-tenth in Manitoba (12.1%) and British Columbia (13.6%).

Other makeshift firefighting aids were also used by occupants to control and extinguish the fire. For example, one-quarter of occupants in Alberta and roughly two-tenths in Manitoba and British Columbia put water on a cooking fire (e.g., water bucket, small water container, or garden hose). Less than one-tenth of occupants in Alberta (5.9%), British Columbia (5.1%) and Manitoba (4.5%) used baking soda, snow, sand, and dry chemical and scoop to extinguish the fire. Another one-tenth of cooking fires in Manitoba and Alberta compared to five per cent in British Columbia were put out by occupants using makeshift firefighting aids, but these incidents were not classified.

The incident burned out in 11.3 per cent of cooking fires in British Columbia, 9.5 per cent of cooking fires in Manitoba, and 6.7 per cent of cooking fires in Alberta.

After excluding unknown and not applicable incidents, in over four-tenths of cooking fires in Manitoba (44.6%), slightly over a half in British Columbia (52.0%), and approximately two-thirds in Alberta (64.7%), fires extinguished by the fire department were primarily put out using water, mainly extinguished with either one line of a 38mm/42mm hose or two or more lines of a 38mm/42mm hose (data not shown).

Performance of smoke alarm device

Table 35 summarizes results regarding whether the smoke alarm operated in the room or area of origin of the fire. Information on the performance of smoke alarms in home cooking fire incidents was limited, as many reporting jurisdictions, especially British Columbia and Manitoba, were unable to confirm the presence and/or performance of smoke alarms in a significant number of incidents. Prior to 2009, Ontario did not report consistently information on this variable, with a large number of unknown incidents (Appendix Table F)[15]. Consequently, results shown here were restricted to analyses of data for the period from 2009 to 2014 only across the four provinces. Excluding Ontario, the proportion of home cooking fires where the presence of an alarm was unknown remained more or less stable through the ten-year study period across the other three provinces (data not shown).

[15] Appendix Table F summarizes the results for the entire ten-year period for each reporting jurisdiction.

TABLE 35. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY SMOKE ALARM PERFORMANCE, 4 JURISDICTIONS, NFID, 2009 TO 2014

Smoke Alarm Performance	Ontario†		Manitoba†		Alberta		British Columbia†	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
No smoke alarm	1047	14.3	100	5.4	956	41.2	274	6.6
Alarm present but did not activate	1585	21.7	307	16.6	284	12.2	–	–
Alarm present and activated	4556	62.4	913	49.5	775	33.4	2183	52.8
Unknown	115	1.6	524	28.4	308	13.3	1675	40.5
Total	**7303**		**1844**		**2323**		**4132**	

Note. †*Not applicable* cases were excluded from the analyses presented here for Ontario (*n*= 787), Manitoba (*n*= 3) and British Columbia (*n*= 8). – Information was unavailable, or code choice was not used in a specific jurisdiction.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Where known, Alberta had the highest proportion of cooking fires where there was no smoke alarm device present (47.4%), compared to the other provinces where the proportions ranged between a low of 7.6% (Manitoba) and a high of 14.6% (Ontario). The alarm was present and activated in the majority of determined cooking fire incidents in British Columbia (88.8%), Manitoba (69.2%) and Ontario (63.4%), compared to fewer than four-tenths of cooking fires in Alberta (38.5%). The smoke alarm failed to activate in slightly over two-tenths of cooking fire incidents in Manitoba (23.3%) and Ontario (22.1%), and in over one-tenth of incidents in Alberta (14.1%).

Impact of smoke alarm activation on occupant(s) response and evacuation

Analyses on impact of smoke alarm activation on occupant(s) response and evacuation were restricted to cooking fire incidents in which the smoke alarm was present and activated. Because information on the impact of smoke alarm activation was not consistently available in Ontario prior to 2009, results summarized in Table 36 were limited to analyses of cooking fire incidents that occurred between 2009 and 2014 only across the four provinces.

Appendix Table G summarizes the results for the entire ten-year period.

Information on the impact of smoke alarm activation was not available for Manitoba.

TABLE 36. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY IMPACT OF SMOKE ALARM ACTIVATION ON OCCUPANT(S) RESPONSE AND EVACUATION, 3 JURISDICTIONS, NFID, 2009 TO 2014

Impact of Smoke Alarm Activation on Occupant Response/ Evacuation	Ontario†		Alberta		British Columbia	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Occupants evacuated safely	3018	66.5	513	66.2	1150	52.7
Unnecessary to evacuate	–	–	119	15.4	562	25.7
Some (not all) occupants evacuated safely	528	11.6	–	–	–	–
Occupants did not evacuate	467	10.3	28	3.6	168	7.7
Not applicable/no occupants	238	5.2	85	11.0	303	13.9
Unknown	289	6.4	30	3.9	–	–
Total	**4540**		**775**		**2183**	

Note. †*System missing* cases were excluded for Ontario (*n*= 16). – Information was unavailable, or code choice was not used in a specific jurisdiction.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

After removing not applicable and unknown incidents, in 30 per cent of cooking fires in British Columbia and 18 per cent in Alberta, it was unnecessary for occupants to evacuate upon the smoke alarm activation.

Where a smoke alarm was present, occupants evacuated safely upon the smoke alarm activation in three-quarters of cooking fires in Ontario and Alberta, and six-tenths of incidents in British Columbia.

In a quarter of incidents in Ontario (24.8%), either occupants did not evacuate or not all occupants evacuated safely.

Individuals did not evacuate safely in less than one-tenth of cooking fire incidents in British Columbia (8.9%) and Alberta (4.2%), after excluding the "not applicable/no occupants" and "unknown" incidents.

4.8. FIRE CASUALTIES

Where fires result in human deaths or injuries, additional information was collected for each fire death or injury. The information for these data elements are presented below for Ontario, Alberta and British Columbia. However, for the analyses presented in this section, Manitoba was excluded as the additional informational elements were not reported for the vast majority of cooking fire injuries. Where available, estimates based on Manitoba's fatal cooking fire casualties were drawn for cross-province comparisons.

Status of victim

Across the three provinces, civilians consistently represented the vast majority of all casualties occurring as a result of home cooking fire incidents.

TABLE 37. HOME COOKING FIRE VICTIMS, BY STATUS OF VICTIM, 3 JURISDICTIONS, NFID, 2005 TO 2014

	Ontario		Alberta†		British Columbia	
Status of Victim	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**
Firefighter	173	8.7	16	3.5	21	3.3
Civilian	–	–	440	96.5	620	96.7
Civilian – occupant	1694	85.0	–	–	–	–
Civilian – non-occupant	121	6.1	–	–	–	–
Other	4	0.2	–	–	–	–
Unknown/ undetermined	2	0.1	–	–	–	–
Total	**1994**		**456**		**641**	

Note. †There were *eight* missing injury cases in Alberta. – Information was unavailable, or code choice was not used in a specific jurisdiction.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

In Ontario, there were 173, or 8.7 per cent, reported firefighter casualties experienced as a result of firefighting activities related to cooking fire incidents between 2005 and 2014, compared to 3.3 per cent and 3.5 per cent in British Columbia and Alberta, respectively.

The focus of the analyses that follows relates to civilian victims only.

Nature of casualties

Over the 2005 to 2014 period, there were 109 civilian deaths in total across the three reporting jurisdictions, representing 4.5 per cent of all reported cooking fire civilian casualties in Alberta, 4.1 per cent of all reported civilian casualties in Ontario, and 2.4 per cent of all civilian casualties in British Columbia. In turn, there were 22 cooking fire fatalities in Manitoba, which accounted for 3.6 per cent of all reported cooking fire casualties (data not shown).

TABLE 38. HOME COOKING FIRE VICTIMS, BY NATURE OF CASUALTIES, 3 JURISDICTIONS, NFID, 2005 TO 2014

	Ontario		Alberta		British Columbia	
Nature of Casualties	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**
Death	74	4.1	20	4.5	15	2.4
Minor injury (less than 1 day hospital or off work)	1211	66.5	314	71.4	236	38.1
Light injury (hospitalized 1-2 days and/or off work 1-15 days)	–	–	65	14.8	331	53.4
Serious injury (hospitalized 3+ days and/or off work 16+ days)	387	21.3	41	9.3	38	6.1
Injury, seriousness unknown	149	8.2	–	–	–	–
Total	**1821**		**440**		**620**	

Note. – Information was unavailable, or code choice was not used in a specific jurisdiction.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

In addition, a total of 2,772 civilian injuries were recorded across the three jurisdictions, ranging in severity from "minor injury," which does not require hospitalization of over a 24-hour period or absence from work of not more than one full day, to "serious injury," requiring admission to a hospital for a period of more than 48 hours and/or an absence from work for a period exceeding fifteen days. Specifically, non-fatal injuries accounted for 95.9 per cent of all cooking fire civilian casualties in Ontario, 95.5 per cent in Alberta, and 97.6 per cent in British Columbia. In turn, there were 608 reported non-fatal cooking fire casualties in Manitoba, accounting for 96.5 per cent of all cooking fire casualties reported in the province (data not shown). No further information was provided for these non-fatal cooking fire casualties in Manitoba.

Seven-tenths (69.3%) of the 1,747 reported cooking fire civilian injuries in Ontario were classified as "minor injury," compared to two-tenths (22.2%) which were classified as "serious" (Table 38). The severity of the injury was not established in 8.5 per cent of civilian injuries in Ontario.

Out of 420 reported cooking fire civilian injuries in Alberta over the ten-year period, 74.8 per cent were classified as "minor," 15.5 per cent as "light" and 9.8 per cent as "serious."

In turn, out of 605 reported cooking fire civilian injuries in British Columbia, 39 per cent were classified as "minor" and 54.7 per cent as "light", compared to 6.3 per cent of cooking fire injuries which were classified as "serious."

Age of victim

Across the three provinces, home cooking fire casualties were more frequently civilians between the ages of 18 and 64 years.

TABLE 39. HOME COOKING FIRE VICTIMS, BY AGE OF VICTIM, 3 JURISDICTIONS, NFID, 2005 TO 2014

	Ontario		Alberta		British Columbia	
Age of Victim	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**
Senior citizens (65 years of age and older)	206	11.3	47	10.7	57	9.2
Adults (18 – 64 years)	1180	64.8	345	78.4	318	51.3
Youth (12 to 17 years of age)	170	9.3	28	6.4	19	3.1
Children (11 years and under)	173	9.5	20	4.5	20	3.2
Unknown	92	5.1	–	–	206	33.2
Total	**1821**		**440**		**620**	

Note. – Information was unavailable, or code choice was not used in a specific jurisdiction.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

The age distribution of home cooking fire victims separately for fatal and non-fatal casualties is provided in Table 40.

Across the three provinces, fatal cooking fire casualties were more often adults between the ages of 18 and 64 years, though, in Ontario, 46 per cent and 42 per cent of cooking fire fatalities were adults 18 and 64 years and senior citizens, respectively.

TABLE 40. VICTIMS OF FATAL AND NON-FATAL HOME COOKING FIRES, BY AGE OF VICTIM, 3 JURISDICTIONS, NFID, 2005 TO 2014

	Nature of Casualties					
Age of Victim	Death	Minor injury[1]	Light injury[2]	Serious injury[3]	Injury, seriousness unknown	Total
			Ontario **(*n* = 1821)**			
Senior citizens (65 years of age and older)	41.90%	9.20%	–	12.10%	11.40%	11.30%
Adults (18 – 64 years)	45.90%	68.50%	–	62.00%	51.00%	64.80%
Youth (12 to 17 years of age)	9.50%	9.40%	–	10.90%	4.70%	9.30%
Children (11 years and under)	2.70%	9.80%	–	11.10%	6.00%	9.50%
Unknown	0.00%	3.10%	–	3.90%	26.80%	5.10%
			Alberta **(*n* = 440)**			
Senior citizens (65 years of age and older)	25.00%	8.90%	10.80%	17.10%	–	10.70%
Adults (18 – 64 years)	75.00%	78.00%	81.50%	78.00%	–	78.40%
Youth (12 to 17 years of age)	0.00%	6.70%	7.70%	4.90%	–	6.40%
Children (11 years and under)	0.00%	6.40%	0.00%	0.00%	–	4.50%
			British Columbia **(*n* = 620)**			
Senior citizens (65 years of age and older)	20.00%	7.60%	9.70%	10.50%	–	9.20%
Adults (18 – 64 years)	60.00%	42.80%	55.60%	63.20%	–	51.30%
Youth (12 to 17 years of age)	0.00%	3.40%	3.00%	2.60%	–	3.10%
Children (11 years and under)	6.70%	2.50%	3.60%	2.60%	–	3.20%
Unknown	13.30%	43.60%	28.10%	21.10%	–	33.20%

Note. [1]Less than 1 day in hospital or off work; [2] Hospitalized 1-2 days and/or off work 1-15 days; [3]Hospitalized 3+ days and/or off work 16+ days. – Information was unavailable, or code choice was not used in a specific jurisdiction.

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Similarly, across the three provinces, victims of cooking fire injuries were more commonly civilians between the ages of 18 and 64 years.

To detect potential trends in age of victim and nature of casualties, nature of casualties was cross-referenced against the four age groups (Table 41). When classifying cases by nature of casualties and age of victim a clearer pattern emerged.

For all age groups, minor injury was the most likely casualty outcome of cooking fires in Ontario and Alberta. In British Columbia, however, light injury was the most likely casualty outcome of cooking fires, whereas minor injury was the second most common casualty outcome across the four age groups.

Bivariate analyses were conducted to examine the relationship between age of victim and nature of casualties in each reporting province (Table 41).[16]

In Ontario and Alberta, the proportion of fatal cooking fire casualties was higher for senior citizens (persons aged 65 years and older) compared to their younger counterparts. In British Columbia, both civilians aged 65 years and older and children 11 years and under were more likely victims of fatal cooking fires.

While there was somewhat less variation in the non-fatal cooking injury age distribution, some interesting patterns did emerge.

For example, compared to their younger counterparts, seniors were less likely to suffer "minor" cooking fire injuries in Ontario and Alberta.

In Alberta, the proportion of serious cooking fire injuries was higher for civilians aged 65 and older compared to their younger counterparts, whereas in Ontario, youth 12 to 17 years of age and children 11 years and under were slightly more likely to suffer serious cooking fire injuries vis-à-vis their older counterparts.

In British Columbia, the proportion of minor cooking fire injuries was slightly higher for youth 12 to 17 years of age compared to their younger and older counterparts.

[16] Pearson Chi-Square (df= 9)= 77.71, p<0.001 (Ontario); 16.11, p<0.10 (Alberta); 2.78, p>0.10^{ns} (British Columbia).

TABLE 41. HOME COOKING FIRE VICTIMS, BY AGE OF VICTIM AND NATURE OF CASUALTIES, 3 JURISDICTIONS, NFID, 2005 TO 2014

	Nature of Casualties				
Age of Victim	Death	Minor injury[1]	Light injury[2]	Serious injury[3]	Injury, seriousness unknown
		Ontario **(*n* = 1729)†**			
Senior citizens (65 years of age and older)	15.00%	53.90%	–	22.80%	8.30%
Adults (18 – 64 years)	2.90%	70.30%	–	20.30%	6.40%
Youth (12 to 17 years of age)	4.10%	67.10%	–	24.70%	4.10%
Children (11 years and under)	1.20%	68.80%	–	24.90%	5.20%
Total	**4.30%**	**67.90%**	**–**	**21.50%**	**6.30%**
		Alberta **(*n* = 440)**			
Senior citizens (65 years of age and older)	10.60%	59.60%	14.90%	14.90%	–
Adults (18 – 64 years)	4.30%	71.00%	15.40%	9.30%	–
Youth (12 to 17 years of age)	0.00%	75.00%	17.90%	7.10%	–
Children (11 years and under)	0.00%	100.00%	0.00%	0.00%	–
Total	**4.50%**	**71.40%**	**14.80%**	**9.30%**	**–**
		British Columbia **(*n* = 414)†**			
Senior citizens (65 years of age and older)	5.30%	31.60%	56.10%	7.00%	–
Adults (18 – 64 years)	2.80%	31.80%	57.90%	7.50%	–
Youth (12 to 17 years of age)	0.00%	42.10%	52.60%	5.30%	–
Children (11 years and under)	5.00%	30.00%	60.00%	5.00%	–
Total	**3.10%**	**32.10%**	**57.50%**	**7.20%**	**–**

Note. [1]Less than 1 day in hospital or off work; [2] Hospitalized 1-2 days and/or off work 1-15 days; [3]Hospitalized 3+ days and/or off work 16+ days. †*Unknown* cases for victim's age were excluded from the analyses presented here for Ontario (*n*= 92) and British Columbia (*n*= 206). – Information was unavailable, or code choice was not used in a specific jurisdiction.

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Sex of victim

Male civilians were more frequently victims of home cooking fires across the three reporting jurisdictions.

TABLE 42. HOME COOKING FIRE VICTIMS, BY SEX OF VICTIM, 3 JURISDICTIONS, NFID, 2005 TO 2014

	Ontario		Alberta		British Columbia	
Sex of Victim	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**
Male	1001	55.0	234	53.2	333	53.7
Female	792	43.5	206	46.8	287	46.3
Unknown	28	1.5	–	–	–	–
Total	**1821**		**440**		**620**	

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

The sex distribution of home cooking fire victims separately for fatal and non-fatal casualties is provided in Table 43.

