

BRITISH COLUMBIA

Office of the Fire Commissioner

Annual Report
2020



Office of the
Fire Commissioner
Emergency Management BC






Working Together for Fire Safety

I am pleased to provide you with the Office of the Fire Commissioner's 2020 annual report, a retrospective account of reported fire incidents and their causes in British Columbia.

In March 2021, Statistics Canada reported that the Canadian death rate was five percent above what would be expected in a year when there had been no pandemic. The Province of Ontario has reported a 35% increase in fire deaths which attributed to more time being spent in residences and away from a work environment. In British Columbia, fire-related deaths have risen from 27 to 52, a 93% increase; 29 deaths were attributed to Structure Fires, 15 deaths due to Vehicle Fires, 6 deaths due to Person Fires and 2 unreported but known pending investigation.

This report confirms that, year after year, most deaths and injuries caused by fire occur in people's private homes. The pandemic appears to have resulted in an increase of fire deaths in British Columbia. More than ever, fire services need to find ways to enhance public education efforts while continuing on delivering fire safety programs. To be most effective and have the greatest impact, fire prevention education programs and campaigns need to be evidenced-based and target the geographic areas, issues, and groups at greatest risk. Comprehensive research has indicated that a targeted focus, where outcomes are measured and activities can be improved, will have the greatest success.

With this approach to fire prevention, I am certain we can shift trends in the province. To do so, the Office of the Fire Commissioner's areas of focus will include:

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- Identification of the highest-risk members of the community;
 - Risks based on dwelling types;
 - Development, monitoring and evaluation of prevention program to ensure that programs continue to target the community's areas of highest risk and concern, and;
 - Researching best practices to enhance fire prevention programs' process, content and delivery, including the use of social media to distribute safety information.

I am acutely aware that not all fire services in British Columbia have the resources to translate this focussed effort into action. I am pleased to report that my office, representing the Province of British Columbia, has partnered with the Centre for Social Data Insights and Innovation at Statistics Canada to develop a series of analytical support tools. These include an interactive

geo-spatial tool to help fire services to identify and target, within their own communities, high-risk areas that would benefit most from fire prevention treatments to not only prevent fires but, more importantly, to prevent injuries and deaths occurring as a result of fires. Fire data will be mapped with associated risk factors (e.g., from the Census and the Canadian Index of Multiple Deprivation) and made available to community fire services throughout the province.

The information in this report is intended to assist in the development of a targeted and focussed application using existing fire prevention methods. The logic of this approach is proven and can be replicated and applied universally. By focusing on the individuals and communities at highest risk of fire injury and deaths within our province, we will all be working together for fire safety.

***Brian Godlonton,
Fire Commissioner***



Executive Summary

SECTION 9 (1) OF THE FIRE SERVICES ACT REQUIRES

local assistant of the fire commissioner (LAFC)s in each municipality, district or part of British Columbia to investigate and report fires. This information in this report has been collated and integrated into the following report. I am thankful for the efforts of LAFCs in providing the data found in this report.

The report is organized to reflect, retrospectively, fires reported to the Office of the Fire Commissioner (OFC) in 2020 and the tables have been assembled in a way to highlight information we believe is most relevant to the British Columbia fires service.

In 2020, there were 7,161 fires that resulted in 180 injuries and 52 deaths¹. Of these:

- **2,834** (40%) were structure fires (150 injuries and 29 deaths);
- **1,147** (16%) were vehicle fires (11 injuries and 15 deaths);
- **26** (0.04%) were person fires (12 injuries and 6 deaths); and
- **3,154** (44%) were outdoor fires (7 injuries and no deaths).

Of those 7,161 fires reported by Office of the Fire Commissioner (OFC) regions:

- **64%** were from the Lower Mainland;
- **15%** were from Vancouver Island;
- **11%** were from Thompson Okanagan;
- **6%** were from Northern BC;
- **3%** were from the South East; and
- **2%** were from other agencies acting on behalf of the Office of the Fire Commissioner.

Structure fires had the most impact on British Columbians resulting in the most injuries and deaths. This category of fires occurred most frequently in residential use structures, with 2,220 incidents events accounting for 78% of structure fires, 134 (89%) injuries and 27 (93%) deaths. The most frequent causes of these residential use structure fires was cooking equipment (649 fires, 43 injuries and one death), and smoker's materials and open flames (529 fires, 53 injuries and 12 deaths).

With a focus on the presence or absence of fire safety systems, such as smoke alarms and sprinkler systems, relative to the base case of no smoke alarm and no sprinkler protection, the following trends were observed:

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¹ Fire Reports have been received for 50 fire deaths; 2 reports remain outstanding at the time of this publication.

- Injury rates were significantly higher in the presence of a working smoke alarm and no sprinkler protection than in structures without working smoke alarms. This is likely because residents attempted to control the fires themselves when the alarms activated. Deaths, however, were lower in structures with working smoke alarms than in structures without a working smoke alarm.
- Death rates were significantly lower whenever fires occurred in the structures with sprinkler protection;
- The presence of smoke alarms and/or sprinkler protection significantly reduced the dependence on the fire department to control the fires; and
- The presence of smoke alarms and/or sprinkler protection significantly reduced the extent to which fires spread beyond the room of origin.
- The very best case for human survival at the time of a fire is in the presence of a working smoke alarm and a working sprinkler system.

Citizens over the age of 65 were overrepresented by 48% of those in reported age groups who died in a fire, and people 80 years old and over made up 20% of this group. This is particularly significant given that BC Stats (2011) predict the 65-and-over age group will increase to 23.7% of the population by 2036, compared with 15% in 2010, and those 80 years of age and over will nearly double increase to 7.4% from 4.2%.

