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Initial Exploration of Fire Information for Indigenous Communities in the NFID (2005-2021) based on Geolocation Data

Summary of Residential Structure Fire Information

Non-sensitive

Prepared for: National Indigenous Fire Safety Council
July 02, 2025

A. P. Robbins

National Research Council Canada | Conseil national de recherches Canada

Canada

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Executive summary

This exploratory effort was undertaken in response to the current Canadian situation of a scarcity of fire incident information for Indigenous communities[1] and with the hope of identifying an additional data source that might enrich the information collected via the recently launched voluntary National Incident Reporting System (NIRS) [NIFSC, 2024].

Key results from the exploratory analysis include the ability to identify available fire information in the NFID for incidents that were located within Indigenous communities. Furthermore, where comparison with previously published studies[2] was possible, similar trends were observed during the exploratory analysis of the current study for all residential fires[3]. Therefore, the NFID could be used to provide an additional data source to combine with NIRS information so that the enriched data could be available for Indigenous communities to help inform fire risk reduction plans tailored to and by each community.

For this report the definition of “Indigenous community locations” is related to the geolocation information that was reported in the NFID and how the incident information was collected. The reported geolocation information was used to identify a subset of the NFID for incidents likely occurring within an Indigenous community. When considering the results in all cases, care is cautioned in the use of the results and observations due to the following factors:

- Relatively small data sizes;
- Potential for under-reporting of Indigenous community incidents since mutual aid was a key contributing factor for reporting, including:
    - Mutual aid would be limited to locations, where an adjacent community:
        - has a Municipal Services Agreement, or equivalent agreement, in place with the Indigenous community, and
        - reports into the federal, provincial or territorial system participating in the NFID survey cycles;
    - Information included in the NFID was reported by staff of the attending fire department providing mutual aid, who were not necessarily members of the adjacent Indigenous community; and
    - Reporting of incident information by an Indigenous community fire department is not expected to be included in the federal or provincial collection systems.

[1] The scarcity of fire incident information for Indigenous communities has been raised in previously published work, including [CMHC, 2004; OCC-BC, 2012; Mihychuk, 2018; GoC, 2019; OCC-ON, 2021; Kumar, 2021; Garis and Desautels, 2022 and 2023; Weckman et al., 2023; NIFSC, 2024].
[2] [CMHC, 2004; Kumar, 2021; Weckman et al., 2023]
[3] See Table 9.

- Heavy reliance on the consistency and accuracy of reported geolocation information in combination with lists of Indigenous community names and Census Subdivision information;
- Under-reported detail of individual incidents indicated by the level of unknown information; and
- The information that is available cannot be meaningfully understood without considering the historical context and present day-realities of Indigenous communities.

This is not to detract from the general observations from this data source, but to be considered when applying the results to specific situations or considerations. In such cases, a detailed review and analysis of the available data would be recommended to explore the available information in context for the community.

For this study, residential fire incident information was identified with Indigenous community locations, based on available geolocation information, for 4,089 fire incidents; 191 fire-related civilian deaths; and 179 fire-related civilian injuries.

Key observations included that results for some select variables (i.e., area of fire origin, object involved in ignition, performance of smoke alarm devices, and act or omission) might indicate similar ranked most common categories or even similar percentages when comparing the datasets for Indigenous and non-Indigenous community locations. Those observations were not applicable to all variables. Furthermore, the comparison of rates of civilian fire-related deaths to 1,000 fire incidents consistently demonstrates higher rates for Indigenous community locations compared to non-Indigenous.

A few noted observations of the rates of the number of fire-related civilian deaths to 1,000 fire incidents include:

- Performance of smoke alarm devices[4], were approximately:
    - 5 times higher for no smoke alarm or alarm did not activate for Indigenous community locations compared to non-Indigenous community information.
- Objects involved in ignition[5], were approximately:
    - 3 times higher for smoker's equipment and open flames for Indigenous community locations compared to non-Indigenous community information;
    - 9 times higher for cooking equipment for Indigenous community locations compared to non-Indigenous community information; and
    - 10 times higher for heating equipment for Indigenous community locations compared to non-Indigenous community information.

[4] See Table 12.
[5] See Table 11.

- Act or omission [6], were approximately:
    - 12 times higher for reported human failing (e.g., including instances where a person may be asleep or fatigued; have a temporary loss of judgement; being impaired; have an accident; or be distracted or preoccupied) for Indigenous community locations compared to non-Indigenous information; and
    - 5 times higher for reported misuse of ignited materials for Indigenous community locations compared to non-Indigenous information.

An example of noted exceptions to the general trends of similar most commonly reported for the act or omission for the category of incendiary fires with:

- The 1st most commonly reported fire incident (~35%) for Indigenous community locations, compared to the 4th to 6th most common (with three categories with about the same percentage of ~12%) for non-Indigenous information; and
- The rate of the number of fire-related civilian deaths to 1,000 fire incidents[7] was 1.4 times higher for Indigenous community locations compared to non-Indigenous information.

Key recommendations based on observations in this study include:

- Where available, Indigenous community-related data is recommended to be used to inform the fire risk for that community;
- Where the amount or quality of the available data is limited for an Indigenous community location, the use of fire information trends observed for non-Indigenous community locations are not recommended, and, if used, should be used with caution; and
- The importance of data collection to support evidence-based discussions and decisions continues to be reinforced.

[6] See Table 13.
[7] See Table 13.

Acknowledgments

The report was prepared for the National Indigenous Fire Safety Council (NIFSC), which is supported by Indigenous Services Canada. We gratefully acknowledge the expertise and input shared by the Board of Directors, Blaine Wiggins, Chief Operating Officer, Mandy Desautels, Chief Administrative Officer, Arnold Lazare, Interim Chief Executive Officer, and Len Garis, Director of Research, the National Indigenous Fire Safety Council for their vision and guidance as the project unfolded. We also gratefully acknowledge Adam Samms, National Incident Reporting System (NIRS) Manager, Indigenous Fire Marshal Service, for his assistance and insights for the naming of communities.

The author would like to acknowledge the significant contribution to this study by the Canadian Centre for Justice and Community Safety Statistics at Statistics Canada that selected the Statistics Canada files to be used and applied the analysis to the NFID first and second survey cycles to provide the results used in this report. Specifically, we wish to thank Rebecca Kong, Kimberley Boyuk, Len Garis and McKenzie Haringa.

We also would like to acknowledge the funding and support for this research by the National Research Council (NRC), Codes Research and Development (Codes R&D) initiative.

Furthermore, access to the content of the National Fire Information Database (NFID) survey cycles of data for this research would not have been possible without the permission and support of the Canadian Association of Fire Chiefs (CAFC), and of the Council of Canadian Fire Marshals and Fire Commissioners (CCFMFC).

Purpose of Report

This report was developed during the exploration of the National Fire Information Database (NFID) content from 2005 to 2021 for reported incidents located in Indigenous communities. The intent is to share the insights gained during this exploration, so that future efforts can be better tailored to utilize the information available in the NFID so that it could be combined with other information to help inform fire risk reduction plans tailored to and by each community.

The presentation of data within this report cannot be considered as either endorsed by the National Indigenous Fire Safety Council (NIFSC) or an expression of their policies or views. Any errors of omission or commission are not the responsibility of the NIFSC.

It is highlighted to the reader that there is currently a relatively small sample of data to use in the simple exploratory analyses presented here. This, in combination with recognized inconsistencies in some of the databases employed, means that the results, while deemed to be generally insightful of the larger trends, must be interpreted with care.

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List of Acronyms

Acronym	Definition
AFN	Assembly of First Nations
CAFC	Canadian Association of Fire Chiefs
CCFMFC	Council of Canadian Fire Marshals and Fire Commissioners
CCJCSS	Canadian Centre for Justice and Community Safety Statistics [of Statistics Canada]
CanCHEC	Canadian Census Health and Environment Cohort
CISP	Centre for Indigenous Statistics and Partnerships [of Statistics Canada]
CMA(s)	Census Metropolitan Area(s)
CMHC	Canada Mortgage and Housing Corporation
CSD(s)	Census subdivision(s)
GoC	Government of Canada
HRDC	Human Resources Development Canada
HSA	Home Safety Assessments
INAC	Indigenous and Northern Affairs Canada
MSA	Municipal Services Agreement
NFID	National Fire Information Database
NHS	National Household Survey
NIFSC	National Indigenous Fire Safety Council
NIRS	National Incident Reporting System
NRC	National Research Council Canada
OCC	Office of the Chief Coroner
OCC-BC	Office of the Chief Coroner, British Columbia
OCC-ON	Office of the Chief Coroner, Ontario
OCC-UFDFN	Office of the Chief Coroner's [Ontario, Table on] Understanding Fire Deaths in First Nations
PCCF	Postal Code Conversion File
PWGSC	Public Works and Government Services Canada
SDS	Small data size (that is used as an indicator in tables of data)
SLI	Single Link Indicator

1 Introduction

There is a scarcity of fire incident information for Indigenous communities, which highlights a broader systemic issue of this type of available data in Canada. Without data there is no evidence-based insight into the size and type of fire risks in these communities. For a long time, fire incident data has not been reported. The federal government collected data from individual First Nations communities on fire incidents until 2010, when the program was discontinued [Mihychuk, 2018]. The importance of a robust data collection system for Indigenous communities was recommended and recognized during the 2018 Parliamentary Session on Fire Safety and Emergency Management in Indigenous Communities [Mihychuk, 2018; GoC, 2019]. This has been the primary driver for the National Indigenous Fire Safety Council (NIFSC) to launch their voluntary National Incident Reporting System (NIRS) [NIFSC, 2024] to collect information on fire incidents that occur within Indigenous communities. This collected information would be used to create community risk profiles that can help communities make informed decisions about their safety in the future. The NIRS gathers, stores and analyses fire incident data from Indigenous communities. The analyses will provide insights into trends, considerations and emerging risks that could be used to inform future education, training, infrastructure and economic planning. With the recent launch of this new reporting system, there are currently of the order of 100's of incidents so far. [Garis and Desautels, 2022 and 2023; NIFSC, 2024]

To explore the possibility of enriching the information collected via the NIRS, it was initially proposed for this study that insights into the fire incidents within Indigenous communities might be captured in fire incidents where fire departments provide mutual aid through Municipal Services Agreements (MSAs) to the adjacent Indigenous community. In such cases, the fire departments report the incident through the provincial, territorial and Canadian Forces systems, whereby the Fire Marshals' and Fire Commissioners' offices collect the data. Therefore, there may be a currently untapped perspective to enrich the current NIRS data. These fire incidents with mutual aid would be included in the contents of the National Fire Information Database (NFID) [Statistics Canada, 2017a; 2017b] that was updated in approximately June 2023 [Statistics Canada, 2022] so that fire incidents from 2005 to 2021 are aggregated from participating jurisdictions. Identifying what is available through this approach would provide evidence-based reasoning for why data collection is important and may also provide evidence-based insights and observations of the fire risk.

This report summarizes the proposed exploration into the potential to leverage information from the NFID in relation to Indigenous communities. Since the information potentially

available in the NFID in relation to fire incidents within Indigenous communities is a proxy, care was therefore taken in the analysis by first understanding the extent of available information and then selecting a refined approach to the exploration. To support this, as initial results became available, these were shared and discussed with NIFSC to identify the emerging available data and gaps that informed the refinement of the approach.

The research team worked with NIFSC for the interpretation of the analysis results and the most appropriate ways to share and communicate the information. The information that is available cannot be meaningfully understood without considering the historical context and present day-realities of Indigenous communities.

This report provides a summary of the exploratory research project, to provide a reference for future more targeted communications.

1.1 Objectives for this report

The objective of this report is to provide a summary of the residential fire information analysis results from exploring reported fire incidents included in the NFID (2005 to 2021) that include geolocation information. The intent of the exploration was to understand whether fire incidents within Indigenous communities in Canada have been included in the aggregated NFID content.

The ultimate objective of this work is to share insights into the potentially available fire information that could be available for Indigenous communities, so that it could be combined with other information to help inform fire risk reduction plans tailored to and by each community.

1.1.1 Scope

The scope was limited to exploring the information available in the two updates to the NFID content [Statistics Canada, 2017a; 2017b]:

- 2005 to 2014 content that was launched in September 2017 [CAFC and CCFMFC, 2016], with the participation of the provinces of Alberta, British Columbia, Manitoba, New Brunswick, Nova Scotia, Ontario and Saskatchewan (from 2012 to 2014), and the Canadian Armed Forces; and
- 2015 to 2021 content that was updated in June 2023 [Statistics Canada, 2022], with the participation of the provinces and territories of British Columbia, Manitoba, New Brunswick, Nova Scotia, Ontario and Yukon (data from 2013 to 2014 was included in the June 2023 update, as well as data to 2021), and the Canadian Armed Forces.

The geolocation information available in the NFID content was explored and this was compared to available data that could be useful in identifying the community type where fire incidents were located. Insights into the geolocation information included in the NFID content and datasets used for comparison in this work are described in Section 2.1 and Appendix B.

1.1.2 Limitations

A summary of the limitations of the scope of work is included in this section. These limitations influence the chosen analysis approach, interpretation of the results and recommendations for future steps that could utilize and build upon the insights gained from this work.

Considerations of the collection of data in the NFID for fire incidents where Mutual Aid has been provided by the reporting fire department that are recommended to be incorporated into the analysis and interpretation of results include:

- Information that is available in the NFID is only what is reported by the first responding fire department to a fire incident, where that fire department reports into a jurisdictional system that has participated in the NFID survey cycles so far.
- The individuals entering data for the first responding fire department may not be members of the adjacent community where the fire incident occurred.
- Data collected follows the information collection manual applicable for each jurisdiction, where the reporting fire department is located.
- Within a jurisdiction, legislation regulates whether mandatory reporting of fire incident information by a fire department to the office of the applicable federal, provincial or territorial fire marshal or fire commissioner is required. Other fire departments may voluntarily report into the jurisdictional collection system or may use a different system for reporting.
- Participation of each jurisdiction in the NFID survey cycles was voluntary.

General limitations of the NFID content that are recommended to be considered in the analysis and interpretation of results include:

- Variations in participation of jurisdictions between and during the two survey cycles (see also Sections 1.3 and 2.1). To track changes or trends over time with confidence, consistent participation is needed. Lack of continuity of participation impacts time-based trend analysis by introducing breaks or discontinuities in the data series and also limits the confidence of overall trends.
- Variations in the collection methodologies between the jurisdictions. While the NFID dictionary was applied at the aggregation of the data, not all of the same variables were collected or shared by all the participating jurisdictions. [Statistics Canada, 2017b; 2022]

- The content of NFID variables with geolocation information, namely:
    - The data entry for incident location is a manually entered alphanumeric value [Statistics Canada, 2017a], so (as observed during the initial review, as described in Section 2.1) typographical errors, spelling mistakes, non-standard abbreviations and local variations in names, etc. can influence the data content. This variable was typically reported to some extent for each incident.
    - Postal code (that is included under the column title of “postcd”) is not explicitly described in the NFID Data Dictionary or User Guide [Statistics Canada, 2017a and 2017b]. However, observations during the initial review (Section 2.1) indicates that the data entry is also a manually entered alphanumeric value, along with the potential for typographical errors. It was noted that it was a less often reported variable.
    - Census Subdivision (CSD) number and name, are standardized values that were added by Statistics Canada during the aggregation of the content of the NFID [Statistics Canada, 2017b], based on the geolocation information available for the incident that includes more detail than is released with the aggregated database.

While the process of categorizing and identifying the location of incidents as to whether they occurred in either an Indigenous or non-Indigenous community was extensive, several limitations were encountered, including:

- The NFID variable property ownership refers to the ownership category controlling the property involved in the fire incident. [Statistics Canada, 2017a] For the dataset analysed, it was noted that Ontario was the only jurisdiction that used the coding to report an Indian Reserve (code 11) controls the ownership of a property.
- The NFID variable major occupancy refers to the overriding (primary) use of a building under single management, which has two or more uses. [Statistics Canada, 2017a] For the dataset analysed, it was noted that Manitoba was the only jurisdiction that used the coding to report a First Nations community (code 80) primarily used the building.
- The ability to determine whether an incident occurred in an Indigenous community relies on the accuracy and completeness of the address data, including incident location. Inaccuracies or missing information in the address could lead to errors.
    - For example, Shoal Lake is part of the name of the Shoal Lake Cree Nation in Manitoba/Ontario and also the name of a rural municipality in Manitoba; therefore, without the inclusion of information to clearly identify the First Nations community in the location name, this information would be conservatively coded as occurring in a non-Indigenous community.
    - While the reported location was cross-checked where other geolocation information was available (such as postal code and CSD information), it is noted (Section 2.1) that incident location information was typically provided, whereas postal code and CSD information was less typically reported for an incident.

- The most recent files available for listing Indigenous communities by postal codes and census subdivisions were used (Appendix B). The NFID files cover the period from 2005 to 2021. It is important to note that geographic boundaries, population distributions, and postal code assignments can change over time. [Statistics Canada, 2017c]
- The assignment of postal codes to CSDs based on the Single Link Indicator (SLI) may result in oversimplification or misclassification of geographic areas. [Statistics Canada, 2017c] This method assumes that most of the population within a postal code resides in a single CSD, which may only sometimes be accurate, especially in densely populated or geographically diverse areas. This process can lack granularity in representing smaller geographic units or communities within larger census subdivisions. Therefore, it was applied at the very end of the approach (Appendix B) to identify potential reported fire incidents based on geolocation information that may be located in an Indigenous community.

For this report the definition of “Indigenous community locations” is related to the geolocation information that was reported in the NFID and how the incident information was collected. The reported geolocation information was used to identify a subset of the NFID for incidents likely occurring within an Indigenous community. When considering the results in all cases, care is cautioned in the use of the results and observations due to the following factors:

- Relatively small data sizes;
- Potential for under-reporting of Indigenous community incidents since mutual aid was a key contributing factor for reporting, including:
    - Mutual aid would be limited to locations, where an adjacent community:
        - has an MSA, or equivalent agreement, in place with the Indigenous community, and
        - reports into the federal, provincial or territorial system participating in the NFID survey cycles;
    - Information included in the NFID was reported by staff of the attending fire department providing mutual aid, who were not necessarily members of the adjacent Indigenous community; and
    - Reporting of incident information by an Indigenous community fire department is not expected to be included in the federal or provincial collection systems.
- Heavy reliance on the consistency and accuracy of reported geolocation information in combination with lists of Indigenous community names and CSD information;
- Under-reported detail of individual incidents indicated by the level of unknown information; and
- The information that is available cannot be meaningfully understood without considering the historical context and present day-realities of Indigenous communities.

In all cases, because of the relatively small data sizes identified for Indigenous community locations and the potential for under-reported community incidents, and since mutual aid was a key contributing factor for reporting what may be captured in the NFID, care is cautioned when interpreting and using the summarized results available.

Furthermore, the information that is available cannot be meaningfully understood without considering the historical context and present day-realities of Indigenous communities.

Therefore, these cautions and list of limitations are not intended to detract from the general observations but to be considered when applying the results to specific situations or considerations. In such cases, a detailed review and analysis of the available data would be recommended to fully explore the available information in context.

Furthermore, these limitations were also listed with the consideration that it is intended that insights from this work will inform future steps. For example, this information might be combined with the data in the NIRS, that is managed by the NIFSC, to help inform the creation of community risk profiles that can help communities make informed decisions about their safety planning. Consideration of the potential for integration of NFID data with NIRS was not part of this work but it is recommended that it be included in considerations for the next steps (see Section 6.1).

1.2 Background

A brief summary of related published reviews is included here with elements and reported observations that may be useful context compared to the results of the exploration of the content of the NFID.

1.2.1 Fire Information Insights

A 2004 report [CMHC, 2004] by the Canada Mortgage and Housing Corporation (CMHC) presented findings on the incidents of fire and impacts on First Nations communities in Canada for a study examining benchmarks and indicators related to Canadian housing fire losses. The study was focused primarily on fire information from 1980 to 1999 that was provided by Human Resources Development Canada (HRDC), Public Works and Government Services Canada (PWGSC), Indigenous and Northern Affairs Canada (INAC), the Office of the Ontario Fire Marshal, the Office of the Alberta Fire Commissioner and the Office of the Fire Commissioner of British Columbia. The range of years was selected based on the voluntary installation of smoke alarms in homes in Canada in the mid-1970’s and the subsequent requirement for mandatory smoke alarms in the early 1980’s.

