Canada

2024 First Nations Health Status Report

Saskatchewan Region

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MESSAGE FROM THE MEDICAL HEALTH OFFICERS

We are pleased to present the 2024 First Nations Health Status Report for the Saskatchewan Region. This report is the result of a collaborative effort involving Indigenous Services Canada - Saskatchewan Region (ISC-SK) and the Northern Inter-Tribal Health Authority (NITHA).

This report provides a regional overview of the health conditions, challenges, and successes affecting the health of First Nations communities in Saskatchewan. Although progress has been made in improving health outcomes, the social determinants of health continue to contribute to health inequities among First Nations communities in the province. The COVID-19 pandemic has further widened these health gaps.

Our report is consistent with the Truth and Reconciliation (TRC) calls to action, specifically 19 and 55, which emphasizes the need to "identify and close the gaps in health outcomes between Indigenous and non-Indigenous communities, and to publish annual progress reports and assess long term trends". Every day, First Nations communities in Saskatchewan demonstrate resilience and hard work in their efforts to enhance health and well-being. Moving forward, it is essential to continue working together to support high-quality, culturally safe health systems, address existing challenges, promote action, and celebrate successes.

We would like to thank the First Nations communities in Saskatchewan, as well as the senior management teams of ISC-SK and NITHA, for supporting this joint project. We commend the project team for their seamless efforts in compiling this report and express our gratitude to the numerous reviewers who provided invaluable feedback. We hope that the insights gained from this report will serve as a foundation for developing collaborative and integrated responses to improve the health status of people living in First Nations communities in Saskatchewan.

Respectfully,

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Northern Inter-Tribal Health Authority

LAND ACKNOWLEDGEMENT

We respectfully acknowledge that the province of Saskatchewan lies on the traditional territories of many First Nations Peoples and is the homeland of the Métis Peoples. For thousands of years this land has been home to Cree, Saulteaux, Dakota, Lakota, Nakota, Dene, and Métis Peoples, who continue to care for and steward these lands today.

As we present this First Nations Health Status Report, we honour the deep knowledge, strength, and resilience of First Nations communities. We recognize the ongoing impacts of colonization, including health inequities, and commit to listening, learning, and collaborating in ways that support self-determination, health, and well-being.

ACKNOWLEDGEMENTS

First, we would like to offer our sincere appreciation and thanks to First Nations leaders and communities in Saskatchewan for the opportunity to measure progress on the health and wellness of their communities. Our aim is for the findings in this report to serve as a valuable resource for future community health planning and inform policies and decisions.

The Office of Medical Health Officers extends its heartfelt gratitude to everyone who contributed to the creation and review of this report, with special recognition to the Health Surveillance and Assessment Unit as the lead writers. Many other individuals from various organizations and units also provided data, valuable feedback and input, including:

- Saskatchewan Ministry of Health
- Saskatchewan Health Authority
- Centre for Indigenous Statistics and Partnerships Social, Health and Labour Statistics Field, Statistics Canada
- Public Health Officers Program, Canadian Public Health Service, Public Health Agency of Canada

EXECUTIVE SUMMARY

Since the 2018 release of the last First Nations Health Status Report, First Nations communities in Saskatchewan made meaningful progress in addressing health disparities. However, communities continue to face significant challenges tied to the social determinants of health (SDOH). The SDOH, which are woven into every aspect of a community's health and wellness, drive the health challenges faced by First Nations communities in Saskatchewan. Factors such as poverty, inadequate and overcrowded housing, and food insecurity remain key drivers of persistent health issues, including communicable diseases, environmental indicators, and drug toxicity. The COVID-19 pandemic impacted the progress made by disrupting public health programs, limiting access to health care, and affecting various SDOH, all which contributed to further widening health gaps. By 2023, the health status of First Nations communities showed some recovery. Despite the setbacks, First Nations communities in Saskatchewan have demonstrated resilience and innovation, finding ways to successfully improve population health and well-being.

The 2024 First Nations Health Status report brings together multiple sources of data and analyses to describe the health and well-being of First Nations communities in Saskatchewan. Where possible, trends over the past 10 years are provided. This report aims to highlight health challenges, celebrate successes, and support actions that lead to improved health outcomes for First Nations Peoples. We hope that this report is a meaningful tool for First Nation leaders, communities and other health partners.