Research conducted by the University of the Fraser Valley² from 2007 to 2014, found that fire-related fatalities in B.C. were disproportionately likely to occur among those aged 65 years or older at the time of the fire (28%, compared to an estimated 15% of the population). To reduce the risks for older B.C. residents, targeted home visits were conducted in selected areas over three years. Those visits, which were made in parallel with health checks and fall-prevention programs, demonstrated the benefits of education programs and smoke alarm installation for elderly group. Those actions resulted in increased smoke alarm coverage, more regular maintenance and checking of alarms and the installation of additional fire safety devices in homes for vulnerable elderly people. As more of our senior population chooses to live independently, it will be important to find effective ways to interact with this population to keep them safe.

It is worth noting that having a working smoke alarm when a fire breaks out can reduce the risk of death from a fire by as much as half. Despite this awareness, in 2020, only 44% of the structure fires reported had a working smoke alarm. This finding suggests there is a significant opportunity for fire prevention education campaigns as well as further requirements for working smoke alarms in structures to enhance public safety.

2 <https://cjr.ufv.ca/smoke-alarms-work-but-not-forever-revisited-successes-and-ongoing-challenges-from-bcs-working-smoke-alarm-campaign/>
(pages 16-17-18) Garis, L, Clare, J , Hughan, S

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This report is based on data entered the FIRES system as of March 15th, 2021. Database content regularly changes in the FIRES system due to the nature of the data collection and entry into the database from numerous users in the province. As a result, the outcome of any additional data analysis conducted after March 15th, 2021 for the same period as this report will differ.

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BC Fires in 2020

This annual report section presents information about all the BC 2020 fires reported to the OFC. In total, 7,161 fires were reported, resulting in 180 injuries and 52³ deaths.

Reporting entities

Table 1 shows how the different types of fire departments in BC responded to these types of fire events. Structure fires and outdoor fires accounted for 44% of the total fire events, with vehicle fires accounting for a further 16%. Career fire departments (56%) and composite departments (38%) reported the bulk of the total fire events. There were 25 injuries and 7 deaths per 1,000 fires in 2020.

Table 1. All BC fires (2020) by fire department type and incident type, showing percentage of fires, number/rate of injuries, and number/rate of deaths

FIRE DEPARTMENT TYPE	INCIDENT TYPE	2020 TOTAL	% FIRES	# INJURIES	INJURY RATE PER 1,000 FIRES	# DEATHS	DEATH RATE PER 1,000 FIRES
CAREER	All fires	4,033	56.3%	99	24.5	11	2.7
	Structure fire	1,502	21.0%	83	55.3	9	6.0
	Vehicle fire	357	5.0%	3	8.4	1	2.8
	Outdoor fire	2,160	30.2%	4	1.9	0	0.0
	Person fire	14	0.2%	9	642.9	1	71.4
COMPOSITE	All fires	2,731	38.1%	67	24.5	20	7.3
	Structure fire	1,125	15.7%	55	48.9	12	10.7
	Vehicle fire	674	9.4%	7	10.4	4	5.9
	Outdoor fire	922	12.9%	3	3.3	0	0.0
	Person fire	10	0.1%	2	200.0	4	400.0
VOLUNTEER	All fires	356	5.0%	11	30.9	14	39.3
	Structure fire	187	2.6%	9	48.1	5	26.7
	Vehicle fire	98	1.4%	1	10.2	8	81.6
	Outdoor fire	69	1.0%	0	0.0	0	0.0
	Person fire	2	0.0%	1	500.0	1	500.0
OTHER	All fires	41	0.6%	3	73.2	5	122.0
	Structure fire	20	0.3%	3	150.0	3	150.0
	Vehicle fire	18	0.3%	0	0.0	2	111.1
	Outdoor fire	3	0.0%	0	0.0	0	0.0
	Person fire	0	0.0%	0	Undefined	0	Undefined
TOTAL	All fires	7,161	100.0%	180	25.1	50	7.0
	Structure fire	2,834	39.6%	150	52.9	29	10.2
	Vehicle fire	1,147	16.0%	11	9.6	15	13.1
	Outdoor fire	3,154	44.0%	7	2.2	0	0.0
	Person fire	26	0.4%	12	461.5	6	230.8

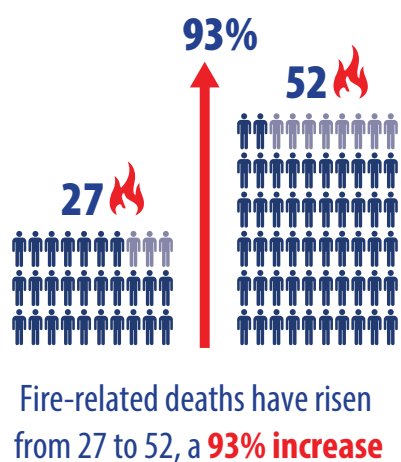
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³ Fire Reports have been received for 50 fire deaths; 2 reports remain outstanding at the time of this publication.

Table 2 shows the variation in reporting across the OFC regions. Just under two-thirds of 2020 fire reports originated from the Lower Mainland (accounting for 64% of injuries and 46% of deaths).

Table 2. All BC fires (2020) by region, showing percentage of fires, number/rate of injuries, and number/rate of deaths

FIRE BY REGION	2020 TOTAL	% FIRES	# INJURIES	INJURY RATE PER 1,000 FIRES	# DEATHS	DEATH RATE PER 1,000 FIRES
Lower Mainland	4,559	63.7%	115	25.2	23	5.0
Vancouver Island	1,077	15.0%	18	16.7	4	3.7
Thompson Okanagan	757	10.6%	15	19.8	5	6.6
South East	181	2.5%	2	11.0	0	0.0
Northern	458	6.4%	24	52.4	6	13.1
Regional districts and other associations	129	1.8%	6	46.5	12	93.0
TOTAL	7,161	100.0%	180	25.1	50	7.0





Method of fire control

Table 3 shows how the 2020 fires were controlled. Fire departments controlled 49% of fires: almost all were controlled through water application (and two thirds of these events requiring 1 hand line or less). Handheld extinguishers (20%) and makeshift firefighting aids (11%) while 11% of fires burned out without intervention.

Table 3. All BC fires (2020) by method of fire control, showing percentage of fires, number/rate of injuries, and number/rate of deaths.