Depending on which benchmark was used, the rate of fire-related deaths in First Nations communities was reported to be approximately 4 to 10.4 times higher than for the rest of Canada. Using the population benchmark, the reported rate of fire-related deaths was approximately 4.4 times the Canada-wide rate, whereas the rates of fire incidents and injuries were lower than the Canada-wide Rate. Fire damage per capita was comparable for the two subsets. Using the number of residential units as a benchmark showed the rate of fire-related deaths for fire incidents in First Nations communities was almost 8.8 times the Canada-wide rate and the rate of fire injury and extent of damage was approximately twice the Canada-wide rate per residential unit. Using the number of fire incidents as a benchmark showed the rate of fire-related deaths for fire incidents in First Nations communities was almost 4.4 times and the rates of injury and damage extent are comparable to the Canada-wide rates; however, the suspected under-reporting of fire information for incidents located in First Nations communities was noted to influence the confidence in these estimates. For incidents that were reported in one- and two-family dwellings, the rate of fire-related deaths for fire incidents in First Nations communities was 10.4 times, the rate of fire incidents was 2.4 times, the rate of fire-related injuries was 2.5 times, and the rate of damage was 1.7 times the Canada-wide incident information. [CMHC, 2004]

Following the 2004 CHMC report, a 2007 study [CMHC, 2007] was commissioned by CMHC to analyze case studies of fire incidents that occurred in First Nations communities in combination with the previous report, with the intent to provide fire prevention guidance that would assist volunteer firefighters and housing managers.

Between 2007 and 2011 [OCC-BC, 2012], among all Indigenous people in British Columbia, the rate of residential fire mortality was approximately four times higher than among non-Indigenous people.

The Ontario Chief Coroner’s Table on Understanding Fire Deaths in First Nations (OCC-UFDFN) was assembled to collect data and information to effectively inform the understanding of fire deaths in First Nations communities. The OCC-UFDFN [OCC-ON, 2021] examined fire-related deaths that had occurred in First Nations communities in Ontario from 2008 to 2017 in 29 fires that occurred in 20 First Nations communities across Ontario. This review reported that First Nations children ages 0-9 had the highest fire-related mortality rate and was about 86 times greater than non-First Nations children in Ontario. Most (approximately 86%) fatal fires in First Nations communities were reported to have either no or non-operational smoke alarms in the home or structure, or the presence of the smoke alarms was reported as unknown. Compared to non-First Nations communities in Ontario, more fatal fire investigations reported the cause as undetermined in First Nations communities. It was suggested that this was due to higher levels of structural damage reported in First Nations communities. The higher levels of structure damage were especially noted for incidents occurring in remote locations where there

were limited or no fire intervention capabilities. Where a fire start cause was reported, the most common were cooking and heating sources.

The OCC-UFDFN reported that emergency response and fire suppression on their own have a limited impact on survival. It was recommended that early detection and escape were paramount to survival; education and prevention were described as key elements in reducing fire fatalities. While the OCC-UFDFN review was focused on factors affecting fire fatalities, it was acknowledged that other factors impact individual communities differently due to the unique realities of each, recommending socioeconomic factors and housing conditions be included in future reviews. [OCC-ON, 2021] These insights have been consistently echoed in other reviews [Garis et al., 2016; Clare, 2023].

A 2021 Statistics Canada report [Kumar, 2021] indicated continued disparities among First Nations people, Métis, Inuit and non-Indigenous people. Significantly higher fire-related mortality and morbidity rates among Indigenous people in Canada were indicated compared to rates among non-Indigenous people, for persons living in private households. The study used the 2011 Canadian Census Health and Environment Cohort (CanCHEC) database that is a unique population-based linked dataset that follows the household (excluding institutions such as hospitals, nursing homes, penitentiaries, and collective dwellings, such as work camps, hotels, shelters) population enumerated in the voluntary 2011 National Household Survey (NHS) for different health outcomes such as mortality, cancer, and hospitalizations between 2011 and 2018. The rate ratios for fire-related mortality rates (deaths per 100,000 person-years) for Indigenous people compared with the rate for non-Indigenous persons were reported as:

- 5.2 for First Nations people, indicating the mortality rate from all fires was approximately five times higher in this population compared with the non-Indigenous population;
- 17.3 for Inuit, indicating the mortality rate from all fires was approximately 17 times higher in this population compared with the non-Indigenous population; and
- Although the rate reported for Métis (0.6) was higher than the non-Indigenous rate (0.3), it was noted as within statistical significance compared to the non-Indigenous rate.

It was noted that the rates were based on a small number of deaths and, subsequently, were related to large confidence intervals (using 95% confidence intervals to represent the variance associated with each estimate) that limited the comparison between population groups.

The rate ratios for hospitalization rates from injuries (hospitalizations per 100,000 person-years) associated with fires for Indigenous people compared with the rate for non-Indigenous persons were reported as [Kumar, 2021]:

- 4.3 for First Nations people, indicating the morbidity rate from all fires was approximately four times higher in this population compared with the non-Indigenous population;
- 5.1 for Inuit, indicating the morbidity rate from all fires was approximately five times higher in this population compared with the non-Indigenous population; and
- Although the rate reported for Métis (2.8) was again higher than the non-Indigenous rate (1.7), it was noted as within statistical significance compared to the non-Indigenous rate.

The 2021 Statistics Canada study also noted contributing factors that were not included within the study that were recommended to be considered when interpreting the disparities in mortality and morbidity between Indigenous populations and the non-Indigenous population, including housing conditions, presence of smoke alarms, status of fire services in Indigenous communities, socioeconomic factors and the application, inspection and maintenance of buildings to applicable fire safety building requirements. Further limitations to consider in the interpretation of the results included that the mortality rates may underestimate the true rates for reasons such as the lack of available information for the institutional populations, populations living in collective dwellings and the homeless.

In 2023, a University of Waterloo study [Weckman et al., 2023] was prepared for NIFSC with the intent to develop recommendations for considerations for future steps when collecting and integrating information from other data sources to include Inuit and Métis populations and communities, as well as First Nations residents on and off reserve, to facilitate a deeper understanding of community-specific fire risks that could form the foundation of evidence-based risk reduction and intervention strategies in communities. The analyses of the study focused on available data related to the state of housing and fire incident data for First Nations Populations on Reserve from data sources, including those compiled by NIFSC: fire incident reports submitted to the National Incident Reporting System (NIRS) [NIFSC, 2024], and Home Safety Assessments (HAS) records. Observations from direct data sources were included in the study.

The most commonly observed broad categories of ignition sources reported for residential fire incidents in the NIRS were noted to be consistent with other residential fire incident trends. For the NIRS, the most common ignition sources reported for fire incidents were listed as: undetermined (~31%), matches (~16%), smoker’s materials (~14%), electrical systems (~15%), cooking equipment (~9%), heating equipment (~7%), wood stoves (~5%), and other (~3%). The most common areas of fire origin reported for fire incidents were listed as:

undetermined (~28%), kitchen (~20%), garage/shed/exterior/deck (~14%), basement/electrical room (~10%), living room (~15%), bedroom (~7%), and bathroom/laundry room (~2%). For all broad categories of ignition sources reported, except for matches, the ratio of deaths to injuries was either 1 or greater. Similarly, for all areas of origin reported, except for bathroom/laundry room, the ratio of deaths to injuries was either 1 or greater. Furthermore, for topics where information was available for comparison, a close correlation was observed between the percentage of fires initiated by each source reported in the NIFS data and reported poor state of repair, as recorded in the HAS documentation. [Weckman et al., 2023]

Aligning with other recommendations [Clare, 2023], the 2023 University of Waterloo study [Weckman et al., 2023] also recognized that only a very small sample of data was available for the NIRS and while observations provide insights into potential trends, care is recommended for the interpretation of results.

Past recommendations to address the reported higher rates of fire-related mortality and morbidity have included the development of programs to enhance the availability and use of smoke alarms, home safety checks, school programs, training of local firefighters, adequate funding for fire services, adoption of building and fire code requirements on Indigenous communities, enforcement of fire code, and creation of a national Indigenous fire marshal's office. [AFN, 2006; Siekieska and Winter, 2017; Al-Hajj et al. 2022; GoC, 2023]

1.3 Overview of NFID

The objective of the NFID [Statistics Canada, 2017a and 2017b] is to develop and maintain a national database of statistical information on fire incidents, losses, and casualties. The database is a collection of fire incidents involving loss in Canada. Microdata on fire incidents from provincial, territorial and federal fire incidents are collected by the Fire Marshals' and Fire Commissioners' offices across Canada. This fire information for participating jurisdictions is aggregated in the NFID by Statistics Canada.

The NFID comprises two data files: an incident file and a casualty file. The incident file contains details related, but not limited, to the date and location of fire incidents, the type of property and its characteristics, fire protection features, circumstances contributing to the outbreak, origin and spread of fire, and the discovery of fire and actions taken. The casualty file contains data on persons injured and deaths due to the fire incident, including age, sex, the nature of the casualty, whether the person was a civilian or firefighter, cause of failure to escape, etc.

The voluntary participation in the NFID production varied between the two survey cycles. For the first survey cycle reporting information between 2005 and 2014 [Statistics Canada, 2017d], the production of NFID included New Brunswick, Ontario, Manitoba, Saskatchewan, Alberta, British Columbia, and the Canadian Armed Forces. In contrast, for the second survey cycle reporting information between 2015 and 2021 [Statistics Canada, 2022], the production of NFID included New Brunswick, Nova Scotia, Ontario, Manitoba, British Columbia, Yukon, and the Canadian Armed Forces.

Since the objective of the research was to explore the potential fire information for incidents located in Indigenous communities, the reported geolocation information is critical. Therefore, information reported by the Canadian Armed Forces was not included in the data analysis for this project, due to the nature of the reporting of geolocation information for the associated incidents (e.g., for the first survey cycle, incident locations were reported for active ranges, bases, support units, ships, or training centres with no indication of cities, towns, etc. and only unknown information reported for mutual aid).

An overall summary of the total number of fire incidents and casualties, indicting jurisdiction participation, for the available content of the NFID at the time of preparation of this analysis (see information in Appendix B, Section B.2) is shown in Figure 1.

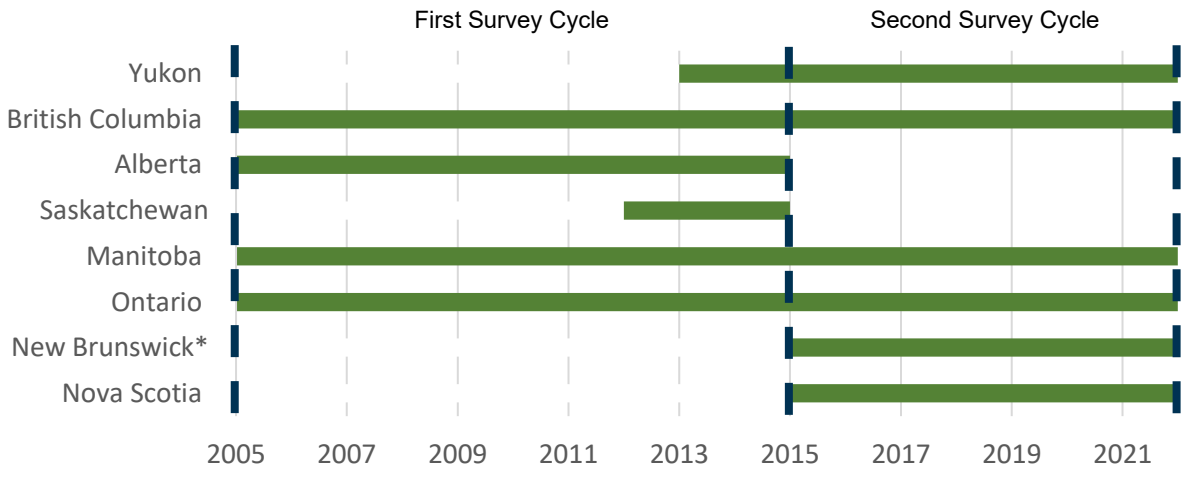


Figure 1 Summary of the years with reported geolocation information for the two NFID survey cycles [CAFC and CCFMFC, 2016; Statistics Canada, 2017d and 2022], based on the information in Appendix B, Section B.2. (Note * In New Brunswick, while having participated in both survey cycles, incident location information was only reported from 2015 to 2021, and casualty information was reported from 2010 to 2021.)

2 Analysis Approach

The analysis approach that was applied by the collaborative teams working on this project included the following steps:

1. Initial review of the content of the NFID database (first survey cycle) for the intended application (Section 2.1).
    - Initial identification of potential geolocation information included in NFID and insights to help select an approach that may be used to identify two datasets of reported fire incidents for those located in Indigenous communities and for those non-Indigenous communities.
2. Detailed analysis to develop two datasets based on geolocation information (using the first and second NFID survey cycles) to be used in the exploration of potential fire incidents that were located in an Indigenous community and incidents located in a non-Indigenous community (Appendix B).
    - Selection of available geoinformation to be used for the development of two datasets based on geolocation information.
    - Verification and validation of the approach used to develop the two datasets based on geolocation information.
    - Review of the quality of the available information for the data elements of the two datasets based on geolocation information to inform the selection of data elements for a preliminary analysis to inform the selection of key data elements for more detailed analysis.
3. Discussion of insights and observations from the analysis (Section 5).
4. Recommendations for considerations based on insights (Section 6.1)

The work of the teams on the project were based on the ability to access the each of the NFID survey cycles directly. Therefore, the National Research Council (NRC) team led the initial review that was based on the first survey cycle (Step 1), the Statistics Canada team led the development of the two datasets based on geolocation information (Step 2). Then based on the outputs from these steps, the NRC led collaborative discussions with NIFSC and Statistics Canada, to develop the insights and recommendations (Steps 3 and 4).

While the original plan for the project was a collaborative approach, due to unforeseen circumstances the reporting was allocated to NRC. Therefore, the summary of information provided by the Statistics Canada team shared for this project is included in Appendix B for transparency, and the report was intended to capture a summary of the overall research activities and their outcomes.

2.1 Summary of Approach and Insights from Initial Review

2.1.1 Overview of the NFID Geolocation Variables Considered

Using the definitions of the NFID variables [Statistics Canada, 2017a] and the content of the first survey cycle of the NFID [Statistics Canada, 2017d], potential variables were explored that may be used to identify fire incidents that occurred within an Indigenous community. The potential NFID variables that were considered are briefly discussed in the following sections.

2.1.1.1 Incident location

The data entry for the *incident location* variable is alphanumeric [Statistics Canada, 2017a]. More specifically for the use of this variable for the exploration, the understanding that the data entry is not standardized was a key consideration to address.

For example, for the first survey cycle of the NFID, it was observed that 26,280 incidents were reported as ‘data element not available in jurisdictional system’ (about 5.6%) for the incident location variable and about 187 incidents were reported with likely erroneous entries (e.g., ‘none’, a number only, a single letter, etc.) out of a total of 467,929 reported incidents.

Additional observations of the variations of the content of the incident location variable included:

- Different location names for the same area, whether differences over time or by the individual entering the data;
- Different versions of abbreviations used for the same words; and
- Typographical errors, due to the manual and non-standardized nature of alphanumeric data entry.

2.1.1.2 Mutual aid

The data entry for the *mutual aid* variable is coded (0 to 9); however, the variable is described that mutual aid is only coded if more than one fire department attended the fire scene. [Statistics Canada, 2017a] For the first survey cycle of the NFID, it was observed that 289,895 incidents were reported as ‘unknown’ (about 62%) and 559 were reported with the code ‘given’

out of 467,929 reported incidents. For the first survey cycle, Alberta and Saskatchewan where the only jurisdictions that reported any incidents coded for mutual aid ‘given’.

2.1.1.3 Major occupancy category

The data entry for the *major occupancy* variable is numerically coded. The coding to report a First Nations community (code 80) primarily used the building [Statistics Canada, 2017a].

For the first survey cycle of the NFID, it was observed that Manitoba was the only jurisdiction that included code 80 for reporting the primary use of the building.

2.1.1.4 Property ownership category

The data entry for the *property ownership category* variable is numerically coded. The coding to report an Indian Reserve (code 11) controls the ownership of a property. [Statistics Canada, 2017a]

For the first survey cycle of the NFID, it was observed that Ontario was the only jurisdiction that included code 11 for reporting the ownership of a property.

2.1.1.5 Postal code

The variable of postal code (*postcd*) appears in the content for the first survey cycle of the NFID; however, the NFID Data Dictionary and User Guide [Statistics Canada, 2017a and 2017b] do not include an explicit description for the variable. Therefore, it is not clear as to the origin or data entry type.

However, for the first survey cycle of the NFID, it was observed that 210,817 incidents show with a blank (about 45% of the total reported incidents) entry for the variable and about 8,231 incidents show likely erroneous entries (e.g., ‘none’, ‘NA’, numbers only, letters only, special characters such as a dash, A1A1A1, X1X1X1, etc.) out of a total of 467,929 reported incidents. Therefore, based on observations of the first survey cycle of the NFID content, it is suggested that it is likely that the data entry is alphanumeric and limited to a maximum of 6 characters.

2.1.1.6 Census Subdivision (CSD) related information

NFID variables for CSD related information included:

- *CSD* number, 68,183 incidents reported with no information (about 15% of the total reported incidents)
- *CSD name*, 68,209 incidents reported with no information (about 15% of the total reported incidents)
- *CSD type*, 68,209 incidents reported with no information (about 15% of the total reported incidents)

The information for these variables is not collected by the reporting fire departments for individual incidents. Instead, the information is part of the other social domain data (Section K of the NFID Data Dictionary) that is added by Statistics Canada during the processing of microdata that is aggregated for the NFID using geography information. [Statistics Canada, 2017a and 2017b]

For the first survey cycle, the information is based on the 2011 Census information [Statistics Canada 2017a]. The census subdivision code is uniquely identified using the two-digit province/territory (PR) code, the two-digit census division (CD) code and the three-digit census subdivision CSD code: to provide a unique eight-digit code (PR-CD-CSD). [Statistics Canada, 2015b]

Considering the observed variations in the incident location variable entries because of non-standardized address formulations and opportunities for typographical errors, a more thorough understanding of the microdata that was used to inform the CSD related information during the development of the other social domain data of the NFID would be recommended before utilizing. This would allow the detail of the verification and validation processes used for the inclusion of the other social domain data to be utilized appropriately while also avoiding unnecessary duplication of effort. (More information is available in Appendix B in relation to CSD-related NFID variables and the files for comparison that were applied in the analysis performed by Statistics Canada.)

2.1.1.7 An Early Observation

Based on a review of the contents of the first survey cycle of the NFID, it was suggested that mutual aid was not a key variable to be considered for this study. Instead, it was recommended to focus on the geolocation of the incident: incident location, CSD related information, postal

code, and the specific coding for major occupancy and property ownership categories. The following summary focuses on these NFID variables.

2.1.2 NFID Variables Selected to be Used in the Initial Review

The NFID geolocation variables that were observed to have the most potential for identifying fire incidents that had occurred within Indigenous communities were suggested to be:

- *Incident location* and *CSD related information*, because of the relatively high proportion of reported information for these variables;
    - However, before considering using the CSD related information, it was recommended to better understand the information and approach used during the NFID aggregation and processing. Therefore, CDS related information was not used in the initial review, but can be found in the analysis summarized in Appendix B.
- *Major occupancy* and *property ownership* categories, while limited in use, the specific coding provided clear identification, and allowed for a comparison of the information included in the incident location variable for these incidents; and
- *Postal code*, while reported for a moderate proportion of the total incidents included in the first survey cycle of the NFID, may provide an opportunity for cross-referencing, where incident location information would benefit from clarification.

Based on these initial insights, for the initial steps to explore whether the NFID potentially included fire incident information that may be related to Indigenous communities, the use of the *incident location* variable, and m*ajor occupancy* and *property ownership* categories were selected as an initial approach to explore whether it may be possible to identify reported fire incident information that had occurred in Indigenous communities within the content of the first survey cycle of the NFID.

2.1.3 Content Used for Initial Review

To use the *incident location* variable, a list of Indigenous community names was developed that could be used to compare with the information reported in the first survey cycle of the NFID. This information was gathered from various publicly available sources (see details of the sources listed in Appendix A), and reviewed by NIFSC staff by comparing the drafted list to inhouse lists to help identify additional community names to be included in the comparison.