In Ontario, 60 per cent of serious non-fatal casualties and 54 per cent of minor non-fatal casualties were males.

In Alberta, 65 per cent of cooking fire fatalities were females, whereas 59 per cent of serious non-fatal casualties and 55 per cent of minor non-fatal casualties were males.

In British Columbia, 67 per cent of cooking fire fatalities were males. In addition, 58 per cent of serious non-fatal casualties and 55 per cent of light non-fatal casualties were males.

In Manitoba, all 22 cooking fire death victims were males (data not shown).

TABLE 43. VICTIMS OF FATAL AND NON-FATAL HOME COOKING FIRES, BY SEX OF VICTIM, 3 JURISDICTIONS, NFID, 2005 TO 2014

	Nature of Casualties					
Sex of Victim	Death	Minor injury[1]	Light injury[2]	Serious injury[3]	Injury, seriousness unknown	Total
			Ontario **(*n* = 1821)**			
Male	51.40%	54.40%	–	59.90%	48.30%	55.00%
Female	48.60%	45.10%	–	39.50%	38.30%	43.50%
Unknown	0.00%	0.50%	–	0.50%	13.40%	1.50%
			Alberta **(*n* = 440)**			
Male	35.00%	54.50%	49.20%	58.50%	–	53.20%
Female	65.00%	45.50%	50.80%	41.50%	–	46.80%
			British Columbia **(*n* = 620)**			
Male	66.70%	50.40%	55.00%	57.90%	–	53.70%
Female	33.30%	49.60%	45.00%	42.10%	–	46.30%

Note. [1]Less than 1 day in hospital or off work; [2] Hospitalized 1-2 days and/or off work 1-15 days; [3]Hospitalized 3+ days and/or off work 16+ days. – Information was unavailable, or code choice was not used in a specific jurisdiction.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

To detect potential trends in sex of victim and nature of casualties, nature of casualties was cross-referenced against sex of victim (Table 44).

For both sexes, minor injury was the most likely casualty outcome of cooking fires in Ontario and Alberta. In British Columbia, however, light injury was the most likely casualty outcome of cooking fires, while minor injury was the second most common casualty outcome for both male and female cooking fire victims.

The current study also sought to examine the nature of the bivariate relationship between sex of victim and nature of casualties (Table 44). Apart from few exceptions pointed out below, there was much less variation in the cooking fire casualty sex distribution, especially for non-fatal cooking fire injuries.

In Alberta, the proportion of cooking fire fatalities was two times higher for females compared to their male counterparts; however, in British Columbia, the reverse was true: The proportion of fatal cooking fire casualties was 1.8 times higher for males relative to females.

TABLE 44. HOME COOKING FIRE VICTIMS, BY SEX OF VICTIM AND NATURE OF CASUALTIES, 3 JURISDICTIONS, NFID, 2005 TO 2014

	Nature of Casualties				
Sex of Victim	**Death**	**Minor injury[1]**	**Light injury[2]**	**Serious injury[3]**	**Injury, seriousness unknown**
		Ontario **(*n* = 1793)†**			
Male	3.80%	65.80%	–	23.20%	7.20%
Female	4.50%	68.90%	–	19.30%	7.20%
	4.10%	**67.20%**	**–**	**21.50%**	**7.20%**
		Alberta **(*n* = 440)**			
Male	3.00%	73.10%	13.70%	10.30%	–
Female	6.30%	69.40%	16.00%	8.30%	–
Total	**4.50%**	**71.40%**	**14.80%**	**9.30%**	**–**
		British Columbia **(*n* = 620)**			
Male	3.00%	35.70%	54.70%	6.60%	–
Female	1.70%	40.80%	51.90%	5.60%	–
Total	**2.40%**	**38.10%**	**53.40%**	**6.10%**	**–**

Note. [1]Less than 1 day in hospital or off work; [2] Hospitalized 1-2 days and/or off work 1-15 days; [3]Hospitalized 3+ days and/or off work 16+ days. †*Unknown* cases for victim's sex were excluded from the analyses presented here for Ontario (*n*= 28). – Information was unavailable, or code choice was not used in a specific jurisdiction.

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Probable/possible cause of casualty

Information on probable cause of cooking fire casualty was reported only in Alberta and British Columbia.

During the 2005 to 2014 period, smoke inhalation was the most frequently reported cause of cooking fire casualties in British Columbia, accounting for 66 per cent of all known cooking fire casualties. In turn, burns accounted for the remaining one-third (34.0%).

TABLE 45. HOME COOKING FIRE VICTIMS, BY PROBABLE CAUSE OF CASUALTY, 2 JURISDICTIONS, NFID, 2005 TO 2014

	Alberta		British Columbia	
Possible Cause	**Freq.**	**Percent**	**Freq.**	**Percent**
Smoke inhalation	164	37.3	298	48.1
Burn	251	57.0	154	24.8
Physical injury	8	1.8	–	–
Other	17	3.9	–	–
Unknown	–	–	168	27.1
Total	**440**		**620**	

Note. – Information was unavailable, or code choice was not used in a specific jurisdiction.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

The reverse was true in Alberta, where more than one-half (57.0%) of cooking fire casualties were due to burns, compared to over one-third (37.3%) due to smoke inhalation. Physical injuries and other causes accounted for the remaining 5.7 per cent.

The distribution of home cooking fire victims by probable cause separately for fatal and non-fatal casualties is provided in Table 46.

Smoke inhalation was the most frequently reported cause of fatal cooking fires in Alberta and British Columbia, whereas burns caused most frequently serious injuries in both provinces. In turn, smoke inhalation was the most commonly reported cause of minor and light injuries in British Columbia, while burns caused most frequently minor and light injuries in Alberta.

In sum, in Alberta, civilian injuries were more commonly due to burns, whereas, deaths were more commonly due to smoke inhalation.

TABLE 46. VICTIMS OF FATAL AND NON-FATAL HOME COOKING FIRES, BY PROBABLE CAUSE OF CASUALTY, 2 JURISDICTIONS, NFID, 2005 TO 2014

Probable Cause	Nature of Casualties				Total
	Death	Minor injury[1]	Light injury[2]	Serious injury[3]	
		Alberta **(*n* = 440)**			
Smoke inhalation	75.00%	39.80%	16.90%	31.70%	37.30%
Burn	15.00%	54.80%	75.40%	65.90%	57.00%
Physical injury	0.00%	1.90%	1.50%	2.40%	1.80%
Other	10.00%	3.50%	6.20%	0.00%	3.90%
		British Columbia **(*n* = 620)**			
Smoke inhalation	60.00%	50.80%	49.20%	15.80%	48.10%
Burn	26.70%	21.20%	23.60%	57.90%	24.80%
Unknown	13.30%	28.00%	27.20%	26.30%	27.10%

Note. [1]Less than 1 day in hospital or off work; [2] Hospitalized 1-2 days and/or off work 1-15 days; [3]Hospitalized 3+ days and/or off work 16+ days.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

This study also sought to examine the bivariate association between probable cause of casualty and nature of casualties in Alberta and British Columbia.

TABLE 47. HOME COOKING FIRE VICTIMS, BY PROBABLE CAUSE OF CASUALTY AND NATURE OF CASUALTIES, 2 JURISDICTIONS, NFID, 2005 TO 2014

Possible Cause	Alberta (*n* = 415)†				British Columbia (*n* = 452)			
	Death	Minor injury[1]	Light injury[2]	Serious injury[3]	Death	Minor injury[1]	Light injury[2]	Serious injury[3]
Smoke inhalation	9.10%	76.20%	6.70%	7.90%	3.00%	40.30%	54.70%	2.00%
Burn	1.20%	68.50%	19.50%	10.80%	2.60%	32.50%	50.60%	14.30%
Total	**4.30%**	**71.60%**	**14.50%**	**9.60%**	**2.90%**	**37.60%**	**53.30%**	**6.20%**

Note. [1]Less than 1 day in hospital or off work; [2] Hospitalized 1-2 days and/or off work 1-15 days; [3]Hospitalized 3+ days and/or off work 16+ days. †Other causes were excluded for Alberta (*n*= 25).
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

In Alberta, smoke inhalation was almost eight times more likely to be the cause of cooking fire deaths than burns (Table 47).[17] In addition, smoke inhalation was more frequently the reported cause of

[17] Pearson Chi-Square (df= 3)=27.37, p<0.001 (Alberta).

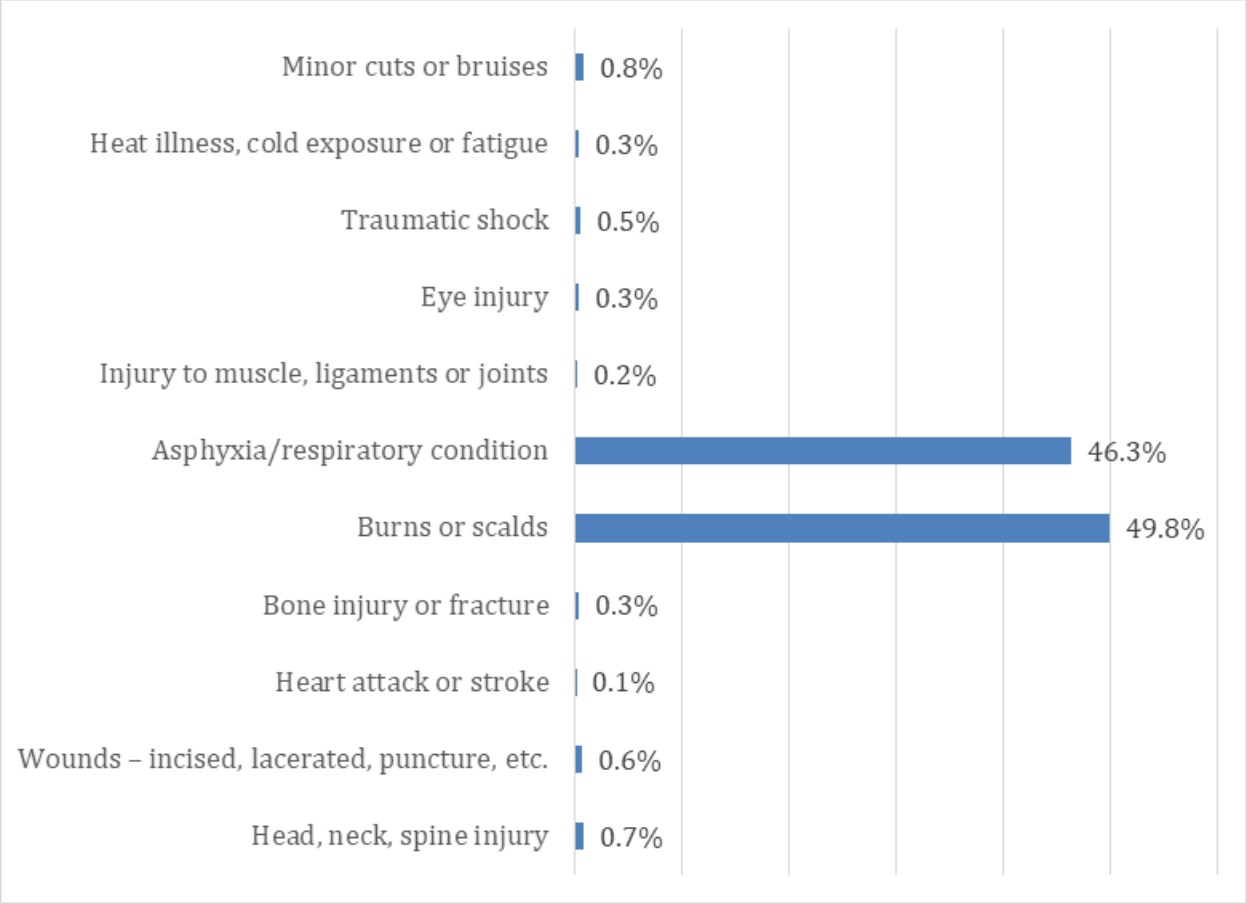
minor injuries, whereas burns were more frequently the reported cause of "light" and "serious" injuries.

In British Columbia, burns were seven times more likely to be the cause of serious cooking fire injuries, whereas smoke inhalation was more frequently the cause of minor and light injuries.[18] Smoke inhalation was slightly more likely to be the reported cause of cooking fire deaths than burns.

Type of injury incurred

Ontario collected information on the type of injury incurred as a result of the cooking fire incident for 1,543 out of 1,747 reported cooking fire civilian injuries.

FIGURE 7. HOME COOKING FIRE INJURY VICTIMS, BY TYPE OF INJURY INCURRED, ONTARIO, NFID, 2005 TO 2014

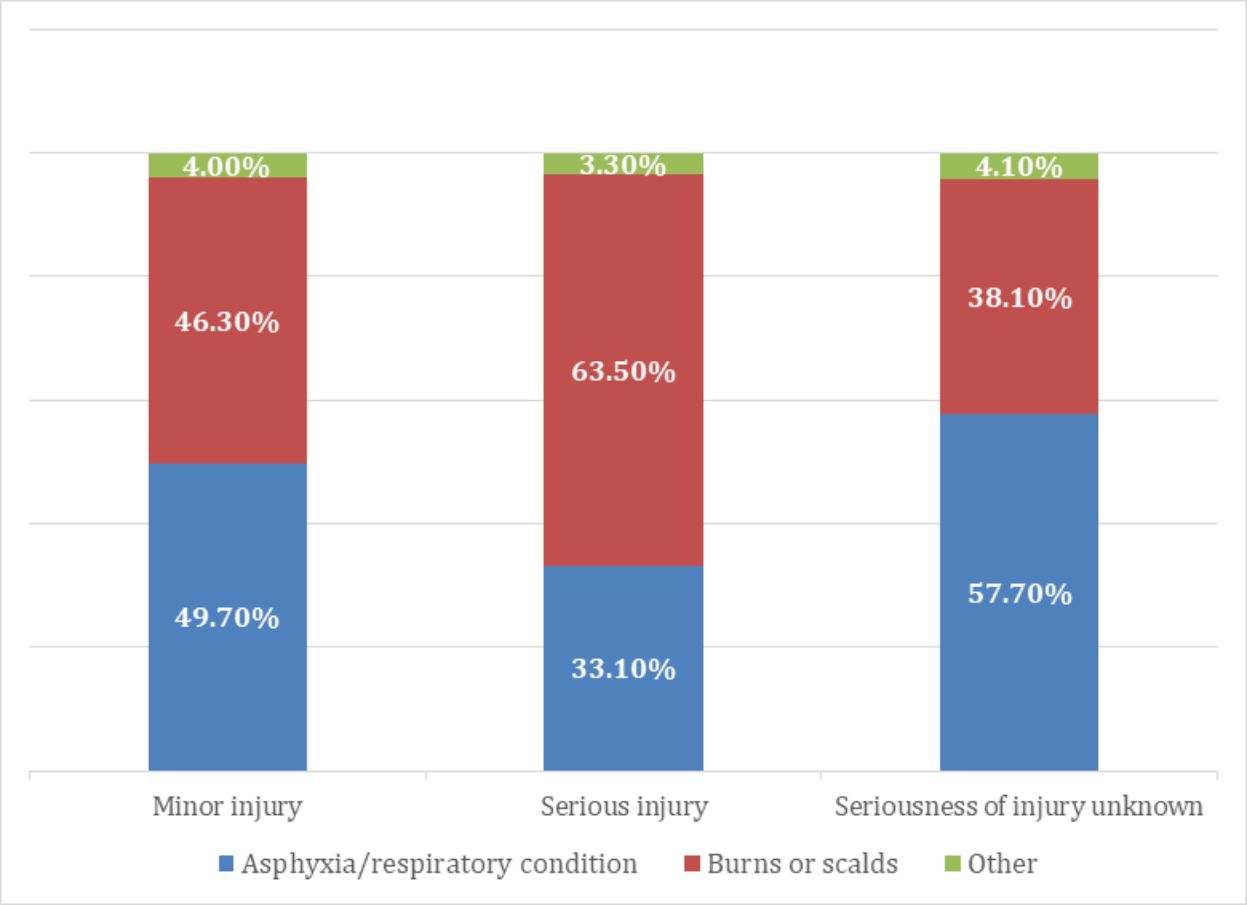


Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Where determined, burns or scalds (49.8%) and asphyxia or respiratory condition (46.3%) were the leading causes of cooking fire injuries in Ontario.

[18] Pearson Chi-Square (df= 3)=26.70, p<0.001 (British Columbia).