METHOD OF FIRE CONTROL (GROUPED)	METHOD OF FIRE CONTROL SUB-CATEGORIES (FIRE DEPARTMENT INVOLVEMENT ONLY)	2020 TOTAL	% FIRES	# INJURIES	INJURY RATE PER 1,000 FIRES	# DEATHS	DEATH RATE PER 1,000 FIRES
Hand held extinguisher		1,452	20.3%	17	11.7	3	2.1
Standpipe and hose systems		57	0.8%	1	17.5	1	17.5
Makeshift fire fighting aids		775	10.8%	19	24.5	1	1.3
Fire Department – water application	All fires	3,493	48.8%	96	27.5	33	9.4
	25mm (1") or less hose	230	3.2%	1	4.3	0	0.0
	38mm or 42mm (1 1/2" or 1 3/4") hose – 1 hand line	2,138	29.9%	27	12.6	11	5.1
	65mm or 70mm (2 1/2" or 3") hose – 1 hand line	43	0.6%	0	0.0	0	0.0
	38mm or 42mm (1 1/2" or 1 3/4") hose – 2 or more hand lines	675	9.4%	41	60.7	10	14.8
	65mm or 70mm (2 1/2" or 3") hose – 2 or more hand lines	77	1.1%	4	51.9	2	26.0
	Combinations of 38/42mm, 65mm, 77mm, or larger hand lines	124	1.7%	18	145.2	7	56.5
	Portable/fixed water deluge/master stream set	54	0.8%	0	0.0	0	0.0
	Unclassified	152	2.1%	5	32.9	3	19.7
Fire Department – other than water	All fires	143	2.0%	0	0.0	2	14.0
	Dry chemical – under 450kg	2	0.0%	0	0.0	0	0.0
	Dry chemical – 450kg and over	1	0.0%	0	0.0	0	0.0
	Combination foam-dry chemical	1	0.0%	0	0.0	0	0.0
	Compressed air foam systems	36	0.5%	0	0.0	0	0.0
	Crash-fire foam vehicle – using hand lines	15	0.2%	0	0.0	3	200.0
	Crash-fire foam vehicle – using monitor	0	0.0%	0	Undefined	0	Undefined
	Pumper – foam hand lines only, via educator/injector	39	0.5%	0	0.0	1	25.6
	Unclassified	49	0.7%	1	20.4	1	20.4
Sprinkler protection		149	2.1%	14	94.0	2	13.4
Fixed system other than sprinklers		40	0.6%	1	25.0	0	0.0
Burned out		762	10.6%	26	34.1	6	7.9
Miscellaneous method of fire control/extinguishment		209	2.9%	6	28.7	0	0.0
Cannot be determined		81	1.1%	0	0.0	2	24.7
TOTAL		7,161	100.0%	180	25.1	50	7.0



Structure fires by property complex type

Table 4 shows the property complexes involved with the 2,834 structure fires reported in 2020 accounting for 150 (83%) injuries and 29 (57%) deaths. Residential use structure fires contributed 78% to this group of fires and resulted in 89% of injuries and 93% of deaths.

Table 4. All BC structure fires (2020) by property complex, showing percentage of fires, number/rate of injuries, and number/rate of deaths.

PROPERTY COMPLEX GROUP	PROPERTY COMPLEX SUB-GROUP	# FIRES	% FIRES	# INJURED	% INJURIES	INJURY RATE PER 1,000 FIRES	# DEATHS	% DEATHS	DEATH RATE PER 1,000 FIRES
ASSEMBLY USE	<i>(Total for whole group)</i>	123	4.3%	4	2.7%	32.5	0	0.0%	0.0
	Amusement park, exhibition & fair ground, stadium	2	0.1%	0	0.0%	0.0	0	0.0%	0.0
	Auditorium, theatre, arena, cultural centre	4	0.1%	0	0.0%	0.0	0	0.0%	0.0
	Church, funeral home	9	0.3%	0	0.0%	0.0	0	0.0%	0.0
	Educational institution (non-residential)	25	0.9%	0	0.0%	0.0	0	0.0%	0.0
	Food or beverage establishment	69	2.4%	4	2.7%	58.0	0	0.0%	0.0
	Recreation, sports facility, sports club, social club	14	0.5%	0	0.0%	0.0	0	0.0%	0.0
INSTITUTIONAL USE	<i>(Total for whole group)</i>	30	1.1%	2	1.3%	66.7	0	0.0%	0.0
	Hospital, medical centre, clinic, sanatorium	14	0.5%	2	1.3%	142.9	0	0.0%	0.0
	Licensed care facility	10	0.4%	0	0.0%	0.0	0	0.0%	0.0
	Prison, penitentiary, jail, detention centre, correctional facility, reformatory	6	0.2%	0	0.0%	0.0	0	0.0%	0.0
RESIDENTIAL USE	<i>(Total for whole group)</i>	2,220	78.3%	134	89.3%	60.4	27	93.1%	12.2
	Camp site/RV park	10	0.4%	1	0.7%	100.0	0	0.0%	0.0
	Educational institution (residential)	3	0.1%	0	0.0%	0.0	0	0.0%	0.0
	Hotel, motel, lodge, hostel, boarding house, dormitory	226	8.0%	13	8.7%	57.5	3	10.3%	13.3
	Residential – row, garden, town housing, condominium	181	6.4%	11	7.3%	60.8	0	0.0%	0.0
	Residential – single detached	1,018	35.9%	63	42.0%	61.9	7	24.1%	6.9
	Residential – apartment	580	20.5%	29	19.3%	50.0	9	31.0%	15.5
	Residential – duplex, 3-plex, 4-plex	102	3.6%	10	6.7%	98.0	0	0.0%	0.0
	Residential – mobile home/trailer park	76	2.7%	6	4.0%	78.9	7	24.1%	92.1
	Residential – with business/mercantile, up to 3 stories	24	0.8%	1	0.7%	41.7	1	3.4%	41.7
BUSINESS USE	Office building	57	2.0%	3	2.0%	52.6	0	0.0%	0.0