DEMOGRAPHICS

The Demographics chapter highlights key population trends and projections for First Nations communities, shedding light on a younger population. The registered First Nations communities' population in Saskatchewan grew by 14% from 72,199 in 2014 to 82,573 in 2023. Roughly half (46.2%) of the First Nations communities' population in 2023 was under the age of 25 years, in contrast to 31.3% in the overall Saskatchewan population. The population aged 50 years and older grew by about 4.0% since 2014, reaching 17.7% of the total First Nations communities' population in 2023.

Despite the First Nations communities' population aging slightly, the population is younger than the general Saskatchewan population. First Nations communities are projected to grow by around 57.4% to roughly 130,000 in 2040.

COVID-19

The COVID-19 chapter examines the impact of the pandemic on First Nations communities, highlighting higher rates of COVID-19 cases, hospitalizations, and deaths, disparities in vaccination coverage, and the protective benefits of vaccines. Generally, throughout the pandemic, case rates were twice as high in First Nations communities compared to the overall Saskatchewan and Canadian populations. The highest case rates were seen in the 0 to 4 year-olds, and the rate of severe outcomes (hospitalization and deaths) were highest among those 50 years of age and older. Vaccination coverage was considerably lower among First Nation communities compared to the overall Saskatchewan population, in particular, for more than two doses. In First Nations communities, older adults were more likely to receive more than two doses of the vaccine. The COVID-19 vaccine was protective against hospitalizations and deaths, particularly for individuals who received two or more doses. Two or more doses of the vaccine offered 62% protection against severe outcomes compared to being unvaccinated.

IMMUNIZATIONS

The Immunization chapter highlights the impact of the COVID-19 pandemic on routine childhood immunization coverage for one-, two- and seven-year-olds, and also the HPV immunization coverage for grade 6 and 8 students in First Nations communities. The COVID-19 pandemic hindered progress that had been made toward the 95% coverage goal to prevent outbreaks, despite the general positive upward trend in immunization coverage in preceding years. However, coverage for most vaccines increased in 2023 compared to the pandemic years. Older children, such as seven-year-olds, had more time to stay up-to-date with routine vaccines before the pandemic, so they saw smaller drops in vaccination coverage from 2020 to 2022. Seven-year-olds also had

coverage close to the 95% target, much higher than the one- and two-year-old age groups during the 2014 to 2023 period. Compared to the overall Saskatchewan population, First Nations communities generally had similar specific immunization coverage, with few exceptions. Within First Nations communities, communities in the north (i.e. NITHA area) tended to have higher immunization coverage compared to south central communities.

COMMUNICABLE DISEASES

The Communicable Diseases chapter provides an overview on the state of sexually transmitted and blood-borne infections (STBBIs), tuberculosis (TB) and counts for other notifiable diseases including food, waterborne, and vaccine-preventable diseases, as well as diseases transmitted by respiratory routes. COVID-19 and syphilis are covered separately in Chapters 2 and 5, respectively. From 2014 to 2023, rates of chlamydia, gonorrhea, human immunodeficiency virus (HIV), hepatitis C (HCV), and active TB were substantially higher in First Nations communities in Saskatchewan compared to the overall Saskatchewan and Canadian populations. The rates of the STBBIs were generally higher in First Nations communities in the NITHA area (compared to the south central area), and among females. However, the sex disparity decreases in older age groups, and in some cases, males in older age groups had higher rates. The highest rates for chlamydia and gonorrhea were among those 20 to 29 years of age, while for HIV and HCV, rates were highest among those 30 to 39 years of age. Active TB rates are significantly higher in First Nations communities, particularly in the NITHA area, compared to the overall Saskatchewan and Canadian populations.

SYPHILIS

The Syphilis chapter highlights the trends of infectious syphilis and late latent syphilis among First Nations communities, noting a significant increase in rates since 2018, and a concerning trend in syphilis among pregnant women and newborns. Prior to 2018, the rate of infectious syphilis was lower among First Nations communities compared to the overall Saskatchewan and Canadian populations. Since then, the rates among First Nations communities have been consistently higher, with a rate 28 times higher than the national rate, and five times higher than the overall Saskatchewan population, in 2023. Focused public health efforts, however, are making a difference as evident by the first drop in infectious syphilis rate among First Nations communities in 2023. The rate of both infectious and late latent syphilis were higher in females, and highest among the 20 to 24 year age group. For males, the highest rate was in the 25 to 29 year age group. Between 2019 and 2023, there was 28 early congenital syphilis cases and six syphilitic stillbirth cases in First Nations communities.