FIGURE 8. VICTIMS OF NON-FATAL HOME COOKING FIRES, BY TYPE OF INJURY INCURRED, ONTARIO, NFID, 2005 TO 2014



Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

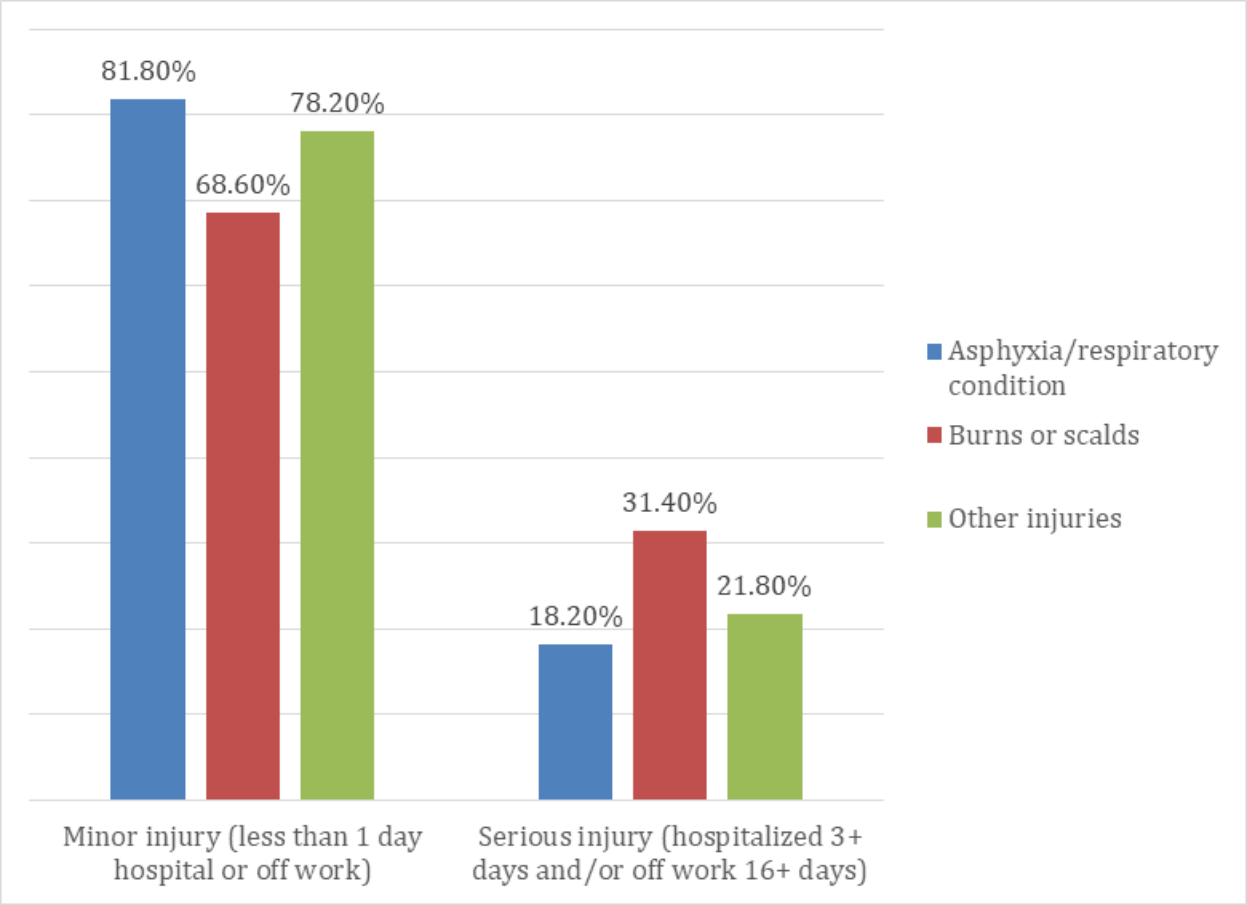
The distribution of home cooking fire victims by type of injury incurred separately for each type of non-fatal casualty is provided in Figure 8.

The causes of minor injuries were split almost equally between asphyxia or respiratory condition (49.7%) and burns or scalds (46.3%). Burns or scalds were most frequently the reported cause of serious cooking fire injuries in Ontario (63.5%), whereas asphyxia or respiratory condition (57.7%) was most frequently the reported cause of cooking fire injuries in which the severity was unknown or could not be determined.

The present study also examined the relationship between type of injury incurred and nature of non-fatal casualties (Figure 9).[19]

[19] Pearson Chi-Square (df= 2)=32.57, p<0.000 (Ontario).

FIGURE 9. HOME COOKING FIRE INJURY VICTIMS, BY TYPE OF INJURY INCURRED AND NATURE OF NON-FATAL CASUALTIES, ONTARIO, NFID, 2005 TO 2014



Note. The analysis presented here was based on a total of 1,446 cases: Unknown values for type of injury incurred were excluded, and so were cases where severity of injury was undermined.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Out of the 1,446 determined cooking fire civilian injuries, asphyxia or respiratory condition and other injuries were more frequently the reported causes of minor injuries, whereas burns or scalds were more frequently the reported cause of serious injuries.

Condition of casualty

In three-quarters of determined cooking fire casualties in Ontario and British Columbia compared to two-thirds of casualties in Alberta, the victims were awake and had no physical or mental impairment at the time of the cooking fire (Table 48), a pattern observed for all types of injuries, irrespective of severity of casualty, across the three provinces (data not shown).

TABLE 48. HOME COOKING FIRE VICTIMS, BY CONDITION OF CASUALTY, 3 JURISDICTIONS, NFID, 2005 TO 2014

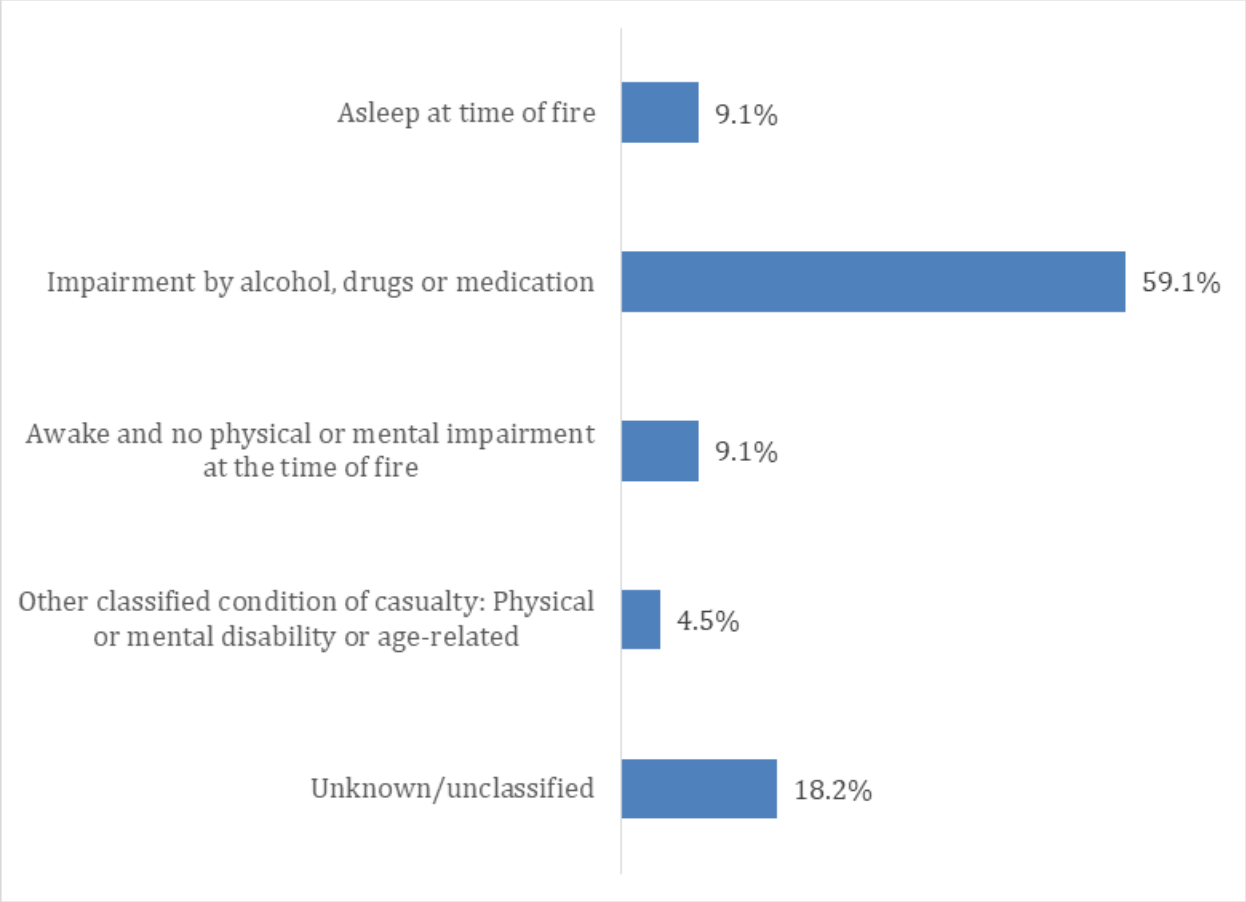
	Ontario		Alberta		British Columbia	
Condition of Casualty	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**
Hearing impaired	1	0.1	–	–	–	–
Visually impaired	2	0.1	–	–	–	–
Asleep at time of fire	163	9.0	57	13.0	70	11.3
Bedridden or other physical handicap	33	1.8	7	1.6	6	1.0
Impairment by alcohol, drugs or medication	81	4.4	37	8.4	27	4.4
Awake and no physical or mental impairment at time of fire	1123	61.7	244	55.5	336	54.2
Too young to react to fire emergency	33	1.8	3	0.7	3	0.5
Mental handicap - includes senility	3	0.2	3	0.7	6	1.0
Child left unattended	10	0.5	14	3.2	–	–
Unclassified	–	–	14	3.2	74	11.9
Unknown	372	20.4	61	13.9	98	15.8
Total	**1821**		**440**		**620**	

Note. – Information was unavailable, or code choice was not used in a specific jurisdiction.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

For the remainder, the leading condition which contributed to the cooking fire civilian casualties across the three provinces was being asleep at the time of the fire followed by impairment by alcohol, drugs or medication. In Ontario, the third leading condition contributing to cooking fire casualties was evenly split between "bedridden or other physical handicap" and "too young to react to fire emergency", whereas in British Columbia, the third leading condition was evenly split between "bedridden or other physical handicap" and "mental handicap".

Focusing only on cooking fire deaths (data not shown), impairment by alcohol, drugs or medication was the leading condition of cooking fire fatalities in Alberta (50.0%) and Manitoba (59.1%, Figure 10), whereas impairment was the second leading condition of fatalities in British Columbia (37.5) and Ontario (25.9%). In British Columbia, being asleep at the time of the fire was the leading condition of cooking fire fatalities (50.0%), whereas being asleep was the second most frequently reported condition of fatal casualties in Alberta (30.0%).

FIGURE 10. HOME COOKING FIRE FATALITIES, BY CONDITION OF CASUALTY, MANITOBA, NFID, 2005 TO 2014



Note. There were 22 cooking fire deaths in Manitoba during the ten-year window of observation.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

The current study also sought to examine the bivariate relationship between condition of casualty and nature of casualties.[20]

TABLE 49. HOME COOKING FIRE VICTIMS, BY CONDITION OF CASUALTY AND NATURE OF CASUALTIES, 3 JURISDICTIONS, NFID, 2005 TO 2014

	Nature of Casualties			
Condition of Casualty	**Death**	**Minor injury[1]**	**Light injury[2]**	**Serious injury[3]**
***Ontario* (*n* = 1373)†**				
Asleep at time of fire	0.70%	72.50%	–	26.80%
Impairment by alcohol, drugs or medication	20.00%	49.30%	–	30.70%
Awake and no physical or mental impairment at the time of fire	2.30%	76.30%	–	21.40%
Other classified condition of casualty: Physical or mental disability or age-related	23.30%	57.50%	–	19.20%
Total	**4.20%**	**73.40%**	**–**	**22.40%**
***Alberta* (*n* =365)**				
Asleep at time of fire	5.30%	82.50%	8.80%	3.50%
Impairment by alcohol, drugs or medication	13.50%	54.10%	13.50%	18.90%
Awake and no physical or mental impairment at the time of fire	0.00%	76.60%	16.00%	7.40%
Other classified condition of casualty: Physical or mental disability or age-related	7.40%	55.60%	22.20%	14.80%
Total	**2.70%**	**73.70%**	**15.10%**	**8.50%**
***British Columbia* (*n* = 448)**				
Asleep at time of fire	5.70%	35.70%	50.00%	8.60%
Impairment by alcohol, drugs or medication	11.10%	14.80%	59.30%	14.80%
Awake and no physical or mental impairment at the time of fire	0.30%	40.20%	54.50%	5.10%
Other classified condition of casualty: Physical or mental disability or age-related	0.00%	40.00%	53.30%	6.70%
Total	**1.80%**	**37.90%**	**54.00%**	**6.30%**

Note. [1]Less than 1 day in hospital or off work; [2] Hospitalized 1-2 days and/or off work 1-15 days; [3]Hospitalized 3+ days and/or off work 16+ days. †Cases where severity of injury was undermined were removed. – Information was unavailable, or code choice was not used in a specific jurisdiction. *Source*. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

[20] Pearson Chi-Square= 134.83, *df*= 6, *p*<0.001 (Ontario); 40.50, *df*= 9, *p*<0.001 (Alberta); 32.89, *df*= 9, *p*<0.001 (British Columbia).

Where known, physical or mental handicap or disability and age-related conditions (e.g., senility, too young to react) as well as impairment by alcohol, drugs or medication were the two most common conditions of cooking fire fatalities in Ontario. In addition, impairment by alcohol, drugs or medication and being asleep at time of fire were the most frequently reported conditions of serious non-fatal civilian injuries, whereas impairment was the least frequently reported condition of minor cooking fire injuries.

In Alberta and British Columbia, impairment by alcohol, drugs or medication was the most frequently reported condition of cooking fire fatalities (Table 49). Like in Ontario, impairment was the most frequently reported condition of serious cooking fire injuries in these two provinces. In addition, impairment by alcohol, drugs or medication was the most frequently reported condition of light civilian injuries in British Columbia. Being asleep at the time of the fire was the leading condition associated with minor cooking fire injuries in Alberta.

Action of casualty

Across the three jurisdictions, the leading action of cooking fire casualties was entering or remaining in the home for firefighting or extinguishment purposes (Table 50). Where determined, over half of the casualties entered or remained on the premises to fight the fire in Alberta (57.7%) and British Columbia (51.2%), and slightly less than half in Ontario (47.9%).

In turn, entering or remaining for rescue purposes and to save personal property contributed together to an additional 14 per cent of cooking fire casualties in Alberta (14.2%) and British Columbia (14.5%).

In Ontario and British Columbia, getting injured while attempting to escape and loss of judgement or panic were the second leading actions of cooking fire casualties. Together these actions accounted for four-tenths (41.0%) and one-quarter (25.4%) of cooking fire casualties in Ontario and British Columbia, respectively.

The distribution of home cooking fire victims by action of casualty separately for fatal and non-fatal casualties is provided in Table 51.[21]

Across the three provinces, entering or remaining in the home for firefighting or extinguishment purposes was the leading action of casualties in nearly all categories of cooking fire injuries. The only exception was in British Columbia where both entering or remaining in the home for firefighting or extinguishment and loss of judgement or panic were evenly split as leading actions of serious cooking fire injuries. Injured while attempting to escape was the most frequently reported action of fatal casualties in both Ontario (41.9%) and British Columbia (60.0%), and second leading action in Alberta (28.6%). Did not act was the leading action of fatalities in Alberta (42.9%), and second leading action in British Columbia (40.0%). In turn, loss of judgement or panic (25.8%) and did not act (22.6%) were the second most commonly reported actions of cooking fire fatalities in Ontario.

[21] Unknown and unclassified cases were excluded for the analyses presented here for each province.