The results of an initial comparison of the draft list of Indigenous community names compared to all the unique entries for the *incident location* variable for the first survey cycle were manually reviewed to provide additional insights into variations in the incident location variable content. This was used to further refine the list and the way the comparison was applied.

While the use of the NFID coded variables of m*ajor occupancy* and *property ownership* facilitated a simple application to identify fire incidents located on Indigenous communities, the approach comparing the draft list of Indigenous community names to the content of the NFID *incident location* variable provided a potential approach to identify more fire incident information on Indigenous community locations.

Therefore, two datasets were developed based on the location of fire incidents as either on an Indigenous community or on a non-Indigenous community. For the initial review these two datasets were developed by combining the unique fire incidents reported in the first survey cycle that were identified by:

- Comparison of the content of the NFID *incident location* variable with the draft list of Indigenous community names; and
- Identification of incidents reported with the NFID coded variables of m*ajor occupancy* (code 80) and *property ownership* (code 11).

These initial two datasets were used to develop the initial review insights.

Summary of Initial Review Insights

The primary insight from the initial review of the first survey cycle of the NFID using the simple comparison of the *incident location* variable with the draft list of Indigenous community names, and coded variables of *major occupancy* and *property ownership* was that out of approximately 467,000 incidents included in the first survey cycle, more than 6,000 fire incidents were identified as located on Indigenous communities, and more than 340 casualty information entries were associated with these incidents.

Based on this initial review of the first survey cycle data and the simple initial review using three NFID geolocation variables: *incident location*, *major occupancy* and *property ownership*, there was a strong indication that information related to fire incidents located within Indigenous communities that may be useful for these communities to inform their fire risk reduction plans development could be located within the NFID content.

2.2 Next Steps of the Analysis Approach

The experience and insight from the initial review was shared with the team within the Canadian Centre for Justice and Community Safety Statistics (CCJCSS) of Statistics Canada. The team within the CCJCSS was able to access both the first and second survey cycles of the NFID to be used in the exploratory analysis, as well as other files within Statistics Canada.

Originally, the project was planned to be collaborative, but during the development of the report, it was found that the Statistics Canada portion of the team could not participate in developing a co-authored report. Therefore, the information about approach for the exploration of the content of the NFID that was used by the Statistics Canada portion of the team is included as Appendix B.

The details of the analysis approach are included in this appendix, as provided by the CCJCSS of Statistics Canada. After inhouse verification and validation of the tables of data from the analysis, the CCJCSS released these for use by the National Research Council (NRC). The results from the analysis performed by the CCJCSS are summarized in the tables in this report, where each table includes an acknowledgment of the source information in the table notes.

Following is a summary of the results from the two datasets (based on geolocation information for fire incidents within Indigenous communities and incidents within non-Indigenous communities) found from this analysis, based on what was shared by Statistics Canada with the NRC for use in this project.

3 Summary of Two Dataset Content

A summary of the analysis results for the two datasets based on geolocation is included in this section for a high-level overview of the content of the two datasets and a summary of the quality of the available data that informed the selection of potential key variables for reporting on. Because of the limited size of the dataset for incident and casualty information for fire incidents located within Indigenous communities and the limited data sizes associated with various variables, only simple counts and ratios are included in the analysis results for select variables at this time. Based on the larger data sizes, observations for structure fires, and residential structural fire incidents were included. In all cases, because of the data sizes and the potential for under-reported incidents, care is cautioned in the use of the use and interpretation of the results and insights.

3.1 High-level Summaries of Dataset Content

A summary of the number of total fire incidents, and fire-related deaths and injuries for the two datasets based on NFID geolocation information is presented in Table 1.

Table 1 Summary of total fire incidents, deaths and injuries based on available geolocation information for the NFID, 2005-2021.

Dataset by geolocation information	Indigenous Community Locations	Non-Indigenous Community Locations
Total number of incidents	9,247	671,641
Total number of fire-related deaths[1]	238	2,718
Total number of fire-related injuries[2]	306	22,688

Notes:
General table notes: This data only includes the jurisdictions that have reported their information to the National Fire Information Database (NFID) between 2005 to 2021, which are: for Nova Scotia, New Brunswick, Ontario, British Columbia, and Manitoba from 2005 to 2021, for Saskatchewan from 2012 to 2014, for Alberta from 2005 to 2014, and for Yukon from 2013 to 2021. In New Brunswick, casualty information was only reported from 2010 to 2021 (however, there was insufficient geolocation information for data reported from 2010 to 2014) and incident location information was only reported from 2015 to 2021.
[1] Fire-related death refers to a person killed accidentally as a direct result of a fire or a person who dies from a fire injury within one year following the date on which the injury was sustained.
[2] Fire-related injury refers to a person accidentally injured as a direct result of a fire.
See also Appendix B for context of information used in the analysis.
Source: Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database analytical subset.

A summary of the number of total fire incidents, and fire-related deaths and injuries for the two datasets based on geolocation information for each participating jurisdiction is presented in Table 2.

Table 2 Summary of total fire incidents, deaths and injuries based on available geolocation information by jurisdiction, for the NFID, 2005-2021.

Jurisdiction	Indigenous Community Locations			Non-Indigenous Community Locations		
	Total number of fire-related incidents	Total number of fire-related deaths[1]	Total number of fire-related injuries[2]	Total number of fire-related incidents	Total number of fire-related deaths[1]	Total number of fire-related injuries[2]
Alberta	1,262	34	70	54,423	238	2,022
British Columbia	1,961	43	78	122,983	558	3,412
Manitoba	2,937	64	72	73,543	228	3,407
New Brunswick	431	SDS	SDS	10,904	53	193
Nova Scotia	692	SDS	22	25,278	163	608
Ontario	1,582	77	51	369,830	1,443	12,954
Saskatchewan	264	SDS	SDS	6,922	SDS	41
Yukon	118	SDS	SDS	7,758	SDS	51
Total	**9,247**	**238**	**306**	**671,641**	**2,718**	**22,688**

Notes:
General table notes: This data only includes the jurisdictions that have reported their information to the National Fire Information Database (NFID) between 2005 to 2021, which are: for Nova Scotia, New Brunswick, Ontario, British Columbia, and Manitoba from 2005 to 2021, for Saskatchewan from 2012 to 2014, for Alberta from 2005 to 2014, and for Yukon from 2013 to 2021. In New Brunswick casualty information was only reported from 2010 to 2021 and incident location information was only reported from 2015 to 2021.

Notes for Table 2 continued:
[1] Fire-related death refers to a person killed accidentally as a direct result of a fire or a person who dies from a fire injury within one year following the date on which the injury was sustained.
[2] Fire-related injury refers to a person accidentally injured as a direct result of a fire.
See also Appendix B for context of information used in the analysis.
Source: Statistics Canada, Canadian Centre for Justice Statistics, National Fire Information Database analytical subset.

3.2 Structure, Vehicle and Outdoor Fire Incidents

A summary of the numbers of fire incidents, and all and civilian fire-related deaths and injuries for is presented in Table 3 for each dataset based on geolocation information for:

- all incidents included in each dataset for analysis by fire type (structure, vehicle and outdoor);
    - with structure fire incidents reported with a property classification group as residential; and
- for total and civilian fire-related deaths and injuries.

Table 3 Summary of number of fire and fire-related deaths and injuries based on available geolocation information, for fire type (structure, vehicle and outdoor), and for residential property classification group for structure fires, 2005-2021.

Dataset by geolocation information	Indigenous Community Locations	Non-Indigenous Community Locations
Total number of incidents	**9,247**	**671,641**
Structural fires[1]	5,570	323,654
Residential[2]	4,089	206,005
Vehicle fires[3]	1,250	114,322
Outdoor fires[4]	2,047	222,618
Total number of fire-related deaths[5]	**238**	**2,718**
Civilian fire-related deaths	215	2,487
Structural fires[1]	203	2,171
Residential[2]	191	2,020
Vehicle fires[3]	SDS	189
Outdoor fires[4]	SDS	72
Total number of fire-related injuries[6]	**306**	**22,654**
Civilian fire-related injuries	205	14,360
Structural fires[1]	188	13,165
Residential[2]	179	11,423
Vehicle fires[3]	SDS	774
Outdoor fires[4]	SDS	304

Notes for Table 3:
SDS refers to small data size.
General table notes: This data only includes the jurisdictions that have reported their information to the National Fire Information Database (NFID) between 2005 to 2021, which are: for Nova Scotia, New Brunswick, Ontario, British Columbia, and Manitoba from 2005 to 2021, for Saskatchewan from 2012 to 2014, for Alberta from 2005 to 2014, and for Yukon from 2013 to 2021. In New Brunswick casualty information was only reported from 2010 to 2021 and incident location information was only reported from 2015 to 2021.
[1] Structural fire include a wide range of properties/assemblies of materials forming a construction for occupancy or use to serve a specific purpose. This includes but is not limited to, all types of buildings, open platforms, bridges, storage facilities, tents, air-supported structures, and grandstands.
[2] Residential fires refers to fires occurring in structures where persons commonly reside for living purposes, either on a permanent or temporary basis. This category includes but is not limited to, single detached homes, duplexes, semi-detached homes, row/garden/town housing, apartments tenements, hotels/motels/lodges/hostels/boarding houses, dormitories, educational institutional residences, camp sites/RV parks, mobile/trailer parks and residential homes with an attached business (up to 3 stories).
[3] Vehicle fires include a wide range of motorized vehicles including, but not limited to passenger vehicles (other than a motor home), trucks, sport utility vehicles, buses, freight or transport vehicles, rail vehicles, farm equipment, water vehicles (e.g., boats, barges, hovercraft), and aircraft. Mobile properties used a structure are excluded (e.g., mobile homes, motor homes, camping trailers).
[4] Outdoor fires refers to fires involving vegetation, grass, brush, crops, leaves and other outdoor properties not involving a structure or vehicle.
[5] Fire-related death refers to a person killed accidentally as a direct result of a fire or a person who dies from a fire injury within one year following the date on which the injury was sustained.
[6] Fire-related injury refers to a person accidentally injured as a direct result of a fire.

4 Summary of Analysis Results for Residential Structure Fires and Civilian Casualties

This section provides a high-level summary of the content of the two datasets for residential structure fire information for numbers of incidents, and civilian fire-related deaths and injuries. Because of the limited size of the dataset for incident and casualty information for fire incidents located within Indigenous communities and the limited data sizes associated with various variables, only simple counts, percentages and ratios are included in the analysis for select variables at this time. In all cases, because of the relatively small data sizes and the potential for under-reported incidents, care is cautioned regarding the use and interpretation of the results and insights available.

This section provides summaries of the analysis results from selected NFID variables for residential fire information that were selected following a review of the quality of the available data in the two datasets based on geolocation information.

4.1 Residential Property Type

For all residential and a selection of residential property types, a summary of the total number of fire incidents, and civilian fire-related deaths and injuries is presented in Table 4 for each dataset based on geolocation information.

Table 4 Summary of residential[1] fire incidents and fire-related civilian casualties based on available geolocation information by residential property classification in the NFID 2005-2021.

Residential Property Classification	Indigenous Community Locations			Non-Indigenous Community Locations		
	Number of fire incidents	Number of civilian fire-related deaths[2]	Number of civilian fire-related injuries[3]	Number of fire incidents	Number of civilian fire-related deaths[2]	Number of civilian fire-related injuries[3]
One and two-family dwellings	3,195	158	146	126,321	1,196	5,553
Apartment, tenement, flat, townhouse, condominium	256	7	15	57,981	571	5,146
Mobile home, mobile accommodation, trailer	384	19	16	9,032	138	272
Other residential[4]	254	7	2	12,671	115	452
Total	**4,089**	**191**	**179**	**206,005**	**2,020**	**11,423**

1. Residential fires refers to fires occurring in structures where persons commonly reside for living purposes, either on a permanent or temporary basis. This category includes but is not limited to, single detached homes, duplexes, semi-detached homes, row/garden/town housing, apartments tenements, hotels/motels/lodges/hostels/boarding houses, dormitories, educational institutional residences, camp sites/RV parks, mobile/trailer parks and residential homes with an attached business (up to 3 stories).
2. Fire-related death refers to a person killed accidentally as a direct result of a fire or a person who dies from a fire injury within one year following the date on which the injury was sustained.
3. Fire-related injury refers to a person accidentally injured as a direct result of a fire.
4. Other residential includes rooming, boarding, lodging house, hostel, hotel, inn, lodge, motor hotel or motel, dormitory, camps/retreats, and the miscellaneous classification that includes children's play house, and residential miscellaneous - unclassified or unknown.

Note: This table includes the jurisdictions that reported data to the National Fire Information Database (NFID) as follows: Nova Scotia, Ontario, Manitoba, and British Columbia 2005 to 2021; Saskatchewan 2012 to 2014; Alberta 2005 to 2014; and Yukon 2013 to 2021. In New Brunswick, incident location information was only reported from 2015 to 2021.
Source: Statistics Canada, Canadian Centre for Justice and Community Safety Statistics, National Fire Information Database analytical subset.

4.2 Age Classification of Casualties

The number of civilian fire-related deaths and injuries for residential fires for each dataset based on geolocation information were reviewed for the reported age classifications of the casualty. Excluding civilian casualties reported as an unknown age classification (that formed between ~9% to 29% of the total information reported for each dataset), the most common age classification of the reported civilian fire-related casualties[8] were observed for:

- Fire incidents[1] that were located in Indigenous communities, for deaths[2] of adults[6] (~60%), children[4] (~26%), and seniors[1-7] (~11%); and for injuries[3] to adults[6] (~70%), children[7] (~16%), and youths[5] (~8%).
- Fire incidents[1] that were located in non-Indigenous communities, where deaths[2] and injuries, respectively, were adults[6] (~59% and 73%), seniors[7] (~35% and 15%), children[4] (~4% and 7%), and youths[5] (~2% and 76%).

[8] Notes for age classification for the summary provided:

1. Residential fires refers to fires occurring in structures where persons commonly reside for living purposes, either on a permanent or temporary basis. This category includes but is not limited to, single detached homes, duplexes, semi-detached homes, row/garden/town housing, apartments tenements, hotels/motels/lodges/hostels/boarding houses, dormitories, educational institutional residences, camp sites/RV parks, mobile/trailer parks and residential homes with an attached business (up to 3 stories).
2. Fire-related death refers to a person killed accidentally as a direct result of a fire or a person who dies from a fire injury within one year following the date on which the injury was sustained.
3. Fire-related injury refers to a person accidentally injured as a direct result of a fire.
4. Children are defined as persons 11 years and under.
5. Youth are persons aged 12 to 17 years.
6. Adults are persons aged 18 to 64 years.
7. Senior citizens are persons aged 65 years and older.

Note: This information includes the jurisdictions that reported data to the National Fire Information Database (NFID) as follows: Nova Scotia, Ontario, Manitoba, and British Columbia 2005 to 2021; Saskatchewan 2012 to 2014; Alberta 2005 to 2014; and Yukon 2013 to 2021. In New Brunswick, incident location information was only reported from 2015 to 2021. Nova Scotia did not provide fire incident data related to the age classification of casualties. Consequently, their numbers have been included in "Unknown."
Source: Statistics Canada, Canadian Centre for Justice and Community Safety Statistics, National Fire Information Database analytical subset.

4.3 Area of Fire Origin

A summary of the number of fire incidents and civilian fire-related deaths and injuries for residential fires for each dataset based on geolocation information is presented for the area of fire origin grouped categories in Table 5. To assist the reader, information for areas of fire origin (such as sleeping areas and kitchen or cooking areas) are also included in Table 5 (see the light grey-coloured rows under the “function areas”), since these types of areas are more commonly described in literature than the grouped category of “function area”.

Table 5 Summary of residential[1] fire incidents and fire-related civilian casualties based on available geolocation information by the area of fire origin, in the NFID 2005-2021.

Area of Fire Origin	Indigenous Community Locations			Non-Indigenous Community Locations		
	Number of fire incidents	Number of civilian fire-related deaths[2]	Number of civilian fire-related injuries[3]	Number of fire incidents	Number of civilian fire-related deaths[2]	Number of civilian fire-related injuries[3]
Assembly, family, sales area	373	48	37	15,102	592	1,461
Function areas	1,225	64	97	75,261	745	7,103
Sleeping area	448	31	24	15,656	411	1,942
Kitchen, cooking area	573	24	45	45,485	247	4,450
Other function area[4]	204	9	28	14120	87	711
Structural area[5]	586	30	6	27,430	105	663
Storage, vehicle or outside area	474	8	15	4040,147	109	11,049
Other area[6]	1,199	38	9	39,696	352	756
Unknown	967	37	4	22,736	324	496
Percentage of unknown of total	24%	19%	<3%	11%	16%	4%
Total (excluding unknown)	3,122	154	175	183,269	1,696	10,927
Total	**4,089**	**191**	**179**	**206,005**	**2,020**	**11,423**

1. Residential fires refers to fires occurring in structures where persons commonly reside for living purposes, either on a permanent or temporary basis. This category includes but is not limited to, single detached homes, duplexes, semi-detached homes, row/garden/town housing, apartments tenements, hotels/motels/lodges/hostels/boarding houses, dormitories, educational institutional residences, camp sites/RV parks, mobile/trailer parks and residential homes with an attached business (up to 3 stories).
2. Fire-related death refers to a person killed accidentally as a direct result of a fire or a person who dies from a fire injury within one year following the date on which the injury was sustained.
3. Fire-related injury refers to a person accidentally injured as a direct result of a fire.
4. Other function area includes dining or eating area, washroom, locker area, office, laundry area, laboratory, display windows, printing and photographic reproduction, electronic equipment communication room, first-aid, treatment area, operating room, electronic equipment room, performance area, backstage, dressing room and process, manufacturing area and function area - unclassified.
5. Structural area includes ceiling, floor and wall assemblies (including concealed spaces), crawl space, exterior balcony, ceiling and floor spaces, exterior wall and roof, awning and canopy.
6. Other area includes the classifications of multiple areas of origin or means of egress, and service, service facilities and equipment area.
Note: This table includes the jurisdictions that reported data to the National Fire Information Database (NFID) as follows: Nova Scotia, Ontario, Manitoba, and British Columbia 2005 to 2021; Saskatchewan 2012 to 2014; Alberta 2005 to 2014; and Yukon 2013 to 2021. In New Brunswick, incident location information was only reported from 2015 to 2021.
Source: Statistics Canada, Canadian Centre for Justice and Community Safety Statistics, National Fire Information Database analytical subset.

4.4 Source of Ignition

A summary of the number of fire incidents and civilian fire-related deaths and injuries for residential fires for each dataset based on geolocation information is presented for the 'igniting object group' categories in Table 6.

Table 6 Summary of residential[1] fire incidents and fire-related civilian casualties based on available geolocation information by the source of ignition, in the NFID 2005-2021.