ENVIRONMENTAL INDICATORS

The Environmental Indicators chapter reports on select environment-related issues within First Nations communities in Saskatchewan, including drinking water advisories (DWAs) and animal bites and wounds. DWAs longer than one year are deemed long-term DWAs (LTDWAs). The number of active LTDWAs have slowly decreased between 2017 and 2023, but there still remains 12 active LTDWA as of the end of 2023. Fortunately, 45% and 85% of DWAs are less than one week in length and two month in length, respectively. Between 2019 and 2023, there were 2,207 reported animal bites and wounds. The most common type of animal bite or wound were dog bites (93%). Those most commonly impacted individuals were children aged 0 to 14 years (34%). Between 2019 and 2023, rates of animal bites and wounds were similar between First Nations communities in the south and central area and in the NITHA area.

SOCIAL DETERMINANTS OF HEALTH

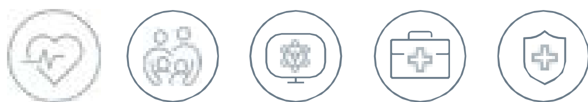
The Social Determinants of Health (SDOH) chapter examines key factors, such as culture and language, food security, housing, education, income, and employment, all of which significantly impact health. The SDOH are the social, environmental, and economic conditions in which people live and work that affect the health of individuals and communities. The SDOH are estimated to affect 80 to 90% of population health. Across the various SDOH explored in the chapter, inequities were most pronounced in First Nations communities, followed by First Nations people living outside reserve lands, when compared to non-First Nations people in Saskatchewan. Fortunately, improvements in addressing these inequities have been made between 2016 and 2021. This includes improvements to housing conditions, educational

attainment, and income.

DRUG TOXICITY

The Drug Toxicity chapter provides an overview of acute drug toxicity deaths, focusing on polysubstance, opioids, stimulants, and benzodiazepines use among First Nations people. Between 2016 and 2023, there were 2075 drug toxicity deaths in Saskatchewan, of which, 952 (46%) were among First Nations people. There was a significant increase in drug toxicity deaths since the pre-pandemic years. Between 2019 and 2023, the proportion of drug toxicity deaths involving polysubstance increased by 45%, from 40% in 2019 to 85% in 2023 among First Nations people. In Saskatchewan, the rate of opioid, stimulant or benzodiazepine toxicity deaths were all about seven times greater among First Nations people in comparison to the non-First Nation population. The gap in opioid toxicity rates between First Nations and non-First Nations populations widened from 2016 to 2023, especially among females. Most opioid toxicity deaths were among the 20 to 39 year age group. Overall, the drug toxicity crisis has escalated significantly since the pre-pandemic years, with First Nations people being disproportionately affected. While initially considered an opioid crisis, the increasingly toxic and changing drug supply is driving a shift toward a polysubstance crisis.

First Nations Health Status Report

2024 

Saskatchewan Region

Chapter 1: Demographics

TERMINOLOGY IN THE REPORT

The 2024 Health Status Report presents data for First Nations people living in Saskatchewan, focusing primarily on First Nations people living on a reserve in Saskatchewan. If the data is unavailable, information for First Nations people living off a reserve is used instead. A "reserve" is defined and managed under the Indian Act, as land allocated by the Canadian government for use by a particular First Nation [1, 2]. Some First Nations may share a reserve and some First Nations may have more than one reserve [1]. First Nations people who are registered to a band (people with Indian Status) have a right to live on a reserve [1]. However, the Government of Canada recognizes that the term "reserve" stems from colonial roots, and acknowledges the importance of the preference of First Nations to use the word "community" instead of "reserve" [2]. Therefore, in the 2024 Health Status Report, data for status First Nations people living on a reserve are referred to as *people living in First Nations communities* or simply, *First Nations communities*. Additionally, while not the best terminology, data for First Nations people living off a reserve are referred to *as First Nations people living outside reserve lands*. The term "reserve lands" is used to soften the language of the term "reserve" [2].