TABLE 50. HOME COOKING FIRE VICTIMS, BY ACTION OF CASUALTY, 3 JURISDICTIONS, NFID, 2005 TO 2014

	Ontario		Alberta		British Columbia	
Action of Casualty	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**
Civilian attempted suppression	2	0.1	–	–	–	–
Fire setter	1	0.1	–	–	–	–
Injured while attempting to escape	275	15.1	38	8.6	59	9.5
Over-exertion, heart attack	–	–	1	0.2	3	0.5
Entered or remained for rescue purposes	42	2.3	19	4.3	27	4.4
Entered or remained for fire fighting/ extinguishment	649	35.6	207	47.0	248	40.0
Entered or remained to save personal property	–	–	32	7.3	43	6.9
Loss of judgement or panic	281	15.4	26	5.9	64	10.3
Received delayed warning	–	–	14	3.2	2	0.3
Did not act	105	5.8	22	5.0	38	6.1
Unclassified	191	10.5	43	9.8	38	6.1
Unknown	275	15.1	38	8.6	98	15.8
Total	**1821**		**440**		**620**	

Note. – Information was unavailable, or code choice was not used in a specific jurisdiction.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

TABLE 51. VICTIMS OF FATAL AND NON-FATAL HOME COOKING FIRES, BY ACTION OF CASUALTY, 3 JURISDICTIONS, NFID, 2005 TO 2014

	Nature of Casualties					
Action of Casualty	Death	Minor injury[1]	Light injury[2]	Serious injury[3]	Injury, seriousness unknown	Total
Ontario **(*n* = 1355)**						
Civilian attempted suppression	6.50%	0.00%	–	0.00%	0.00%	0.10%
Fire setter	3.20%	0.00%	–	0.00%	0.00%	0.10%
Injured while attempting to escape	41.90%	18.90%	–	23.10%	17.80%	20.30%
Entered or remained for rescue purposes	0.00%	3.70%	–	2.00%	2.20%	3.10%
Entered or remained for fire fighting/extinguishment	0.00%	52.60%	–	38.00%	48.90%	47.90%
Loss of judgement or panic	25.80%	17.50%	–	31.00%	17.80%	20.70%
Did not act	22.60%	7.30%	–	5.90%	13.30%	7.70%
Alberta **(*n* = 359)**						
Injured while attempting to escape	28.60%	11.40%	3.60%	12.10%	–	10.60%
Over-exertion, heart attack	14.30%	0.00%	0.00%	0.00%	–	0.30%
Entered or remained for rescue purposes	0.00%	4.90%	8.90%	3.00%	–	5.30%
Entered or remained for fire fighting/extinguishment	0.00%	58.60%	66.10%	48.50%	–	57.70%
Entered or remained to save personal property	14.30%	9.50%	8.90%	3.00%	–	8.90%
Loss of judgement or panic	0.00%	6.10%	10.70%	12.10%	–	7.20%
Received delayed warning	0.00%	3.80%	0.00%	12.10%	–	3.90%
Did not act	42.90%	5.70%	1.80%	9.10%	–	6.10%
British Columbia **(*n* = 484)**						
Injured while attempting to escape	60.00%	11.20%	11.20%	17.60%	–	12.20%
Over-exertion, heart attack	0.00%	1.10%	0.00%	2.90%	–	0.60%
Entered or remained for rescue purposes	0.00%	8.40%	3.70%	5.90%	–	5.60%
Entered or remained for fire fighting/extinguishment	0.00%	49.40%	56.20%	29.40%	–	51.20%
Entered or remained to save personal property	0.00%	6.70%	10.90%	5.90%	–	8.90%
Loss of judgement or panic	0.00%	14.60%	10.50%	29.40%	–	13.20%
Received delayed warning	0.00%	0.00%	0.70%	0.00%	–	0.40%
Did not act	40.00%	8.40%	6.70%	8.80%	–	7.90%

Note. [1]Less than 1 day in hospital or off work; [2] Hospitalized 1-2 days and/or off work 1-15 days; [3]Hospitalized 3+ days and/or off work 16+ days. – Code choice was not used in a specific jurisdiction.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

The bivariate association between action of casualty and nature of casualties was also examined.

Did not act and injured while attempting to escape were the two most commonly reported actions of cooking fire fatalities across the three provinces. [22]

TABLE 52. HOME COOKING FIRE VICTIMS, BY ACTION OF CASUALTY AND NATURE OF CASUALTIES, 3 JURISDICTIONS, NFID, 2005 TO 2014

Action of Casualty	Nature of Casualties			
	Death	Minor injury[1]	Light injury[2]	Serious injury[3]
Ontario **(*n* = 1264)†**				
Injured while attempting to escape	5.00%	68.00%	–	27.00%
Entered or remained for rescue purposes	0.00%	85.00%	–	15.00%
Entered or remained for fire fighting/extinguishment	0.30%	80.70%	–	18.90%
Loss of judgement or panic	3.00%	61.50%	–	35.50%
Did not act	7.50%	73.10%	–	19.40%
Total	**2.40%**	**73.70%**	**–**	**24.00%**
Alberta **(*n* = 359)**				
Injured while attempting to escape or over-exertion	7.70%	76.90%	5.10%	10.30%
Entered or remained for rescue purposes	0.00%	68.40%	26.30%	5.30%
Entered or remained for fire fighting/extinguishment	0.00%	74.40%	17.90%	7.70%
Entered or remained to save personal property	3.10%	78.10%	15.60%	3.10%
Loss of judgement or panic	0.00%	61.50%	23.10%	15.40%
Did not act	8.30%	69.40%	2.80%	19.40%
Total	**1.90%**	**73.30%**	**15.60%**	**9.20%**
British Columbia **(*n* = 484)**				
Injured while attempting to escape or over-exertion	4.80%	35.50%	48.40%	11.30%
Entered or remained for rescue purposes	0.00%	55.60%	37.00%	7.40%
Entered or remained for fire fighting/extinguishment	0.00%	35.50%	60.50%	4.00%
Entered or remained to save personal property	0.00%	27.90%	67.40%	4.70%
Loss of judgement or panic	0.00%	40.60%	43.80%	15.60%
Did not act	5.00%	37.50%	50.00%	7.50%
Total	**1.00%**	**36.80%**	**55.20%**	**7.00%**

Note. [1]Less than 1 day in hospital or off work; [2] Hospitalized 1-2 days and/or off work 1-15 days; [3]Hospitalized 3+ days and/or off work 16+ days. †Cases where severity of injury was undermined were removed. – Information was unavailable, or code choice was not used in a specific jurisdiction. *Source*. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

[22] Pearson Chi-Square= 65.61, *df*= 8, *p*<0.001 (Ontario); 36.98, *df*= 15, *p*<0.01 (Alberta); 40.79, *df*= 15, *p*<0.001 (British Columbia).

Loss of judgement or panic was the most frequently reported action of serious cooking fire injuries in both Ontario and British Columbia, while loss of judgement or panic was the second most commonly reported action of serious non-fatal casualties in Alberta, after failure to act.

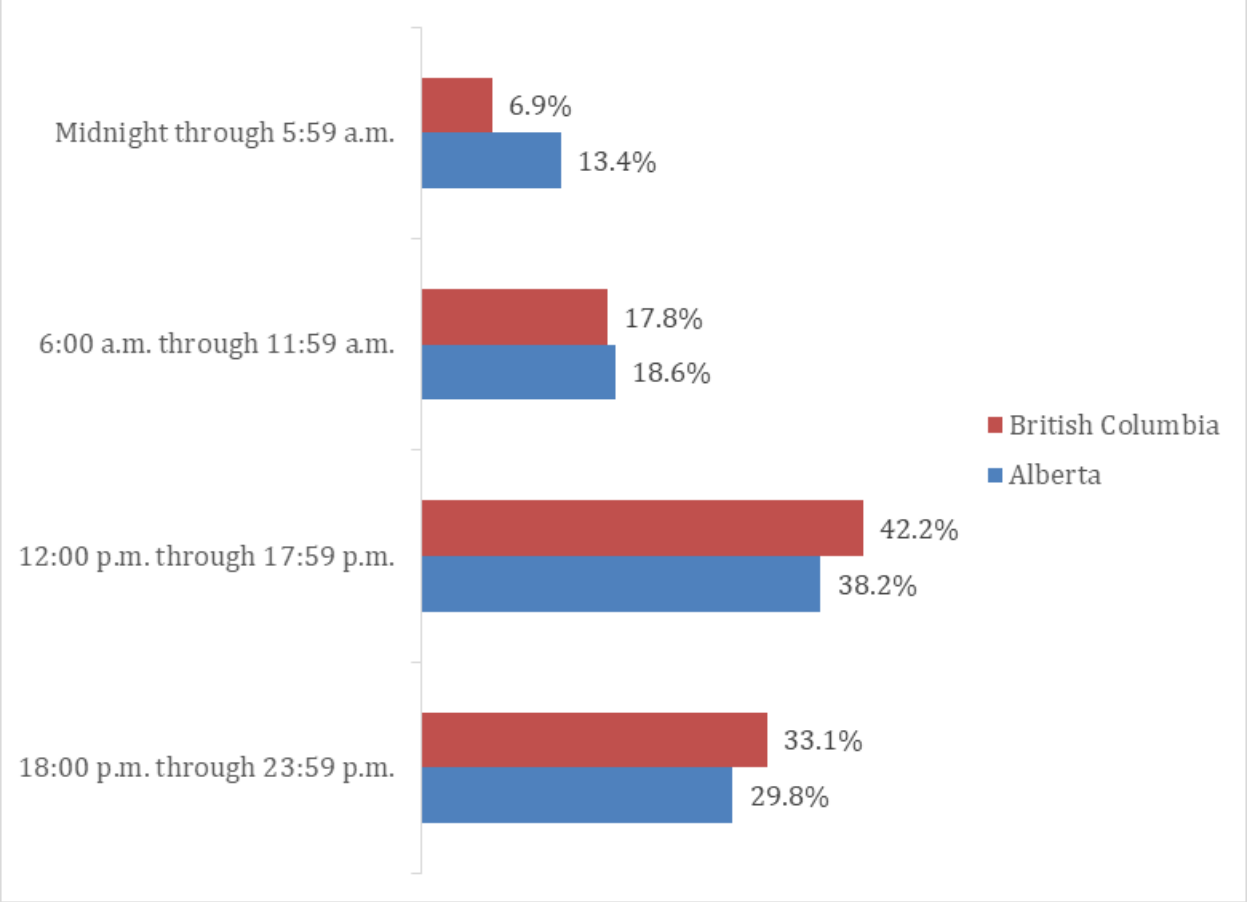
Entering or remaining in the residence for rescue purposes was the most frequently reported action of minor cooking fire injuries in Ontario and British Columbia.

Entering or remaining to save personal property or for firefighting were the most frequent actions of light civilian casualties in British Columbia, whereas entering or remaining for rescue purposes and loss of judgement or panic were the most commonly reported actions of light cooking fire injuries in Alberta.

Time of day of casualty

Over four-tenths of cooking fire civilian casualties occurred between 12:00 pm and 6:00 pm, when many people prepare their lunches and dinners.

FIGURE 11. HOME COOKING FIRE VICTIMS, BY TIME OF DAY OF CASUALTY, 2 JURISDICTIONS, NFID, 2005 TO 2014



Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

The distribution of home cooking fire victims by time of day of casualty separately for fatal and non-fatal casualties is provided in Table 53.

TABLE 53. VICTIMS OF FATAL AND NON-FATAL HOME COOKING FIRES, BY TIME OF DAY OF CASUALTY, 2 JURISDICTIONS, NFID, 2005 TO 2014

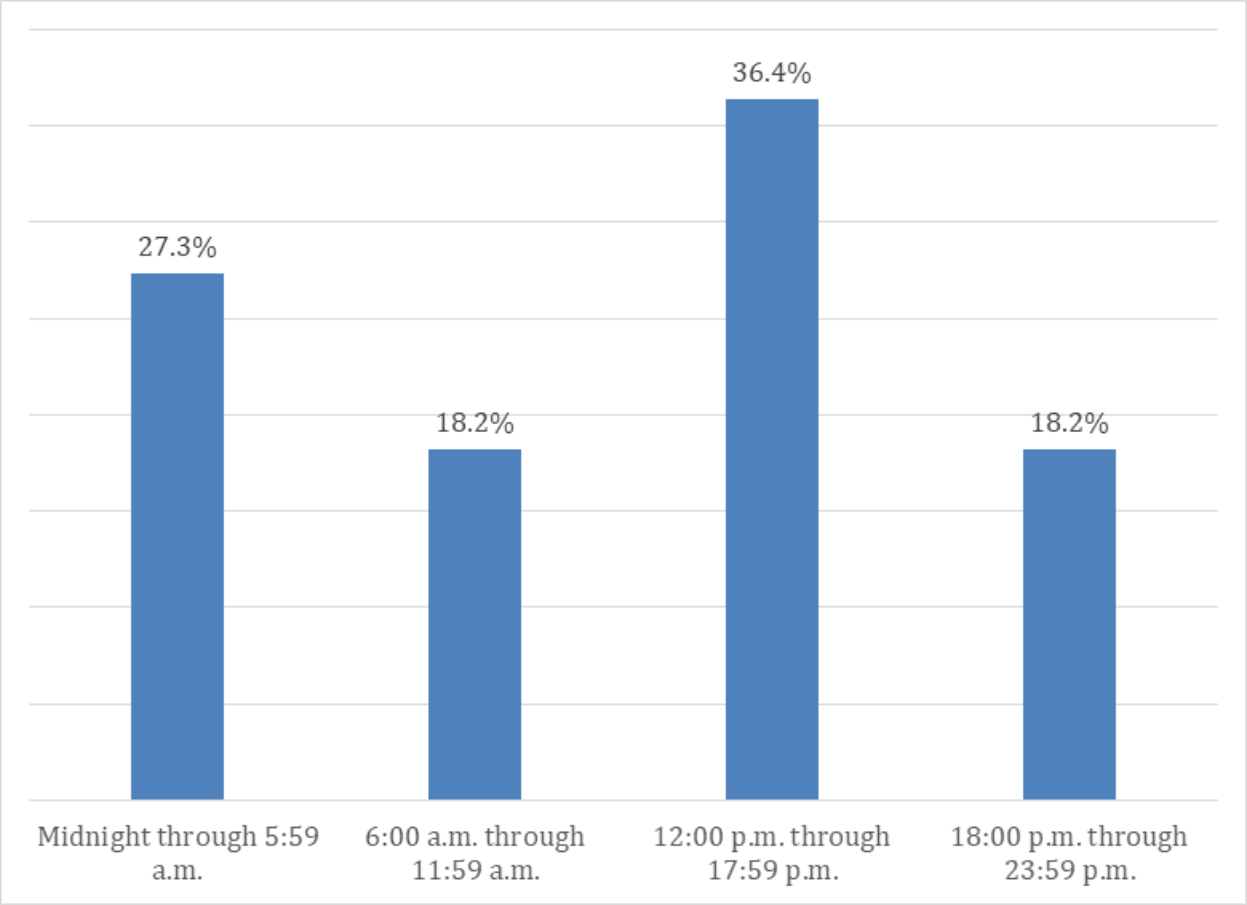
	Nature of Casualties				
Time of Day of Casualty	Death	Minor injury[1]	Light injury[2]	Serious injury[3]	Total
Alberta **(*n* = 440)**					
Midnight through 5:59 a.m.	30.00%	13.70%	9.20%	9.80%	13.40%
6:00 a.m. through 11:59 a.m.	10.00%	20.40%	15.40%	14.60%	18.60%
12:00 p.m. through 17:59 p.m.	25.00%	38.90%	36.90%	41.50%	38.20%
18:00 p.m. through 23:59 p.m.	35.00%	27.10%	38.50%	34.10%	29.80%
British Columbia **(*n* = 611)†**					
Midnight through 5:59 a.m.	21.40%	6.40%	5.90%	13.20%	6.90%
6:00 a.m. through 11:59 a.m.	28.60%	19.10%	17.00%	13.20%	17.80%
12:00 p.m. through 17:59 p.m.	21.40%	42.10%	43.20%	42.10%	42.20%
18:00 p.m. through 23:59 p.m.	28.60%	32.30%	34.00%	31.60%	33.10%

Note. [1]Less than 1 day in hospital or off work; [2] Hospitalized 1-2 days and/or off work 1-15 days; [3]Hospitalized 3+ days and/or off work 16+ days. †*System missing* cases were excluded for the analyses presented here for British Columbia (*n*= 9).
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

In both Alberta and British Columbia, roughly four out of every ten cooking fire civilian injuries, for nearly all categories of fire injuries, occurred between 12:00 pm and 6:00 pm, whereas roughly three out of every ten injuries occurred between 6 pm and 12 am. In Alberta, the highest proportions of light injuries occurred between noon and midnight.

In Alberta, the highest proportion of cooking fire deaths occurred between 6:00 pm and 12:00 am (Table 53), while in Manitoba, fire deaths were more common between noon and 6:00 pm (Figure 12). In turn, in British Columbia, fatalities most frequently occurred between 6:00 am and noon and between 6:00 pm and midnight (Table 53).

FIGURE 12. HOME COOKING FIRE FATALITIES, BY TIME OF DAY OF CASUALTY, MANITOBA, NFID, 2005 TO 2014



Note. There were 22 cooking fire deaths in Manitoba during the ten-year window of observation.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

The bivariate relationship between time of day of casualty and nature of casualties was also examined (Table 54).

In both Alberta and British Columbia, cooking fires that occurred late at night, between midnight and 6:00 am, were more likely to result in fatal civilian casualties. For example, compared to cooking fires that occurred between 12:00 pm and 6:00 pm, which is when many people prepare their meals, fires that occurred between midnight and 6:00 am were roughly three and six-times more likely to result in fatal casualties in Alberta and British Columbia, respectively. In addition, in British Columbia, cooking fires that occurred between midnight and 6:00 am were more likely to result in serious injuries. Serious injuries in Alberta occurred most frequently between noon and midnight, which include peak times during the day when people prepare meals.

TABLE 54. HOME COOKING FIRE VICTIMS, BY TIME OF DAY OF CASUALTY AND NATURE OF CASUALTIES, 2 JURISDICTIONS, NFID, 2005 TO 2014

	Alberta (*n* = 440)				British Columbia (*n* = 611)†			
Time of Day of Casualty	**Death**	**Minor injury[1]**	**Light injury[2]**	**Serious injury[3]**	**Death**	**Minor injury[1]**	**Light injury[2]**	**Serious injury[3]**
Midnight through 5:59 a.m.	10.20%	72.90%	10.20%	6.80%	7.10%	35.70%	45.20%	11.90%
6:00 a.m. through 11:59 a.m.	2.40%	78.00%	12.20%	7.30%	3.70%	41.30%	50.50%	4.60%
12:00 p.m. through 17:59 p.m.	3.00%	72.60%	14.30%	10.10%	1.20%	38.40%	54.30%	6.20%
18:00 p.m. through 23:59 p.m.	5.30%	64.90%	19.10%	10.70%	2.00%	37.60%	54.50%	5.90%
Total	**4.50%**	**71.40%**	**14.80%**	**9.30%**	**2.30%**	**38.50%**	**53.00%**	**6.20%**

Note. [1]Less than 1 day in hospital or off work; [2] Hospitalized 1-2 days and/or off work 1-15 days; [3]Hospitalized 3+ days and/or off work 16+ days. †*System missing* cases were excluded for the analyses presented here for British Columbia (*n*= 9).
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Igniting object involved in casualty

The stovetop was involved in the vast majority of civilian casualties across the three reporting provinces (Table 55). For example, pans heated on the stovetop accounted for 84 per cent of all casualties in Ontario. In Alberta and British Columbia, deep-fat fryers heated on stovetops and pans heated on stovetops accounted each for up to one-third of cooking fire casualties, whereas 17 per cent of casualties were associated with stovetop fires due to other circumstances in both provinces.