Source of ignition[2]	Indigenous Community Locations			Non-Indigenous Community Locations		
	Number of fire incidents	Number of civilian fire-related deaths[3]	Number of civilian fire-related injuries[4]	Number of fire incidents	Number of civilian fire-related deaths[3]	Number of civilian fire-related injuries[4]
Cooking equipment[5]	450	17	39	43,456	175	4,292
Heating equipment[6]	374	13	22	23,352	82	515
Electrical appliances, distribution and other equipment[7]	372	10	21	29,707	156	1239
Smoker's equipment and open flame[8]	856	48	41	37,240	790	2,789
Exposure or no igniting object[9] and miscellaneous	590	29	6	28,893	244	585
Unknown	1,447	74	50	43,357	573	2,003
Percentage of unknown of total	35%	39%	28%	21%	28%	18%
Total (excluding unknown)	2,642	117	129	162,648	1,447	9,420
Total	**4,089**	**191**	**179**	**206,005**	**2,020**	**11,423**

1. Residential fires refers to fires occurring in structures where persons commonly reside for living purposes, either on a permanent or temporary basis. This category includes but is not limited to, single detached homes, duplexes, semi-detached homes, row/garden/town housing, apartments tenements, hotels/motels/lodges/hostels/boarding houses, dormitories, educational institutional residences, camp sites/RV parks, mobile/trailer parks and residential homes with an attached business (up to 3 stories).
2. Source of ignition refers to the actual equipment, device or item which brings about ignition. The following categories have been used to present the source of fire: cooking equipment, heating equipment, appliances and household equipment, electrical distribution equipment, other electrical equipment, smoker's material and open flame, exposure fire, no igniting object, or other/unknown.
3. Fire-related death refers to a person killed accidentally as a direct result of a fire or a person who dies from a fire injury within one year following the date on which the injury was sustained.
4. Fire-related injury refers to a person accidentally injured as a direct result of a fire.
5. Cooking equipment includes but is not limited to, ovens/stoves, top burner area (including fire in a pot or pan), deep fat fryers, commercial ovens and stoves, smokers, pans or grills not on stove, hot plates, barbecues, portable warming appliances, toasters, kettles, coffee makers, microwave ovens, etc.
6. Heating equipment includes but is not limited to, central heating units such as furnaces/boilers, water heaters, space heaters, baseboard heaters, wood stoves, fireplaces, chimneys, vent connectors, and radiant heating systems.
7. Electrical appliances, distribution and other equipment includes but is not limited to, televisions, radios, washing machines and dryers, dishwashers, air condition units, refrigerators/freezers, electric blankets/heating pads, vacuum cleaners, hair dryers, snow blowers, permanent electric wiring, conductors, transformers, fuses, circuit breakers, extension cords/power bars, batteries, appliance motors, power tools, computers/laptops, lamps (incandescent, fluorescent, halogen, grow lamps), video game equipment, photocopiers, printers, etc.
8. Smoker's material and open flame includes but is not limited to, cigarettes, pipes, cigars, lighters, matches, ashtrays, lanterns, candles, cutting torch, welding equipment, blow torches, soldering irons, hot ashes or embers not associated with smoking, etc.
9. An exposure fire is one where the structure reported was not the originating source of the fire. An exposure fire can occur as a direct consequence of a fire originating in either a completely detached segregated building, vehicle, structure or facility or an outside open area (e.g., campfires, forest fires, tree/grass/shrub or brush fires). No igniting object refers to lightning.

Notes for Table 6 continued:
Note: This table includes the jurisdictions that reported data to the National Fire Information Database (NFID) as follows: Nova Scotia, Ontario, Manitoba, and British Columbia 2005 to 2021; Saskatchewan 2012 to 2014; Alberta 2005 to 2014; and Yukon 2013 to 2021. In New Brunswick, incident location information was only reported from 2015 to 2021.
Source: Statistics Canada, Canadian Centre for Justice and Community Safety Statistics, National Fire Information Database analytical subset.

4.5 Performance of Smoke Alarm Device

A summary of the number of fire incidents and civilian fire-related deaths and injuries for residential fires for each dataset based on geolocation information is presented for the performance of smoke alarm device in Table 7.

Table 7 Summary of residential[1] fire incidents and fire-related civilian casualties based on available geolocation information by the performance of smoke alarm device, in the NFID 2005-2021.

Performance of Smoke Alarm Device	Indigenous Community Locations			Non-Indigenous Community Locations		
	Number of fire incidents	Number of civilian fire-related deaths[2]	Number of civilian fire-related injuries[3]	Number of fire incidents	Number of civilian fire-related deaths[2]	Number of civilian fire-related injuries[3]
No smoke alarm	1,196	68	67	31,084	368	1,432
Alarm activated	465	13	22	67,868	529	5,449
Alarm did not activate	199	12	20	24,516	289	1,793
Not applicable or unknown	2,229	98	70	82,537	834	2,749
Percentage of Not applicable or Unknown of total	55%	51%	39%	40%	41%	24%
Total (excluding not applicable and unknown)	1,860	93	109	123,468	1,186	8,674
Total	**4,089**	**191**	**179**	**206,005**	**2,020**	**11,423**

1. Residential fires refers to fires occurring in structures where persons commonly reside for living purposes, either on a permanent or temporary basis. This category includes but is not limited to, single detached homes, duplexes, semi-detached homes, row/garden/town housing, apartments tenements, hotels/motels/lodges/hostels/boarding houses, dormitories, educational institutional residences, camp sites/RV parks, mobile/trailer parks and residential homes with an attached business (up to 3 stories).
2. Fire-related death refers to a person killed accidentally as a direct result of a fire or a person who dies from a fire injury within one year following the date on which the injury was sustained.
3. Fire-related injury refers to a person accidentally injured as a direct result of a fire.
Note: This table includes the jurisdictions that reported data to the National Fire Information Database (NFID) as follows: Nova Scotia, Ontario, Manitoba, and British Columbia 2005 to 2021; Saskatchewan 2012 to 2014; Alberta 2005 to 2014; and Yukon 2013 to 2021. In New Brunswick, incident location information was only reported from 2015 to 2021. Nova Scotia and Yukon did not provide fire incident data related to smoke alarm performance. Consequently, their numbers have been included in "Unknown."
Source: Statistics Canada, Canadian Centre for Justice and Community Safety Statistics, National Fire Information Database analytical subst.

4.6 Act or Omission

A summary of the number of fire incidents and civilian fire-related deaths and injuries for residential fires for each dataset based on geolocation information is presented for the 'act or omission group' that contributed to the onset of the fire incident in Table 8.

Table 8 Summary of residential[1] fire incidents and fire-related civilian casualties based on available geolocation information by act or omission, in the NFID 2005-2021.

Act or Omission[2]	Indigenous Community Locations			Non-Indigenous Community Locations		
	Number of fire incidents	Number of civilian fire-related deaths[3]	Number of civilian fire-related injuries[4]	Number of fire incidents	Number of civilian fire-related deaths[3]	Number of civilian fire-related injuries[4]
Incendiary fires[5]	1,177	24	25	18,826	278	551
Misuse of source of ignition[6]	314	19	23	18,280	400	1,237
Misuse of material ignited[7]	210	9	21	18,854	153	1,821
Combined Mechanical/ electrical / failure / malfunction[8] and construction, design or installation deficiency[9]	485	7	26	36627	146	1120
Misuse of equipment[10]	322	8	6	25,700	141	2,220
Human failing[11]	360	36	32	21,022	178	1,642
Vehicle accident	5	0	0	213	0	7
Miscellaneous	497	14	0	19,219	52	650
Unknown	719	74	46	47,264	672	2,175
Percentage of unknown of total	18%	39%	26%	23%	33%	19%
Total (excluding unknown)	3,370	117	133	158,741	1,348	9,248
Total	**4,089**	**191**	**179**	**206,005**	**2,020**	**11,423**

1. Residential fires refers to fires occurring in structures where persons commonly reside for living purposes, either on a permanent or temporary basis. This category includes but is not limited to, single detached homes, duplexes, semi-detached homes, row/garden/town housing, apartments tenements, hotels/motels/lodges/hostels/boarding houses, dormitories, educational institutional residences, camp sites/RV parks, mobile/trailer parks and residential homes with an attached business (up to 3 stories).
2. Act or omission refers to the set of circumstances precipitated by human acts (something that was done) or human omissions to act (something that was not done) that contributed to the onset of the fire incident. The purpose of this classification is to indicate these acts or omissions, be they deliberate or negligent. It includes such actions as incendiary acts and negligent use of fuel sources, equipment or materials. It also includes such factors as mechanical failures which may have resulted from human omissions through lack of maintenance, or through design, construction or installation deficiencies.
3. Fire-related death refers to a person killed accidentally as a direct result of a fire or a person who dies from a fire injury within one year following the date on which the injury was sustained.
4. Fire-related injury refers to a person accidentally injured as a direct result of a fire.
5. Incendiary act refers to deliberate acts of arson caused by individuals or groups of persons during riots, civil disturbances, acts of vandalism or mischief. This category also includes suspicious fires.
6. Misuse of source of ignition refers to primarily accidents involving the source of ignition such things as the misuse/improper extinguishment of smokers' material, inadequate control of open fires, playing with a source of ignition, welding or using a torch too close to a flammable object, etc.
7. Misuse of material ignited refers to the improper use/handling or storage of the material that caught fire, such as an accidental fuel spill, overheating of cooking oil, grease or wax, placing a combustible too close to heat, etc.

Notes for Table 8 continued:
8. Mechanical/electrical failure/malfunction refers to the omission to maintain mechanical or electrical equipment properly, which resulted in: a part to fail, leak or break; or an automatic control failure; or a manual control failure; or an electrical short circuit; or for a part to wear out; or an engine backfire; or some other sort of mechanical/electrical failure or malfunction.
9. Construction, design or installation deficiency refers to construction, design deficiencies of the structure in general. This category also includes the installation of materials too close to a combustible, over fusing, suspected faulty wiring and other installation deficiency.
10. Misuse of equipment includes but is not limited to the following: over-fueling of equipment, a log rolling out of a fireplace or wood burning oven, screen not closed, flying embers, lack of maintenance, leaving equipment unattended, glass doors exploded, shattered, paper fell out, misuse of equipment - unclassified and misuse of equipment - cannot be determined.
11. Human failing refers to instances where the onset of the fire was related to circumstances related to a person or persons. It includes instances where the act or omission was due to a person/persons: being asleep or fatigued at the time of the fire; having temporary loss of judgement; having a physical or mental disability; being impaired by alcohol, drugs or medication; having an accident; being distracted or preoccupied. It also includes factors of age where an infant, young child or elderly person was unattended or unsupervised. This category also includes ignorance of hazard, multiple persons involved, gang activity, human failing - unclassified or human failing - cannot be determined.
Note: This table includes the jurisdictions that reported data to the National Fire Information Database (NFID) as follows: Nova Scotia, Ontario, Manitoba, and British Columbia 2005 to 2021; Saskatchewan 2012 to 2014; Alberta 2005 to 2014; and Yukon 2013 to 2021. In New Brunswick, incident location information was only reported from 2015 to 2021.
Source: Statistics Canada, Canadian Centre for Justice and Community Safety Statistics,
National Fire Information Database analytical subset.

5 Discussion of Results

In all cases, because of the data sizes and the potential for under-reported incidents and under-reported details of each incident, simple counts and general trends are discussed, and care is cautioned in the use of the results and observations.

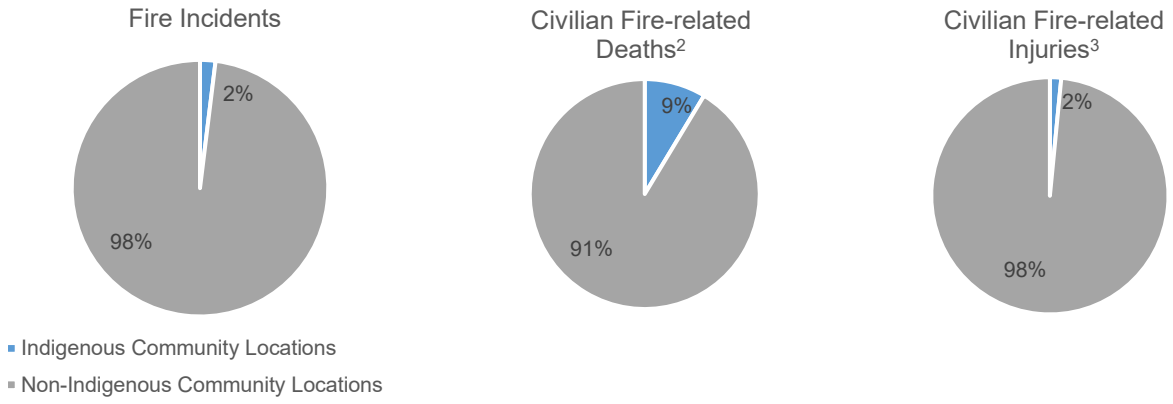
Furthermore, because of the known incompleteness of the dataset for incidents in Indigenous community locations that is heavily reliant on reported incidents where mutual aid was provided, it would not be appropriate to consider the dataset information compared with population or number of households that would be community-related data. Therefore, overall, the discussion considers general trends within the datasets and rates using the number of fire incidents as a benchmark.

5.1 Select Key Variables

Overall, the dataset for residential fire incidents that was found with geolocation information in Indigenous community locations from information from the two surveys of the participating jurisdictions for 2005-2021 were (Table 4, and Figure 2):

- 4,089 fire incidents, or about 2% of the total dataset with geolocation information available;
- 191 fire-related civilian deaths, or about 9% of the total dataset with geolocation information available; and
- 179 fire-related injuries, or about 2% of total dataset with geolocation information available.

Figure 2 Overview of proportions of residential fire information[1] identified using geolocation information for incidents compared with Indigenous community locations and non-Indigenous locations in the NFID 2005-2021, based on Table 4.



1. Residential fires refers to fires occurring in structures where persons commonly reside for living purposes, either on a permanent or temporary basis. This category includes but is not limited to, single detached homes, duplexes, semi-detached homes, row/garden/town housing, apartments tenements, hotels/motels/lodges/hostels/boarding houses, dormitories, educational institutional residences, camp sites/RV parks, mobile/trailer parks and residential homes with an attached business (up to 3 stories).
2. Fire-related death refers to a person killed accidentally as a direct result of a fire or a person who dies from a fire injury within one year following the date on which the injury was sustained.
3. Fire-related injury refers to a person accidentally injured as a direct result of a fire.

Based on the information presented in Table 4, a summary is presented in Table 9 for each dataset based on geolocation information for the:

- Rate of civilian fire-related deaths to the number of fire incidents per 1,000 fires;
- Rate of civilian fire-related injuries to the number of fire incidents per 1,000 fires;
- Ratio of civilian fire-related deaths to injuries; and
- Ratios of the values for Indigenous community location data to values for non-Indigenous community location data for the three values described above.

Table 9 Rate of residential[1] fire-related civilian casualties to the number of fire incidents per 1,000 incidents based on available geolocation information by residential property classification, in the NFID 2005-2021.

Residential Property Classification	Indigenous Community Locations	Non-Indigenous Community Locations	Ratio of Indigenous Community Locations to Non-Indigenous Community Locations
Total residential fires			
Rate of number of fire-related civilian deaths[2] to 1,000 fire incidents	46.7	9.8	4.8
Rate of number of fire-related civilian injuries[3] to 1,000 fire incidents	43.8	55.5	0.8
Ratio of number of fire-related civilian deaths[2] to injuries[3]	1.1	0.2	6.0
One and two-family dwellings			
Rate of number of fire-related civilian deaths[2] to 1,000 fire incidents	49.5	9.5	5.2
Rate of number of fire-related civilian injuries[3] to 1,000 fire incidents	45.7	44.0	1.0
Ratio of number of fire-related civilian deaths[2] to injuries[3]	1.1	0.2	5.0
Mobile home, mobile accommodation, trailer			
Rate of number of fire-related civilian deaths[2] to 1,000 fire incidents	49.5	15.3	3.2
Rate of number of fire-related civilian injuries[3] to 1,000 fire incidents	41.7	30.1	1.4
Ratio of number of fire-related civilian deaths[2] to injuries[3]	1.2	0.5	2.3
Apartment, tenement, flat, townhouse, condominium			
Rate of number of fire-related civilian deaths[2] to 1,000 fire incidents	27.3	9.8	2.8
Rate of number of fire-related civilian injuries[3] to 1,000 fire incidents	58.6	88.8	0.7
Ratio of number of fire-related civilian deaths[2] to injuries[3]	0.5	0.1	4.2

1. Residential fires refers to fires occurring in structures where persons commonly reside for living purposes, either on a permanent or temporary basis. This category includes but is not limited to, single detached homes, duplexes, semi-detached homes, row/garden/town housing, apartments tenements, hotels/motels/lodges/hostels/boarding houses, dormitories, educational institutional residences, camp sites/RV parks, mobile/trailer parks and residential homes with an attached business (up to 3 stories).
2. Fire-related death refers to a person killed accidentally as a direct result of a fire or a person who dies from a fire injury within one year following the date on which the injury was sustained.
3. Fire-related injury refers to a person accidentally injured as a direct result of a fire.
Note: This table includes the jurisdictions that reported data to the National Fire Information Database (NFID) as follows: Nova Scotia, Ontario, Manitoba, and British Columbia 2005 to 2021; Saskatchewan 2012 to 2014; Alberta 2005 to 2014; and Yukon 2013 to 2021. In New Brunswick, incident location information was only reported from 2015 to 2021.
Source: Statistics Canada, Canadian Centre for Justice and Community Safety Statistics, National Fire Information Database analytical subset.

Based on the information presented in Table 9, for all residential fires, the rate of the number of fire-related civilian deaths to 1,000 fire incidents is approximately 47 for Indigenous community locations, compared with approximately 10 for non-Indigenous community locations. That is a rate of civilian deaths to 1,000 fires of approximately 5 times higher for Indigenous community locations compared to non-Indigenous information. Considering the content of the NFID and

assumed reporting related to Mutual Aid Agreements, this result compares well with previous studies which show about 4.4 to 5 times higher rates for First Nations communities, 17 times higher for Inuit communities and about 1 time for Métis Settlements compared to non-Indigenous information [CMHC, 2004; Kumar, 2021].

The rate of the number of fire-related civilian injuries to 1,000 fire incidents (Table 9) is approximately 44 for Indigenous community locations, compared with approximately 56 for non-Indigenous community locations. This is approximately the same rate for Indigenous community locations compared to non-Indigenous information. This result compares well with a previous study that also reported about the same rates for First Nations communities [Weckman et al., 2023]. Considering the information available for all residential fires in Indigenous community locations, the source for the current study (drawn from the NFID data) is a different data source compared to the previous two studies, while it is noted that similar trends are observed compared to the previously published studies.

For the number of fire incidents, civilian fire-related deaths, and civilian fire-related injuries, the top three most common types of residential fire, based on the summary of information presented in Table 4, were as follows:

- For fire incidents located in Indigenous communities, were:
    - one- and two-family dwellings (~78% of incidents, 83% of deaths, and 82% of injuries);
    - mobile home, mobile accommodation, trailer (~9%, 10%, and 9%); and
    - apartment, tenement, flat, townhouse, condominium (~6%, 4%, and 8%).
- For fire incidents located on non-Indigenous communities, were:
    - one- and two-family dwellings (~61% of incidents, 59% of deaths, and 49% of injuries);
    - apartment, tenement, flat, townhouse, condominium (~28%, 28%, and 45%); and
    - mobile home, mobile accommodation, trailer (~4%, 7%, and 2%).

Based on the information presented in Table 9, for one-and two-family dwelling fires, the rate of the number of fire-related civilian deaths to 1,000 fire incidents is approximately 50 for Indigenous community locations, compared with approximately 10 for non-Indigenous community locations. That is, the rate of civilian deaths to 1,000 fires is approximately 5 times higher for Indigenous community locations compared to non-Indigenous information. This result compares reasonably with previous studies of 10.4 times for First Nations communities compared to non-Indigenous information [CMHC, 2004].

The majority of residential information for fire incidents, and civilian fire related deaths and injuries was consistently reported for one-and two-family dwellings for both Indigenous

community locations (~78%, ~83% and 82%) and non-Indigenous community locations (~61%, 59% and 49%). Because of the large proportion reported for one- and two-family dwelling fire information, the following discussion focuses on all residential fire information.

5.1.1 Area of Fire Origin

Excluding information reported for area of fire origin as an unknown (for incidents, civilian deaths, and civilian injuries, respectively, of 24%, 19%, and 2% for incidents in Indigenous communities; and 11%, 16%, and 4% for incidents on non-Indigenous communicated locations), the most common reported areas of fire origin, based on the information summarized in Table 5 are as follows:

- For fire incidents located in Indigenous communities:
    - Fire incidents were structural areas (~19%), kitchen or cooking areas (~18%), storage, vehicle or outside areas (~15%), sleeping areas (~14%), and assembly and family areas (~12%).
    - Civilian fire-related deaths were assembly and family areas (~31%), sleeping areas (~20%), structural areas (~19%), and kitchen or cooking areas (~16%).
    - Civilian fire-related injuries were kitchen or cooking areas (~26%), assembly or family areas (~21%), sleeping areas (~14%), and storage, vehicle or outside areas (~9%).
- For fire incidents located in non-Indigenous communities:
    - Fire incidents were kitchen areas (~25%), storage, vehicle or outside areas (~22%), structural areas (~15%), and sleeping areas (~9%).
    - Civilian fire-related deaths were assembly or family areas (~35%), sleeping areas (~24%), kitchen or cooking areas (~15%), vehicle or outside areas (~6%), and structural areas (~6%).
    - Civilian fire-related injuries were kitchen or cooking areas (~41%), sleeping areas (18%), assembly or family areas (~13%), storage, vehicle or outside areas (~10%), and structural areas (~6%).