TABLE 4 CONTINUED ON NEXT PAGE

PROPERTY COMPLEX GROUP	PROPERTY COMPLEX SUB-GROUP	# FIRES	% FIRES	# INJURED	% INJURIES	INJURY RATE PER 1,000 FIRES	# DEATHS	% DEATHS	DEATH RATE PER 1,000 FIRES
COMMERCIAL/ MERCANTILE USE	<i>(Total for whole group)</i>	129	4.6%	1	0.7%	7.8	1	3.4%	7.8
	Commercial centre including fuel dispensing (may include restaurant, stores, etc.)	22	0.8%	1	0.7%	45.5	0	0.0%	0.0
	Commercial centre, shopping centre, strip mall	86	3.0%	0	0.0%	0.0	1	3.4%	11.6
	Department store, variety store	16	0.6%	0	0.0%	0.0	0	0.0%	0.0
	Service station with storage in back lot (includes fuel dispensing)	5	0.2%	2	1.3%	400.0	0	0.0%	0.0
MANUFACTURING USE	Industrial manufacturing	76	2.7%	2	1.3%	26.3	0	0.0%	0.0
STORAGE USE	<i>(Total for whole group)</i>	16	0.6%	0	0.0%	0.0	0	0.0%	0.0
	Grain elevator	2	0.1%	0	0.0%	0.0	0	0.0%	0.0
	Industrial storage facility, bulk storage tanks	14	0.5%	0	0.0%	0.0	0	0.0%	0.0
OTHER SPECIAL USE	<i>(Total for whole group)</i>	178	6.3%	4	2.7%	22.5	1	3.4%	5.6
	Air transportation use, air terminal, airport	0	0.0%	0	0.0%	Undefined	0	0.0%	Undefined
	Building/structure unclassified (describe)	91	3.2%	2	1.3%	22.0	1	3.4%	11.0
	Car park	12	0.4%	0	0.0%	0.0	0	0.0%	0.0
	Communications	0	0.0%	0	0.0%	Undefined	0	0.0%	Undefined
	Farm or agricultural use	40	1.4%	0	0.0%	0.0	0	0.0%	0.0
	Harbour, waterfront property, marine terminal	7	0.2%	1	0.7%	142.9	0	0.0%	0.0
	Laboratory	0	0.0%	0	0.0%	Undefined	0	0.0%	Undefined
	Parks – federal, provincial or city (includes historic sites)	9	0.3%	0	0.0%	0.0	0	0.0%	0.0
	Railway terminal, yard, subway	4	0.1%	0	0.0%	0.0	0	0.0%	0.0
	Utility	15	0.5%	1	0.7%	66.7	0	0.0%	0.0
UNKNOWN	Cannot be determined	5	0.2%	0	0.0%	0.0	0	0.0%	0.0
TOTAL		2,834	100.0%	150	100.0%	52.9	29	100.0%	10.2



78% all structure fires in 2020
were residential structures —
and lead to **89%** of injuries and
93% of all structure fire related deaths.



Residential structure fires

Table 5 shows the room of fire origin for the 2,220 residential² use structure fires reported in 2020 (resulting in 134 injuries and 27 deaths). Kitchens accounted for just under one-third of fires (31% of injuries with 1 death). Bedrooms accounted for a further 12% of fires (24% of injuries and 26% of deaths), and living rooms resulted in 8% of fires (12% of injuries and 15% of deaths).

Table 5. All BC residential structure fires (2020) by room of fire origin, showing percentage of fires, number/rate of injuries, number/rate of deaths, and number/rate of fires that extended beyond the room of origin.

ROOM OF ORIGIN GROUPED	# FIRES	% FIRES	# INJURED	% INJURIES	INJURY RATE PER 1,000 FIRES	# DEATHS	% DEATHS	DEATH RATE PER 1,000 FIRES	# EXTENDED BEYOND ROOM OF ORIGIN	% EXTENDED BEYOND ROOM OF ORIGIN
Bathroom	46	1.6%	3	2.2%	65.2	0	0.0%	0.0	9	19.6%
Bedroom	296	12.4%	32	23.9%	108.1	7	25.9%	23.6	47	15.9%
Office	5	0.2%	1	0.7%	200.0	0	0.0%	0.0	2	40.0%
Closet	13	0.4%	0	0.0%	0.0	0	0.0%	0.0	1	7.7%
Assembly area – other	27	0.5%	1	0.7%	37.0	0	0.0%	0.0	9	33.3%
Laundry room	64	2.5%	0	0.0%	0.0	0	0.0%	0.0	4	6.3%
Hallways and means of egress	56	2.2%	6	4.5%	107.1	4	14.8%	71.4	7	12.5%
Living room	159	7.5%	16	11.9%	100.6	4	14.8%	25.2	37	23.3%
Function area – unclassified	3	0.6%	0	0.0%	0.0	0	0.0%	0.0	0	0.0%
Foyer	20	0.5%	2	1.5%	100.0	0	0.0%	0.0	5	25.0%
Kitchen	633	32.6%	41	30.6%	64.8	1	3.7%	1.6	28	4.4%
Dining area	20	0.7%	3	2.2%	150.0	1	3.7%	50.0	4	20.0%
Porch	107	5.1%	3	2.2%	28.0	2	7.4%	18.7	31	29.0%
Balcony	79	3.1%	13	9.7%	164.6	2	7.4%	25.3	36	45.6%
Storage area	43	2.2%	0	0.0%	0.0	1	3.7%	23.3	21	48.8%
Garage	93	4.7%	7	5.2%	75.3	0	0.0%	0.0	40	43.0%
Outside area – other	109	3.7%	0	0.0%	0.0	0	0.0%	0.0	64	58.7%
Utility and equipment and furnace room	67	3.1%	1	0.7%	14.9	0	0.0%	0.0	12	17.9%
Trash area	26	0.5%	0	0.0%	0.0	0	0.0%	0.0	13	50.0%
Chimney, flue pipe, gas vent	65	1.8%	0	0.0%	0.0	0	0.0%	0.0	9	13.8%
Service facilities	12	0.4%	1	0.7%	83.3	0	0.0%	0.0	1	8.3%
Crawl space	14	0.8%	0	0.0%	0.0	2	7.4%	142.9	5	35.7%
Structural area – other	167	8.0%	2	1.5%	12.0	0	0.0%	0.0	52	31.1%
All other areas	96	4.8%	2	1.5%	20.8	3	11.1%	31.3	72	75.0%
TOTAL	2,220	100.0%	134	100.0%	60.4	27	100.0%	12.2	509	22.9%

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² PC3100-PC3900 throughout the report when referring to residential-use structure fires.