TABLE 55. HOME COOKING FIRE VICTIMS, BY IGNITING OBJECT INVOLVED IN CASUALTY, 3 JURISDICTIONS, NFID, 2005 TO 2014

	Ontario		Alberta		British Columbia	
Igniting Object	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**
Stove, top burner area - involving fire in pan	1534	84.2	157	35.7	219	35.3
Stove, top burner area - involving fire in pot used as a deep fat fryer	–	–	159	36.1	212	34.2
Stove, top burner area - involving other circumstances	–	–	76	17.3	108	17.4
Oven of stove, range	75	4.1	10	2.3	14	2.3
Deep fat fryer - separate appliance	61	3.3	2	0.5	2	0.3
Open fired broiler, portable type - includes barbecue	46	2.5	23	5.2	25	4.0
Other tabletop cooking appliances: Microwave, toaster, etc.	9	0.5	13	3.0	19	3.1
Unclassified or unknown	96	5.3	–	–	21	3.4
Total	**1821**		**440**		**620**	

Note. – Information was unavailable, or code choice was not used in a specific jurisdiction.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

The distribution of home cooking fire victims by igniting object involved in casualty for fatal and non-fatal casualties is provided in Table 56.

In Ontario, 87 per cent (*n*= 60) of the 69 determined civilian cooking fire deaths involved pans heated on the stovetop (Table 56). Similarly, pans heated on the stovetop were involved in roughly 89 per cent of minor (*n*= 1,149) and serious (*n*= 366) injuries, and 88 per cent of injuries where the severity was unknown (*n*= 141).

In Alberta, stovetop fires were involved in 85 per cent (*n*= 17) of 20 civilian deaths. Similarly, stovetops were involved in roughly 90 per cent of minor (*n*= 314), light (*n*= 65) and serious (*n*= 41) injuries, with the highest proportions of injuries for each non-fatal casualty category most frequently attributed to deep-fat fryers heated on the stovetop and pans heated on the stovetop.

TABLE 56. VICTIMS OF FATAL AND NON-FATAL HOME COOKING FIRES, BY IGNITING OBJECT INVOLVED IN CASUALTY, 3 JURISDICTIONS, NFID, 2005 TO 2014

	Nature of Casualties					
Igniting Object	Death	Minor injury[1]	Light injury[2]	Serious injury[3]	Injury, seriousness unknown	Total
Ontario **(*n* = 1725)†**						
Stove, top burner area - involving fire in pan	87.00%	89.30%	–	88.50%	87.90%	88.90%
Oven of stove, range	5.80%	4.80%	–	1.90%	6.40%	4.30%
Open fired broiler, portable type - includes barbecue	1.40%	2.20%	–	4.90%	1.40%	2.70%
Other tabletop cooking appliances	0.00%	0.70%	–	0.30%	0.00%	0.50%
Deep fat fryer - separate appliance	5.80%	3.00%	–	4.40%	4.30%	3.50%
Alberta **(*n* = 440)**						
Stove, top burner area - involving fire in pan	30.00%	34.40%	43.10%	36.60%	–	35.70%
Stove, top burner area - involving fire in pot used as a deep fat fryer	15.00%	35.70%	38.50%	46.30%	–	36.10%
Stove, top burner area - involving other circumstances	40.00%	18.80%	9.20%	7.30%	–	17.30%
Oven of stove, range	0.00%	2.90%	1.50%	0.00%	–	2.30%
Open fired broiler, portable type - includes barbecue	10.00%	4.80%	3.10%	9.80%	–	5.20%
Other tabletop cooking appliances	5.00%	3.20%	3.10%	0.00%	–	3.00%
Deep fat fryer - separate appliance	0.00%	0.30%	1.50%	0.00%	–	0.50%
British Columbia **(*n* = 599)†**						
Stove, top burner area - involving fire in pan	7.10%	38.00%	38.90%	18.90%	–	36.60%
Stove, top burner area - involving fire in pot used as a deep fat fryer	28.60%	32.30%	35.70%	54.10%	–	35.40%
Stove, top burner area - involving other circumstances	42.90%	17.50%	18.50%	8.10%	–	18.00%
Oven of stove, range	0.00%	3.50%	1.60%	2.70%	–	2.30%
Open fired broiler, portable type - includes barbecue	21.40%	5.20%	1.90%	10.80%	–	4.20%
Other tabletop cooking appliances	0.00%	3.10%	3.10%	5.40%	–	3.20%
Deep fat fryer - separate appliance	0.00%	0.40%	0.30%	0.00%	–	0.30%

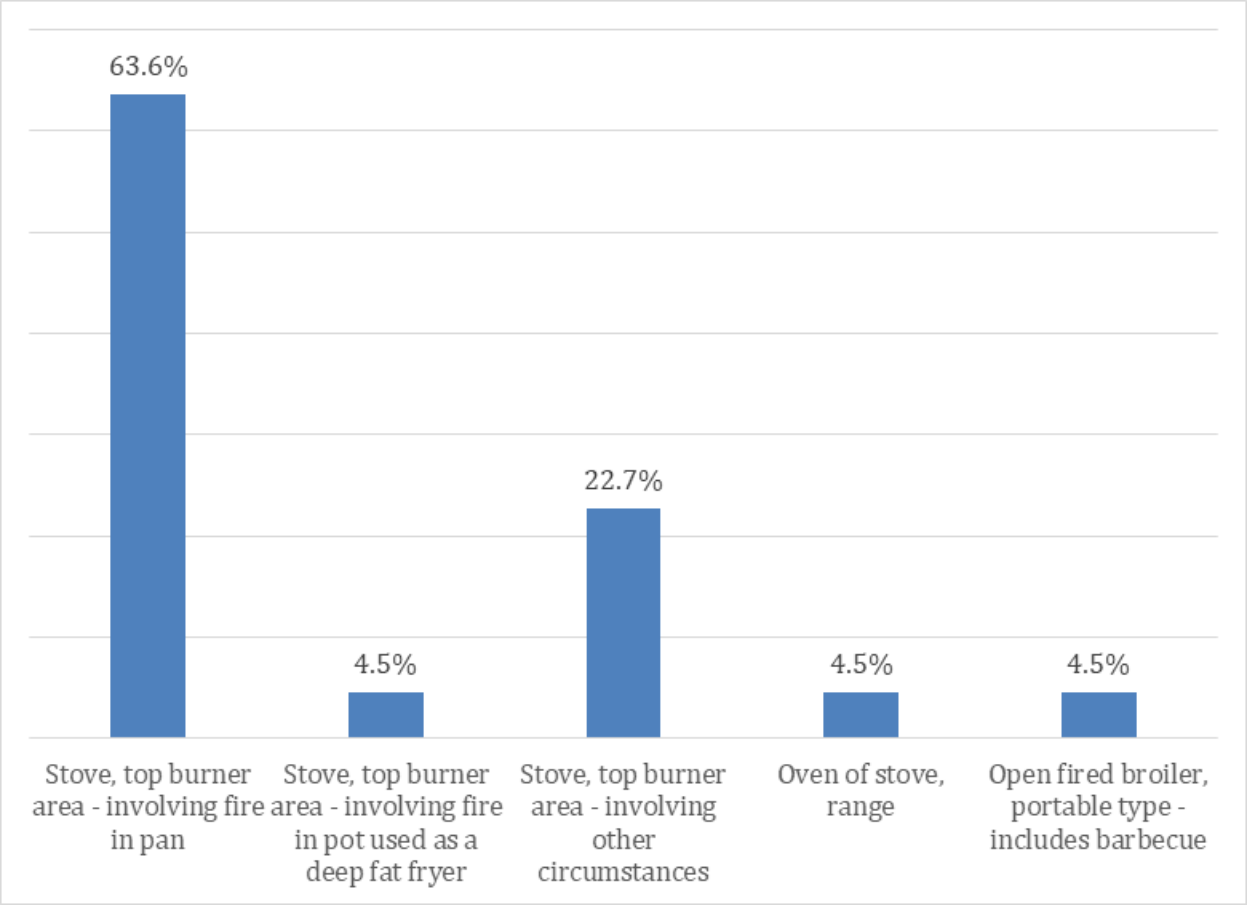
Note. [1]Less than 1 day in hospital or off work; [2] Hospitalized 1-2 days and/or off work 1-15 days; [3]Hospitalized 3+ days and/or off work 16+ days. †*Unknown or unclassified* cases were excluded from the analyses presented here for Ontario (*n*= 96) and British Columbia (*n*= 21). – Information was unavailable, or code choice was not used in a specific jurisdiction.

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

In British Columbia, 79 per cent (*n*= 11) of 14 determined deaths were the result of stovetop fires. In addition, stovetop fires, nearly evenly split between deep-fat fryers heated on the stovetop and pans heated on the stovetop, resulted in 88 percent of minor injuries (*n*= 229) and 93 per cent of light injuries (*n*= 319) in this province. Eight out of every ten serious injuries (*n*= 37) in British Columbia involved the stovetop, particularly stovetop-heated deep-fat fryers (54.1%).

In Manitoba, as revealed in Figure 13, 91 per cent (*n*= 20) of 22 reported deaths were the result of stovetop fires, the majority resulting from pans heated on the stovetop (70%).

FIGURE 13. HOME COOKING FIRE FATALITIES, BY IGNITING OBJECT INVOLVED IN CASUALTY, MANITOBA, NFID, 2005 TO 2014



Note. There were 22 cooking fire deaths in Manitoba during the ten-year window of observation.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

To detect potential trends in igniting object and nature of casualties, nature of non-fatal casualties was cross-referenced against the igniting object involved in casualty (Table 57). In Ontario and Alberta, minor injuries were the most likely casualty outcome for all igniting objects. In British Columbia, while this pattern persisted for oven and open, portable fired broiler fires, light injuries were most commonly the outcome of cooking fires in which stovetops or other tabletop appliances were involved in ignition.

TABLE 57. HOME COOKING FIRE VICTIMS, BY IGNITING OBJECT INVOLVED IN CASUALTY AND NATURE OF NON-FATAL CASUALTIES, 3 JURISDICTIONS, NFID, 2005 TO 2014

	Ontario (n = 1515)†			Alberta (n = 420)			British Columbia (n = 585)		
Igniting Object	**Minor injury[1]**	**Light injury[2]**	**Serious injury[3]**	**Minor injury[1]**	**Light injury[2]**	**Serious injury[3]**	**Minor injury[1]**	**Light injury[2]**	**Serious injury[3]**
Stove, top burner area - involving fire in pan	76.00%	–	24.00%	71.50%	18.50%	9.90%	39.90%	56.90%	3.20%
Stove, top burner area - involving fire in pot used as a deep fat fryer	–	–	–	71.50%	16.50%	12.00%	35.70%	54.80%	9.50%
Stove, top burner area - involving other circumstances	–	–	–	86.80%	8.80%	n<5	39.20%	57.80%	n<5
Oven of stove, range	88.70%	–	11.30%	90.00%	n<5	0.00%	57.10%	35.70%	n<5
Open fired broiler, portable type - includes barbecue	58.10%	–	41.90%	71.40%	n<5	n<5	54.50%	27.30%	n<5
Other tabletop cooking appliances: Microwave, toaster, etc.	88.90%	–	n<5	83.30%	n<5	0.00%	36.80%	52.60%	n<5
Deep fat fryer - separate appliance‡	68.60%	–	31.40%	–	–	–	–	–	–
Total	**75.80%**	**–**	**24.20%**	**74.80%**	**15.50%**	**9.80%**	**39.10%**	**54.50%**	**6.30%**

Note. [1]Less than 1 day in hospital or off work; [2] Hospitalized 1-2 days and/or off work 1-15 days; [3]Hospitalized 3+ days and/or off work 16+ days. †Cases where severity of injury was undermined were removed. ‡Because of very small counts for separate deep fat fryers for both Alberta (n= 2) and British Columbia (n= 2), these cases were combined with deep-fat fryers heated on the stovetop for the analyses presented here. *n<5*= Proportions based on less than 5 cases were suppressed. – Information was unavailable, or code choice was not used in a specific jurisdiction.

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

A final analysis was performed to further examine the bivariate relationship between igniting object and nature of non-fatal casualties (Table 57).[23] In Ontario, the highest proportions of serious injuries occurred when open, portable fired broilers and deep fat fryers were involved in ignition, whereas the oven and tabletop cooking appliances (e.g., microwave, toaster, etc.) were involved more frequently in ignition of cooking fires that resulted in minor injuries. In each Alberta and British Columbia, the highest proportion of serious injuries occurred in stovetop-heated deep-fat fryer fires.

Smoke alarm performance in casualty

The proportion of home cooking fire casualties where there was either no smoke alarm present, or present but not activated, or the presence of an alarm was unknown was over four-tenths in Ontario (43.3%) and slightly over half in Alberta (52.7%).[24]

TABLE 58. HOME COOKING FIRE VICTIMS, BY SMOKE ALARM PERFORMANCE, 2 JURISDICTIONS, NFID, 2005 TO 2014

	Ontario†		Alberta	
Smoke Alarm Performance	**Freq.**	**Percent**	**Freq.**	**Percent**
No smoke alarm	176	10.1	103	23.4
Alarm present but did not activate	409	23.5	86	19.5
Alarm present and activated	987	56.7	208	47.3
Unknown	170	9.8	43	9.8
Total	**1742**		**440**	

Note. †*Not applicable* cases were excluded from the analyses presented here for Ontario (*n*= 79).
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

The distribution of home cooking fire victims by smoke alarm performance for fatal and non-fatal casualties is provided in Table 59.

[23] Pearson Chi-Square= 15.26, *df*=4, *p*<0.01 (Ontario); 12.68, *df*=10, *p*>0.10^{ns} (Alberta); 21.55, *df*=10, *p*<0.05 (British Columbia).
[24] British Columbia was not included in the analyses presented here because it had a larger number of unknowns and did not include information on the category "alarm present but did not activate."

TABLE 59. VICTIMS OF FATAL AND NON-FATAL HOME COOKING FIRES, BY SMOKE ALARM PERFORMANCE IN CASUALTY, 2 JURISDICTIONS, NFID, 2005 TO 2014

Smoke alarm performance in casualty	Nature of Casualties					
	Death	Minor injury[1]	Light injury[2]	Serious injury[3]	Injury, seriousness unknown	Total
		Ontario **(*n* = 1572)†**				
No smoke alarm	21.40%	11.00%	–	8.30%	15.60%	11.20%
Alarm present but did not activate	32.10%	24.80%	–	28.00%	28.40%	26.00%
Alarm present and activated	46.40%	64.30%	–	63.70%	56.00%	62.80%
		Alberta **(*n* = 397)†**				
No smoke alarm	58.80%	22.60%	33.90%	24.10%	–	25.90%
Alarm present but did not activate	11.80%	21.20%	27.10%	20.70%	–	21.70%
Alarm present and activated	29.40%	56.20%	39.00%	55.20%	–	52.40%

Note. [1]Less than 1 day in hospital or off work; [2] Hospitalized 1-2 days and/or off work 1-15 days; [3]Hospitalized 3+ days and/or off work 16+ days. †*Unknown* cases were excluded from the analyses presented here for Ontario (*n*= 170) and Alberta (*n*= 43). – Information was unavailable, or code choice was not used in a specific jurisdiction.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

In Ontario, where determined, the smoke alarm was present and activated in 46 per cent of fatalities, roughly 64 per cent of minor (64.3%) and serious (63.7%) injuries and 56 per cent of injuries in which severity could not be determined. Similarly, in Alberta, the smoke alarm was present and activated in more than half of minor (56.2%) and serious injuries (55.2%); however, the proportion was lower for light injuries at nearly four-tenths (39.0%). The smoke alarm was present and activated in only about three-tenths of fatalities (29.4%) in Alberta.

In close to six-tenths of fatalities in Alberta (58.8%) compared to two-tenths in Ontario (21.4%), there was no smoke alarm present. In Ontario, there was no smoke alarm in roughly one-tenth of non-fatal casualties, for all types of injuries. The proportion of non-fatal casualties where no alarm was present stood at approximately a quarter for minor and serious injuries and one-third for light injuries in Alberta.

In turn, in one-tenth of fatalities in Alberta compared to one-third in Ontario, the smoke alarm was present but did not activate. In roughly a quarter of injuries in Ontario, the smoke alarm was present

but did not activate. Similarly, in Alberta, the smoke alarm was present but did not activate in two-tenths of minor and serious injuries and over a quarter of light injuries.

