

BRITISH COLUMBIA

Office of the Fire Commissioner

Annual Report
2021



Office of the
Fire Commissioner
Emergency Management BC





Enhancing Fire Safety in BC Office of the Fire Commissioner 2021 Annual Report

HONOURABLE MIKE FARNWORTH

Minister of Public Safety and Solicitor General
PO Box 9010 Stn Prov Govt
Victoria BC V8W 9E2

DEAR MINISTER,

I am pleased to submit for your review the 2021 Annual Report of the Office of the Fire Commissioner (OFC) for the year ending December 31, 2021.

The OFC's mandate is to minimize the loss of life, injury, and damage to property from fire by administering and enforcing British Columbia's fire safety legislation. The OFC leads provincial fire prevention and fire reporting programs, promotes fire safety awareness, and establishes minimum training standards for fire services personnel. The OFC also provides structure fire expertise and coordinates fire services during emergencies.

OFC HIGHLIGHTS

Over the past year, the OFC focussed on progressing its mandate in the following areas:

Organizational Effectiveness—Five new Fire Service Advisor (FSA) positions were created to increase support to community fire services across the province. FSA responsibilities include providing expert advice, guidance, and support for fire investigations, inspection best practices, fire incident reporting, training, and the administration of the Fire Services Act and the British Columbia Fire Code, including enforcement through provincial fire orders, if necessary.

Fire Services Training Support—The OFC is collaborating with its partners to finalize the British Columbia Structure Firefighter Minimum Training Standards. The manual, policy, and curriculum are essential to ensure the skill and safety of firefighters in the field and will be implemented in 2022/2023.



Fire Reporting and Data—Significant work has been done to increase fire reporting compliance by fire departments, which is a legal requirement under the Fire Services Act. This work includes direct, firsthand support to fire departments, raising awareness regarding the importance of reliable and consistent data, and technological improvements to FIRES. Last year, one hundred percent of fire deaths were reported.

Public Education and Engagement—There are four key annual opportunities the OFC leads or supports to increase awareness of fire prevention and life safety: Fire Prevention Week, Burn Awareness Week, Emergency Preparedness Week, and Carbon Monoxide Awareness Week. These campaigns, along with building new partnerships and strengthening existing ones, creating social media messages, developing education resources, collaborating on other awareness campaigns, participating in media interviews, and completing education program updates, are key to teaching people how to take steps to keep themselves safe and raising the OFC's profile as a leader in fire safety. Planning is underway on how best to reach historically under-served people, including Indigenous communities and Elders and seniors.

Partnership Development—In addition to ongoing engagement with fire service partners and government ministries and agencies, the OFC has partnered with the Canadian Centre for Justice and Community Safety Statistics at Statistics Canada to develop a series of data-analytic tools. Fire data will be mapped with associated risk factors, community fire rates, deaths, injuries, and smoke alarm function at the time of a fire. This data will be made available to community fire services throughout the province to focus on specific areas of fire prevention. This work should be complete in summer 2022.

The OFC has an interagency agreement with the BC Wildfire Service and the Fire Chiefs' Association of BC and will continue to work with those organizations to ensure a safe, efficient, and coordinated response to wildland urban interface fire incidents.

In addition, the OFC is working with the Cross-Ministry Encampment Working Group to enhance fire safety and prevention in encampments of people experiencing homelessness.

The OFC continues to position itself to effectively support, coordinate, and work with community fire services and provincial agencies on an ongoing basis and during emergency incidents and extreme events.



2021 FIRE STATISTICS AND TRENDS

In October 2021, Statistics Canada reported that the Canadian death rate rose to 6.3 percent above what would have been expected based on March 2021 statistics, a year prior to the COVID-19 pandemic. From August 2021 to October 2021, British Columbia deaths increased 21.7 percent. The increase was due to COVID-19, opioid poisonings, extreme heat events (heat domes), and fires.

Between 2019 and 2021, fire-related deaths in British Columbia rose from 27 to 56—a 107 percent increase. In 2021, there were 59 additional fire-related deaths—a five percent increase from the previous year. Over the last two reporting years, there has been a **119 PERCENT INCREASE IN FIRE-RELATED DEATHS**.

This is a national trend and has prompted the Council of Canadian Fire Marshals and Fire Commissioners to partner with Statistics Canada to investigate the Canadian Coroner and Medical Examiner Database (CCMED) to better understand the circumstances of fire-related deaths and inform provincial and national prevention programs.

In British Columbia, most fire-related deaths and injuries occur in people's homes. During the pandemic, the number of fire-related deaths continued to increase. It is imperative that fire services continue to increase public education efforts, particularly home fire safety programs for the youth and the elderly, which according to data are most at risk. The most frequent causes of these residential structure fires were cooking equipment (664 fires, 39 injuries, and three deaths) and smoker's materials and open flames (653 fires, 44 injuries, and eight deaths). Working smoke alarms remain the most effective measure for preventing fire injuries and death.