Table 6 shows the source of ignition for residential use structure fires reported in 2020. Nearly one-third (29%) of fires were caused by cooking equipment (32% of injuries and 1 death), almost one-quarter (24%) resulted from smoker's material and open flames (40% injuries and 44% deaths, with the sub-category source of ignition shown in the table), and in 17% of cases the source of ignition could not be determined.

Table 6. All BC residential structure fires (2020) by source of ignition, showing percentage of fires, number/rate of injuries, and number/rate of deaths.

SOURCE OF IGNITION GROUPED	SOURCE SUB-CATEGORY (SMOKER'S MATERIAL ONLY)	# FIRES	% FIRES	# INJURED	% INJURIES	INJURY RATE PER 1,000 FIRES	# DEATHS	% DEATHS	DEATH RATE PER 1,000 FIRES
Cooking equipment		649	29.2%	43	32.1%	66.3	1	3.7%	0.0
Heating equipment		186	8.4%	7	5.2%	60.1	0	0.0%	16.4
Appliances & equipment		99	4.5%	3	2.2%	0.0	2	7.4%	0.0
Electrical distribution equipment		141	6.4%	4	3.0%	48.3	0	0.0%	0.0
Other electrical equipment		84	3.8%	1	0.7%	13.0	1	3.7%	0.0
Smoker's material and open flame	(Total for whole group)	529	23.8%	53	39.6%	106.4	12	44.4%	8.0
	Cigarette, pipe, or cigar	169	7.6%	22	16.4%	80.5	5	18.5%	6.7
	Ashtray	15	0.7%	0	0.0%	130.4	0	0.0%	0.0
	Lighter or match	183	8.2%	17	12.7%	103.4	5	18.5%	5.7
	Lamp/lantern – non-electric	2	0.1%	2	1.5%	0.0	0	0.0%	0.0
	Candle	35	1.6%	5	3.7%	148.1	0	0.0%	37.0
	Cutting torch/welding equipment	5	0.2%	0	0.0%	0.0	0	0.0%	0.0
	Hot ashes/embers (non-smoking)	17	0.8%	0	0.0%	0.0	0	0.0%	0.0
	Torch (non-cutting/welding)	27	1.2%	5	3.7%	161.3	0	0.0%	0.0
	Unclassified/cannot be determined	76	3.4%	2	1.5%	155.6	2	7.4%	0.0
Exposure		90	4.1%	0	0.0%	35.1	0	0.0%	0.0
Miscellaneous igniting object		59	2.7%	2	1.5%	145.2	2	7.4%	0.0
Cannot be determined		383	17.3%	21	15.7%	28.3	9	33.3%	23.6
TOTAL		2,220	100.0%	134	100.0%	60.4	27	100.0%	12.2

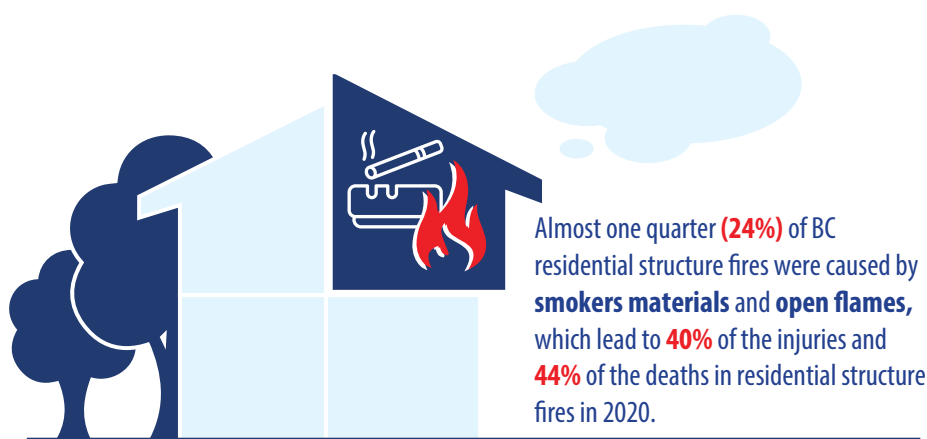


Table 7 shows the act or omission involved with residential use structure fires reported in 2020. Human failing was responsible for 42% of these fires resulting in 57% of injuries and 33% of deaths. Other major acts/omissions were mechanical/electrical failure/malfunctions (12% of fires, 7% of injuries, and 4% of deaths) and incendiary fires (10% fires, 9% injuries, and 5 deaths). The act or omission involved could not be determined in 15% of fires.

Table 7. All BC residential structure fires (2020) by act or omission, showing percentage of fires, number/rate of injuries, and number/rate of deaths.