The study also sought to examine the bivariate relationship between smoke alarm performance in casualty and nature of casualties.[25]

TABLE 60. HOME COOKING FIRE VICTIMS, BY SMOKE ALARM PERFORMANCE IN CASUALTY AND NATURE OF CASUALTIES, 2 JURISDICTIONS, NFID, 2005 TO 2014

	Nature of Casualties				
Smoke alarm performance in casualty	**Death**	**Minor injury[1]**	**Light injury[2]**	**Serious injury[3]**	**Injury, seriousness unknown**
		Ontario **(*n* = 1572)†**			
No smoke alarm	6.80%	65.30%	–	15.30%	12.50%
Alarm present but did not activate	4.40%	63.60%	–	22.20%	9.80%
Alarm present and activated	2.60%	68.40%	–	21.00%	8.00%
Total	**3.60%**	**66.80%**	**–**	**20.70%**	**9.00%**
		Alberta **(*n* = 397)†**			
No smoke alarm	9.70%	64.10%	19.40%	6.80%	–
Alarm present but did not activate	2.30%	72.10%	18.60%	7.00%	–
Alarm present and activated	2.40%	78.80%	11.10%	7.70%	–
Total	**4.30%**	**73.60%**	**14.90%**	**7.30%**	**–**

Note. [1]Less than 1 day in hospital or off work; [2] Hospitalized 1-2 days and/or off work 1-15 days; [3]Hospitalized 3+ days and/or off work 16+ days. †*Unknown* cases were excluded from the analyses presented here for Ontario (*n*= 170) and Alberta (*n*= 43). – Information was unavailable, or code choice was not used in a specific jurisdiction.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Compared to cooking fires where a smoke alarm was present and activated, cooking fires that occurred in homes that had no smoke alarm present were 2.6 times and 4 times more likely to result in fatal civilian casualties in Ontario and Alberta, respectively.

[25] Pearson Chi-Square (*df*= 6) = 16.23, *p*<0.05 (Ontario); 16.01, *p*<0.05 (Alberta).

4.9. SELECTED RISK FACTORS OF FIRE LOSS

In this section, the impact of selected circumstances contributing to fire on extent of fire, extent of damage, flame spread, and fire casualties are examined in greater detail.

Extent of fire spread and circumstances contributing to fire

Because information on extent of fire spread was not available for Ontario prior to 2009, the analyses presented here was restricted to the period from 2009 to 2014 for the three reporting jurisdictions.

Across the three provinces, the relationship between igniting object and extent of fire spread was statistically significant.[26]

The oven was the equipment most commonly bringing about ignition of cooking fires confined to the object of origin in the three provinces, and it was the igniting equipment least likely associated with cooking fires that spread beyond the room of origin. In addition, in Ontario and British Columbia, the oven was the least likely equipment associated with cooking fires that spread beyond the object of origin yet remained confined to the room of origin.

Stovetop-heated pots used as deep-fat fryers were more likely to result in ignition of cooking fires that spread beyond the object of origin yet remained confined to the room of origin in Alberta. In British Columbia, both stovetop-heated deep-fat fryers and separate, electric deep fat fryers resulted most frequently in cooking fires confined to the room of origin. In Ontario, pans heated on the stovetop were more frequently involved in ignition of cooking fires confined to the room of origin, whereas, in Alberta, pans heated on the stovetop and portable deep fat fryers were the second most frequently implicated equipment in cooking fires that were confined to the room of origin.

In Ontario, deep fat fryers and open, portable fired broilers were the equipment contributing to ignition of cooking fires that spread beyond the room of origin. In cooking fires that spread beyond the room of origin in Alberta and British Columbia, open, portable fired broilers were the equipment most likely to be involved in ignition.

There were some variations across the three reporting jurisdictions regarding the impact of fuel or energy associated with the igniting object on extent of fire spread.[27] Where determined, electric cooking equipment was more likely to be involved in cooking fires that remained confined to the room of origin in both Alberta and Ontario, whereas in British Columbia, cooking fires involving gas or other-fueled cooking equipment were slightly more likely to cause burning or charring that remained confined to the room of origin. In addition, if electricity was the energy associated with the igniting object, the cooking fire was less likely to cause burning or charring that spread beyond the room of origin across the three provinces.

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[26] Pearson Chi-Square$_{\text{Igniting object}}$= 1354.58, df= 10, p<0.001 (Ontario); 264.88, df= 14, p<0.001 (Alberta); 333.91, df= 14, p<0.001 (British Columbia).

[27] Pearson Chi-Square$_{\text{Fuel or energy associated with igniting object}}$ (df= 4)= 193.32, p<0.001 (Ontario); 75.31, p<0.001 (Alberta); 33.72, p<0.001 (British Columbia).

TABLE 61. EXTENT OF FIRE SPREAD BY CIRCUMSTANCES CONTRIBUTING TO FIRE, 3 JURISDICTIONS, NFID, 2009 TO 2014

	Ontario (*n* = 7946)			Alberta (*n* = 2120)			British Columbia (*n* = 4140)		
Circumstances	**Confined to object of origin**	**Confined to room of origin**	**Spread beyond room of origin**	**Confined to object of origin**	**Confined to room of origin**	**Spread beyond room of origin**	**Confined to object of origin**	**Confined to room of origin**	**Spread beyond room of origin**
Igniting Object									
Stovetop - involving fire in pan	29.60%	62.30%	8.10%	15.30%	66.20%	18.50%	61.40%	30.80%	7.80%
Stovetop - involving fire in pot used as a deep fat fryer	–	–	–	8.60%	72.00%	19.40%	35.30%	52.40%	12.30%
Stovetop - involving other circumstances	–	–	–	24.40%	57.70%	17.80%	59.30%	32.70%	8.00%
Oven of stove, range	81.30%	16.50%	2.20%	49.70%	35.70%	14.70%	81.40%	14.30%	4.20%
Deep fat fryer - separate appliance	24.80%	53.70%	21.50%	n<5	64.30%	n<5	n<5	53.30%	n<5
Open fired broiler, portable type - includes barbecue	58.70%	19.70%	21.70%	14.10%	34.00%	51.90%	40.60%	39.70%	19.60%
Other tabletop cooking appliances	56.80%	37.80%	5.40%	30.90%	46.40%	22.70%	63.10%	30.50%	6.40%
Unclassified or unknown	30.20%	54.80%	15.00%	0.00%	n<5	n<5	50.80%	35.60%	13.60%
Fuel or Energy Associated with Igniting Object									
Electricity	34.60%	57.70%	7.70%	17.90%	65.50%	16.60%	57.60%	34.10%	8.30%
Fuel gases or other fuels	47.10%	41.00%	11.90%	19.10%	47.00%	33.90%	48.60%	38.40%	13.10%
Cannot be determined	35.10%	49.90%	15.00%	14.10%	57.70%	28.20%	65.10%	25.10%	9.80%
Energy Causing Ignition									
Spark & Direct Flame	–	–	–	17.20%	41.70%	41.10%	48.50%	37.10%	14.50%
Hot object	–	–	–	19.80%	64.40%	15.90%	59.00%	33.60%	7.40%
Other	–	–	–	10.20%	70.80%	19.10%	65.90%	24.20%	9.90%
Cannot be determined	–	–	–	11.70%	49.50%	38.80%	46.50%	36.60%	16.80%

TABLE 61. CONTINUED

Circumstances	Ontario (*n* = 7946)			Alberta (*n* = 2120)			British Columbia (*n* = 4140)		
	Confined to object of origin	Confined to room of origin	Spread beyond room of origin	Confined to object of origin	Confined to room of origin	Spread beyond room of origin	Confined to object of origin	Confined to room of origin	Spread beyond room of origin
Material First Ignited									
Building components	13.90%	53.70%	32.40%	7.20%	40.70%	52.10%	13.70%	53.40%	32.90%
Furniture, furnishings	11.40%	76.60%	12.10%	n<5	60.00%	24.00%	33.30%	39.40%	27.30%
Clothing, textiles	64.90%	31.00%	4.20%	44.40%	40.30%	15.30%	64.50%	28.20%	7.30%
Wood, paper products	53.60%	36.80%	9.60%	17.00%	50.90%	32.10%	46.30%	43.20%	10.50%
Flammable liquids, combustible liquids	31.40%	61.30%	7.30%	9.10%	74.30%	16.60%	37.00%	51.20%	11.80%
Flammable gases	73.10%	15.30%	11.60%	32.60%	39.50%	27.90%	48.40%	35.50%	16.10%
Chemicals, plastics, metals	78.60%	n<5	0.00%	30.50%	58.60%	10.90%	64.70%	30.60%	4.70%
Agricultural products	66.70%	n<5	0.00%	68.60%	28.60%	n<5	82.50%	14.70%	2.80%
Miscellaneous	59.20%	35.90%	4.80%	42.10%	42.10%	15.70%	78.60%	17.60%	3.80%
Unknown, undetermined	32.70%	51.70%	15.60%	14.40%	50.40%	35.30%	64.70%	23.70%	11.50%
Act or Omission									
Incendiary fires	39.40%	48.50%	n<5	n<5	52.60%	31.60%	42.50%	25.00%	32.50%
Misuse of source of ignition	43.50%	46.00%	10.50%	25.00%	39.30%	35.70%	59.10%	31.80%	n<5
Misuse of material ignited	46.50%	44.20%	9.30%	14.80%	68.90%	16.30%	37.30%	49.60%	13.00%
Mechanical/electrical failure/malfunction	50.70%	35.30%	14.00%	27.60%	47.40%	25.00%	62.20%	28.30%	9.40%
Construction, design or installation deficiency	78.70%	15.90%	5.40%	n<5	58.30%	n<5	45.00%	55.00%	0.00%
Misuse of equipment	26.40%	63.80%	9.80%	23.30%	43.30%	33.30%	69.40%	24.20%	n<5
Human failing	–	–	–	19.40%	58.90%	21.80%	61.60%	31.00%	7.50%
Unknown, undetermined	48.60%	43.50%	7.90%	14.10%	37.50%	48.40%	49.70%	33.30%	16.90%
Total	**38.40%**	**52.30%**	**9.30%**	**17.90%**	**60.90%**	**21.10%**	**56.90%**	**34.00%**	**9.10%**

Note. – Variable or code choice not used in a specific jurisdiction. *n<5*= Proportions based on less than 5 cases were suppressed.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Where known, spark and direct flames were the energy causing ignition most likely associated with cooking fires that caused burning or charring that spread beyond the room of origin in the two reporting jurisdictions.[28]

Cooking fires that caused burning or charring that spread beyond the room of origin were more likely to involve building components as the materials first ignited across the three jurisdictions.[29] In both Alberta and British Columbia, cooking fires confined to the object of origin were more likely to involve agricultural products, mostly food, as the materials first ignited. In Alberta, cooking fires that caused burning or charring that remained confined to the room of origin were more likely to involve ignition of flammable and combustible liquids, mostly cooking oils and fats.

Across the three reporting jurisdictions, the relationship between act or omission and extent of fire was statistically significant.[30] However, there was variability in terms of how acts or omissions impacted the extent of fire spread across the three reporting provinces.

In Ontario, cooking fires that spread beyond the object of origin but remained confined to the room of origin were more likely to be associated with misuse of equipment, mostly referring to incidents associated with "unattended cooking" (data not shown), whereas construction, design or installation deficiency was more commonly associated with cooking fires that were confined to the object of origin. In turn, mechanical, electrical failure, or malfunction was the most common act or omission in cooking fires that spread beyond the room of origin.

In Alberta, misuse of material ignited, mostly referring to incidents where cooking oil, grease, or wax overheated or where combustibles were placed too close to heat (data not shown), was the most common act or omission contributing to cooking fires that while spreading beyond the object of origin remained confined to the room of origin.

In British Columbia, misuse of equipment, mechanical, electrical failure, or malfunction and human failing were the three most common acts or omissions involved in cooking fires that were confined to the object of origin. Construction, design or installation deficiency and misuse of material ignited, split almost evenly between incidents where combustibles were placed too close to heat and where cooking oil, grease, or wax overheated (data not shown), were the acts or omissions contributing most frequently to cooking fires that caused burning or charring that remained confined to the room of origin. Where determined, incendiary fires were more likely to cause burning or charring that spread beyond the room of origin in this province.

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[28] Pearson Chi-Square$_{\text{Energy causing ignition}}$ (df= 6)= 136.08, p<0.001 (Alberta); 71.51, p<0.001 (British Columbia).

[29] Pearson Chi-Square$_{\text{Material first ignited}}$ (df= 18)= 1279.11, p<0.001 (Ontario); 491.67, p<0.001 (Alberta); 700.71, p<0.001 (British Columbia).

[30] Pearson Chi-Square$_{\text{Act or omission}}$= 672.60, df= 12, p<0.001 (Ontario); 76.08, df= 14, p<0.001 (Alberta); 186.80, df= 14, p<0.001 (British Columbia).

Extent of damage and circumstances contributing to fire

The oven was the leading equipment involved in ignition of cooking fires that caused damage that remained confined to the object of origin in the two reporting provinces, and the least likely equipment to be associated with either cooking fires that spread beyond the object of origin yet remained confined to the room of origin or cooking fires that caused damage that spread beyond the room of origin.[31] Overall, the stovetop, especially when used for deep fat frying, was the equipment most likely involved in ignition of cooking fires that caused damage that remained confined to the room of origin in Alberta, whereas in British Columbia, stovetop-heated deep-fat fryers, separate, portable deep fat fryers and open, portable fired broilers were most frequently implicated in ignition of cooking fires that caused damage that either remained confined to the room of origin or spread beyond the room of origin.

In Alberta, electric cooking equipment resulted more frequently in cooking fires that caused damage that remained confined to the room of origin.[32] In addition, if electricity was the energy associated with the igniting object, the cooking fire damage was less likely to have spread beyond the room of origin. Where known, variations in extent of fire damage across different fuels or sources of energy were not as pronounced for cooking fires that caused damage that spread beyond the object of origin in British Columbia. In turn, among determined incidents, fires involving electric cooking equipment were more likely to cause damage that was confined to the object of origin, whereas gas or other-fueled cooking equipment resulted more frequently in fires that caused damage that remained confined to the room of origin.

Where known, spark and direct flames were the energy causing ignition most likely implicated in cooking fires that caused fire damage that spread beyond the room of origin in the two reporting jurisdictions.[33]

Cooking fires that caused damage that spread beyond the room of origin were more likely to involve building components as the materials first ignited in the two jurisdictions.[34] In both Alberta and British Columbia, cooking fires that caused fire damage confined to the object of origin were more likely to involve agricultural products, mostly referring food, as the materials ignited first. In Alberta, cooking fires that caused damage confined to the room of origin were more likely to involve ignition of flammable and combustible liquids, mostly cooking oils and fats.

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[31] Pearson Chi-Square$_{\text{Igniting object}}$ (df= 14)= 272.73, p<0.001 (Alberta); 487.71, p<0.001 (British Columbia).

[32] Pearson Chi-Square$_{\text{Fuel or energy associated with igniting object}}$ (df= 4)= 47.09, p<0.001 (Alberta); 52.54, p<0.001 (British Columbia).

[33] Pearson Chi-Square$_{\text{Energy causing ignition}}$ (df= 6)= 105.50, p<0.001 (Alberta); 28.60, p<0.001 (British Columbia).

[34] Pearson Chi-Square$_{\text{Material first ignited}}$ (df= 18)= 499.30, p<0.001 (Alberta); 819.11, p<0.001 (British Columbia).