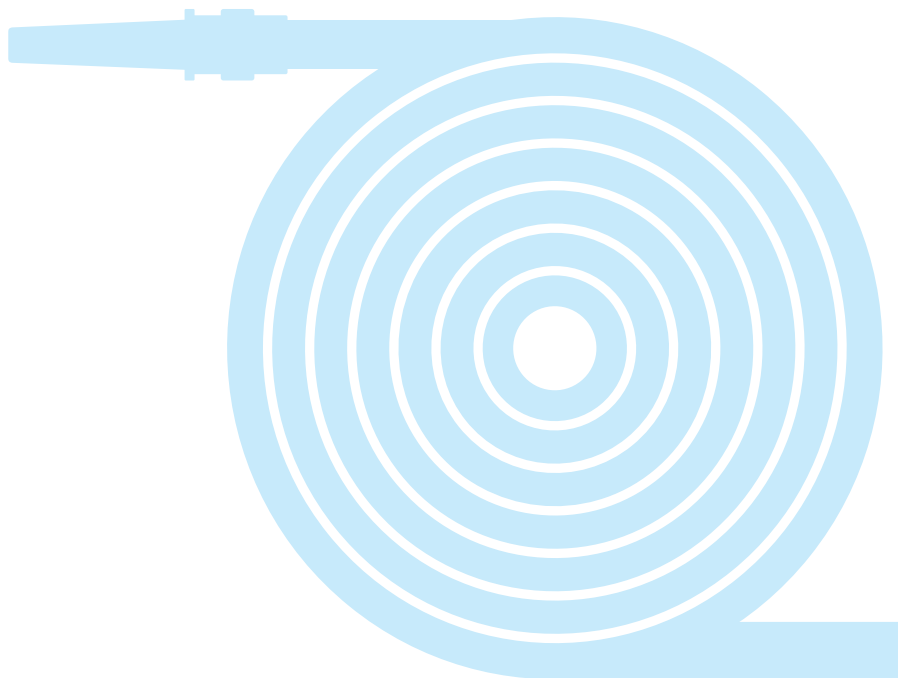


The tables in this report include the statistics that will guide the OFC's work in 2022 and beyond.

The conditions in 2021 will likely continue in 2022. COVID-19 continues to be present in communities, climate change will be an ongoing challenge with heat domes and extreme wildfire events, the opioid crisis has not diminished, and the provincial population continues to increase.

The OFC plays a critical role in the province's public safety system, and we remain committed to working towards strategic and operational excellence in all aspects of our diverse service delivery mandate.

Brian Godlonton
Fire Commissioner





Executive Summary

This Annual Report includes statistics for fires reported to the Office of the Fire Commissioner (OFC) by fire services across the province in 2021. The following data and tables comprise data collected and collated from daily fires system reporting.

NUMBER OF FIRES AND DISTRIBUTION

In 2021, there were 9,166 fires resulting in 180 injuries and 59 deaths. Of these:

- **4,384** (48 percent) were outdoor fires (19 injuries and no deaths)
- **3,504** (38 percent) were structure fires (125 injuries and 36 deaths)
- **1,255** (14 percent) were vehicle fires (23 injuries and 15 deaths)
- **23** (0.03 percent) were person fires (13 injuries and eight deaths) and

Of those 9,166 fires:

- **57.8** percent were from the Lower Mainland region
- **12.5** percent were from Vancouver Island region
- **16.5** percent were from Thompson Okanagan region
- **8** percent were from Northern BC region
- **3.7** percent were from the South East region
- **1.7** percent were from other agencies acting on behalf of the Office of the Fire Commissioner

STRUCTURE FIRE INJURIES, DEATHS, AND CAUSES

Of all reported fires, structure fires resulted in the greatest number of injuries and deaths. Most structure fires were places of residence.

There were 2,751 residential structure fires (79 percent of structure fires). Of those, there were 118 injuries, and 36 deaths. The most frequent causes of these residential structure fires were cooking equipment (664 fires, 39 injuries, and three deaths) and smoker's materials and open flames (653 fires, 44 injuries, and 8 deaths).

FIRE SAFETY SYSTEM EFFECTIVENESS

Fire safety system effectiveness was evaluated based on the presence or absence of fire safety systems such as smoke alarms and sprinkler systems:

- Injury rates were significantly higher in structures with a working smoke alarm and no sprinkler protection than without working smoke alarms. This is likely because residents attempted to control the fires themselves when the alarms were activated. However, death rates 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 structures with sprinkler protection.

- The presence of smoke alarms and/or sprinkler protection significantly reduced dependence on the fire department to control the fires.
- The presence of smoke alarms and/or sprinkler protection significantly reduced the extent to which fires spread beyond the room of origin.

As shown in the data tables, a working smoke alarm and sprinkler systems create the greatest opportunity for surviving a fire.

FIRE DEMOGRAPHICS

Over the last five years people over the age of 65 were over-represented (30 percent higher than other age categories) in fire deaths. Those over 80 years of age comprised 12 percent of this group. This is particularly significant given that BC Stats (2011) predicts the 65-and-over age group will comprise 23.7 percent of the population by 2036, compared with 15 percent in 2010. Those 80 years of age and over will nearly double to 7.4 percent from 4.2 percent.

FIRE PREVENTION AND EDUCATION

It is evident from the 2021 fire data and the current fire death trends in British Columbia that fire services need to increase community awareness about fire risk and prevention.

Working smoke alarms could reduce the risk of fire deaths by 50 percent. In 2021, only 42 percent of reported residential structure fires had a working smoke alarm

and 11 percent had no smoke alarm. This indicates a significant public safety opportunity for the fire service to increase fire prevention education campaigns with an emphasis on working smoke alarms.

2022 CHANGES AND ONGOING COMMITMENTS

In 2022, consistent with the theme of continuous improvement, the OFC will continue to build its capacity to effectively deliver its mandate:

- Its organizational effectiveness will be improved with the addition of a new deputy fire commissioner.
- The vacant FSA positions will be filled and program improvements resulting from an internal review will have been actioned.
- The FSAs will provide ongoing guidance and support to fire services in their regions, the minimum training standards will be in process, and we will look for opportunities to build new and strengthen existing relationships with fire services partners.
- There will be an increase in fire reporting, based on current trends, which will support our commitment to evidence-based decision-making.
- The OFC will also dedicate significant effort toward public education and fire prevention, including its social media presence.