WHAT IS THE HEALTH STATUS REPORT AND ITS PURPOSE

The 2024 Health Status Report provides an update on important health data and trends in First Nations communities in Saskatchewan. The data describes the health of First Nations communities and provides comparisons to provincial and national data when possible. The report highlights both improvements and challenges related to the health of individuals within First Nations communities in Saskatchewan. The audience for the report is the general public, community members looking for statistical information about the health of people living in First Nations communities in Saskatchewan and other stakeholders who can use the data to inform future policies and choices. In the 2024 Health Status Report, data is gathered from both the Northern Inter-Tribal Health Authority (NITHA) and Indigenous Services Canada – Saskatchewan (SK) Region (ISC-SK).

WHO WE ARE AND WHO WE SERVE

ISC-SK, in partnership with NITHA in select communities, delivers and/or funds public health programs and services to First Nations communities across Saskatchewan Region.

- ISC-SK works with eight tribal councils and seven independent First Nations to provide health services and programs to improve the health status of First Nations. The tribal councils are: Battlefords Agency Tribal Chiefs, File Hills Qu'Appelle Tribal Council, Meadow Lake Tribal Council, Northwest Professional Services Corporation, Prince Albert Grand Council, Saskatoon Tribal Council, Touchwood Agency Tribal Chiefs and Yorkton Tribal Council.
- In total, ISC-SK serves 82 First Nations communities in Saskatchewan[1,2] and provides public health services to 49 First Nations communities in the south and central geographical areas in Saskatchewan. In the 2024 Health Status report, statistics and mentions to south and central communities will pertain to these 49 First Nations communities.
- NITHA is one of the first Indigenous-led public health organizations in Canada that supports health services to First Nations communities in northern Saskatchewan. It is comprised of four partners: Prince Albert Grand Council, Meadow Lake Tribal Council, Peter Ballantyne Cree Nation, and Lac La Ronge Indian Band. NITHA works closely with each partner to support delivery of quality health service to its member communities [3]. Together, the NITHA partners provide public health service to 33 First Nations communities.
- In the 2024 Health Status report, statistics and mentions to communities in the NITHA area will correspond to these 33 First Nations communities.

[1] Public health service is provided for a total of number of 81 First Nations communities. Data from Whitecap Dakota First Nation is transferred to the Saskatchewan Health Authority (SHA).

[2] The 82 First Nations communities includes the 33 First Nations communities which receive public health service from NITHA.

MAP OF FIRST NATIONS COMMUNITIES IN SASKATCHEWAN

Legend

- Major Cities
- First Nations communities in the NITHA area
- First Nations communities in the south central area

Treaties in Saskatchewan

- Treaty #2
- Treaty #4
- Treaty #5
- Treaty #6
- Treaty #7
- Treaty #8
- Treaty #10

FIRST NATIONS COMMUNITIES IN THE SOUTH CENTRAL AREA

1 – Ahtahkakoop Cree Nation
2 – Beardy's and Okemasis Cree Nation
3 – Big Island Lake Cree Nation
4 – Big River First Nation
5 – Carry the Kettle Nakoda Nation
6 – Cote First Nation
7 – Cowessess First Nation
8 – Day Star First Nation
9 – Fishing Lake First Nation
10 – Gordon First Nation
11 – Kahkewistahaw First Nation
12 – Kawacatoose First Nation
13 – Keeseekoose First Nation
14 – The Key First Nation
15 – Kinistin Saulteaux Nation
16 – Little Black Bear's Band
17 – Little Pine First Nation
18 – Lucky Man First Nation
19 – Mistawasis Nêhiyawak First Nation
20 – Moosomin First Nation
21 – Mosquito, Grizzly Bear's Head
22 – Muscowpetung Saulteaux Nation
23 – Muskeg Lake Cree Nation
24 – Muskoday First Nation
25 – Muskowekwan First Nation
26 – Nekaneet First Nation
27 – Ocean Man First Nation
28 – Ochapowace First Nation
29 – Okanese First Nation
30 – One Arrow First Nation
31 – Onion Lake First Nation
32 – Pasqua First Nation
33 – Peepeekisis Cree Nation
34 – Pelican Lake First Nation
35 – Pheasant Rump Nakota First Nation
36 – Piapot First Nation
37 – Poundmaker First Nation
38 – Red Pheasant First Nation
39 – Saulteaux First Nation
40 – Standing Buffalo Dakota Nation
41 – Star Blanket Cree Nation
42 – Sweetgrass First Nation
43 – Thunderchild First Nation
44 – White Bear First Nation
45 – Whitecap Dakota First Nation
46 – Witchekan Lake First Nation
47 – Wood Mountain Lakota First Nation
48 – Yellow Quill First Nation
49 – Zagime Anishnabek