The four most common reported areas of fire origin for fire incidents, civilian deaths, and injuries were reasonably similar for Indigenous and non-Indigenous community locations. However, for civilian deaths the area of fire origin reported as structural areas was the 3rd most common for civilian deaths in Indigenous community locations compared to the 5th most common for non-Indigenous community locations.

Based on the information presented in Table 5, a summary of fire information is presented in Table 10 for the:

- Rate of civilian fire-related deaths to the number of fire incidents per 1,000 fires;
- Rate of civilian fire-related injuries to the number of fire incidents per 1,000 fires;
- Ratio of civilian fire-related deaths to injuries; and
- Ratios of the values for Indigenous community location data to non-Indigenous community location data for the three values described above.

Based on the information presented in Table 10, for structural areas, the rate of the number of fire-related civilian deaths to 1,000 fire incidents is approximately 51 for Indigenous community locations, compared with approximately 4 for non-Indigenous community locations. This is a rate of civilian deaths to 1,000 fires of approximately 13 times higher for Indigenous community locations compared to non-Indigenous information. For other areas of fire origin, the rate of civilian deaths to 1,000 fires is approximately 3 to 8 times higher for Indigenous community locations compared to non-Indigenous community locations. Therefore, while the rankings of the most common areas of fire origin for Indigenous and non-Indigenous community locations are mostly similar, the observed trends are very different.

The ratio of civilian fire-related deaths to injuries, for Indigenous community locations, ranges from approximately 0.5 to 5, compared to approximately 0.1 to 0.4 for ratios for non-Indigenous community locations. For Indigenous community locations, the highest ratio of deaths to injuries of about 5 was associated with structural areas, compared to about 0.2 for the non-Indigenous community locations. The ratios of civilian deaths to injuries compare well to previous the previous study by Weckman et al. [2023], of about 1 or greater.

Table 10 Rate of residential[1] fire-related civilian casualties to the number of fire incidents per 1,000 incidents based on available geolocation information by the area of fire origin, in the NFID 2005-2021.

Area of Fire Origin	Indigenous Community Locations	Non-Indigenous Community Locations	Ratio of Indigenous Community Locations to Non-Indigenous Community Locations
Assembly, family, sales area (groups of people), includes lounge, living room			
Rate of number of fire-related civilian deaths[2] to 1,000 fire incidents	128.7	39.2	3.3
Rate of number of fire-related civilian injuries[3] to 1,000 fire incidents	99.2	96.7	1.0
Ratio of number of fire-related civilian deaths[2] to injuries[3]	1.3	0.4	3.2
Structural area			
Rate of number of fire-related civilian deaths[2] to 1,000 fire incidents	51.2	3.8	13.4
Rate of number of fire-related civilian injuries[3] to 1,000 fire incidents	10.2	24.2	0.4
Ratio of number of fire-related civilian deaths[2] to injuries[3]	5.0	0.2	31.6
Function area – Sleeping area			
Rate of number of fire-related civilian deaths[2] to 1,000 fire incidents	69.2	26.3	2.6
Rate of number of fire-related civilian injuries[3] to 1,000 fire incidents	53.6	124.0	0.4
Ratio of number of fire-related civilian deaths[2] to injuries[3]	1.3	0.2	6.1
Function area – kitchen, cooking area			
Rate of number of fire-related civilian deaths[2] to 1,000 fire incidents	41.9	5.4	7.7
Rate of number of fire-related civilian injuries[3] to 1,000 fire incidents	78.5	97.8	0.8
Ratio of number of fire-related civilian deaths[2] to injuries[3]	0.5	0.1	9.6

1. Residential fires refers to fires occurring in structures where persons commonly reside for living purposes, either on a permanent or temporary basis. This category includes but is not limited to, single detached homes, duplexes, semi-detached homes, row/garden/town housing, apartments tenements, hotels/motels/lodges/hostels/boarding houses, dormitories, educational institutional residences, camp sites/RV parks, mobile/trailer parks and residential homes with an attached business (up to 3 stories).
2. Fire-related death refers to a person killed accidentally as a direct result of a fire or a person who dies from a fire injury within one year following the date on which the injury was sustained.
3. Fire-related injury refers to a person accidentally injured as a direct result of a fire.
Note: This table includes the jurisdictions that reported data to the National Fire Information Database (NFID) as follows: Nova Scotia, Ontario, Manitoba, and British Columbia 2005 to 2021; Saskatchewan 2012 to 2014; Alberta 2005 to 2014; and Yukon 2013 to 2021. In New Brunswick, incident location information was only reported from 2015 to 2021.
Source: Statistics Canada, Canadian Centre for Justice and Community Safety Statistics, National Fire Information Database analytical subset.

5.1.2 Source of Ignition

Excluding information reported for igniting object group as an unknown (for incidents, civilian deaths, and civilian injuries, respectively, of ~35%, ~39%, and ~28% for incidents in Indigenous communities; and ~21%, ~28%, and ~18% for incidents on non-Indigenous communicated locations), the most common reported igniting object group for residential fires, based on the information summarized in Table 6 were as follows:

- For fire incidents located in Indigenous communities, for reported:
    - Fire incidents, and civilian fire-related deaths and injuries were smokers' equipment and open flame (~32% incidents, ~41% deaths, ~32% injuries), cooking equipment (~17%, ~15%, ~30%), heating equipment (~14%, ~11%, ~17%), electrical appliances, and distribution and other equipment (~14%, ~9%, ~16%).
- For fire incidents located in non-Indigenous communities, for reported:
    - Fire incidents were cooking equipment (~27%), smokers' equipment and open flame (~23%), electrical appliances, distribution and other equipment (~18%), and heating equipment (~14%).
    - Civilian fire-related deaths were smokers' equipment and open flame (~55%), cooking equipment (~12%), electrical appliances, distribution and other equipment (~11%), and heating equipment (~6%).
    - Civilian fire-related injuries were cooking equipment (~46%), smokers' equipment and open flame (~30%), electrical appliances, distribution and other equipment (~13%), and heating equipment (~5%).

The four most common reported object involved in ignition for fire incidents, and civilian deaths and injuries were reasonably similar for Indigenous and non-Indigenous community locations.

Based on the information presented in Table 6, a summary is presented in Table 11 for the:

- Rate of civilian fire-related deaths to the number of fire incidents per 1,000 fires;
- Rate of civilian fire-related injuries to the number of fire incidents per 1,000 fires;
- Ratio of civilian fire-related deaths to injuries; and
- Ratios of the values for Indigenous community location data to non-Indigenous community location data for the three values described above.

Table 11 Rate of residential[1] fire-related civilian casualties to the number of fire incidents per 1,000 incidents based on available geolocation information by the source of ignition, in the NFID 2005-2021.

Source of ignition[2]	Indigenous Community Locations	Non-Indigenous Community Locations	Ratio of Indigenous Community Locations to Non-Indigenous Community Locations
Smokers' equipment and open flame[5]			
Rate of number of fire-related civilian deaths[3] to 1,000 fire incidents	56.1	21.2	2.6
Rate of number of fire-related civilian injuries[4] to 1,000 fire incidents	47.9	74.9	0.6
Ratio of number of fire-related civilian deaths[3] to fire-related injuries[4] for fires	1.2	0.3	4.1
Cooking equipment[6]			
Rate of number of fire-related civilian deaths[3] to 1,000 fire incidents	37.8	4.0	9.4
Rate of number of fire-related civilian injuries[4] to 1,000 fire incidents	86.7	98.8	0.9
Ratio of number of fire-related civilian deaths[3] to fire-related injuries[4] for fires	0.4	0.0	10.7
Heating equipment[7]			
Rate of number of fire-related civilian deaths[3] to 1,000 fire incidents	34.8	3.5	9.9
Rate of number of fire-related civilian injuries[4] to 1,000 fire incidents	58.8	22.1	2.7
Ratio of number of fire-related civilian deaths[3] to fire-related injuries[4] for fires	0.6	0.2	3.7
Electrical appliances, distribution and other equipment[8]			
Rate of number of fire-related civilian deaths[3] to 1,000 fire incidents	26.9	5.3	5.1
Rate of number of fire-related civilian injuries[4] to 1,000 fire incidents	56.5	41.7	1.4
Ratio of number of fire-related civilian deaths[3] to fire-related injuries[4] for fires	0.5	0.1	3.8
Miscellaneous			
Rate of number of fire-related civilian deaths[3] to 1,000 fire incidents	105.3	13.1	8.1

1. Residential fires refers to fires occurring in structures where persons commonly reside for living purposes, either on a permanent or temporary basis. This category includes but is not limited to, single detached homes, duplexes, semi-detached homes, row/garden/town housing, apartments tenements, hotels/motels/lodges/hostels/boarding houses, dormitories, educational institutional residences, camp sites/RV parks, mobile/trailer parks and residential homes with an attached business (up to 3 stories).
2. Source of ignition refers to the actual equipment, device or item which brings about ignition. The following categories have been used to present the source of fire: cooking equipment, heating equipment, appliances and household equipment, electrical distribution equipment, other electrical equipment, smoker's material and open flame, exposure fire, no igniting object, or other/unknown.
3. Fire-related death refers to a person killed accidentally as a direct result of a fire or a person who dies from a fire injury within one year following the date on which the injury was sustained.
4. Fire-related injury refers to a person accidentally injured as a direct result of a fire.
5. Smoker's material and open flame includes but is not limited to, cigarettes, pipes, cigars, lighters, matches, ashtrays, lanterns, candles, cutting torch, welding equipment, blow torches, soldering irons, hot ashes or embers not associated with smoking, etc.
6. Cooking equipment includes but is not limited to, ovens/stoves, top burner area (including fire in a pot or pan), deep fat fryers, commercial ovens and stoves, smokers, pans or grills not on stove, hot plates, barbecues, portable warming appliances, toasters, kettles, coffee makers, microwave ovens, etc.
7. Heating equipment includes but is not limited to, central heating units such as furnaces/boilers, water heaters, space heaters, baseboard heaters, wood stoves, fireplaces, chimneys, vent connectors, and radiant heating systems.

Table notes continued on next page.

Notes for Table 11 continued:
8. Electrical appliances, distribution and other equipment includes but is not limited to, televisions, radios, washing machines and dryers, dishwashers, air condition units, refrigerators/freezers, electric blankets/heating pads, vacuum cleaners, hair dryers, snow blowers, permanent electric wiring, conductors, transformers, fuses, circuit breakers, extension cords/power bars, batteries, appliance motors, power tools, computers/laptops, lamps (incandescent, fluorescent, halogen, grow lamps), video game equipment, photocopiers, printers, etc.

Note: This table includes the jurisdictions that reported data to the National Fire Information Database (NFID) as follows: Nova Scotia, Ontario, Manitoba, and British Columbia 2005 to 2021; Saskatchewan 2012 to 2014; Alberta 2005 to 2014; and Yukon 2013 to 2021. In New Brunswick, incident location information was only reported from 2015 to 2021.

Source: Statistics Canada, Canadian Centre for Justice and Community Safety Statistics, National Fire Information Database analytical subset.

Based on the information presented in Table 11 for the source of ignition, the rate of the number of fire-related civilian deaths to 1,000 fire incidents were approximately:

- 3 times higher for smoker's equipment and open flames for Indigenous community locations compared to non-Indigenous community information;
- 9 times higher for cooking equipment for Indigenous community locations compared to non-Indigenous community information;
- 10 times higher for heating equipment for Indigenous community locations compared to non-Indigenous community information; and
- 5 times higher for electrical appliances, distribution and equipment for Indigenous community locations compared to non-Indigenous community information.

Overall, again, while the most common ignition sources are similar, the observed trends of the Indigenous and non-Indigenous community location datasets are very different.

5.1.3 Performance of Smoke Alarm Devices

Excluding information reported for the performance of smoke alarm devices as an unknown or not applicable[9] (for incidents, civilian deaths, and civilian injuries, respectively, of ~55%, ~51%, and ~39% for incidents in Indigenous communities; and ~40%, ~41%, and ~24% for incidents on non-Indigenous communicated locations), the performance of smoke alarms for residential fires, based on the information summarized in Table 7, Figure 3 and Figure 4, were as follows:

- For fire incidents in Indigenous community locations, for reported fire incidents, civilian fire-related deaths, and injuries, for a:
    - smoke alarm was reported to have activated were ~25%, ~14%, and ~20%; and
    - smoke alarm did not activate or no smoke alarm was reported were ~75%, ~86%, and ~80%.

- For fire incidents in non-Indigenous community locations, for reported fire incidents, civilian fire-related deaths, and injuries, for a:
    - smoke alarm reported to have activated were ~55%, ~45%, and ~63%; and
    - smoke alarm that was reported to have not activated or no smoke alarm was reported were ~45%, ~55%, and ~37%.

The relatively large proportion of information reported as unknown or not applicable (Table 7), that are combined to address some small data sizes, indicated that care is recommended in the interpretation of the information and that future consideration of the details of the incidents involved may provide useful insights.

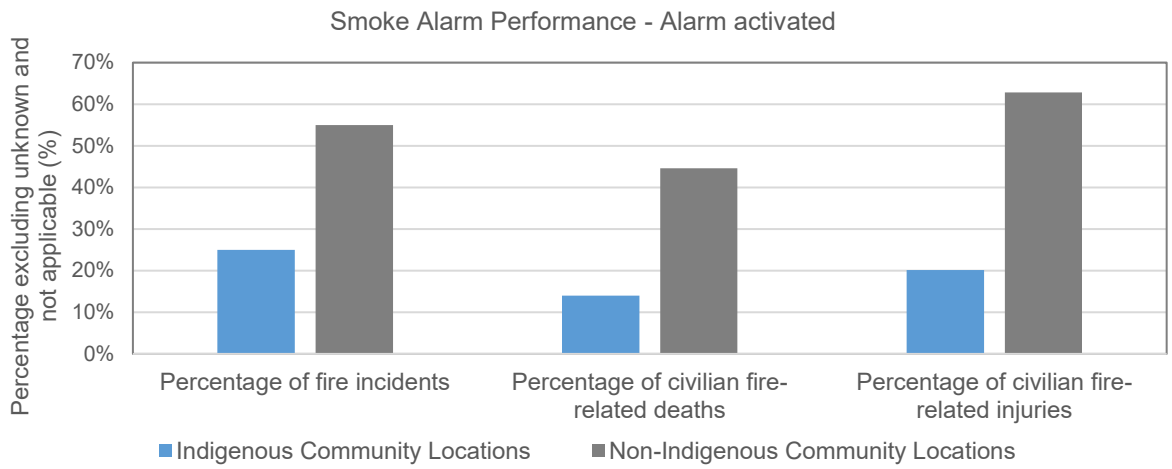


Figure 3 Proportion of reported fire incidents, civilian fire-related deaths and injuries, of performance of smoke alarm for residential fires reported for an activated smoke alarm, based on the information summarized in Table 7, excluding information reported for the performance of smoke alarm devices as an unknown or not applicable, in the NFID 2025-2021.

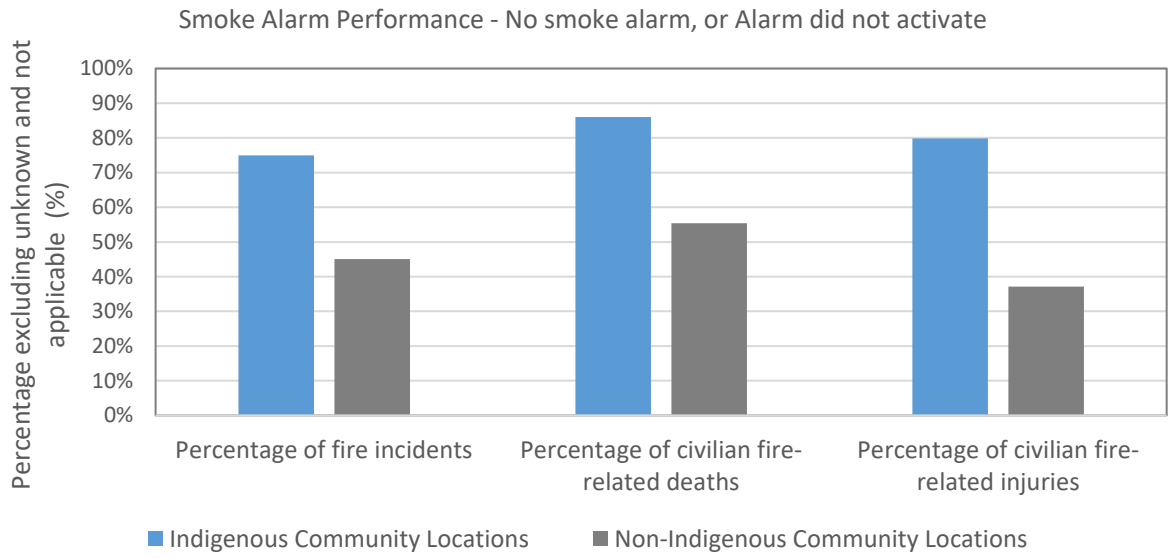


Figure 4 Proportion of reported fire incidents, civilian fire-related deaths and injuries, of performance of smoke alarm for residential fires reported as either no smoke alarm present or the alarm did not activate, based on the information summarized in Table 7, excluding information reported for the performance of smoke alarm devices as an unknown or not applicable, in the NFID 2025-2021.

Based on the information presented in Table 7, a summary is presented in Table 12 for the:

- Rate of civilian fire-related deaths to the number of fire incidents per 1,000 fires;
- Rate of civilian fire-related injuries to the number of fire incidents per 1,000 fires;
- Ratio of civilian fire-related deaths to injuries; and
- Ratios of the values for Indigenous community location data to non-Indigenous community location data for the 3 values described above.

Table 12 Rate of residential[1] fire-related civilian casualties to the number of fire incidents per 1,000 incidents based on available geolocation information by the performance of smoke alarm device, in the NFID 2005-2021.

Performance of Smoke Alarm Device	Indigenous Community Locations	Non-Indigenous Community Locations	Ratio of Indigenous Community Locations to Non-Indigenous Community Locations
No smoke alarm			
Rate of number of fire-related civilian deaths[2] to 1,000 fire incidents	56.9	11.8	4.8
Rate of number of fire-related civilian injuries[3] to 1,000 fire incidents	56.0	46.1	1.2
Ratio of number of fire-related civilian deaths[2] to injuries[3]	1.0	0.3	3.9
Alarm activated			
Rate of number of fire-related civilian deaths[2] to 1,000 fire incidents	28.0	7.8	3.6
Rate of number of fire-related civilian injuries[3] to 1,000 fire incidents	47.3	80.3	0.6
Ratio of number of fire-related civilian deaths[2] to injuries[3]	0.6	0.1	6.1
Alarm did not activate			
Rate of number of fire-related civilian deaths[2] to 1,000 fire incidents	60.3	11.8	5.1
Rate of number of fire-related civilian injuries[3] to 1,000 fire incidents	100.5	73.1	1.4
Ratio of number of fire-related civilian deaths[2] to injuries[3]	0.6	0.2	3.7

1. Residential fires refers to fires occurring in structures where persons commonly reside for living purposes, either on a permanent or temporary basis. This category includes but is not limited to, single detached homes, duplexes, semi-detached homes, row/garden/town housing, apartments tenements, hotels/motels/lodges/hostels/boarding houses, dormitories, educational institutional residences, camp sites/RV parks, mobile/trailer parks and residential homes with an attached business (up to 3 stories).
2. Fire-related death refers to a person killed accidentally as a direct result of a fire or a person who dies from a fire injury within one year following the date on which the injury was sustained.
3. Fire-related injury refers to a person accidentally injured as a direct result of a fire.
Note: This table includes the jurisdictions that reported data to the National Fire Information Database (NFID) as follows: Nova Scotia, Ontario, Manitoba, and British Columbia 2005 to 2021; Saskatchewan 2012 to 2014; Alberta 2005 to 2014; and Yukon 2013 to 2021. In New Brunswick, incident location information was only reported from 2015 to 2021. Nova Scotia and Yukon did not provide fire incident data related to smoke alarm performance. Consequently, their numbers have been excluded.
Source: Statistics Canada, Canadian Centre for Justice and Community Safety Statistics, National Fire Information Database analytical subset.