TABLE 62. EXTENT OF COOKING FIRE DAMAGE BY CIRCUMSTANCES CONTRIBUTING TO FIRE, 2 JURISDICTIONS, NFID, 2005 TO 2014

	Alberta (*n* = 3298)			British Columbia (*n* = 5837)		
Circumstances	**Confined to object of origin**	**Confined to room of origin**	**Spread beyond room of origin**	**Confined to object of origin**	**Confined to room of origin**	**Spread beyond room of origin**
Igniting Object						
Stovetop - involving fire in pan	10.70%	55.00%	34.30%	45.70%	31.30%	23.00%
Stovetop - involving fire in pot used as a deep fat fryer	5.30%	59.80%	35.00%	21.50%	42.20%	36.30%
Stovetop - involving other circumstances	16.70%	47.30%	36.00%	42.40%	32.70%	24.90%
Oven of stove, range	41.10%	31.10%	27.90%	71.70%	17.10%	11.10%
Deep fat fryer - separate appliance	n<5	41.70%	50.00%	n<5	46.70%	33.30%
Open fired broiler, portable type - includes barbecue	14.20%	36.20%	49.50%	28.80%	43.10%	28.10%
Other tabletop cooking appliances	25.00%	33.60%	41.40%	48.00%	30.90%	21.10%
Unclassified or unknown	n<5	38.50%	38.50%	41.50%	39.20%	19.30%
Fuel or Energy Associated with Igniting Object						
Electricity	12.90%	54.10%	33.00%	42.70%	32.20%	25.10%
Fuel gases or other fuels	15.00%	41.20%	43.80%	34.90%	38.10%	27.00%
Cannot be determined	12.70%	39.20%	48.10%	56.20%	29.60%	14.20%
Energy Causing Ignition						
Spark & Direct Flame	15.90%	33.30%	50.80%	35.20%	35.70%	29.10%
Hot object	13.50%	53.50%	32.90%	42.60%	32.70%	24.70%
Other	8.70%	62.60%	28.70%	50.40%	29.10%	20.60%
Cannot be determined	11.90%	34.10%	54.10%	49.60%	33.70%	16.70%

TABLE 62. CONTINUED

Circumstances	Alberta (*n* = 3298)			British Columbia (*n* = 5837)		
	Confined to object of origin	Confined to room of origin	Spread beyond room of origin	Confined to object of origin	Confined to room of origin	Spread beyond room of origin
Material First Ignited						
Building components	5.80%	29.20%	65.00%	6.10%	42.10%	51.80%
Furniture, furnishings	n<5	40.00%	50.00%	21.70%	47.80%	30.40%
Clothing, textiles	28.00%	49.50%	22.40%	51.90%	31.70%	16.40%
Wood, paper products	13.60%	39.10%	47.30%	33.60%	39.40%	27.00%
Flammable liquids, combustible liquids	6.80%	61.40%	31.80%	23.90%	42.20%	33.90%
Flammable gases	25.40%	39.70%	34.90%	47.40%	34.20%	18.40%
Chemicals, plastics, metals	22.10%	52.90%	25.00%	45.60%	35.00%	19.30%
Agricultural products	42.70%	29.90%	27.40%	66.80%	19.20%	14.00%
Miscellaneous	32.90%	38.40%	28.70%	57.60%	24.80%	17.60%
Unknown, undetermined	11.90%	30.30%	57.70%	53.50%	26.60%	19.80%
Act or Omission						
Incendiary fires	17.40%	45.70%	37.00%	35.70%	32.10%	32.10%
Misuse of source of ignition	12.50%	42.50%	45.00%	37.50%	40.60%	21.90%
Misuse of material ignited	9.70%	59.50%	30.70%	24.20%	35.40%	40.50%
Mechanical/electrical failure/malfunction	24.90%	34.90%	40.20%	51.50%	27.00%	21.60%
Construction, design or installation deficiency	n<5	47.40%	31.60%	32.00%	56.00%	n<5
Misuse of equipment	19.60%	41.30%	39.10%	58.00%	28.40%	13.60%
Human failing	14.30%	47.50%	38.20%	45.90%	32.50%	21.70%
Unknown, undetermined	14.50%	31.60%	53.90%	41.00%	34.20%	24.80%
Total	**13.30%**	**50.80%**	**35.80%**	**42.30%**	**32.90%**	**24.70%**

Note. – Variable or code choice not used in a specific jurisdiction. *n<5*= Proportions based on less than 5 cases were suppressed.

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

The relationship between act or omission and extent of damage was statistically significant in both provinces.[35] However, again, there were some differences in the nature of the bivariate relationship in the two provinces. For example, in Alberta, misuse of material ignited, mostly referring to incidents where cooking oil, grease, or wax overheated or combustibles were placed too close to heat (data not shown), was the most common act or omission contributing to cooking fires that caused damage that while spread beyond the object of origin remained confined to the room of origin.

In British Columbia, misuse of equipment and mechanical, electrical failure, or malfunction, followed by human failing, were the most common acts or omissions involved in cooking fires that caused damage confined to the object of origin. In turn, misuse of material ignited, mostly referring to incidents where either cooking oil, grease, or wax overheated or where combustibles were placed too close to heat (data not shown), was the common act or omission involved in cooking fire that caused damage that spread beyond the room of origin. Construction, design or installation deficiency and misuse of source of ignition were the two acts or omissions most frequently involved in cooking fires that were confined to the room of origin in this province.

Flame spread and circumstances contributing to fire

The results presented in Table 63 were based on analyses of cooking fire data for Manitoba only, and cover the period from 2005 to 2014 (*N*= 2,671).[36]

Stovetop-heated deep-fat fryers were more frequently involved in ignition of cooking fires that caused flames or char that spread beyond the room or area of origin, whereas the oven was the igniting equipment least likely implicated in cooking fires that caused flames that spread beyond the room or area of origin.[37]

The impact of fuel or energy associated with the igniting object on flame spread was not statistically significant in Manitoba.[38]

Where known, spark and direct flames were the energy causing ignition most likely implicated in cooking fires that caused flames or char that spread beyond the room or area of origin.[39]

Cooking fires that caused flames or char that spread beyond the room or area of origin were more likely to involve furniture or furnishings and building components as the materials first ignited.[40] Flammable and combustible liquids were the next most common materials first ignited in cooking fires that caused flames or char that spread beyond the room or area of origin.

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[35] Pearson Chi-Square$_{\text{Act or omission}}$ (df= 14)= 95.04, p<0.001 (Alberta); 222.57, p<0.001 (British Columbia).
[36] Unknown and unclassified cases on the dependent variable were excluded for the analyses presented here (n= 579).
[37] Pearson Chi-Square$_{\text{Igniting object}}$ (df= 7)= 185.66, p<0.001 (Manitoba).
[38] Pearson Chi-Square$_{\text{Fuel or energy associated with igniting object}}$ (df= 2)= 3.83, p>0.01^{ns} (Manitoba).
[39] Pearson Chi-Square$_{\text{Energy causing ignition}}$ (df= 3)= 7.88, p<0.05 (Manitoba).
[40] Pearson Chi-Square$_{\text{Material first ignited}}$ (df= 9)= 265.19, p<0.001 (Manitoba).

TABLE 63. FLAME SPREAD BY CIRCUMSTANCES CONTRIBUTING TO FIRE, MANITOBA, NFID, 2005 TO 2014

Circumstances	Flame spread was not a factor	Flames spread beyond room or area of origin
Igniting Object		
Stovetop - involving fire in pan	65.20%	34.80%
Stovetop- involving fire in pot used as a deep fat fryer	34.10%	65.90%
Stovetop - involving other circumstances	73.50%	26.50%
Oven of stove, range	93.20%	6.80%
Deep fat fryer - separate appliance	72.20%	27.80%
Open fired broiler, portable type	76.70%	23.30%
Other tabletop cooking appliances	83.10%	16.90%
Unclassified or unknown	82.80%	17.20%
Fuel or Energy Associated with Igniting Object		
Electricity	71.60%	28.40%
Fuel gases or other fuels	71.50%	28.50%
Cannot be determined	64.50%	35.50%
Energy Causing Ignition		
Spark & Direct Flame	64.90%	35.10%
Hot object	71.20%	28.80%
Other	82.40%	17.60%
Cannot be determined	72.20%	27.80%
Material First Ignited		
Building components	46.30%	53.70%
Furniture, furnishings	44.00%	56.00%
Clothing, textiles	70.60%	29.40%
Wood, paper products	74.50%	25.50%
Flammable liquids, combustible liquids	54.50%	45.50%
Flammable gases	89.50%	n<5
Chemicals, plastics, metals	81.50%	18.50%
Agricultural products	100.00%	0.00%
Miscellaneous	84.80%	15.20%
Unknown, undetermined	71.50%	28.50%
Act or Omission		
Incendiary fires	44.40%	55.60%
Misuse of source of ignition	63.20%	36.80%
Misuse of material ignited	70.40%	29.60%
Mechanical/electrical failure/malfunction	75.50%	24.50%
Construction, design or installation deficiency	n<5	0.00%
Misuse of equipment	90.50%	9.50%
Human failing	75.10%	24.90%
Unknown, undetermined	67.90%	32.10%
Total	**71.10%**	**28.90%**

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Where determined, incendiary fires were more likely to cause flames or char that spread beyond the room or area of origin in this province (Table 63).[41] Misuse of source of ignition was the second leading act or omission contributing to cooking fires that caused flames or char that spread beyond the room or area of origin.

Extent of fire casualties and circumstances contributing to fire

Pans heated on the stovetop and separate deep fat fryers were more frequently involved in ignition of cooking fires that resulted in at least one casualty in Ontario.

In Manitoba, Alberta and British Columbia, cooking fires that resulted in at least one casualty were more likely to involve stovetops. Specifically, stovetop-heated deep-fat fryers were more likely to be involved in ignition that resulted in at least one cooking fire casualty across these three provinces, whereas ignition of stovetop-heated pans was the second most frequent scenario leading to cooking fires that resulted in at least one fire casualty.[42]

Where known, compared to cooking fires where gas or other fuels were associated with the igniting object, fires involving electric cooking equipment were 1.6 times in Ontario and Manitoba and 2.2 times in Alberta more likely to cause at least one fire casualty.[43] Results were not statistically significant for British Columbia.

Where determined, hot object, which refers to direct heat by conduction or radiation and no direct contact with flames or embers, was the energy causing ignition most likely implicated in cooking fires that caused at least one casualty in Alberta.[44]

Where determined, cooking fires that resulted in at least one casualty were more likely to be associated with incidents in which flammable and combustible liquids, most often cooking oils and fats, were the materials first ignited across the four reporting jurisdictions.[45]

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[41] Pearson Chi-Square$_{\text{Act or omission}}$ (df= 7)= 43.72, p<0.001 (Manitoba).
[42] Pearson Chi-Square$_{\text{Igniting object}}$= 203.79, df= 5, p<0.001 (Ontario); 72.47, df= 7, p<0.001 (Manitoba); 37.99, df= 7, p<0.001 (Alberta); 137.28, df= 7, p<0.001 (British Columbia).
[43] Pearson Chi-Square$_{\text{Fuel or energy associated with igniting object}}$ (df= 2)= 59.84, p<0.001 (Ontario); 13.49, p<0.01 (Manitoba); 40.89, p<0.001 (Alberta); 3.48, p>0.10^{ns} (British Columbia).
[44] Pearson Chi-Square$_{\text{Energy causing ignition}}$ (df= 3)= 2.41, p>0.10^{ns} (Manitoba); 34.33, p<0.001 (Alberta); 27.25, p<0.001 (British Columbia).
[45] Pearson Chi-Square$_{\text{Material first ignited}}$ (df= 9)= 179.05, p<0.001 (Ontario); 64.91, p<0.001 (Manitoba); 69.82, p<0.001 (Alberta); 158.10, p<0.001 (British Columbia).

TABLE 64. COOKING FIRE CASUALTIES BY CIRCUMSTANCES CONTRIBUTING TO FIRE, 4 JURISDICTIONS, NFID, 2005 TO 2014

	ON (*n* = 14194)		MB (*n* = 3250)		AB (*n* = 3596)		BC (*n* = 6175)	
Circumstances	**No casualties**	**At least one casualty**	**No casualties**	**At least one casualty**	**No casualties**	**At least one casualty**	**No casualties**	**At least one casualty**
Igniting Object								
Stovetop - involving fire in pan	87.00%	13.00%	82.10%	17.90%	88.20%	11.80%	90.70%	9.30%
Stovetop - involving fire in pot used as a deep fat fryer	–	–	75.20%	24.80%	85.50%	14.50%	84.20%	15.80%
Stovetop - involving other circumstances	–	–	89.10%	10.90%	91.80%	8.20%	93.00%	7.00%
Oven of stove, range	96.20%	3.80%	94.60%	5.40%	95.70%	4.30%	98.60%	1.40%
Deep fat fryer - separate appliance	86.80%	13.20%	90.90%	n<5	96.40%	n<5	90.50%	n<5
Open fired broiler, portable type - includes barbecue	96.00%	4.00%	92.90%	7.10%	92.70%	7.30%	93.30%	6.70%
Other tabletop cooking appliances	94.80%	5.20%	91.80%	8.20%	91.40%	8.60%	95.40%	4.60%
Unclassified or unknown	89.10%	10.90%	92.00%	n<5	100.00%	0.00%	93.90%	6.10%
Fuel or Energy Associated with Igniting Object								
Electricity	87.80%	12.20%	84.60%	15.40%	87.40%	12.60%	91.00%	9.00%
Fuel gases or other fuels	92.30%	7.70%	90.10%	9.90%	94.30%	5.70%	91.60%	8.40%
Cannot be determined	87.30%	12.70%	88.90%	11.10%	96.80%	3.20%	93.80%	6.20%
Energy Causing Ignition								
Spark & Direct Flame	–	–	88.70%	11.30%	93.90%	6.10%	91.20%	8.80%
Hot object	–	–	85.50%	14.50%	87.40%	12.60%	90.60%	9.40%
Other	–	–	85.50%	14.50%	91.80%	8.20%	92.60%	7.40%
Cannot be determined	–	–	88.60%	11.40%	97.60%	n<5	97.00%	3.00%

TABLE 64. CONTINUED

Circumstances	ON (*n* = 14194)		MB (*n* = 3250)		AB (*n* = 3596)		BC (*n* = 6175)	
	No casualties	At least one casualty	No casualties	At least one casualty	No casualties	At least one casualty	No casualties	At least one casualty
Material First Ignited								
Building components	89.70%	10.30%	86.60%	13.40%	96.70%	3.30%	94.60%	5.40%
Furniture, furnishings	90.10%	9.90%	87.20%	12.80%	91.10%	n<5	92.00%	n<5
Clothing, textiles	88.40%	11.60%	86.00%	14.00%	88.70%	11.30%	92.60%	7.40%
Wood, paper products	95.30%	4.70%	89.30%	10.70%	93.90%	6.10%	94.10%	5.90%
Flammable liquids, combustible liquids	86.00%	14.00%	79.60%	20.40%	85.40%	14.60%	85.80%	14.20%
Flammable gases	95.80%	4.20%	91.70%	n<5	92.10%	7.90%	92.80%	7.20%
Chemicals, plastics, metals	100.00%	0.00%	87.80%	12.20%	92.90%	7.10%	95.90%	4.10%
Agricultural products	96.70%	n<5	92.90%	n<5	90.80%	9.20%	95.40%	4.60%
Miscellaneous	92.80%	7.20%	90.30%	9.70%	94.00%	6.00%	96.30%	3.70%
Unknown, undetermined	86.20%	13.80%	89.80%	10.20%	94.60%	5.40%	94.20%	5.80%
Act or Omission								
Incendiary fires	92.20%	7.80%	90.60%	9.40%	94.10%	n<5	97.20%	n<5
Misuse of source of ignition	91.90%	8.10%	92.60%	n<5	97.60%	n<5	95.40%	n<5
Misuse of material ignited	88.30%	11.70%	86.10%	13.90%	86.40%	13.60%	88.30%	11.70%
Mechanical/electrical failure/malfunction	95.70%	4.30%	93.20%	6.80%	94.80%	5.20%	96.40%	3.60%
Construction, design or installation deficiency	98.60%	1.40%	100.00%	0.00%	90.50%	n<5	96.40%	n<5
Misuse of equipment	87.20%	12.80%	95.50%	n<5	96.00%	n<5	97.80%	n<5
Human failing	–	–	79.90%	20.10%	89.80%	10.20%	91.20%	8.80%
Unknown, undetermined	90.70%	9.30%	91.20%	n<5	96.90%	n<5	94.30%	5.70%
Total	**89.10%**	**10.90%**	**85.80%**	**14.20%**	**89.30%**	**10.70%**	**91.30%**	**8.70%**

Note. – Variable or code choice not used in a specific jurisdiction. *n<5*= Proportions based on less than 5 cases were suppressed.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

Misuse of equipment, mostly referring to unattended equipment, and misuse of material ignited were the most common acts or omissions contributing to cooking fires that caused at least one casualty in Ontario.[46] The category human failing was the most common act or omission contributing to cooking fires that caused at least one casualty in Manitoba.[47] In particular, among human failings, risk of at least one cooking fire casualty was highest for incidents in which suspected impairment, falling asleep or being fatigued and physical or mental disability were the contributing acts or omissions (data not shown). In Alberta and British Columbia[48], cooking fires resulting in at least one casualty tended to be associated with misuse of material ignited, particularly incidents in which overheated cooking oil, grease, or wax was the contributing factor for the cooking fire outbreak (data not shown).

Area of origin and fire loss measures

In Ontario, Alberta and British Columbia, cooking fires that occurred in the kitchen were less likely to have spread beyond the room of origin, a pattern observed for both extent of fire spread[49] and extent of damage[50] (Table 65). In addition, kitchen cooking fires were more likely to result in burning or charring and damage that remained confined to the room of origin in Alberta. Similarly, in Ontario, the extent of fire spread of cooking fires that occurred in the kitchen were more likely to remain confined to the room of origin. In contrast, in British Columbia, the extent of fire spread and damage of cooking fires that occurred in the kitchen were more likely to remain confined to the object of origin.