ACT OR OMISSION GROUPED	# FIRES	% FIRES	# INJURED	% INJURIES	INJURY RATE PER 1,000 FIRES	# DEATHS	% DEATHS	DEATH RATE PER 1,000 FIRES
Incendiary fires	224	10.1%	12	9.0%	53.6	5	18.5%	22.3
Misuse of source of ignition	193	8.7%	9	6.7%	46.6	4	14.8%	20.7
Misuse of material ignited	98	4.4%	10	7.5%	102.0	1	3.7%	10.2
Mechanical/electrical failure/malfunction	258	11.6%	9	6.7%	34.9	1	3.7%	3.9
Construction, design or installation deficiency	41	1.8%	0	0.0%	0.0	0	0.0%	0.0
Misuse of equipment	105	4.7%	0	0.0%	0.0	0	0.0%	0.0
Human failing	924	41.6%	76	56.7%	82.3	9	33.3%	9.7
Vehicle accident	2	0.1%	0	0.0%	0.0	0	0.0%	0.0
Miscellaneous act or omission	10	0.5%	1	0.7%	100.0	2	7.4%	200.0
Cannot be determined	342	15.4%	14	10.4%	40.9	4	14.8%	11.7
Not applicable	23	1.0%	3	2.2%	130.4	1	3.7%	43.5
TOTAL	2,220	100.0%	134	100.0%	60.4	27	100.0%	12.2

Table 8 shows the level of fire origin for residential use structure fires reported in 2020. Almost half (45%) originated on the ground floor of the building (49% injuries and 74% deaths) and a further 20% commenced on the second storey (24% injuries and 7% deaths).

Table 8. All BC residential structure fires (2020) by level of fire origin, showing percentage of fires, number/rate of injuries, and number/rate of deaths.

LEVEL OF ORIGIN GROUPED	# FIRES	% FIRES	# INJURED	% INJURIES	INJURY RATE PER 1,000 FIRES	# DEATHS	% DEATHS	DEATH RATE PER 1,000 FIRES
Basement, sub-basement	185	8.3%	11	8.2%	59.5	1	3.7%	5.4
Ground floor, grade level or grade to 3m	1,005	45.3%	66	49.3%	65.7	20	74.1%	19.9
2nd storey or over 3m to 6m above grade	433	19.5%	32	23.9%	73.9	2	7.4%	4.6
3rd storey or over 6m to 9m (20ft to 30ft) above grade	173	7.8%	7	5.2%	40.5	2	7.4%	11.6
4th to 12th storey (inclusive) or over 9m to 36m (30ft to 120ft) above grade	186	8.4%	12	9.0%	64.5	1	3.7%	5.4
Over 12 storey or over 36m (120ft)	31	1.4%	2	1.5%	64.5	0	0.0%	0.0
Crawl space, under structure	17	0.8%	0	0.0%	0.0	1	3.7%	58.8
Mezzanine (any floor)	1	0.0%		0.0%	0.0		0.0%	0.0
Roof level (includes concealed roof space, attic)	62	2.8%	2	1.5%	32.3	0	0.0%	0.0
Exposure fire	80	3.6%		0.0%	0.0		0.0%	0.0
Cannot be determined	47	2.1%	2	1.5%	42.6	0	0.0%	0.0
TOTAL	2,220	100.0%	134	100.0%	60.4	27	100.0%	12.2

Table 9 shows the height of buildings that experienced a residential use structure fire reported in 2020. Almost 8 out of 10 (82%) of all residential structure fires occurred in buildings 4 storeys high or lower (89% of injuries and 93% of deaths) noting no deaths occurred on the 5th or 6th floors.

Table 9. All BC residential structure fires (2020) by building height, showing percentage of fires, number/rate of injuries, and number/rate of deaths.

BUILDING HEIGHT GROUPED	# FIRES	% FIRES	# INJURED	% INJURIES	INJURY RATE PER 1,000 FIRES	# DEATHS	% DEATHS	DEATH RATE PER 1,000 FIRES
1 story above grade	549	24.7%	43	32.1%	78.3	8	29.6%	14.6
2 stories above grade	764	34.4%	45	33.6%	58.9	8	29.6%	10.5
3 stories above grade	296	13.3%	26	19.4%	87.8	5	18.5%	16.9
4 stories above grade	230	10.4%	6	4.5%	26.1	4	14.8%	17.4
5 or 6 stories above grade	120	5.4%	3	2.2%	25.0	0	0.0%	0.0
7 to 12 stories above grade	105	4.7%	9	6.7%	85.7	1	3.7%	9.5
13 stories and over above grade	110	5.0%	2	1.5%	18.2	0	0.0%	0.0
Cannot be determined	46	2.1%	0	0.0%	0.0	1	3.7%	21.7
TOTAL	2,220	100.0%	134	100.0%	60.4	27	100.0%	12.2



Almost 8 out of 10 **(82%)** of all residential structure fires occurred in buildings **4 storeys high or lower** and lead to **89%** of injuries and **93%** of deaths.



Influence of life safety systems on residential fire outcomes

Table 10 looks at the fire outcomes (casualties, fire department involvement in extinguishing fires, and extent of fire spread beyond the room of origin) for residential use structure fires reported in 2020 as a function of life safety systems in place. Smoke alarm status in this table represented those fires that had an alarm activated ('yes') or no smoke alarm installed ('no'). Similarly, sprinkler status represented those fires that had complete sprinkler protection ('yes') or no sprinkler protection ('no'). According to this classification process, the 'other' category fires shown in these tables were neither 'yes' or 'no' for smoke alarm nor for sprinkler protection. Where appropriate, 95% confidence intervals are included to show the estimated range around each rate and percentage.

Table 10. All BC residential structure fires (2020) by life safety system, showing number/percentage of fires, number/rate of injuries (with 95% confidence intervals, CI), number/rate of deaths (with 95% CI), fire department control (% 95% CI), and extended beyond room of origin (% 95% CI)

SMOKE ALARM	SPRINKLER	FIRES (% TOTAL)	INJURIES (% TOTAL)	INJURY RATE (95% CI)	DEATHS (% TOTAL)	DEATH RATE (95% CI)	% FIRE DEPARTMENT EXTINGUISH (95% CI)	% BEYOND ROOM OF ORIGIN (95% CI)
Yes	Yes	441 20%	20 15%	45.4 (25.5 65)	3 11%	6.8 (-0.9 14.5)	9.3% (7.9% 10%)	2.7% (1.9% 3.5%)
No	Yes	16 1%	0 0%	0.0 (0 0)	0 0%	0.0 (0 0)	31.3% (19.6% 42.8%)	0.0% (0 0)
Yes	No	550 25%	51 38%	92.7 (67 118)	6 22%	10.9 (2.1 19)	41.1% (38.9% 43%)	21.6% (19.9% 23%)
No	No	301 14%	13 10%	43.2 (19.7 66.6)	2 7%	6.6 (-2.5 15.8)	65.4% (62.7% 68.1%)	47.2% (44.2% 50%)
Other	Other	912 41%	50 37%	54.8 (39.6 70)	16 59%	17.5 (8.9 26)	43.3% (41.6% 44.9%)	28.6% (27% 30%)
TOTAL		2,220 100%	134 100%	60.4 (50 70)	27 100%	12.2 (7.6 16)	38.9% (37% 39%)	24.1% (23% 25%)