Based on the information presented in Table 12, the rate of the number of fire-related civilian deaths to 1,000 fire incidents were approximately:

- 4 times higher for alarm activated for Indigenous community locations compared to non-Indigenous community information;
- 5 times higher for no smoke alarm for Indigenous community locations compared to non-Indigenous community information; and
- 5 times higher for alarm did not activate for Indigenous community locations compared to non-Indigenous community information.

As noted for other variables, the observed trends of the Indigenous and non-Indigenous community location datasets are very different.

5.1.4 Act or Omission

Excluding information reported for the act or omission group as an unknown (for incidents, civilian deaths, and civilian injuries, respectively, of ~18%, ~39%, and ~26% for incidents in Indigenous communities; and ~23%, ~33%, and ~19% for incidents on non-Indigenous community locations), the most common reported act or omission group for residential fires, based on the information summarized in Table 8, were as follows:

- For fire incidents located in Indigenous communities, where the reported reason for:
    - Fire incidents were incendiary fires (~35%), miscellaneous (~15%), mechanical/ electrical / failure / malfunction and construction, design or installation deficiency (~14%), human failing (~11%), and misuse of equipment (~10%);
    - Civilian fire-related deaths were human failing (~31%), incendiary fires (~21%), misuse of source of ignition (~16%), miscellaneous (~12%), and misuse of material ignited (~8%); and
    - Civilian fire-related injuries were human failing (~24%), mechanical/ electrical / failure / malfunction and construction, design or installation deficiency (~20%), incendiary fires (~19%), misuse of source of ignition (~17%), and misuse of material ignited (~16%).
- For fire incidents located in non-Indigenous communities, where the reported reason for:
    - Fire incidents were relatively evenly reported categories of mechanical/ electrical / failure / malfunction and construction, design or installation deficiency (~23%), misuse of equipment (~16%), human failing (~13%), incendiary fires (~12%), misuse of source of ignition (~12%), and misuse of material ignited (~12%)
    - Civilian fire-related deaths were misuse of source of ignition (~30%), incendiary fires (~21%), human failing (~13%), misuse of material ignited (~11%), mechanical/ electrical / failure / malfunction and construction, design or installation deficiency (~11%), and misuse of equipment (~10%); and
    - Civilian fire-related injuries were misuse of equipment (~24%), misuse of material ignited (~20%), human failing (~18%), misuse of source of ignition (~13%), mechanical/ electrical / failure / malfunction and construction, design or installation deficiency (~12%).

The four most common reported acts or omissions for fire incidents, and civilian deaths and injuries were reasonably similar for Indigenous and non-Indigenous community locations. However, the most distinct differences were associated with:

- Incendiary fires that were:
  - The 1st most common reported act or omission for fire incidents for Indigenous community locations, compared to
  - The 4th to 6th most common for non-Indigenous community locations (considering there are three classifications with a similar percentage of ~12%, as described above).

Based on the information presented in Table 8, a summary of the reported act or omission group information for residential fires is presented in Table 13 for the:

- Rate of civilian fire-related deaths to the number of fire incidents per 1,000 fires;
- Rate of civilian fire-related injuries to the number of fire incidents per 1,000 fires;
- Ratio of civilian fire-related deaths to injuries; and
- Ratios of the values for Indigenous community location data to non-Indigenous community location data for the three values described above.

Table 13 Rate of residential[1] fire-related civilian casualties to the number of fire incidents per 1,000 incidents based on available geolocation information by act or omission, in the NFID 2005-2021.

Act or Omission[2]	Indigenous Community Locations	Non-Indigenous Community Locations	Ratio of Indigenous Community Locations to Non-Indigenous Community Locations
Incendiary fires[5]			
Rate of number of fire-related civilian deaths[3] to 1,000 fire incidents	20.4	14.8	1.4
Rate of number of fire-related civilian injuries[4] to 1,000 fire incidents	21.2	29.3	0.7
Ratio of number of fire-related civilian deaths[3] to fire-related injuries[4] for fires	1.0	0.5	1.9
Construction, design or installation deficiency[6]			
Rate of number of fire-related civilian deaths[3] to 1,000 fire incidents	28.6	2.1	13.6
Rate of number of fire-related civilian injuries[4] to 1,000 fire incidents	209.5	15.9	13.2
Ratio of number of fire-related civilian deaths[3] to fire-related injuries[4] for fires	0.1	0.1	1.0
Human failing[7]			
Rate of number of fire-related civilian deaths[3] to 1,000 fire incidents	100.0	8.5	11.8
Rate of number of fire-related civilian injuries[4] to 1,000 fire incidents	88.9	78.1	1.1
Ratio of number of fire-related civilian deaths[3] to fire-related injuries[4] for fires	1.1	0.1	10.4
Misuse of material ignited[8]			
Rate of number of fire-related civilian deaths[3] to 1,000 fire incidents	42.9	8.1	5.3
Rate of number of fire-related civilian injuries[4] to 1,000 fire incidents	100.0	96.6	1.0
Ratio of number of fire-related civilian deaths[3] to fire-related injuries[4] for fires	0.4	0.1	5.1
Misuse of equipment[9]			
Rate of number of fire-related civilian deaths[3] to 1,000 fire incidents	24.8	5.5	4.5
Rate of number of fire-related civilian injuries[4] to 1,000 fire incidents	18.6	86.4	0.2
Ratio of number of fire-related civilian deaths[3] to fire-related injuries[4] for fires	1.3	0.1	21.0

1. Residential fires refers to fires occurring in structures where persons commonly reside for living purposes, either on a permanent or temporary basis. This category includes but is not limited to, single detached homes, duplexes, semi-detached homes, row/garden/town housing, apartments tenements, hotels/motels/lodges/hostels/boarding houses, dormitories, educational institutional residences, camp sites/RV parks, mobile/trailer parks and residential homes with an attached business (up to 3 stories).
2. Act or omission refers to the set of circumstances precipitated by human acts (something that was done) or human omissions to act (something that was not done) that contributed to the onset of the fire incident. The purpose of this classification is to indicate these acts or omissions, be they deliberate or negligent. It includes such actions as incendiary acts and negligent use of fuel sources, equipment or materials. It also includes such factors as mechanical failures which may have resulted from human omissions through lack of maintenance, or through design, construction or installation deficiencies.
3. Fire-related death refers to a person killed accidentally as a direct result of a fire or a person who dies from a fire injury within one year following the date on which the injury was sustained.
4. Fire-related injury refers to a person accidentally injured as a direct result of a fire.
5. Incendiary act refers to deliberate acts of arson caused by individuals or groups of persons during riots, civil disturbances, acts of vandalism or mischief. This category also includes suspicious fires.
6. Construction, design or installation deficiency refers to construction, design deficiencies of the structure in general. This category also includes the installation of materials too close to a combustible, over fusing, suspected faulty wiring and other installation deficiency.

Notes for Table 13 continued:
7. Human failing refers to instances where the onset of the fire was related to circumstances related to a person or persons. It includes instances where the act or omission was due to a person/persons: being asleep or fatigued at the time of the fire; having temporary loss of judgement; having a physical or mental disability; being impaired by alcohol, drugs or medication; having an accident; being distracted or preoccupied. It also includes factors of age where an infant, young child or elderly person was unattended or unsupervised. This category also includes ignorance of hazard, multiple persons involved, gang activity, human failing - unclassified or human failing - cannot be determined.
8. Misuse of material ignited refers to the improper use/handling or storage of the material that caught fire, such as an accidental fuel spill, overheating of cooking oil, grease or wax, placing a combustible too close to heat, etc.
9. Misuse of equipment includes but is not limited to the following: over-fueling of equipment, a log rolling out of a fireplace or wood burning oven, screen not closed, flying embers, lack of maintenance, leaving equipment unattended, glass doors exploded, shattered, paper fell out, misuse of equipment - unclassified and misuse of equipment - cannot be determined.
Note: This table includes the jurisdictions that reported data to the National Fire Information Database (NFID) as follows: Nova Scotia, Ontario, Manitoba, and British Columbia 2005 to 2021; Saskatchewan 2012 to 2014; Alberta 2005 to 2014; and Yukon 2013 to 2021. In New Brunswick, incident location information was only reported from 2015 to 2021.
Source: Statistics Canada, Canadian Centre for Justice and Community Safety Statistics, National Fire Information Database analytical subset.

Based on the information presented in Table 13, the rate of the number of fire-related civilian deaths to 1,000 fire incidents were approximately:

- 1.4 times higher for reported incendiary fires for Indigenous community locations compared to non-Indigenous community information;
- 14 times higher for reported construction, design or installation deficiencies for Indigenous community locations compared to non-Indigenous community information;
- 12 times higher for reported human failing for Indigenous community locations compared to non-Indigenous community information; and
- 5 times higher for reported misuse of ignited materials for Indigenous community locations compared to non-Indigenous community information.

While generally the most commonly reported categories and the proportions might be similar when comparing trends between Indigenous community locations and non-Indigenous community information, the rates of fire-related civilian deaths to 1,000 fire incidents indicate very different trends.

One example counter to this general observation is for the act or omission category of incendiary fires, with incendiary fires reported as the most common category (~35%) for Indigenous community locations, compared with the 4th most common (with ~12%) for non-Indigenous information. In addition, the rate of the number of fire-related civilian deaths to 1,000 fire incidents (Table 13) is approximately 1.4 times higher for reported incendiary fires for Indigenous community locations compared to non-Indigenous community information. Therefore, while the proportion of fires attributed to incendiary acts might be higher and more common, the rates of deaths to fire incidents are reasonably similar when comparing the information available for Indigenous community locations to non-Indigenous.

These observations are consistent as noted for other variables; the observed trends of the Indigenous and non-Indigenous community location datasets are very different. Therefore, utilization of non-Indigenous information to estimate trends in Indigenous communities is not recommended. Furthermore, these observations support the importance of the collection of fire information for Indigenous communities to inform evidence-based discussions and decision-making for the communities.

6 Summary and Future Suggestions

In summary, this exploratory effort was undertaken in response to the current Canadian situation of a scarcity of information on fire incidents in Indigenous communities and the hope was to identify an additional data source that might enrich the information collected via the recently launched NIRS.

It was proposed that insights into the fire incidents within Indigenous communities might be captured in fire incidents where fire departments provide mutual aid through MSAs to the adjacent Indigenous community. In such cases, the fire departments report the incident through the provincial, territorial and Canadian Forces systems, whereby the fire marshals' and fire commissioners' offices collect the data. Therefore, there may be a currently untapped perspective to enrich the current NIRS data. Such fire incidents with mutual aid would be included in the contents of the NFID that was updated so that fire incidents from 2005 to 2021 are aggregated from participating jurisdictions. Identifying what data is available, based on reported geolocation information, would provide evidence-based reasoning for why data collection is important and may also provide evidence-based insights and observations of the fire risk.

The consistency and accuracy of reported geolocation information available was key in the approach used for the identification of potential information for fire incidents located in Indigenous communities. General limitations of the NFID content (Section 1.1.2) that were recommended to be considered during the analysis and interpretation of results include the variations in participation of the jurisdictions, the differences in collection methodologies and the data entry methods for the geolocation variables. The approach to identify a dataset of fire incidents in Indigenous community locations relied heavily on the NFID Incident location variable. Specifically, data entry for incident location is a manually entered alphanumeric value, so typographical errors, spelling mistakes, non-standard abbreviations and local variations in names, etc. can influence the data content. However, it was highly valuable for this research because this variable was typically reported to some extent for each incident. While other geolocation information (postal code, census subdivision, major occupancy with code 80 for a First Nations community, or property ownership with code 11 for a First Nations community) was less typically reported for an incident, they were applied after the initial comparison of incident location and identified additional incidents to be included in the dataset for Indigenous community locations (Section 2). Therefore, while not regularly reported, these variables with additional geolocation information were still valuable during this exploration of the content of the NFID.

When considering the results in all cases, because of the relatively small data sizes, the potential for under-reporting of community incidents since mutual aid was a key contributing factor for reporting, and under-reported detail of individual incidents indicated by the level of unknown information. Furthermore, the information that is available cannot be meaningfully understood without considering the historical context and present day-realities of Indigenous communities. Therefore, care is cautioned in the use of the results and observations. This is not to detract from the general observations but to be considered when applying the results to specific situations or considerations. In such cases, a detailed review and analysis of the available data would be recommended to explore the available information in context fully.

Key results from the exploratory analysis included that residential fire incident information was identified in Indigenous community locations based on available geolocation information, including:

- 4,089 fire incidents;
- 191 fire-related civilian deaths; and
- 179 fire-related civilian injuries.

Therefore, the NFID could be used to provide an additional data source to combine with NIRS information so that the enriched data could be available for Indigenous communities to help inform fire risk reduction plans tailored to and by each community.

Observations from the preliminary analysis include, for all residential fires (Table 9):

- The rate of the number of residential fire-related civilian deaths to 1,000 fire incidents is approximately 5 times higher for Indigenous community locations compared to non-Indigenous information.
    - Considering the content of the NFID and assumed reporting related to Mutual Aid Agreements, this result compares well with previous studies of about 4.4 to 5 times higher rates for First Nations communities, 17 times higher for Inuit communities and about 1 time for Métis Settlements compared to non-Indigenous information [CMHC, 2004; Kumar, 2021].
- The rate of the number of fire-related civilian injuries to 1,000 fire incidents is similar to (about 0.8 times) the rate for non-Indigenous information.
- The ratio of the number of fire-related civilian deaths to injuries is approximately one (~1.1) for Indigenous community locations (compared to a ratio of about 0.2 for non-Indigenous information). This result compares well with a previous study that also reported about a ratio of deaths to injuries of one for First Nations communities [Weckman et al., 2023].

Where comparison with previously published studies was possible, it was noted that the data source for the current study (drawn from the NFID data) is a different data source compared to previous studies that were included in the background literature review (Section 1.2), and it is noted that similar trends were observed. Therefore, this indicates that the dataset identified for Indigenous community locations, based on geolocation information using NFID content, could be added to the previous Indigenous community fire information without duplication or overlap, thus adding to the available data to help communities inform fire risk and risk reduction plans for their communities.

Key observations revealed that while the results for select variables (i.e., area of fire origin, object involved in ignition, performance of smoke alarm devices, and act or omission) showed similar ranked most common categories or even similar percentages when comparing the datasets for Indigenous and non-Indigenous community locations, the comparison of rates of civilian fire-related deaths to 1,000 fire incidents consistently indicate higher rates for Indigenous community locations compared to non-Indigenous.

A few noted observations include, for the reported areas of fire origin, the rate of the number of fire-related civilian deaths to 1,000 fire incidents (Table 10) were approximately:

- 13 times higher for structural areas for Indigenous community locations compared to non-Indigenous information; and
- 3 to 8 times higher for other reported areas of fire origin for Indigenous community locations compared to non-Indigenous information.

For the reported performance of smoke alarm devices, the rate of the number of fire-related civilian deaths to 1,000 fire incidents (Table 12) were approximately:

- 5 times higher for no smoke alarm activated or alarm did not activate for Indigenous community locations compared to non-Indigenous community information; and
- 4 times higher for alarm activated for Indigenous community locations compared to non-Indigenous community information.

For the reported object involved in ignition, the rate of the number of fire-related civilian deaths to 1,000 fire incidents (Table 11) were approximately:

- 10 times higher for heating equipment for Indigenous community locations compared to non-Indigenous community information;
- 9 times higher for cooking equipment for Indigenous community locations compared to non-Indigenous community information; and
- 3 times higher for smoker’s equipment and open flames for Indigenous community locations compared to non-Indigenous community information.

In addition, for the reported act or omission, the rate of the number of fire-related civilian deaths to 1,000 fire incidents were approximately:

- 12 times higher for reported human failing (e.g., including instances where a person may be asleep or fatigued; have a temporary loss of judgement; being impaired; have an accident; or be distracted or preoccupied) for Indigenous community locations compared to non-Indigenous information (Table 13);
- 5 times higher for reported misuse of ignited materials for Indigenous community locations compared to non-Indigenous information (Table 13).

Two examples of exceptions to the general trends of similar most commonly reported categories, and even similar percentages in some instances, include for the act or omission categories:

- For incendiary fires with:
    - The 1st most commonly reported fire incident (~35%) for Indigenous community locations, compared to the 4th to 6th most common (with three categories evenly ranked with ~12% each) for non-Indigenous information; and
    - The rate of the number of fire-related civilian deaths to 1,000 fire incidents (Table 13) that was 1.4 times higher for Indigenous community locations compared to non-Indigenous information.

This example of the observations of the trends observed within the reported acts or omissions is a further indication of the differences between the trends observed in the dataset for fire incidents in Indigenous community locations and non-Indigenous.

The observed trends echo those raised in previous studies that used different data sources [CMHC, 2004; Kumar, 2021; Weckman et al., 2023]. The observations in this study indicate that it is recommended, where available, Indigenous community-related data be used to inform the fire risk for that community. When information or the quality of data is limited for Indigenous communities, then caution is recommended if fire information trends observed for non-Indigenous community locations would be used for estimating the trends for Indigenous community locations. These observations support the importance of data collection to support evidence-based discussions and decisions.

6.1 Future Considerations

If the NFID content is to be used in future efforts to identify fire incidents located in Indigenous communities using reported geolocation information, some suggestions for consideration include:

- Any improvement to the availability, accuracy and consistency of the NFID geolocation information and reporting variations between jurisdictions would be useful in the identification of fire incidents located in Indigenous communities. Strengthening the coverage of data in these areas will enhance the effectiveness of the analysis. For example, auto-population of address and postal code from dispatch information could be beneficial, depending on what is available as part of each data entry system.
- Overall improvements to NFID geolocation information would likely assist all Canadian communities in identifying fire incident information to help inform fire risk reduction plans, as well as other applications that rely on the geolocation information.
- A significant effort during this research was dedicated to identifying fire incidents and the review and refinement of the datasets based on available geolocation information, while also acknowledging the context of limitations and assumptions. Drawing from lessons learned, it is recommended that future efforts include data cleaning, dataset review and cross-checks during the planning phase. Time is recommended to be allocated to thoroughly analyze location names using the geolocation information, as this may also identify additional or misclassified incidents.
- The list of community names would be recommended to be refined by including province information to support a more precise and dependable match between the reported incident location and Indigenous community locations.
- Considering what improvements may be implemented to address the availability, accuracy and consistency of the NFID geolocation information in the future, other supplementary variables related to addresses might be useful. These could be selected to improve the identification of incident locations.
  Overall, this initial exploration of the content of the NFID had the aim to understand whether fire incidents within Indigenous communities in Canada have been included in the aggregated NFID content. Therefore, recommended next steps include investigating how this information might be used to enrich or complement the information collected via the recently launched NIRS.

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Appendix A List of References for Community Name Information

A list of Indigenous community names was compiled from publicly available data for this project. The process of verifying whether the geolocation information reported in the National Fire Information Database (NFID) matches that of an Indigenous community involved cross-checking data from various available sources.

Care was taken to compile and check public information available for a mix of local community names, names of Nations, bands, hamlets and settlements, band and reserve numbers from:

- Indigenous assemblies, councils and organizations, including:
    - British Columbia Assembly of First Nations [BCAFN 2024],
    - Council of Yukon First Nations [CYFN, 2024],
    - Assembly of First Nations Yukon Region [AFNYR, 2024],
    - Saskatchewan Federation of Sovereign Indigenous Nations [FSIN, 2024],
    - Manitoba Chiefs [AMC, 2024; SCOI, 2024],
    - Chiefs of Ontario [CO, 2024],
    - Assembly of First Nations Quebec-Labrador [AFNQL, 2024],
    - Atlantic Policy Congress of First Nations Chiefs [APCFNC, 2024],
    - New Brunswick Assembly of First Nations [NBAFN, 2022],
    - Inuit Tapiriit Kanatami [ITK, 2024],
    - Nunatukavut [NK, 2024],
    - Nunavik Regional Board of Health and Social Services [NRBHSS, 2024],
    - Inuvialuit Regional Corporation [IRC, 2024],
    - Métis Settlements General Council [MSGC, 2024];
- Government of Canada databases and interactive maps [CIRNAC, 2024a and 2024b; ISC, 2024];
- Provincial and territorial government lists [AG, 2024; GBC, 2016; GNT, 2024a and 2024b; MG, 2024, GO, 2024a and 2024b; GNB, 2024; PNS, 2019; GNL, 2024; NPC, 2204]; and

For each potential community name found, a general web search was used to identify if the community had their own website. Where this was found, the website was reviewed to identify if additional potential community names may have been used over time to add to the draft list of community names.