2022 will likely be another challenging year and the OFC will continue to work with its partners and seek opportunities for improving fire safety across the province.

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DISCLAIMER: This report is based on data entered in to FIRES as of February 15, 2022. Data in FIRES is "live". As a result, the outcome of any additional data analysis after February 15, 2022 may differ with that in this report.

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BC Fires in 2021

In 2021, 9,166 fires were reported to the OFC, including a reported 180 injuries and 59 deaths.

REPORTING ENTITIES

► **TABLE 1** shows that structure fires and outdoor fires accounted for 86 percent of the total fire events, with vehicle fires accounting for a further 14 percent. Career fire departments (52 percent) and composite departments (38 percent) reported the bulk of the total fire events. There were 20 injuries and six deaths per 1,000 fires in 2021.

Table 1. All BC fires (2021) 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	2021 TOTAL	% FIRES	# INJURIES	INJURY RATE PER 1,000 FIRES	# DEATHS	DEATH RATE PER 1,000 FIRES
CAREER	All fires	4,741	51.7%	90	19.0	12	2.5
	Structure fire	1,606	17.5%	68	42.3	7	4.4
	Vehicle fire	341	3.7%	7	20.5	2	5.9
	Outdoor fire	2,782	30.4%	9	3.2	0	0.0
	Person fire	12	0.1%	6	500.0	3	250.0
COMPOSITE	All fires	3,494	38.1%	72	20.6	22	6.3
	Structure fire	1,316	14.4%	48	36.5	15	11.4
	Vehicle fire	705	7.7%	12	17.0	3	4.3
	Outdoor fire	1,466	16.0%	10	6.8	0	0.0
	Person fire	7	0.1%	2	285.7	4	571.4
VOLUNTEER	All fires	721	7.9%	14	19.4	17	23.6
	Structure fire	455	5.0%	8	17.6	11	24.2
	Vehicle fire	144	1.6%	1	6.9	6	41.7
	Outdoor fire	119	1.3%	0	0.0	0	0.0
	Person fire	3	0.0%	5	Undefined	0	Undefined
OTHER	All fires	210	2.3%	4	19.0	8	38.1
	Structure fire	127	1.4%	1	7.9	3	23.6
	Vehicle fire	65	0.7%	3	46.2	4	61.5
	Outdoor fire	17	0.2%	0	0.0	0	0.0
	Person fire	1	0.0%	0	Undefined	1	Undefined
TOTAL	All fires	9,166	100.0%	180	19.6	59	6.4
	Structure fire	3,504	38.2%	125	35.7	36	10.3
	Vehicle fire	1,255	13.7%	23	18.3	15	12.0
	Outdoor fire	4,384	47.8%	19	4.3	0	0.0
	Person fire	23	0.3%	13	565.2	8	347.8

➤ **TABLE 2** shows just under 60 percent of 2021 fire reports originated from the Lower Mainland (accounting for 120 injuries and 20 deaths).

Table 2. All BC fires (2021) by region.

FIRE BY REGION	2021 TOTAL	% FIRES	# INJURIES	INJURY RATE PER 1,000 FIRES	# DEATHS	DEATH RATE PER 1,000 FIRES
Lower Mainland	5,294	57.8%	120	22.7	20	3.8
Vancouver Island	1,144	12.5%	18	15.7	11	9.6
Thompson Okanagan	1,508	16.5%	22	14.6	14	9.3
South East	335	3.7%	9	26.9	2	6.0
Northern	732	8.0%	7	9.6	2	2.7
Regional districts and other associations	153	1.7%	4	26.1	10	65.4
TOTAL	9,166	100.0%	180	19.6	59	6.4

9,166 fires were reported to the OFC in 2021.
Of the total fire events in BC:





METHOD OF FIRE CONTROL

► **TABLE 3** shows fire departments controlled 46 percent of fires through water application (40 percent of these events requiring one hand line or less), handheld extinguishers (20 percent), and makeshift firefighting aids (11 percent). Fifteen percent of fires burned out without intervention.

Table 3. All BC fires (2021) by method of fire control.

METHOD OF FIRE CONTROL (GROUPED)	METHOD OF FIRE CONTROL SUB-CATEGORIES (FIRE DEPARTMENT INVOLVEMENT ONLY)	2021 TOTAL	% FIRES	# INJURIES	INJURY RATE PER 1,000 FIRES	# DEATHS	DEATH RATE PER 1,000 FIRES
Hand held extinguisher		1,786	19.5%	30	16.8	2	1.1
Standpipe and hose systems		123	1.3%	3	24.4	1	8.1
Makeshift fire fighting aids		962	10.5%	22	22.9	1	1.0
Fire Department – water application	All fires	4,212	46.0%	85	20.2	41	9.7
	25mm (1") or less hose	323	3.5%	1	3.1	0	0.0
	38mm or 42mm (1 1/2" or 1 3/4") hose – 1 hand line	2,503	27.3%	45	18.0	11	4.4
	65mm or 70mm (2 1/2" or 3") hose – 1 hand line	853	9.3%	26	30.5	24	28.1
	38mm or 42mm (1 1/2" or 1 3/4") hose – 2 or more hand lines	46	0.5%	2	43.5	0	0.0
	65mm or 70mm (2 1/2" or 3") hose – 2 or more hand lines	76	0.8%	0	0.0	1	13.2
	Combinations of 38/42mm, 65mm, 77mm, or larger hand lines	151	1.6%	8	53.0	2	13.2
	Portable/fixed water deluge/master stream set	68	0.7%	0	0.0	2	29.4
	Unclassified	192	2.1%	3	15.6	1	5.2
Fire Department – other than water	All fires	159	1.7%	3	18.9	2	12.6
	Dry chemical – under 450kg	3	0.0%	0	0.0	0	0.0
	Dry chemical – 450kg and over	0	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	55	0.6%	3	54.5	0	0.0
	Crash-fire foam vehicle – using hand lines	13	0.1%	0	0.0	0	0.0
	Crash-fire foam vehicle – using monitor	0	0.0%	0	0.0	0	0.0
	Pumper – foam hand lines only, via educator/injector	31	0.3%	0	0.0	1	32.3
	Unclassified	56	0.6%	0	0.0	1	17.9
Sprinkler protection		161	1.8%	6	37.3	0	0.0
Fixed system other than sprinklers		55	0.6%	2	36.4	0	0.0
Burned out		1,386	15.1%	25	18.0	11	7.9
Miscellaneous method of fire control/extinguishment		223	2.4%	3	13.5	0	0.0
Cannot be determined		99	1.1%	1	10.1	1	10.1
TOTAL		9,166	100.0%	180	19.6	59	6.4