With a focus on the presence/absence of fire safety systems, relative to the base case (no smoke alarm and no sprinkler protection), the following trends can be seen in Table 10:

- Injury rates are significantly higher in the presence of a working smoke alarm and no sprinkler protection – likely because residents attempted to control the fires themselves when the alarms activated;
- Death rates are significantly lower whenever the fires occurred in the presence of sprinkler protection;
- The presence of smoke alarms and/or sprinkler protection significantly reduced the dependence on the fire department to control the fires; and
- The presence of smoke alarms and/or sprinkler protection significantly reduced the extent to which fires spread beyond the room of origin.



Fire casualties: 5-year trends

From 2016 to 2020 there were 968 fire-related injuries reported to the OFC. During the same time there was a total of 127 fire-related deaths reported. Table 11 shows the annual casualties (2016-2020) for all fires reported to the OFC. The average injury rate per 1,000 fires over this time period was 28.6 and the average death rate was 3.7. The injury rate for fire/police was 1.9 and there were no fatalities for first responders in this data.

Table 11. All fire casualties and police/fire casualties (2015-2020), showing number/%/rate of injuries, and number/%/rate of deaths

YEAR	# FIRES	ALL CASUALTIES						FIRE/POLICE			
		# INJURIES	% INJURIES	INJURY RATE	# DEATHS	% DEATHS	DEATH RATE	# INJURIES	INJURY RATE	# DEATHS	DEATH RATE
2016	6,259	185	19.1%	29.6	25	19.7%	4.0	11	1.8	0	0.0
2017	6,818	177	18.3%	26.0	26	20.5%	3.8	11	1.6	0	0.0
2018	6,742	204	21.1%	30.3	26	20.5%	3.9	20	3.0	0	0.0
2019	6,907	205	21.2%	29.7	27	21.3%	3.9	10	1.4	0	0.0
2020	7,161	180	18.6%	25.1	50	39.4%	7.0	12	1.7	0	0.0
TOTAL	33,887	968	100.0%	28.6	127	100.0%	3.7	64	1.9	0	0.0

Table 12 shows all injuries and police/fire injuries by injury seriousness for all fires reported to the OFC between 2016 and 2020. The average rate for minor injuries over this time was 13 per 1,000 fires, with corresponding rates of 9.0 for light injuries and 4.0 for serious injuries. The rates for fire/police injuries were lower and the rate of serious injuries for this group was 0.1 per 1,000 fires.

Table 12. All fire casualties and police/fire casualties (2015-2020) by injury seriousness, showing number/rate of minor, light, and serious injuries.

YEAR	# FIRES	ALL CASUALTIES						FIRE/POLICE					
		# MINOR INJURIES	RATE MINOR INJURIES	# LIGHT INJURIES	RATE LIGHT INJURIES	# SERIOUS INJURIES	RATE SERIOUS INJURIES	# MINOR INJURIES	RATE MINOR INJURIES	# LIGHT INJURIES	RATE LIGHT INJURIES	# SERIOUS INJURIES	RATE SERIOUS INJURIES
2016	6,259	82	13.1	76	12.1	27	4.3	9	1.4	1	0.2	1	0.2
2017	6,818	85	12.5	70	10.3	22	3.2	5	0.7	6	0.9	0	0.0
2018	6,742	97	14.4	79	11.7	28	4.2	12	1.8	7	1.0	1	0.1
2019	6,907	89	12.9	80	11.6	36	5.2	6	0.9	3	0.4	1	0.1
2020	7,161	82	11.5	75	10.5	23	3.2	5	0.7	7	1.0	0	0.0
TOTAL	33,887	435	12.8	305	9.0	136	4.0	37	1.1	24	0.7	3	0.1

NB. 'Minor' injuries required less than one day in hospital or off work, 'light' injuries required 1-2 days hospital and/or 1-15 days off work, and 'serious' injuries required 3 or more days in hospital and/or more than 15 days off work.

Table 13 shows the relative frequency of fire casualties by age group for all fires reports submitted to the OFC between 2016 and 2020. 47% of injuries and 20% of deaths were classified as 'missing' the age information, this table also corrects the percentages within each age group to remove the influence of unknowns. These percentages are then compared (for deaths) to the overall population size of each age group in Canada, using Census data. This shows that citizens who are aged 50 and over are overrepresented with respect to frequency of death by fire. All fire casualties (2016-2020) by age group, showing number/rate of injuries/deaths, correcting for 'unknown' ages, and in comparison, to the population size of each age group

Table 13. All fire casualties (2015-2020) by age group, showing number/rate of injuries/deaths, correcting for 'unknown' ages, and in comparison, to the population size of each age group.