An additional perspective was used, based on the fire incident information based on the reported for the NFID variables [Statistics Canada, 2017a] of:

- *Property ownership* (with the NFID label of PROPOWN) with the coding to report an Indian Reserve (code 11) controls the ownership of a property, and
- *Major occupancy* (with the NFID label of MAJOCC) with the coding to report a First Nations community (code 80) primarily used the building.

For incidents with these codings, the content of the *incident location* variable (with the NFID label of INCIDLOC) was also reviewed and cross-checked with the draft list of Indigenous community names, further adding to the list being used for comparison.

The draft list of Indigenous community names was reviewed by National Indigenous Fire Safety Council (NIFSC) staff, and compared to inhouse lists of Indigenous community names, in order to add additional names to the list.

The draft list was compared to the content of the first survey cycle of the NFID incident location variable, and a review of this was used to help identify potential variations of location names related to the manual entry. For example, where there may be misspelling, a typographical error in the data entry, or variations of abbreviations or spelling. The draft list and comparison approach used were refined based on this review.

Appendix B Description of Analysis for Creating the Geographic Location Flag

The Canadian Centre for Justice and Community Safety Statistics (CCJCSS) of Statistics Canada used the insights that were shared by National Research Council Canada (NRC) after the initial review that had been conducted using the content from the first survey cycle of the National Fire Information Database (NFID) (as summarized in Section 2.1) to help inform the creation of the geographic location flag analysis approach that was applied to the first and second cycles of the NFID. The results from the analysis are summarized in the tables in this report, where each table is acknowledged based on the source information in the table notes. The details of the analysis approach are included in this appendix, as provided by the CCJCSS of Statistics Canada.

B.1 Objective of the Analysis

This research aims to explore the potential to identify fire incidents occurring in Indigenous Communities in Canada from 2005 to 2021 using the NFID. The first step in this analysis involves comparing the location of Indigenous communities with the reported geolocation information in the NFID. The intent is to identify the number of incidents that may be identified based on the reported geolocation information, to better understand the NFID content.

B.2 National Fire Information Database (NFID)

The objective of the NFID is to develop and maintain a national database of statistical information on fire incidents, losses, and casualties. The database is intended to be a census of fire incidents involving loss in Canada. The NFID comprises two data files - an incident file and a casualty file. The incident file contains details related, but not limited, to the date and location of fire incidents, the type of property and its characteristics, fire protection features, circumstances contributing to the outbreak, origin and spread of fire, and the discovery of fire and actions taken. The casualty file contains data on persons injured and deaths due to the fire incident, including age, sex, the nature of the casualty, whether the person was a civilian or firefighter, cause of failure to escape, etc.

The participation in the NFID production varied between the two survey cycles. Between 2005 and 2014, the production of NFID included New Brunswick, Ontario, Manitoba, Saskatchewan, Alberta, British Columbia, and the Canadian Armed Forces. In contrast, between 2015 and 2021, the production of NFID included New Brunswick, Nova Scotia, Ontario, Manitoba, British Columbia, Yukon, and the Canadian Armed Forces.

B.2.1 Frequencies of the NFID database

Table 14 presents the total number of NFID fire-related incidents and victims by jurisdiction, 2005-2021.

Table 14 Total number of fire incidents and fire-related casualties by survey cycle and jurisdiction, 2005-2021.

Jurisdiction	Number of fire incidents			Number of fire-related casualties[1]		
Survey Cycle	2005 to 2014	2015 to 2021	Total	2005 to 2014	2015 to 2021	Total
Nova Scotia	12,881	13,203	26,084	410	394	804
New Brunswick	17,928	11,335	29,263	319	253	572
Ontario	235,955	142,053	378,008	9,108	5,683	14,791
Manitoba	52,072	24,408	76,480	2,741	1,030	3,771
Saskatchewan	7,475	…	7,475	76	…	76
Alberta	55,685	…	55,685	2,330	…	2,330
British Columbia	74,245	51,238	125,483	2,527	1,589	4,116
Yukon	1,536	6,341	7,877	19	54	73
Total	**457,777**	**248,578**	**706,355**	**17,530**	**9,003**	**26,533**

… Not available

1. Casualties refers to deaths or injuries that occurred as a direct result of a specific fire incident.

Note: This data includes the jurisdictions that reported data to the National Fire Information Database (NFID) as follows: New Brunswick, Nova Scotia, Ontario, Manitoba, and British Columbia 2005 to 2021; Saskatchewan 2012 to 2014; Alberta 2005 to 2014; Yukon 2013 to 2021. In New Brunswick casualty information was reported from 2010 to 2021.

Source: Statistics Canada, Canadian Centre for Justice and Community Safety Statistics, National Fire Information Database.

B.3 Creating the Geographic Location Flag

B.3.1 Indigenous Geography Datasets

Determining whether the geolocation information reported in the NFID matches that of an Indigenous community was extensive and involved cross-checking data from various sources. NFID geographic information was compared to four files containing information that allow for the identification of reported fire incidents that occurred in Indigenous communities. These files were used to create the Indigenous community definition used within this report. This definition is primarily based on the insights shared by the NRC, based on their initial review (Section 2.1), but also incorporates supplementary components from the Centre for Indigenous Statistics and Partnerships (CISP) of Statistics Canada and additional manual coding to enhance the applicability and accuracy.

The first file provided by CISP, categorizes 2021 Census subdivisions (CSDs) into ‘on reserve’, ‘inside Inuit Nunangat’, and ‘other’ categories. The category ‘on reserve’ includes eight CSD types legally affiliated with First Nations or Indian bands, i.e., Indian reserve (IRI), Indian settlement (S-É) (except for the two Indian settlements of Champagne Landing 10 and Kloo Lake, located in Yukon), Indian government district (IGD), Terres réservées aux Cris (TC), Terres réservées aux Naskapis (TK), Nisga'a land (NL), Tsawwassen Lands (TWL) and

Tla'amin Lands (TAL). The category ‘inside Inuit Nunangat’ includes CSDs located in the four Inuit regions: Nunatsiavut (Northern coastal Labrador), Nunavik (Northern Quebec), the territory of Nunavut and the Inuvialuit region of the Northwest Territories. These regions collectively encompass the area traditionally occupied by Inuit in Canada. The category ‘other’ includes all CSDs in Canada not defined as 'on reserve’ or ‘inside Inuit Nunangat’. For more information on Indigenous variables, including information on their classifications, please refer to the Indigenous Peoples Reference Guide, Census of Population, 2021.

The second CISP file includes a CSD flag which indicates a certain percentage of the population is Indigenous. It classifies 2021 Census CSDs based on the 2016 Census population data. A flag is assigned to on-reserve CSDs if greater than 50% of the population identified as Indigenous or to off-reserve CSDs if greater than 70% of the population identified as Indigenous. The NRC shared a list of community names and permutations that was developed during their initial review (Section 2.1) that was used to develop a dataset containing a compiled list of Indigenous community names. The Postal Code Conversion File (PCCF) database linked postal codes to CSDs, allowing incidents with a postal code to be compared to the CSD files provided by CISP.

B.4 Pre-processing

Prior to this project, the location information on the NFID file underwent processing through PCODE, a software designed to standardize addresses according to Canada Post Corporation guidelines and generate postal codes for each address.

PCODE analyzes addresses in two components: the street address information and the municipality, province, and postal code. Subsequently, these postal codes were merged with the PCCF to append additional geographical information, including CSD and Census Metropolitan Area (CMA).

In cases where a postal code corresponded to more than one CSD, the CSD was determined using the Single Link Indicator (SLI). The SLI is a value assigned to indicate a one-to-one relationship between postal codes and geographic areas. Specifically, an SLI value of '1' flags one record of an active postal code to one CSD. The method used to establish the Single Link Indicator identifies the geographic area with most of the population assigned to a particular location.

Pre-processing on the geographic variables was conducted to detect and resolve any anomalies in the data to prepare to match to other datasets. The pre-processing was completed using SAS (see Section B.10.4 for the details of the programs used). The approach involved a systematic analysis of the data, leveraging various SAS functionalities. Specific

SAS procedures and data step transformations were employed to clean, standardize, and prepare the dataset for further analysis. The data cleaning and standardization process addressed issues such as case sensitivity, unwanted special characters (e.g., tabulator, spaces), and variations in the representation of specific terms, making the data more consistent and more comparable. The following is a list of the geolocation variables that were pre-processed (showing NFID data labels in all capitals): INCIDLOC (incident location or community name), CSD_Name (census subdivision name) and PCODE (postal code) for the NFID incident dataset and the Community name variable on the NRC list of potential community names (that was based on the initial review of the first survey cycle of the NFID) to compare with the incident location NFID variable contents. The following explains how the pre-processing was conducted on these geolocation variables:

- All characters in the text were converted to uppercase to ensure that the case did not influence subsequent comparisons or transformations.
- All non-alphanumeric characters were removed to ensure consistency.
- The NFID's Incident Location data element was marked as missing if it had fewer than three characters or lacked alphabetical characters.
- Hyphens were replaced with spaces.
- Substrings in the Incident Location data element of the NFID with multiple permutations were identified, and specific substrings were replaced with other specified substrings. For example, "TOWNSHIP" was replaced with "TWP," and similar replacements were made for various variations of "TOWNSHIP" and other terms like "TWSP," "TSP," "TWST," "TWNSHP," etc.
- Double, triple, and quadruple spaces were replaced with a single space.
- Leading spaces were removed.
- The string "ON" was found in many incident locations in Ontario, and the "find" function searched for the substrings "ON" and "ONTARIO" and removed them from the location's name. Specific exceptions such as "NIAGARA ON THE LAKE" were not affected.
- Postal codes that matched a postal code in the PCCF file were retained, while those without a match were marked as missing.

Please note the following information regarding the analysis:

Out of the total number of records in the NFID incident file, 25,467 (3.58%) have no geographic information available. This means that the location of these incidents is unknown. The majority of these incidents took place in New Brunswick (70.40%) and Ontario (25.90%). These incidents were excluded from analysis.

An additional 267 victim records do not match any incident record. These victim records were excluded from analysis.

Incidents reported by the Canadian Armed Forces were not included in this analysis. Due to the nature of their reporting, they were deemed out of scope.

Table 15 presents the number of incidents and victims by jurisdiction included in the subset file after pre-processing and removing out of scope records, 2005-2021.

Table 15 Total number of fire incidents and fire-related casualties with geolocation information available for analysis by jurisdiction, 2005-2021.

Jurisdiction	Number of fire incidents			Number of fire-related casualties[1]		
Survey Cycle	2005 to 2014	2015 to 2021	Total	2005 to 2014	2015 to 2021	Total
Nova Scotia	12,881	13,089	25,970	410	390	800
New Brunswick	---	11,335	11,335	---	253	253
Ontario	230,113	141,299	371,412	8,876	5,649	14,525
Manitoba	52,072	24,408	76,480	2,741	1,030	3,771
Saskatchewan	7,186	…	7,186	73	…	73
Alberta	55,685	…	55,685	2,330	…	2,330
British Columbia	74,159	50,785	124,944	2,525	1,566	4,091
Yukon	1,536	6,340	7,876	19	54	73
Total	**433,632**	**247,256**	**680,888**	**16,974**	**8,942**	**25,916**

… Not available

--- Data reported did not include sufficient geolocation information to be included in the analysis.

1. Casualties refers to deaths or injuries that occurred as a direct result of a specific fire incident.

Note: This data includes the jurisdictions that reported data to the National Fire Information Database (NFID) from 2005 to 2021: Nova Scotia, Ontario, Manitoba, and British Columbia; Saskatchewan from 2012 to 2014; Alberta from 2005 to 2014; and Yukon from 2013 to 2021. In New Brunswick, incident location information was only reported from 2015 to 2021, and casualty information was reported from 2010 to 2021.

Source: Statistics Canada, Canadian Centre for Justice and Community Safety Statistics, National Fire Information Database analytical subset.

B.5 Quality Assessment of Geographic Variables

B.5.1 Available distinct

The first step of assessing the quality of the datasets was to determine the completeness and the validity of the data. Verifying each variable's distinct values helps assess the effectiveness of the pre-processing step presented in the previous section. Table 16 presents data availability (%) and the number of distinct values for variables of interest.

Table 16 Data availability and distinct values for the geographic variables present, NFID incident subset.

Variable	Percentage (%) of Available Data	Number of Distinct Values
STR_NAME	85.33	152,261
INCIDLOC	99.83	9,673
CSD	63.04	1,541
CSD_NAME	63.04	1,468
PCODE	62.80	162,762

Note: This data includes the jurisdictions that reported data to the National Fire Information Database (NFID) from 2005 to 2021: Nova Scotia, Ontario, Manitoba, and British Columbia; Saskatchewan from 2012 to 2014; Alberta from 2005 to 2014; and Yukon from 2013 to 2021. In New Brunswick, incident location information was only reported from 2015 to 2021, and casualty information was reported from 2010 to 2021.
Source: Statistics Canada, Canadian Centre for Justice and Community Safety Statistics, National Fire Information Database analytical subset.

The Annex, in Section B.10, presents the percentage of data availability and the number of distinct values for variables present in the NFID file by jurisdiction.

The NFID variables used in this analysis to link with the Indigenous community datasets are INCIDLOC, CSD, CSD_Name and PCODE.

B.6 Geographic Location Flag

The methodology used in this study involves using a set of conditions to systematically categorize and identify incident locations in the incident dataset as occurring either in an Indigenous or non-Indigenous community. These flagged incidents are then counted and presented as percentages for each specific condition. This approach provides a structured way to classify incidents, allowing for targeted analysis and interpretation based on specific criteria. The iterative process allows for refinement based on analysis outcomes and stakeholder feedback. The flags used in this analysis are designed to be sequential, once one of the criteria was met, the incident was flagged as occurring in an Indigenous community. If an incident meets the criteria for Flag 1, it is automatically excluded from being eligible to meet any other category requirements. Therefore, incidents are not counted more than once. Each flag corresponds to a specific set of conditions. Therefore, an incident is assigned only one flag based on the first applicable set of conditions encountered during the analysis.

Table 17 Number of geographic location flags generated for each condition, NFID incident subset.

Condition Flag	Condition Description	Count	Percent
1	Provincial Criteria for Property Ownership/Primary Use	349	3.77
2	Community Name Match	5,309	57.41
3	CSD or Postal Code Match - On Reserve or Inuit Nunangat	2,058	22.26
4	CSD or Postal Code Match - Indigenous Population Percentage	447	4.83
5	CSD Name Match - Indigenous Population Percentage	228	2.47
6	Manual coding	856	9.26
Total incidents		**9, 247**	**100**

Note: This data includes the jurisdictions that reported data to the National Fire Information Database (NFID) from 2005 to 2021: Nova Scotia, Ontario, Manitoba, and British Columbia; Saskatchewan from 2012 to 2014; Alberta from 2005 to 2014; and Yukon from 2013 to 2021. In New Brunswick, incident location information was only reported from 2015 to 2021, and casualty information was reported from 2010 to 2021.
Source: Statistics Canada, Canadian Centre for Justice and Community Safety Statistics, National Fire Information Database analytical subset.

Condition 1: *Provincial Criteria for Property Ownership/Primary Use*

- In Ontario, an incident is flagged if property ownership is controlled by an Indian Reserve, which determines the ownership category for the property involved in the fire incident.
- In Manitoba, an incident qualifies if it occurred in a First Nations community, identified through the building's major occupancy. This refers to the primary use of a building under single management, even if the building serves multiple purposes.

Condition 2: *Community Name Match*

- The location of the incident in the NFID database must match a community name in the list of community names that was developed by the NRC portion of the research team.

Condition 3: *CSD or Postal Code Match - On Reserve or Inuit Nunangat*

- The Census Subdivision (CSD) or Postal Code of the incident location must match the CSD or Postal Code in the first file provided by CISP, where the CSD is defined as ‘on reserve’ or ‘inside Inuit Nunangat’.

Condition 4: *CSD or Postal Code Match - Indigenous Population Percentage*

- The CSD or Postal Code of the incident location must match the CSD or Postal Code in the second file provided by CISP, where the CSD is classified as an Indigenous community based on the percentage of the population that is Indigenous.

Condition 5: *CSD Name Match - Indigenous Population Percentage*

- The incident location must match the name of a CSD classified as an Indigenous community based on the percentage of the population that is Indigenous.

Condition 6: *Manual coding* (see Annex Section B.10.3 for detailed information)

The manual coding involved in flag 6 was conducted upon a review of the results of the SPEDIS, COMPGED, COMPARE, COMPLEV, and INDEX functions in SAS. The SPEDIS function determines the likelihood of two words matching, expressed as the asymmetric spelling distance between the two words. It measures the minimum number of single-character edits required to change one string into the other. Similarly, COMPGED calculates the generalized edit distance between two variables. COMPARE performs a character-by-character comparison between two variables and the position of the leftmost character by which the two strings differ. It returns 0 if the strings are identical and a non-zero value otherwise. COMPLEV is similar to SPEDIS and calculates the Levenshtein distance between two variables. INDEX checks if one variable is a substring of the other. It returns the position of the first occurrence of the variable or 0 if it is not found. Incident locations with a high SPEDIS score were output for manual review and flagged accordingly.

Manual coding was also used to include incompletely enumerated reserves, such as Six Nations, which may not participate in the Census and therefore would not be represented in the Indigenous community flag files. This approach ensured more comprehensive coverage but also introduced a potential limitation, as the data for these communities may be less consistent or comparable to other regions. Additionally, manual coding was used to include Métis majority communities in Manitoba and Saskatchewan, which would have otherwise been unrepresented due to the nature of the files used.

When comparing the names of Indigenous communities to census subdivision (CSD) names, each CSD name that resembled an Indigenous community name was assessed based on the Indigenous community flag. The aim was to determine whether multiple CSD names were similar to an Indigenous community name and, importantly, whether all were associated with an Indigenous community. For example, both "Carrot River" and "Carrot River 29A" were found to have a notable similarity score. However, it is essential to note that "Carrot River" is a CSD name and does not pertain to an Indigenous community. Without the "29A" designation, it is uncertain whether an incident occurred in an Indigenous community, and as a result, it did not receive an Indigenous community flag.

Table 18 presents a detailed analysis of the distribution of condition flags in different reporting jurisdictions. The incidents are distributed differently across the jurisdictions, with condition flag 2 being the most common. In Nova Scotia, most of the incidents fall under flag 3 (85.69%), with notable percentages under flag 6 (9.39%) and flag 2 (3.18%). In New Brunswick, flag 2 (54.06%) and flag 3 (31.79%) are primarily displayed, with smaller proportions under flag 6 (14.15%). In Ontario, flag 2 (41.34%) and flag 3 (23.51%) have the highest percentages of incidents, followed by flag 6 (16.18%) and flag 1 (12.01%). In Manitoba, flag 2 has the greatest

proportion at 77.15%, with smaller proportions under flags 1, 4, 5, and 6. Most incidents in Saskatchewan fall under flag 2 (66.29%) and flag 5 (28.03%), with smaller percentages under flag 6. Predominantly, incidents in Alberta fall under flag 2 (75.59%) and flag 6 (10.06%). In British Columbia, flags 2 and 3 stand out at 50.69% and 41.97%, respectively. Yukon is marked by flag 4, constituting 74.58%.

Table 18 Geographic location flags by jurisdiction, NFID incident subset.

Jurisdiction	Condition Flag					
	1	2	3	4	5	6
Nova Scotia	0	3.18	85.69	0	1.73	9.39
New Brunswick	0	54.06	31.79	0	0	14.15
Ontario	12.01	41.34	23.51	6.83	0.13	16.18
Manitoba	5.41	77.15	2.55	6.26	2.11	6.5
Saskatchewan	0	66.29	0	0	28.03	5.68
Alberta	0	75.59	4.6	5.31	4.44	10.06
British Columbia	0	50.69	41.97	0	0.15	7.19
Yukon	0	9.32	0	74.58	16.1	0
Total	3.77	57.41	22.26	4.83	2.47	9.26

Note: This data includes the jurisdictions that reported data to the National Fire Information Database (NFID) from 2005 to 2021: Nova Scotia, Ontario, Manitoba, and British Columbia; Saskatchewan from 2012 to 2014; Alberta from 2005 to 2014; and Yukon from 2013 to 2021. In New Brunswick, incident location information was only reported from 2015 to 2021, and casualty information was reported from 2010 to 2021.
Source: Statistics Canada, Canadian Centre for Justice and Community Safety Statistics, National Fire Information Database analytical subset.