STRUCTURE FIRES BY PROPERTY COMPLEX TYPE

► **TABLE 4** shows the properties involved with the 3,504 structure fires reported in 2021 accounting for 125 (69 percent) injuries and 36 (61 percent) deaths. Residential use structure fires contributed 79 percent to this group of fires and resulted in 94 percent of injuries and 100 percent of deaths.

Table 4. All BC structure fires (2021) by property complex.

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>	145	4.1%	1	0.8%	6.9	0	0.0%	0.0
	Amusement park, exhibition & fair ground, stadium	1	0.0%	0	0.0%	0.0	0	0.0%	0.0
	Auditorium, theatre, arena, cultural centre	13	0.4%	1	0.8%	76.9	0	0.0%	0.0
	Church, funeral home	18	0.5%	0	0.0%	0.0	0	0.0%	0.0
	Educational institution (non-residential)	32	0.9%	0	0.0%	0.0	0	0.0%	0.0
	Food or beverage establishment	62	1.8%	0	0.0%	0.0	0	0.0%	0.0
	Recreation, sports facility, sports club, social club	19	0.5%	0	0.0%	0.0	0	0.0%	0.0
INSTITUTIONAL USE	<i>(Total for whole group)</i>	30	0.9%	0	0.0%	0.0	0	0.0%	0.0
	Hospital, medical centre, clinic, sanatorium	15	0.4%	0	0.0%	0.0	0	0.0%	0.0
	Licensed care facility	14	0.4%	0	0.0%	0.0	0	0.0%	0.0
	Prison, penitentiary, jail, detention centre, correctional facility, reformatory	1	0.0%	0	0.0%	0.0	0	0.0%	0.0
RESIDENTIAL USE	<i>(Total for whole group)</i>	2,751	78.5%	118	94.4%	42.9	36	100.0%	13.1
	Camp site/RV park	16	0.5%	2	1.6%	125.0	0	0.0%	0.0
	Educational institution (residential)	5	0.1%	0	0.0%	0.0	0	0.0%	0.0
	Hotel, motel, lodge, hostel, boarding house, dormitory	278	7.9%	16	12.8%	57.6	1	2.8%	3.6
	Residential – row, garden, town housing, condominium	229	6.5%	6	4.8%	26.2	1	2.8%	4.4
	Residential - single detached	1,393	39.8%	57	45.6%	40.9	23	63.9%	16.5
	Residential - apartment	605	17.3%	22	17.6%	36.4	4	11.1%	6.6
	Residential - duplex, 3-plex, 4-plex	105	3.0%	7	5.6%	66.7	1	2.8%	9.5
	Residential - mobile home/trailer park	95	2.7%	4	3.2%	42.1	4	11.1%	42.1
	Residential - with business/mercantile, up to 3 storeys	25	0.7%	4	3.2%	160.0	2	5.6%	80.0
BUSINESS USE	Office building	62	1.8%	0	0.0%	0.0	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>	155	4.4%	1	0.8%	6.5	0	0.0%	0.0
	Commercial centre including fuel dispensing (may include restaurant, stores, etc.)	38	1.1%	0	0.0%	0.0	0	0.0%	0.0
	Commercial centre, shopping centre, strip mall	82	2.3%	1	0.8%	12.2	0	0.0%	0.0
	Department store, variety store	25	0.7%	0	0.0%	0.0	0	0.0%	0.0
	Service station with storage in back lot (includes fuel dispensing)	6	0.2%	0	0.0%	0.0	0	0.0%	0.0
	Strip mall including fuel dispensing	4	0.1%	0	0.0%	0.0	0	0.0%	0.0
MANUFACTURING USE	Industrial manufacturing	93	2.7%	3	2.4%	32.3	0	0.0%	0.0
STORAGE USE	<i>(Total for whole group)</i>	13	0.4%	1	0.8%	76.9	0	0.0%	0.0
	Grain elevator	4	0.1%	1	0.8%	250.0	0	0.0%	0.0
	Industrial storage facility, bulk storage tanks	9	0.3%	0	0.0%	0.0	0	0.0%	0.0
OTHER SPECIAL USE	<i>(Total for whole group)</i>	244	7.0%	1	0.8%	4.1	0	0.0%	0.0
	Air transportation use, air terminal, airport	1	0.0%	0	0.0%	0.0	0	0.0%	0.0
	Building/structure unclassified (describe)	138	3.9%	1	0.8%	7.2	0	0.0%	0.0
	Car park	17	0.5%	0	0.0%	0.0	0	0.0%	0.0
	Communications	1	0.0%	0	0.0%	0.0	0	0.0%	0.0
	Farm or agricultural use	44	1.3%	0	0.0%	0.0	0	0.0%	0.0
	Harbour, waterfront property, marine terminal	2	0.1%	0	0.0%	0.0	0	0.0%	0.0
	Laboratory	2	0.1%	0	0.0%	0.0	0	0.0%	0.0
	Parks (federal, provincial or city) (includes historic sites)	19	0.5%	0	0.0%	0.0	0	0.0%	0.0
	Railway terminal, yard (excludes subway)	1	0.0%	0	0.0%	0.0	0	0.0%	0.0
	Utility	19	0.5%	0	0.0%	0.0	0	0.0%	0.0
UNKNOWN	Cannot be determined	11	0.3%	0	0.0%	0.0	0	0.0%	0.0
TOTAL		3,504	100.0%	125	100.0%	35.7	36	100.0%	10.3



79% of all structure fires in 2021
were **residential structures** and
lead to **94%** of injuries and **100%**
of all structure fire related deaths.