In Manitoba (Figure 14), the impact of area of origin on flame or char spread was not statistically significant.[51]

As summarized in Table 65, kitchen cooking fires were 1.6 and 1.9 times more likely to result in at least one casualty in Manitoba and Ontario, respectively.[52]

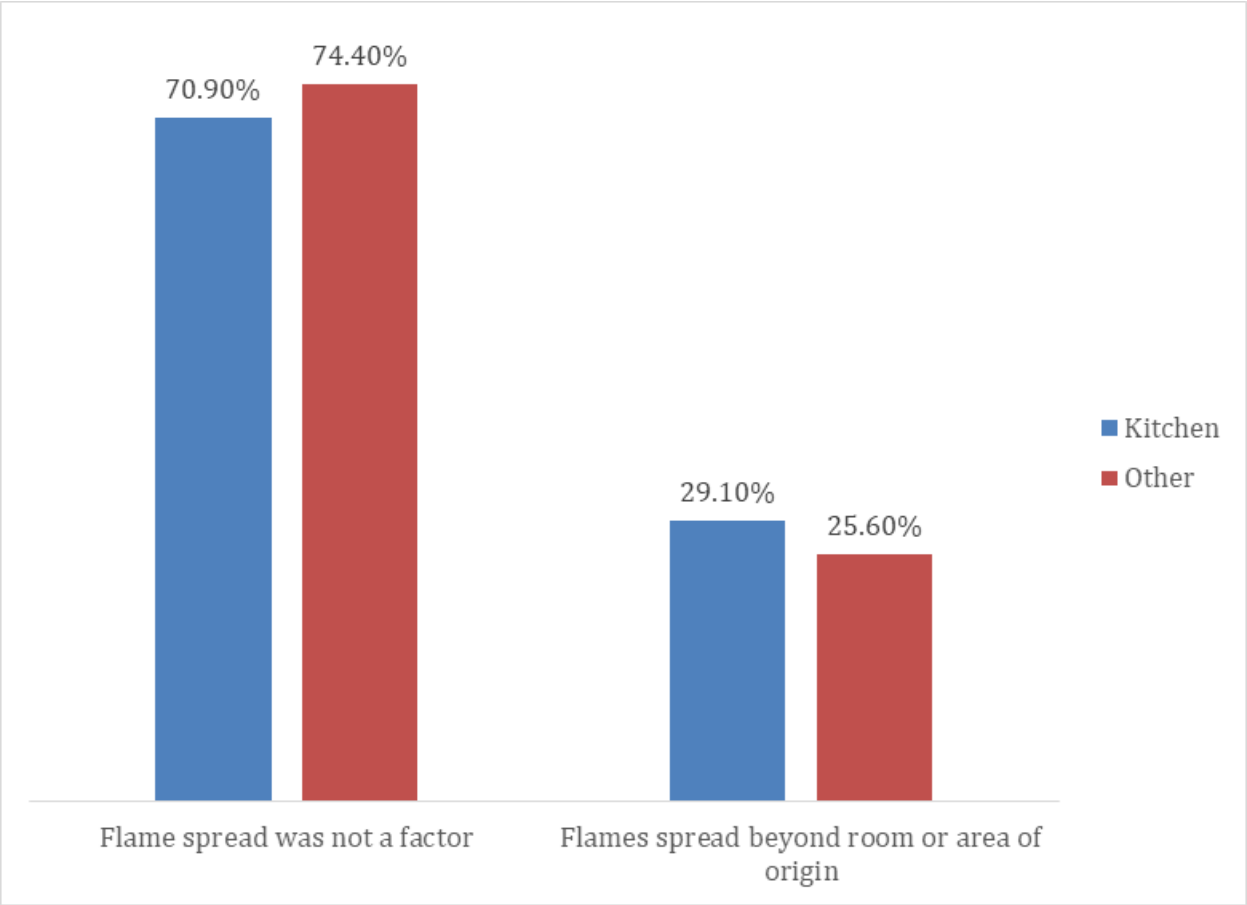
[46] Pearson Chi-Square$_{\text{Act or omission}}$ (df= 6)= 123.16, p<0.001 (Ontario).
[47] Pearson Chi-Square$_{\text{Act or omission}}$ (df= 7)= 31.08, p<0.001 (Manitoba).
[48] Pearson Chi-Square$_{\text{Act or omission}}$ (df= 7)= 31.26, p<0.001 (Alberta); 32.62, p<0.001 (British Columbia).
[49] Pearson Chi-Square$_{\text{Area of origin}}$ (df= 2)= 365.02, p<0.001 (Ontario); 83.37, p<0.001 (Alberta); 60.29, p<0.001 (British Columbia).
[50] Pearson Chi-Square$_{\text{Area of origin}}$ (df= 2)= 21.63, p<0.001 (Alberta); 34.03, p<0.001 (British Columbia).
[51] Pearson Chi-Square$_{\text{Area of origin}}$ (df= 1)= 0.92, p>0.01^{ns} (Manitoba).
[52] Pearson Chi-Square$_{\text{Area of origin}}$ (df= 1)= 51.12, p<0.001 (Ontario); 4.87, p<0.05 (Manitoba); 1.49, p>0.10^{ns} (Alberta); 0.41, p>0.10^{ns} (British Columbia).

TABLE 65. FIRE LOSS MEASURES BY AREA OF ORIGIN, 4 JURISDICTIONS, NFID, 2005 TO 2014

Area of Origin	Extent of Fire†			Extent of Damage			Casualty	
	Confined to object of origin	Confined to room of origin	Spread beyond room of origin	Confined to object of origin	Confined to room of origin	Spread beyond room of origin	No casualties	At least one casualty
Ontario								
Other	52.20%	27.60%	20.20%	–	–	–	93.80%	6.20%
Kitchen	36.20%	56.20%	7.60%	–	–	–	88.40%	11.60%
Total	**38.40%**	**52.30%**	**9.30%**	**–**	**–**	**–**	**89.10%**	**10.90%**
Manitoba								
Other	–	–	–	–	–	–	91.10%	8.90%
Kitchen	–	–	–	–	–	–	85.50%	14.50%
Total	**–**	**–**	**–**	**–**	**–**	**–**	**85.80%**	**14.20%**
Alberta								
Other	15.50%	40.80%	43.70%	14.80%	39.60%	45.70%	91.00%	9.00%
Kitchen	18.20%	63.50%	18.30%	13.10%	52.20%	34.60%	89.10%	10.90%
Total	**17.90%**	**60.90%**	**21.10%**	**13.30%**	**50.80%**	**35.80%**	**89.30%**	**10.70%**
British Columbia								
Other	41.50%	38.80%	19.70%	29.20%	39.80%	31.00%	90.50%	9.50%
Kitchen	58.20%	33.60%	8.20%	43.40%	32.40%	24.20%	91.40%	8.60%
Total	**56.90%**	**34.00%**	**9.10%**	**42.30%**	**32.90%**	**24.70%**	**91.30%**	**8.70%**

Note. †Analyses presented here were restricted to cooking fire data for the period from 2009 to 2014.
– Variable or code choice not used in a specific jurisdiction.
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

FIGURE 14. FLAME SPREAD BY AREA OF ORIGIN, MANITOBA, NFID, 2005 TO 2014



Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

5. Summary and Concluding Remarks

Cooking fires are a significant, yet preventable, threat to public safety.

Consistently topping the list of known sources of ignition during the period from 2005 to 2014, cooking equipment fires were either the single largest, or second largest, source of ignition in home structure fires across the four reporting provinces and over time, responsible for a total of 27,215 reported cooking fire incidents, 3,729 reported casualties and hundreds of millions of dollars in direct property and contents damage.

Specifically, for the period from 2005 to 2014, there were 14,194 reported home structure fires caused by cooking in Ontario. These fires caused 74 civilian deaths, 1,747 reported civilian fire injuries, 173 firefighter casualties, and for the years between 2005 and 2008, direct property and contents losses estimated at approximately $100 million in damage.

During the ten-year period from 2005 to 2014, cooking equipment was involved in a total of 3,250 reported home structure fires in Manitoba, which caused 22 civilian deaths, 608 civilian injuries and an estimated $66 million in direct property and contents damage.

Alberta's 3,596 reported home cooking structure fires were responsible for 20 civilian deaths, 428 civilian injuries and 16 firefighter casualties between 2005 and 2014. Direct property damage from these fires was estimated at $192,936,915.

Cooking equipment was involved in 6,175 reported home structure fires in British Columbia during the 10-year window of observation. These fires caused 15 civilian deaths, 605 civilian injuries, 21 firefighter casualties, and almost $166 million in property and contents losses.

Lack of reliable, on-going and up-to-date national data on home fires have made it difficult to establish the significance of the cooking fire problem, determine its associated risk factors, and identify how widely certain factors or circumstances are represented in the population to support the development of evidence-based fire safety and fire prevention programs to influence behavioural changes. Based on secondary, descriptive analyses of the NFID for the ten-year period covering 2005 to 2014, the present research provided useful information about the frequency, causes and circumstances of home cooking fires that were reported to local fire departments in four Canadian provinces. Additional details were also provided about cooking-related fire casualties and victims' demographic and behavioural profiles. This rich national database offered a key opportunity to fill important gaps in the Canadian fire literature allowing a better understanding of the nature and characteristics of home cooking fires and the injuries, deaths and property damage they cause, and the identification of specific groups in the population at greater risk, to effectively address the various factors that define residential cooking fire risk and vulnerability. To allocate most efficiently and effectively the already limited funding available, educational programming must be specific, targeted and evidence-based. Findings of the present study can, therefore, inform the development, implementation and assessment of public education programming aimed at changing unsafe cooking

practices and inappropriate, potentially dangerous intervention behaviours among the identified target audience groups.

Considering the propensity for home cooking structure fires across the four reporting provinces, the extent and seriousness of many of these fires, their harmful and devastating effects, and the evidence presented here that cooking fires and cooking fire casualties were not equally distributed across the four jurisdictions, and that there were different risk factors, including demographic, behavioural, and environmental factors or circumstances, that contributed to the outbreak, spread and resulting negative outcomes of cooking fires, it is imperative, for comparative and evaluative purposes, to continue collecting cooking fire statistics. Echoing key requirements identified by Statistics Canada (2017c) to address ongoing challenges in fire data collection and quality improvement efforts, if the NFID project is to continue beyond its pilot stage, two important recommendations moving forward would be, to the extent possible, standardize data elements and codes across Canadian jurisdictions and, very importantly, to ensure completeness and accuracy of the information collected, even when fire incidents are small and do not pose significant threat to life and property. Future data collection efforts should consider the possibility of gathering demographic information, such as age, sex, and visible minority status, for the host directly involved in the cooking fire incident, irrespective of whether or not the individual was a victim of a fire casualty. Along with the rich behavioural and environmental characteristics already collected, inclusion of demographic information is key to better understand the human dynamics of cooking fires and to further quantify the vulnerability of certain subgroups within the population.

The analyses presented here shed light on the demographics, behavioural and environmental patterns associated with home cooking fires separately for each reporting jurisdiction. Further questions remain about the impact of levels of socioeconomic disadvantage and underlying socio-economic characteristics at the community or neighbourhood level. It is important for future research to gain a more detailed understanding of how "externally operating structures beyond the scope of those behaviours and activities identifiable at an individual level" impact incidence rates, fatality rates and injury rates of home cooking fires (Clark, et al., 2014: p. 15). The NFID linked fire incident data with other socioeconomic datasets such as unemployment rate, crime rate, percent population aged 25 and older with no certificate, diploma or degree, median after-tax income in thousands of dollars, average number of persons in private households, percent of single parent family dwellings, percent of population aged 65 and older, percent of population aged 5 and younger, and percentage of dwellings that are single detached dwellings. This information was identified at both the census subdivision and the census metropolitan/census agglomeration levels (Statistics Canada, 2017b). Thus, further aggregate analyses of the NFID can characterize how cooking fire incidence and casualty rates at the neighbourhood level correlate with relevant social and community factors. Such aggregate level analyses can provide important insights about the effect of socioeconomic status and life cycle stages on cooking fire incidence and casualty rates.

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Appendix: Additional Tables

APPENDIX TABLE A. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY PRESENCE OF SPRINKLER PROTECTION, 4 JURISDICTIONS, NFID, 2005 TO 2014

Sprinkler Protection	Ontario		Manitoba†		Alberta†		British Columbia†	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
No sprinkler protection present	6776	47.7	2492	76.8	2419	85.4	4000	64.9
Sprinkler protection present	612	4.3	140	4.3	172	6.1	981	15.9
Cannot be determined	6806	47.9	611	18.8	241	8.5	1179	19.1
Total	**14194**		**3243**		**2832**		**6160**	

Note. †*Not applicable* cases were excluded from the analyses presented here for Manitoba (*n*= 7), Alberta (*n*= 764) and British Columbia (*n*= 15).

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

APPENDIX TABLE B. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY FIRE DETECTION DEVICES, 2 JURISDICTIONS, NFID, 2005 TO 2014

	Ontario		Alberta†	
Fire Detection Devices	**Freq.**	**Percent**	**Freq.**	**Percent**
Smoke detectors	10164	71.6	2308	71.1
Smoke detectors, heat detectors and smoke detectors in return air ducts	–	–	86	2.6
Heat detectors and smoke detectors in return air ducts	–	–	5	0.2
Heat detectors	53	0.4	4	0.1
Smoke detectors and specialty detectors	–	–	43	1.3
Heat detectors and specialty detectors	–	–	1	0.0
Heat detectors, smoke detectors and specialty detectors	–	–	8	0.2
No detection devices	1039	7.3	322	9.9
Cannot be determined	2938	20.7	470	14.5
Total	**14194**		**3247**	

Note. †*Not applicable* cases were excluded from the analyses presented here for Alberta (*n*= 349).
Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

APPENDIX TABLE C. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY EXTENT OF FIRE SPREAD, 3 JURISDICTIONS, NFID, 2005 TO 2014

	Ontario†		Alberta†		British Columbia	
Extent of Fire Spread	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**
Confined to object of origin	3054	21.5	632	18.9	3283	53.2
Confined to room of origin	4163	29.3	1984	59.3	2261	36.6
Spread beyond room of origin	744	5.2	654	19.6	631	10.2
Unclassified/ Unknown	6228	43.9	74	2.2	–	–
Total	**14189**		**3344**		**6175**	

Note. †*Not applicable* cases were excluded from the analyses presented here for Ontario (*n*= 5) and Alberta (*n*= 252).

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

APPENDIX TABLE D. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY INITIAL DETECTION, 4 JURISDICTIONS, NFID, 2005 TO 2014

	Ontario		Manitoba		Alberta		British Columbia†	
Initial Detection	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**
Visual sighting or other means of personal detection	4578	32.3	1976	60.8	2713	75.4	3871	62.8
Some fire detection device	639	4.5	1118	34.4	287	8.0	654	10.6
No initial detection (burned out before detection)	66	0.5	–	–	21	0.6	12	0.2
Unknown, unclassified	8911	62.8	156	4.8	575	16.0	1623	26.3
Total	**14194**		**3250**		**3596**		**6160**	

Note. †*Not applicable* cases were excluded from the analyses presented here for British Columbia (*n*= 15).

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

APPENDIX TABLE E. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY ACTION TAKEN, 4 JURISDICTIONS, NFID, 2005 TO 2014

	Ontario†		Manitoba		Alberta		British Columbia†	
Action Taken	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**	**Freq.**	**Percent**
Burned out/Minor fire	664	8.3	556	17.1	481	13.4	1180	20.7
Extinguished by occupant	3435	42.7	1329	40.9	956	26.6	1965	34.5
Extinguished by automatic system	33	0.4	12	0.4	49	1.4	206	3.6
Extinguished by fire department	3619	45.0	1058	32.6	1261	35.1	1933	33.9
Unclassified	215	2.7	222	6.8	383	10.7	85	1.5
Unknown	78	1.0	73	2.2	466	13.0	331	5.8
Total	**8044**		**3250**		**3596**		**5700**	

Note. †*System missing* cases were excluded from the analyses presented here for Ontario (*n*= 6,150) and British Columbia (*n*= 475).

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

APPENDIX TABLE F. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY SMOKE ALARM PERFORMANCE, 4 JURISDICTIONS, NFID, 2005 TO 2014

Smoke Alarm Performance	Ontario†		Manitoba†		Alberta		British Columbia†‡	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
No smoke alarm	1050	7.8	184	5.7	1413	39.3	450	8.8
Alarm present but did not activate	2462	18.4	565	17.4	479	13.3	–	–
Alarm present and activated	7434	55.4	1563	48.1	1223	34.0	3125	61.4
Unknown	2461	18.4	935	28.8	481	13.4	1518	29.8
Total	**13407**		**3247**		**3596**		**5093**	

†*Not applicable* cases were excluded from the analyses presented here for Ontario (*n*= 787), Manitoba (*n*= 3) and British Columbia (*n*= 15). ‡*System missing* cases were excluded from the analyses presented here for British Columbia (*n*= 1,067).

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

APPENDIX TABLE G. NUMBER AND PROPORTION OF REPORTED HOME STRUCTURE FIRES INVOLVING COOKING EQUIPMENT BY IMPACT OF SMOKE ALARM ACTIVATION ON OCCUPANT(S) RESPONSE AND EVACUATION, 3 JURISDICTIONS, NFID, 2005 TO 2014

Impact of Smoke Alarm Activation on Occupant Response/Evacuation	Ontario†		Alberta		British Columbia	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Occupants evacuated safely	3018	66.5	814	66.6	1689	54.0
Unnecessary to evacuate	–	–	186	15.2	796	25.5
Some (not all) occupants evacuated safely	528	11.6	–	–	–	–
Occupants did not evacuate	467	10.3	40	3.3	215	6.9
Not applicable/no occupants/alarm did not activate	238	5.2	129	10.5	425	13.6
Unknown	289	6.4	54	4.4	–	–
Total	**4540**		**1223**		**3125**	

Note. Analyses presented here were restricted to cooking fire incidents where there was an alarm present and activated. †*System missing* cases were excluded from the analyses presented here for Ontario (*n*= 2,894).

Source. Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database.

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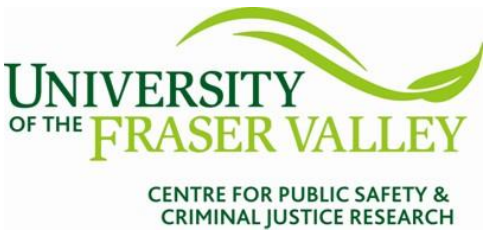
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