Table 19 summarizes the cumulative occurrences of incidents meeting specific conditions. If an incident meets the conditions for multiple flags, each applicable flag is counted separately. The sum of all flags on the left side represents the total count of incidents meeting any condition. For example, if an incident initially meets the condition for Flag 1 but later meets the conditions for two other flags. The sum of all flags on the left would be 3. This approach allows for assessing the distribution of conditions and evaluating the quality of records meeting only one condition.

Table 19 Geographic location flags by the sum of all flags, NFID incident subset.

Sum of all flags	Condition Flag					
	1	2	3	4	5	6
1	254	1,933	342	18	226	856
2	95	1,881	1,037	334	2	0
3	0	1,494	502	84	0	0
4	0	1	165	11	0	0
5	0	0	12	0	0	0
Total	**349**	**5,309**	**2,058**	**447**	**228**	**856**

Note: This data includes the jurisdictions that reported data to the National Fire Information Database (NFID) from 2005 to 2021: Nova Scotia, Ontario, Manitoba, and British Columbia; Saskatchewan from 2012 to 2014; Alberta from 2005 to 2014; and Yukon from 2013 to 2021. In New Brunswick, incident location information was only reported from 2015 to 2021, and casualty information was reported from 2010 to 2021.
Source: Statistics Canada, Canadian Centre for Justice and Community Safety Statistics, National Fire Information Database analytical subset.

Table 20 represents a count for each flag where an incident met its condition, even if it had met another condition previously. This cumulative count provides the total number of incidents that meet a specific condition across different scenarios. It allows for multiple counts of the same incident if it fulfills different criteria at different times. Each cell in the table represents the total count of incidents that meet the specified condition, regardless of whether the incident met another condition previously. This comprehensive approach enables a thorough evaluation of the effectiveness and accuracy of each flag in capturing incidents that meet its respective criteria.

Table 20 All Geographic location flags triggered, NFID incident subset.

All Flags					
1	2	3	4	5	6
2,005	5,925	2,110	2,110	756	4,429

Note: This data includes the jurisdictions that reported data to the National Fire Information Database (NFID) from 2005 to 2021: Nova Scotia, Ontario, Manitoba, and British Columbia; Saskatchewan from 2012 to 2014; Alberta from 2005 to 2014; and Yukon from 2013 to 2021. In New Brunswick, incident location information was only reported from 2015 to 2021, and casualty information was reported from 2010 to 2021.
Source: Statistics Canada, Canadian Centre for Justice and Community Safety Statistics, National Fire Information Database analytical subset.

B.6.1 Analysis of the geographic location flag

Table 21 Summary of fire incidents and fire-related civilian casualties based on available geolocation information by survey cycle, 2005-2021.

Survey Cycle	Geographic Location Flag	Number of fire incidents	Percent of fire incidents	Number of fire-related casualties[1]	Percent fire-related casualties[1]
2005-2014	Indigenous Community Locations	6,213	1.43	401	2.36
	Non-Indigenous Community Locations	427,419	98.57	16,573	97.64
2015-2021	Indigenous Community Locations	3,034	1.23	143	1.60
	Non-Indigenous Community Locations	244,222	98.77	8,799	98.40
Total	Indigenous Community Locations	9,247	1.36	544	2.10
	Non-Indigenous Community Locations	671,641	98.64	25,372	97.90

1. Casualties refers to deaths or injuries that occurred as a direct result of a specific fire incident.
Note: This data includes the jurisdictions that reported data to the National Fire Information Database (NFID) from 2005 to 2021: Nova Scotia, Ontario, Manitoba, and British Columbia; Saskatchewan from 2012 to 2014; Alberta from 2005 to 2014; and Yukon from 2013 to 2021. In New Brunswick, incident location information was only reported from 2015 to 2021, and casualty information was reported from 2010 to 2021.
Source: Statistics Canada, Canadian Centre for Justice and Community Safety Statistics, National Fire Information Database analytical subset.

Table 22 Summary of fire incidents based on available geolocation information by jurisdiction, 2005-2021.

Jurisdiction	Indigenous Community Locations		Non-Indigenous Community Locations	
	Number	Percent	Number	Percent
Nova Scotia	692	2.66	25,278	97.34
New Brunswick	431	3.8	10,904	96.2
Ontario	1,582	0.43	369,830	99.57
Manitoba	2,937	3.84	73,543	96.16
Saskatchewan	264	3.67	6,922	96.33
Alberta	1,262	2.27	54,423	97.73
British Columbia	1,961	1.57	122,983	98.43
Yukon	118	1.5	7,758	98.5
Total	**9,247**	**1.36**	**671,641**	**98.64**

Note: This data includes the jurisdictions that reported data to the National Fire Information Database (NFID) from 2005 to 2021: Nova Scotia, Ontario, Manitoba, and British Columbia; Saskatchewan from 2012 to 2014; Alberta from 2005 to 2014; and Yukon from 2013 to 2021. In New Brunswick, incident location information was only reported from 2015 to 2021, and casualty information was reported from 2010 to 2021.
Source: Statistics Canada, Canadian Centre for Justice and Community Safety Statistics, National Fire Information Database analytical subset.

Table 23 Summary of fire-related casualties1 based on available geolocation information by jurisdiction, 2005-2021.

Jurisdiction	Indigenous Community Locations		Non-Indigenous Community Locations	
	Number	Percent	Number	Percent
Nova Scotia	29	3.63	771	96.38
New Brunswick	7	2.77	246	97.23
Ontario	128	0.88	14,397	99.12
Manitoba	136	3.61	3,635	96.39
Saskatchewan	13	17.81	60	82.19
Alberta	104	4.46	2,226	95.54
British Columbia	121	2.96	3,970	97.04
Yukon	6	8.22	67	91.78
Total	**544**	**2.1**	**25,372**	**97.9**

1. Casualties refers to deaths or injuries that occurred as a direct result of a specific fire incident.
Note: This data includes the jurisdictions that reported data to the National Fire Information Database (NFID) from 2005 to 2021: Nova Scotia, Ontario, Manitoba, and British Columbia; Saskatchewan from 2012 to 2014; Alberta from 2005 to 2014; and Yukon from 2013 to 2021. In New Brunswick, incident location information was only reported from 2015 to 2021, and casualty information was reported from 2010 to 2021.
Source: Statistics Canada, Canadian Centre for Justice and Community Safety Statistics, National Fire Information Database analytical subset.

Table 24 Summary of total fire incidents, deaths and injuries based on available geolocation information for the NFID, 2005-2021.

Jurisdiction	Indigenous Community Locations		Non-Indigenous Community Locations	
	Number	Percent	Number	Percent
2005	608	1.33	45,064	98.67
2006	623	1.41	43,614	98.59
2007	656	1.45	44,608	98.55
2008	613	1.51	39,863	98.49
2009	633	1.45	43,028	98.55
2010	577	1.34	42,529	98.66
2011	548	1.29	41,965	98.71
2012	668	1.4	47,063	98.6
2013	567	1.38	40,392	98.62
2014	720	1.8	39,293	98.2
2015	528	1.46	35,674	98.54
2016	369	1.02	35,640	98.98
2017	341	1.05	32,241	98.95
2018	387	1.08	35,496	98.92
2019	429	1.29	32,774	98.71
2020	366	1.04	34,685	98.96
2021	614	1.6	37,712	98.4
Total	9247	1.36	671,641	98.64

Note: This data includes the jurisdictions that reported data to the National Fire Information Database (NFID) from 2005 to 2021: Nova Scotia, Ontario, Manitoba, and British Columbia; Saskatchewan from 2012 to 2014; Alberta from 2005 to 2014; and Yukon from 2013 to 2021. In New Brunswick, incident location information was only reported from 2015 to 2021, and casualty information was reported from 2010 to 2021.
Source: Statistics Canada, Canadian Centre for Justice and Community Safety Statistics, National Fire Information Database analytical subset.

B.7 Verification

Multiple verification processes were conducted to identify incident locations as Indigenous or non-Indigenous accurately. Here are the key takeaways:

- Non-Indigenous communities were cross-checked with incidents flagged as 6 (manually coded), using CSD and postal code data to identify potential overlaps.
- Geo Search was used to determine the CSD information for location names lacking CSD information. Locations with the same name but where one had known CSD information and were flagged as Indigenous communities were used as reference points to identify potential Indigenous community associations.
- Indigenous Services Canada maps were used to cross-check incident locations, and Geo Search was used to verify any inconsistencies.
- The NFID incident file containing postal codes mapped to CSDs by SLI was compared with Geocoded Ontario data. This comparison validated the accuracy of the postal code-CSD MAPPINGS, and the additional flags used.

B.8 Limitations of the Analysis Approach

While the process of categorizing and identifying incident locations in the incident dataset as occurring either in an Indigenous or non-Indigenous community was extensive, it also presents several limitations:

- The NFID variable property ownership defines the ownership category controlling the property involved in the fire incident. If an Indian Reserve controls the ownership was only reported by Ontario.
- The NFID variable major occupancy refers to the overriding (primary) use of a building under single management, which has two or more uses. Whether the First Nations community primarily used the building was only reported in Manitoba.
- The ability to determine whether an incident occurred in an Indigenous Community relies on the accuracy and completeness of the address data. Inaccuracies or missing information in the address could lead to errors. For example, Swan Lake is a community in Saskatchewan and a First Nations Reserve; without the additive of First Nation in the location name, these records would be coded as non-indigenous.
- The assignment of postal codes to CSDs based on the SLI may result in oversimplification or misclassification of geographic areas. This method assumes that most of the population within a postal code resides in a single CSD, which may only sometimes be accurate, especially in densely populated or geographically diverse areas. This process can lack granularity in representing smaller geographic units or communities within larger CSDs.

- Postal codes and CSDs were mapped using the latest files available. The provided data spans 2005-2021. Geographic boundaries, population distributions, and postal code assignments can change over time.
- Consistent participation from respondents would support the tracking of changes or trends over time accurately. Lack of continuity can negatively impact trend analysis by introducing breaks or discontinuities in the data series. The NFID production varied between two survey cycles. From 2005 to 2014, NFID production included New Brunswick, Ontario, Manitoba, Saskatchewan, Alberta, and British Columbia. In contrast, from 2015 to 2021, NFID production included New Brunswick, Nova Scotia, Ontario, Manitoba, British Columbia, and Yukon.
- Incompletely enumerated reserves, such as Six Nations, which may not participate in the Census and therefore would not be represented in the Indigenous community flag files may be less consistent or comparable to other regions

B.9 Future considerations

If this project will be repeated in future years, some recommendations provided for consideration include:

- The list of community names that was drafted by NRC could be refined by including province information on all records. This refinement could provide an additional information to improve cross-matching for locations attributed to their respective province. Adding province data along with postcode may help achieve a more dependable match between incident location names and Indigenous communities.
- In addition, the NRC community name list, a concordance file for alternate names for communities that get entered on the long form census can be provided from CISP could be added.
- The second CISP file included a CSD flag which indicates a certain percentage of the population is Indigenous. It classifies 2021 Census CSDs based on the 2016 Census population data. This could be updated to include classifications based on the 2021 Census population data.
- Additional time should be allocated to thoroughly analyze location names using the Indigenous community flags to identify and rectify any overlooked or misclassified records.
- It is recommended that efforts be prioritized toward improving the availability of address data. Strengthening the coverage of data would be important to supporting a comprehensive understanding of Indigenous communities and will enhance the effectiveness of the analysis.
- Due to limitations with the SLI it is recommended to include supplementary variables related to addresses to properly geocode addresses. This will improve the analysis of Indigenous communities and their geographic location.

B.10 Annex for Appendix B

B.10.1 Available Distinct by Jurisdictions

Table 12 Data availability for geographic variables present on the file, by jurisdiction, NFID incident database.

Variable	NS	NB	ON	MB	SK	AB	BC	YT
STR_NAME	81.47	100	97.87	27.30	0	62.74	98.97	69.91
INCIDLOC	99.97	100	99.73	100	100	100	99.88	100
CSD	74.84	70.90	70.84	22.55	0	46.36	73.47	49.39
CSD_NAME	74.84	70.90	70.81	22.55	0	46.36	73.47	49.39
PCODE	74.69	70.81	70.47	22.55	0	46.35	73.23	49.39

Table 13 Distinct values for geographic variables present on the file, by jurisdictions, NFID incident database.

Variable	NS	NB	ON	MB	SK	AB	BC	YT
STR_NAME	8,639	3,931	86,675	109,39	0	22,370	28,807	1,558
INCIDLOC	1,579	960	4,941	699	699	683	496	30
CSD	78	247	425	146	0	278	363	15
CSD_NAME	74	212	424	142	0	276	360	15
PCODE	5,749	6,040	92,997	6,470	0	13,008	37,885	621

B.10.2 PCODE Overview

PCODE is a software product developed at Statistics Canada that will take a Canadian address and

1) standardize it according to the Canada Post Corporation guidelines
2) generate a postal code for this address

How does PCODE do this?

PCODE looks at the address in two parts. There is street information and the municipality, province, and postal code. PCODE first looks from right to left to extract the postal code, which is matched using pattern matching (ANA NAN, ANANAN), then the province (from a pre-determined list of spellings and abbreviations), and then the municipality (matched against a list from Canada Post and a list maintained by StatCan). What remains is the street address

portion. This street address portion is sent to a semantic parser that identifies the street address's components.

If all goes well, PCOCDE will identify the following components on an address:

- For a civic-style address
- Apartment number (optional)
- Civic suffix (optional)
- Street number
- Street name
- Street type (optional)
- Street Direction (optional)

For a non-civic style address, PCODE will identify one of the following

- Post office box number
- Route number
- General Delivery

Each month, StatCan receives the postal code address data (PCAD) from Canada Post, which is stored in the PCODE database. This data is range-based and contains multiple possibilities for a civic street number address range. PCODE will use the values found in the civic suffix, apartment number, street type, and street direction to select the best match on the CPC data for the input postal code.

PCODE users have access to many different parameter settings to determine how hard PCODE tries to find a match. These options include fuzzy matching, imputation of missing components, changing the street type and direction to get a match, expanding the search to a wider area, and imputing the postal code if there is only one for a municipality. More info can be provided upon request.

B.10.3 Manual Coding

if (find(INCIDLOC,"FIRST NATION") gt 0 or find(INCIDLOC," F N ") gt 0 or find(INCIDLOC," FN ") gt 0 or find(INCIDLOC,"FIRST NATIONS") gt 0 or find(INCIDLOC,"TRIBAL COUNCIL") gt 0 or
find(INCIDLOC,"TERRITORY GOVERNMENT") gt 0 or find(INCIDLOC,"METIS SETTLEMENT") gt 0 or find(INCIDLOC,"CREE NATION") gt 0 or find(INCIDLOC,"1ST NATIONS") gt 0
or find(INCIDLOC,"INDIAN RESERVE") gt 0 or find(INCIDLOC,"INDIAN RESERVATION") gt 0 or find(INCIDLOC,"NATIVE COUNCIL") gt 0 or find(INCIDLOC," IR ") gt 0

```
or find(INCIDLOC,"INDIAN BAND") gt 0 or find(INCIDLOC," BAND COUNCIL") gt 0 or
find(INCIDLOC," RESERVE ") gt 0 or find(INCIDLOC," TRIBE ") gt 0
or find(INCIDLOC," NATION ") gt 0 or INCIDLOC in ("MCLEOD LAKE BAND","NEE TAHI
BUHN BAND")) then Flag6=1;
if juris = "13" and INCIDLOC in ("EEL RIVER BAR FIRST","PABINEAU FIRST
NATIO","INDIAN ISLAND","ELSIPOGTOG FIRST NATION","WOODSTOCK FIRST
NATI","TOBIQUE FIRST NATION","MADAWASKA MALISEET F","RED BANK INDIAN RESE")
then Flag6=1; *FN mapping;
if juris = "35" and INCIDLOC in ("WAHNAPITAE","SIX NATIONS OF GRAND","SAUGEEN")
then Flag6=1; *FN mapping;
if juris = "46" and INCIDLOC in ("EBB FLOW") then Flag6=1; *FN mapping;
if juris = "46" and INCIDLOC in
("BROCHET","BARROWS","BISSETT","CAMPERVILLE","DUCK BAY","THICKET
PORTAGE","WABOWDEN")then Flag6=1; *geosearch;
if juris = "47" and INCIDLOC in ("PIAPOT","COTE")then Flag6=1; *FN mapping;
if juris = "48" and INCIDLOC in ("CALLING LAKE","RED EARTH CREEK","WABASCA")then
Flag6=1; *geosearch;
if INCIDLOC IN ("THE NATION","MUNICIPALITY OF THE NATION","THE NATION TP","LA
NATION MUN WEST SECTOR LIMOGESON","LA NATION") then call missing (Flag6);
* Similar to spelling file;
if INCIDLOC IN ("BEAR RIVER","BERENS RIVER","BOUCTOUCHE","CHIPPEWA OF THE
THAM","COUCHICHING", "CURVE LAKE 35","CURVE LAKE SMIT","CURVE LAKESMIT",
"DEASE LAKE","EAGLE LAKE","EDEN VALLEY NO216","ESKASONI","FISHERS
GRANT","FORT ALEXANDER RM O","LONG LK RES58","MILLBROOK","NIPISSING BAND
10",
"PAQTNKEK NIKTUEK 23","PIGEON LAKE NO138A","ROCKY BAY","ROSEAU
RIVER","SERPENT RIVER","SHOAL LAKE TOWN",
"SIX NATIONS PART 40 HALDIMAND NORFOLK","SIX NATIONS RES","ST
LOUIS","TLETINQOX TIN BAND ANAHAM BAND","UNIPOUHEOS NO121","UPPER HAY
RIVER NO212","UTIKOOMAK LAKE NO155",
"UTIKOOMAK LAKE NO155A","UTIKOOMAK LAKE NO155A","WABASCA
NO166D","WATERHEN","RESERVE 77","SHEGUINDAH FNR") then Flag6=1;
if INCIDLOC IN ("ROCKY BAY") and juris = "12" then call missing (Flag6);
if not missing (STR_NAME) and  (find(STR_NAME,"FIRST NATION") gt 0 or
find(STR_NAME," F N ") gt 0 or find(STR_NAME," FN ") gt 0 or find(STR_NAME,"FIRST
NATIONS") gt 0 or find(STR_NAME,"TRIBAL COUNCIL") gt 0 or
find(STR_NAME,"TERRITORY GOVERNMENT") gt 0 or find(STR_NAME,"METIS
SETTLEMENT") gt 0 or find(STR_NAME,"CREE NATION") gt 0 or find(STR_NAME,"1ST
NATIONS") gt 0
or find(STR_NAME,"INDIAN RESERVE") gt 0 or find(STR_NAME,"INDIAN RESERVATION")
gt 0 or find(STR_NAME,"NATIVE COUNCIL") gt 0 or find(STR_NAME," IR ") gt 0
or find(STR_NAME,"INDIAN BAND") gt 0 or find(STR_NAME," BAND COUNCIL") gt 0 or
find(STR_NAME," RESERVE ") gt 0 or find(STR_NAME," TRIBE ") gt 0
or find(STR_NAME," NATION ") gt 0 or STR_NAME in ("MCLEOD LAKE BAND","NEE TAHI
BUHN BAND")) then Flag6=1;
```

```
if STR_NAME IN ("12 NATION ST","13170 NATION VALLEY RD","ARMY RESERVE RD")
then call missing (Flag6);
if juris = "35" and INCDNTID in
("000000016083253","000000013744986","000000013966194","000000014450206","0000000
15112198") then  Flag6=1; * based on geocoded file;
if Flag6=1 and IndigComm ne 1 then do;
IndigComm = 1;
Flag=6;
end;
```

B.10.4 SAS Programs

Table 25 List of the programs used in this project and their description.

SAS program	Description
NFID Indigenous Community Flag.sas	To import the NFID, CISP, NCR, and PCCF files and create the indigenous community flag