RESIDENTIAL STRUCTURE FIRES

► **TABLE 5** shows the room of fire origin for the 2,751 residential¹ use structure fires reported in 2021 (resulting in 118 injuries and 36 deaths). Kitchens accounted for one-quarter of fires (30 percent of injuries with five deaths), bedrooms accounted for a further 13 percent of fires (22 percent of injuries and 22 percent of the deaths), and living rooms resulted in seven percent of fires (17 percent of injuries and 31 percent of deaths).

Table 5. All BC residential structure fires (2021) by room of fire origin.

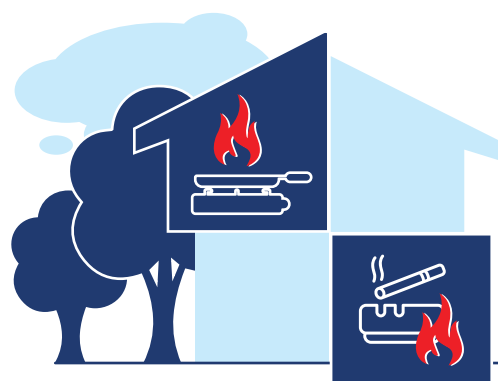
ROOM OF ORIGIN GROUPED	# FIRES	% FIRES	# INJURED	% INJURIES	INJURY RATE PER 1,000 FIRES	# DEATHS	% DEATHS	DEATH RATE PER 1,000 FIRES	# EXTENDED BEYOND ROOM OF ORIGIN	% EXTENDED BEYOND ROOM OF ORIGIN
Bathroom	52	1.9%	8	6.8%	153.8	0	0.0%	0.0	11	21.2%
Bedroom	368	13.4%	26	22.0%	70.7	8	22.2%	21.7	49	13.3%
Office	6	0.2%	0	0.0%	0.0	0	0.0%	0.0	1	16.7%
Closet	4	0.1%	1	0.8%	250.0	1	2.8%	250.0	1	25.0%
Assembly area – other	20	0.7%	2	1.7%	100.0	0	0.0%	0.0	8	40.0%
Laundry room	60	2.2%	0	0.0%	0.0	0	0.0%	0.0	5	8.3%
Hallways and means of egress	76	2.8%	3	2.5%	39.5	1	2.8%	13.2	11	14.5%
Living room	185	6.7%	20	16.9%	108.1	11	30.6%	59.5	54	29.2%
Function area – unclassified	7	0.3%	0	0.0%	0.0	0	0.0%	0.0	3	42.9%
Foyer	16	0.6%	0	0.0%	0.0	0	0.0%	0.0	5	31.3%
Kitchen	672	24.4%	35	29.7%	52.1	5	13.9%	7.4	35	5.2%
Dining area	13	0.5%	1	0.8%	76.9	0	0.0%	0.0	1	7.7%
Porch	109	4.0%	6	5.1%	55.0	0	0.0%	0.0	28	25.7%
Balcony	83	3.0%	3	2.5%	36.1	1	2.8%	12.0	30	36.1%
Storage area	43	1.6%	0	0.0%	0.0	0	0.0%	0.0	20	46.5%
Garage	109	4.0%	4	3.4%	36.7	0	0.0%	0.0	43	39.4%
Outside area – other	255	9.3%	1	0.8%	3.9	2	5.6%	7.8	204	80.0%
Utility and equipment and furnace room	65	2.4%	0	0.0%	0.0	0	0.0%	0.0	12	18.5%
Trash area	29	1.1%	0	0.0%	0.0	0	0.0%	0.0	7	24.1%
Chimney, flue pipe, gas vent	54	2.0%	0	0.0%	0.0	0	0.0%	0.0	9	16.7%
Service facilities	1	0.0%	0	0.0%	0.0	0	0.0%	0.0	0	0.0%
Crawl space	10	0.4%	0	0.0%	0.0	0	0.0%	0.0	5	50.0%
Structural area – other	400	14.5%	3	2.5%	7.5	4	11.1%	10.0	280	70.0%
All other areas	114	4.1%	5	4.2%	43.9	3	8.3%	26.3	87	76.3%
TOTAL	2,751	100.0%	118	100.0%	42.9	36	100.0%	13.1	909	33.0%

¹ PC3100-PC3900 throughout the report when referring to residential-use structure fires.

► **TABLE 6** shows the source of ignition for residential structure fires reported in 2021. Nearly one-quarter (24 percent) of fires were caused by cooking equipment (33 percent of injuries and three deaths), another 24 percent resulted from smoker's material and open flames (37 percent injuries and 22 percent deaths, with source of ignition shown in the table), and in 15 percent of cases the source of ignition could not be determined.

Table 6. All BC residential structure fires (2021) by source of ignition.