AGE GROUP	ALL FIRES				CORRECTED (REMOVING UNKNOWN)		% POPULATION	DEATH: POPULATION RATIO
	# INJURIES	% INJURIES	# DEATHS	% DEATHS	% INJURIES	% DEATHS		
Under 5	3	1.7%	0	0.0%	3.1%	0.0%	4.7%	0.0
5 to 9	3	1.7%	0	0.0%	3.1%	0.0%	5.1%	0.0
10 to 14	0	0.0%	0	0.0%	0.0%	0.0%	5.0%	0.0
15 to 19	3	1.7%	0	0.0%	3.1%	0.0%	5.6%	0.0
20 to 24	6	3.3%	2	4.0%	6.3%	5.0%	6.2%	0.8
25 to 29	7	3.9%	1	2.0%	7.3%	2.5%	6.5%	0.4
30 to 34	13	7.2%	1	2.0%	13.5%	2.5%	6.8%	0.4
35 to 39	9	5.0%	5	10.0%	9.4%	12.5%	6.3%	2.0
40 to 44	13	7.2%	2	4.0%	13.5%	5.0%	6.3%	0.8
45 to 49	5	2.8%	1	2.0%	5.2%	2.5%	6.9%	0.4
50 to 54	8	4.4%	1	2.0%	8.3%	2.5%	7.6%	0.3
55 to 59	10	5.6%	4	8.0%	10.4%	10.0%	7.6%	1.3
60 to 64	2	1.1%	4	8.0%	2.1%	10.0%	7.0%	1.4
65 to 69	5	2.8%	5	10.0%	5.2%	12.5%	6.2%	2.0
70 to 74	3	1.7%	4	8.0%	3.1%	10.0%	4.3%	2.3
75 to 79	1	0.6%	2	4.0%	1.0%	5.0%	3.1%	1.6
80 and over	5	2.8%	8	16.0%	5.2%	20.0%	4.6%	4.3
Unknown	84	46.7%	10	20.0%				
TOTAL	968	100.0%	127	100.0%				

NB. Population estimates derived from the 2016 Census Profile, accessed at: <https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/index-eng.cfm>



Fire-related casualties: 2020 casualty behaviour

Focusing on the fires detailed in the residential use structure fires tables, the following tables details the information recorded about the fire-related casualties resulting from structure fires reported to the OFC in 2020 (resulting in 180 injuries and 50 deaths).

Table 14 shows the conditions of casualties from 2020 residential use structure fires. Almost one-fifth of injuries (19%) were unknown/unclassified and 47% were awake with no impairment at the time of injury. Almost half (47%) of deaths were unknown/unclassified and one-quarter (24%) were asleep at the time of the fire.

Table 14. All structure fire casualties (2020) by condition of casualty, showing number/% of injuries/deaths

CONDITION OF CASUALTY	# INJURIES	% INJURIES	# DEATHS	% DEATHS
Awake with no physical/mental impairment	84	46.7%	9	11.8%
Too young to react to fire emergency	0	0.0%	0	0.0%
Asleep at time of fire	46	25.6%	6	23.5%
Bedridden or other physical disability	1	0.6%	2	0.0%
Mental disability	1	0.6%	0	5.9%
Impairment by alcohol, drugs, or medication	13	7.2%	6	11.8%
Under restraint or detention	0	0.0%	0	0.0%
Unknown	19	10.6%	22	41.2%
Unclassified	16	8.9%	5	5.9%
TOTAL	180	100.0%	50	100.0%

Table 15 shows the actions of casualties from 2020 residential structure fires. Over one-fifth of injuries (22%) were unknown/unclassified, and 27% voluntarily entered/remained in the fire area, and 8% were injured while attempting to escape. One-fifth of deaths (20%) were unknown/unclassified and 64% died attempting to escape.

Table 15. All structure fire casualties (2020) by action of casualty, showing number/% of injuries/deaths.

ACTION OF CASUALTY	# INJURIES	% INJURIES	# DEATHS	% DEATHS
Injured while attempting to escape	15	8.3%	32	64.0%
Over-exertion, heart attack	51	28.3%	4	8.0%
Voluntarily entered/remained – rescue	0	0.0%	1	2.0%
Voluntarily entered/remained – fire fighting	7	3.9%	0	0.0%
Voluntarily entered/remained – save property	42	23.3%	0	0.0%
Loss of judgment/panic	8	4.4%	0	0.0%
Received delayed warning	13	7.2%	2	4.0%
Did not act	4	2.2%	1	2.0%
Unknown	14	7.8%	3	6.0%
Unclassified	26	14.4%	7	14.0%
TOTAL	180	100.0%	50	100.0%

Table 16 shows the cause of injuries from 2020 residential structure fires. One third (30%) of deaths resulted from smoke inhalation and 30% resulted from burns. Just under one third (30%) of deaths were unknown/unclassified

Table 16. All structure fire casualties (2020) by cause of injury, showing number/% of injuries/deaths.

CAUSE OF INJURY	# INJURIES	% INJURIES	# DEATHS	% DEATHS
Smoke inhalation	64	35.6%	15	30.0%
Burns – fire/flames	65	36.1%	15	30.0%
Burns – hot substances	21	11.7%	0	0.0%
Struck by objects/persons	3	1.7%	1	2.0%
Falls	8	4.4%	0	0.0%
Explosives	3	1.7%	1	2.0%
Electrical current	4	2.2%	0	0.0%
Unknown	8	4.4%	3	6.0%
Unclassified	4	2.2%	15	30.0%
TOTAL	180	100.0%	50	100.0%

Table 17 shows the cause of failure to escape from 2020 residential structure fires. Almost 80% of injuries and 66% of deaths were classified as unknown/unclassified with respect to the cause of failure to escape. A further 26% of deaths were classified as trapped by fire/smoke.

Table 17. All structure fire casualties (2020) by cause of failure to escape, showing number/% of injuries/deaths.

CAUSE OF FAILURE TO ESCAPE	# INJURIES	% INJURIES	# DEATHS	% DEATHS
Trapped by fire/smoke – vertical openings	6	3.3%	2	4.0%
Trapped by fire/smoke – horizontal openings	6	3.3%	11	22.0%
High flame spread of combustible surfaces	5	2.8%	0	0.0%
Building collapse	0	0.0%	0	0.0%
Falling debris	1	0.6%	0	0.0%
Explosion	10	5.6%	2	4.0%
Exit locked/obstructed	2	1.1%	2	4.0%
Outdoor fire	8	4.4%	0	0.0%
Unknown	69	38.3%	25	50.0%
Unclassified	73	40.6%	8	16.0%
TOTAL	180	100.0%	50	100.0%



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