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		664	24.1%	39	33.1%	58.7	3	8.3%	4.5
Heating equipment		185	6.7%	6	5.1%	32.4	3	8.3%	16.2
Appliances & equipment		106	3.9%	3	2.5%	28.3	1	2.8%	9.4
Electrical distribution equipment		172	6.3%	7	5.9%	40.7	3	8.3%	17.4
Other electrical equipment		72	2.6%	3	2.5%	41.7	0	0.0%	0.0
Smoker's material and open flame	(Total for whole group)	653	23.7%	44	37.3%	67.4	8	22.2%	12.3
	Cigarette, pipe, or cigar	180	6.5%	7	5.9%	38.9	4	11.1%	22.2
	Ashtray	17	0.6%	1	0.8%	58.8	0	0.0%	0.0
	Lighter or match	229	8.3%	13	11.0%	56.8	2	5.6%	8.7
	Lamp/lantern – non-electric	0	0.0%	0	0.0%	0.0	0	0.0%	0.0
	Candle	64	2.3%	13	11.0%	203.1	0	0.0%	0.0
	Cutting torch/welding equipment	5	0.2%	1	0.8%	200.0	0	0.0%	0.0
	Hot ashes/embers (non-smoking)	20	0.7%	0	0.0%	0.0	1	2.8%	50.0
	Torch (non-cutting/welding)	38	1.4%	2	1.7%	52.6	0	0.0%	0.0
	Unclassified/cannot be determined	100	3.6%	7	5.9%	70.0	1	2.8%	10.0
Exposure		429	15.6%	0	0.0%	0.0	2	5.6%	4.7
Miscellaneous igniting object		61	2.2%	0	0.0%	0.0	1	2.8%	16.4
Cannot be determined		409	14.9%	16	13.6%	39.1	15	41.7%	36.7
TOTAL		2,751	100.0%	118	100.0%	42.9	36	100.0%	13.1



Nearly one-quarter **(24%)** of fires were caused by **cooking equipment**.

An additional **24%** resulted from **smoker's materials** and **open flames**.

➤ **TABLE 7** shows human failing was responsible for 38 percent of fires resulting in 57 percent of injuries and 28 percent of deaths. Other major acts/omissions were misuse of equipment (14 percent of fires, one percent of injuries, and three percent of deaths) and incendiary fires (nine percent fires, nine percent injuries, and four deaths). The act or omission involved could not be determined in 16 percent of fires.

Table 7. All BC residential structure fires (2021) 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	251	9.1%	11	9.3%	43.8	4	11.1%	15.9
Misuse of source of ignition	183	6.7%	9	7.6%	49.2	1	2.8%	5.5
Misuse of material ignited	101	3.7%	8	6.8%	79.2	3	8.3%	29.7
Mechanical/electrical failure/malfunction	287	10.4%	9	7.6%	31.4	3	8.3%	10.5
Construction, design, or installation deficiency	42	1.5%	1	0.8%	23.8	0	0.0%	0.0
Misuse of equipment	384	14.0%	1	0.8%	2.6	1	2.8%	2.6
Human failing	1,039	37.8%	67	56.8%	64.5	10	27.8%	9.6
Vehicle accident	2	0.1%	0	0.0%	0.0	0	0.0%	0.0
Miscellaneous act or omission	9	0.3%	1	0.8%	111.1	2	5.6%	222.2
Cannot be determined	434	15.8%	11	9.3%	25.3	12	33.3%	27.6
Not applicable	19	0.7%	0	0.0%	0.0	0	0.0%	0.0
TOTAL	2,751	100.0%	118	100.0%	42.9	36	100.0%	13.1

➤ **TABLE 8** shows that just over one third (39 percent) of fires originated on the ground floor of the building (47 percent injuries and 50 percent deaths) and a further 16 percent commenced on the second storey (22 percent injuries and 11 percent deaths).

Table 8. All BC residential structure fires (2021) by level of fire origin.

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	203	7.4%	12	10.2%	59.1	6	16.7%	29.6
Ground floor, grade level or grade to 3m	1,076	39.1%	55	46.6%	51.1	18	50.0%	16.7
Second storey or over 3m to 6m above grade	451	16.4%	26	22.0%	57.6	4	11.1%	8.9
3rd Storey or over 6m to 9m (20ft to 30ft) above grade	183	6.7%	14	11.9%	76.5	2	5.6%	10.9
4th to 12th storey (inclusive) or over 9m to 36m (30ft to 120ft) above grade	240	8.7%	10	8.5%	41.7	3	8.3%	12.5
Over 12 Storey or over 36m (120ft)	26	0.9%	1	0.8%	38.5	0	0.0%	0.0
Crawl space, under structure	16	0.6%	0	0.0%	0.0	0	0.0%	0.0
Mezzanine (any floor)	3	0.1%	0	0.0%	0.0	0	0.0%	0.0
Roof level (includes concealed roof space, attic)	73	2.7%	0	0.0%	0.0	0	0.0%	0.0
Exposure fire	433	15.7%	0	0.0%	0.0	2	5.6%	4.6
Cannot be determined	47	1.7%	0	0.0%	0.0	1	2.8%	21.3
TOTAL	2,751	100.0%	118	100.0%	42.9	36	100.0%	13.1

► **TABLE 9** shows that approximately eight out of ten (84 percent) of all residential structure fires occurred in buildings four storeys high or lower (87 percent of injuries and 95 percent of deaths).

Table 9. All BC residential structure fires (2021) by building height.

BUILDING HEIGHT GROUPED	# FIRES	% FIRES	# INJURED	% INJURIES	INJURY RATE PER 1,000 FIRES	# DEATHS	% DEATHS	DEATH RATE PER 1,000 FIRES
One storey above grade	753	27.4%	33	28.0%	43.8	15	41.7%	19.9
Two storeys above grade	954	34.7%	46	39.0%	48.2	15	41.7%	15.7
Three storeys above grade	370	13.4%	14	11.9%	37.8	2	5.6%	5.4
Four storeys above grade	235	8.5%	10	8.5%	42.6	2	5.6%	8.5
5 or 6 storeys above grade	134	4.9%	4	3.4%	29.9	0	0.0%	0.0
7 to 12 storeys above grade	156	5.7%	7	5.9%	44.9	1	2.8%	6.4
Thirteen storeys and over above grade	94	3.4%	3	2.5%	31.9	1	2.8%	10.6
Cannot be determined	55	2.0%	1	0.8%	18.2	0	0.0%	0.0
TOTAL	2,751	100.0%	118	100.0%	42.9	36	100.0%	13.1





INFLUENCE OF LIFE SAFETY SYSTEMS ON RESIDENTIAL FIRE OUTCOMES

➤ **TABLE 10** looks at the fire outcomes for residential use structure fires. Smoke alarm status represents those fires that had an alarm activated ('yes') or no smoke alarm installed ('no'). Similarly, sprinkler status represents 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 percent confidence intervals are included to show the estimated range around each rate and percentage.

Table 10. All BC residential structure fires (2021) by life safety system.

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	495 18%	17 14%	34.3 18.0	50.7	0 0%	0.0 0.0	0.0	10.1% 8.7%	11.5%	2.4% 1.7%	3.1%
No	Yes	14 1%	1 1%	71.4 -68.6	211.4	0 0%	0.0 0.0	0.0	21.4% 10.5%	32.4%	14.3% 4.9%	23.6%
Yes	No	564 21%	44 37%	78.0 55.0	101.1	8 22%	14.2 14.2	14.2	44.9% 42.8%	47.0%	22.0% 20.2%	23.7%
No	No	283 10%	21 18%	74.2 42.5	105.9	6 17%	21.2 21.2	21.2	65.7% 62.9%	68.5%	48.8% 45.8%	51.7%
Other	Other	1,395 51%	35 30%	25.1 16.8	33.4	22 61%	15.8 15.8	15.8	33.6% 32.4%	34.9%	19.0% 17.9%	20.0%
TOTAL		2,751 100%	118 100%	42.9 35.2	50.6	36 100%	13.1 13.1	13.1	36.2% 35.3%	37.1%	33.0% 32.1%	33.9%

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 2017 to 2021 there were 933 fire-related injuries reported to the OFC. During the same time, there was a total of 195 fire-related deaths reported.

➤ **TABLE 11** shows the annual casualties for all fires reported to the OFC. The average injury rate per 1,000 fires over this time was 25.2 and the average death rate was 5.3. The injury rate for fire/police was 1.7 and there were no fatalities for first responders in this data.

Table 11. All fire casualties and police/fire casualties (2017-2021).

YEAR	# FIRES	ALL CASUALTIES						FIRE/POLICE			
		# INJURIES	% INJURIES	INJURY RATE	# DEATHS	% DEATHS	DEATH RATE	# INJURIES	INJURY RATE	# DEATHS	DEATH RATE
2017	6,827	175	18.8%	25.6	26	13.3%	3.8	11	1.6	0	0.0
2018	6,761	189	20.3%	28.0	26	13.3%	3.8	20	3.0	0	0.0
2019	6,962	207	22.2%	29.7	28	14.4%	4.0	10	1.4	0	0.0
2020	7,277	182	19.5%	25.0	56	28.7%	7.7	12	1.6	0	0.0
2021	9,166	180	19.3%	19.6	59	30.3%	6.4	10	1.1	0	0.0
TOTAL	36,993	933	100.0%	25.2	195	100.0%	5.3	63	1.7	0	0.0

➤ **TABLE 12** shows all injuries and police/fire injuries by injury seriousness for all fires reported to the OFC between 2017 and 2021. The average rate for minor injuries over this time was 11.7 per 1,000 fires, with corresponding rates of 9.6 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 (2017-2021) by injury seriousness.

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
2017	6,827	83	12.2	70	10.3	22	3.2	5	0.7	6	0.9		0.0
2018	6,761	88	13.0	73	10.8	28	4.1	12	1.8	7	1.0	1	0.1
2019	6,962	90	12.9	79	11.3	38	5.5	6	0.9	3	0.4	1	0.1
2020	7,277	82	11.3	76	10.4	24	3.3	5	0.7	7	1.0	0	0.0
2021	9,166	88	9.6	56	6.1	36	3.9	4	0.4	5	0.5	1	0.1
TOTAL	36,993	431	11.7	354	9.6	148	4.0	32	0.9	28	0.8	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 submitted to the OFC between 2017 and 2021. Fifty-two percent of injuries and 22 percent 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. Those 80 and over were 2.6 times greater in terms of the death to Canadian population ratio.

Table 13. All fire casualties (2017-2021) by age group.

AGE GROUP	ALL FIRES				CORRECTED (REMOVING UNKNOWN)		% POPULATION	DEATH: POPULATION RATIO
	# INJURIES	% INJURIES	# DEATHS	% DEATHS	% INJURIES	% DEATHS		
Under five	16	1.7%	3	1.1%	3.6%	1.4%	4.70%	0.3
5 to 9	4	0.4%	4	1.4%	0.9%	1.8%	5.10%	0.4
10 to 14	2	0.2%	2	0.7%	0.4%	0.9%	5.00%	0.2
15 to 19	13	1.4%	3	1.1%	2.9%	1.4%	5.60%	0.2
20 to 24	21	2.3%	19	6.8%	4.7%	8.7%	6.20%	1.4
25 to 29	45	4.8%	7	2.5%	10.1%	3.2%	6.50%	0.5
30 to 34	46	4.9%	13	4.6%	10.3%	5.9%	6.80%	0.9
35 to 39	32	3.4%	12	4.3%	7.2%	5.5%	6.30%	0.9
40 to 44	52	5.6%	26	9.3%	11.6%	11.9%	6.30%	1.9
45 to 49	31	3.3%	5	1.8%	6.9%	2.3%	6.90%	0.3
50 to 54	39	4.2%	18	6.4%	8.7%	8.2%	7.60%	1.1
55 to 59	36	3.9%	16	5.7%	8.1%	7.3%	7.60%	1.0
60 to 64	31	3.3%	25	8.9%	6.9%	11.4%	7.00%	1.6
65 to 69	31	3.3%	22	7.8%	6.9%	10.0%	6.20%	1.6
70 to 74	15	1.6%	13	4.6%	3.4%	5.9%	4.30%	1.4
75 to 79	6	0.6%	5	1.8%	1.3%	2.3%	3.10%	0.7
80 and over	27	2.9%	26	9.3%	6.0%	11.9%	4.60%	2.6
Unknown	486	52.1%	62	22.1%				
TOTAL	933	100.0%	281	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: 2021 CASUALTY BEHAVIOUR

The following tables detail the information recorded about the fire-related casualties resulting from structure fires reported to the OFC in 2021 (resulting in 118 injuries and 43 deaths).

➤ **TABLE 14** shows the conditions of casualties from 2021 residential structure fires. Almost one-quarter of injuries (24 percent) were unknown/unclassified and 42 percent were awake with no impairment at the time of injury. Almost 40 percent of deaths were unknown/unclassified and one-fifth (21 percent) were asleep at the time of the fire.

Table 14. *All structure fire casualties (2021) by condition of casualty.*

CONDITION OF CASUALTY	# INJURIES	% INJURIES	# DEATHS	% DEATHS
Awake or no physical/mental impairment	49	41.5%	12	27.9%
Too young to react to fire emergency	0	0.0%	0	0.0%
Asleep at time of fire	23	19.5%	9	20.9%
Bedridden or other physical disability	2	1.7%	1	2.3%
Mental disability	1	0.8%	1	2.3%
Impairment by alcohol, drugs, or medication	14	11.9%	3	7.0%
Under restraint or detention	1	0.8%	0	0.0%
Unknown	19	16.1%	13	30.2%
Unclassified	9	7.6%	4	9.3%
TOTAL	118	100.0%	43	100.0%

➤ **TABLE 15** shows the actions of casualties from 2021 residential structure fires. Over one-fifth of injuries (20 percent) were unknown/unclassified, and 41 percent voluntarily entered/remained in the fire area, and 23 percent were injured while attempting to escape. Almost half of deaths (49 percent) were unknown/unclassified and 23 percent died attempting to escape.

Table 15. *All structure fire casualties (2021) by action of casualty.*

ACTION OF CASUALTY	# INJURIES	% INJURIES	# DEATHS	% DEATHS
Injured while attempting to escape	27	22.9%	10	23.3%
Over-exertion, heart attack	0	0.0%	0	0.0%
Voluntarily entered/remained - rescue	4	3.4%	2	4.7%
Voluntarily entered/remained - fire fighting	39	33.1%	1	2.3%
Voluntarily entered/remained - save property	5	4.2%	2	4.7%
Loss of judgement/panic	11	9.3%	3	7.0%
Received delayed warning	4	3.4%	0	0.0%
Did not act	4	3.4%	4	9.3%
Unknown	16	13.6%	18	41.9%
Unclassified	8	6.8%	3	7.0%
TOTAL	118	100.0%	43	100.0%

► **TABLE 16** shows the cause of injuries from 2021 residential structure fires. One third (33 percent) of deaths resulted from smoke inhalation and 23 percent resulted from burns. Almost 40 percent of deaths were unknown/unclassified

Table 16. All structure fire casualties (2021) by cause of injury.

CAUSE OF INJURY	# INJURIES	% INJURIES	# DEATHS	% DEATHS
Smoke inhalation	45	38.1%	14	32.6%
Burns - fire/flames	41	34.7%	9	20.9%
Burns - hot substances	15	12.7%	1	2.3%
Struck by objects/persons	1	0.8%	0	0.0%
Falls	6	5.1%	2	4.7%
Explosives	1	0.8%	0	0.0%
Electrical current	0	0.0%	0	0.0%
Unknown	4	3.4%	17	39.5%
Unclassified	5	4.2%	0	0.0%
TOTAL	118	100.0%	43	100.0%

► **TABLE 17** shows the cause of failure to escape from 2021 residential structure fires. Over 80 percent of injuries and 63 percent of deaths were classified as unknown/unclassified with respect to the cause of failure to escape. A further 30 percent of deaths were classified as trapped by fire/smoke.

Table 17. All structure fire casualties (2021) by cause of failure to escape.

CAUSE OF FAILURE TO ESCAPE	# INJURIES	% INJURIES	# DEATHS	% DEATHS
Trapped by fire/smoke - vertical openings	2	1.7%	4	9.3%
Trapped by fire/smoke - horizontal openings	5	4.2%	9	20.9%
High flame spread of combustible surfaces	7	5.9%	2	4.7%
Building collapse	1	0.8%	0	0.0%
Falling debris	1	0.8%	0	0.0%
Explosion	2	1.7%	0	0.0%
Exit locked/obstructed	1	0.8%	1	2.3%
Outdoor fire	0	0.0%	0	0.0%
Unknown	49	41.5%	19	44.2%
Unclassified	50	42.4%	8	18.6%
TOTAL	118	100.0%	43	100.0%