FIRST NATIONS COMMUNITIES IN THE NITHA AREA

50 – Birch Narrows Dene Nation
51 – Black Lake Denesuline First Nation
52 – Brabant Lake
53 – Buffalo River Dene Nation
54 – Canoe Lake First Nation
55 – Clearwater River Dene Nation
56 – Cumberland House Cree Nation
57 – Denare Beach
58 – Deschambault Lake
59 – English River First Nation
60 – Flying Dust First Nation
61 – Fond Du Lac Denesuline First Nation
62 – Grandmother's Bay
63 – Hall Lake
64 – Hatchet Lake Denesuline First Nation
65 – Island (Ministikwan) Lake First Nation
66 – James Smith Cree Nation
67 – Kinoosao
68 – Kitsaki
69 – Little Red River (La Ronge)
70 – Makwa Sahgaiehcan First Nation
71 – Montreal Lake Cree Nation and Little Red Reserve
72 – Pelican Narrows
73 – Red Earth Cree Nation
74 – Sandy Bay
75 – Shoal Lake Cree Nation
76 – Southend Reindeer Lake
77 – Stanley Mission
78 – Sturgeon Lake First Nation
79 – Sturgeon Landing
80 – Sucker River
81 – Wahpeton Dakota Nation
82 – Waterhen First Nation

INTRODUCTION

Presented in this chapter are the demographic composition, trends over time, and projected growth of the First Nations communities in Saskatchewan population. Understanding the demographic composition of populations is important as public health programs and initiatives are intrinsically influenced by the changing characteristics of the populations they serve [1]. How fast a population is growing affects both short- and long-term planning for community health and medical infrastructure [1]. Public health programs must be able to respond to changes in population demographics, including fluctuations in sex and age composition, population density, as well as urban-rural movement [1].

Characteristics, distribution, and projected growth of First Nations communities' population included in this chapter are based on 2014 to 2023 Indigenous Services Canada (ISC) population data. As per the *Indian Act*, there are two categories: Status (or registered) and Non-Status. The term 'Indian' is now considered outdated and offensive and is only used in this legal context as it pertains to the *Act*. Status Indian is a legal identifier defined by the *Indian Act* and includes First Nations people who are registered under ISC's Indian Register, the Indian Registration System (IRS). This register provides an accurate count of the registered First Nations communities population, and is the population data used for the 2024 Health Status Report. The ISC data used in this report reflects the unadjusted IRS population count as of December 31, 2023, which is not adjusted for late reporting of births and deaths (see Appendix for further details).

HIGHLIGHTS

- The registered First Nations communities' population in Saskatchewan increased from 72,199 in 2014 to 82,573 in 2023.
- In 2023, 46.2% of the First Nations communities in Saskatchewan was under 25 years of age, which is a decrease from 53.3% in 2014.
- The population aged 50 years and older grew by about 4.0% since 2014, reaching 17.7% of the total First Nations communities' population in 2023.
- The First Nations communities in Saskatchewan is projected to grow by around 57.4%, from 82,573 in 2023 to 130,000 in 2040.

A MIXED GROWTH TREND IN CANADA

From 2016 to 2021, Canada's population grew by 5.2%, adding around 1.8 million people [2]. This increase was slightly higher than the 5.0% growth rate from 2011 to 2016 [3]. Despite the pandemic, most of Canada's population came from migration (more people migrating in than leaving), which made up nearly 80% of the growth from 2016 to 2021 [2]. The remaining 20% came from natural increase, meaning more births than deaths.

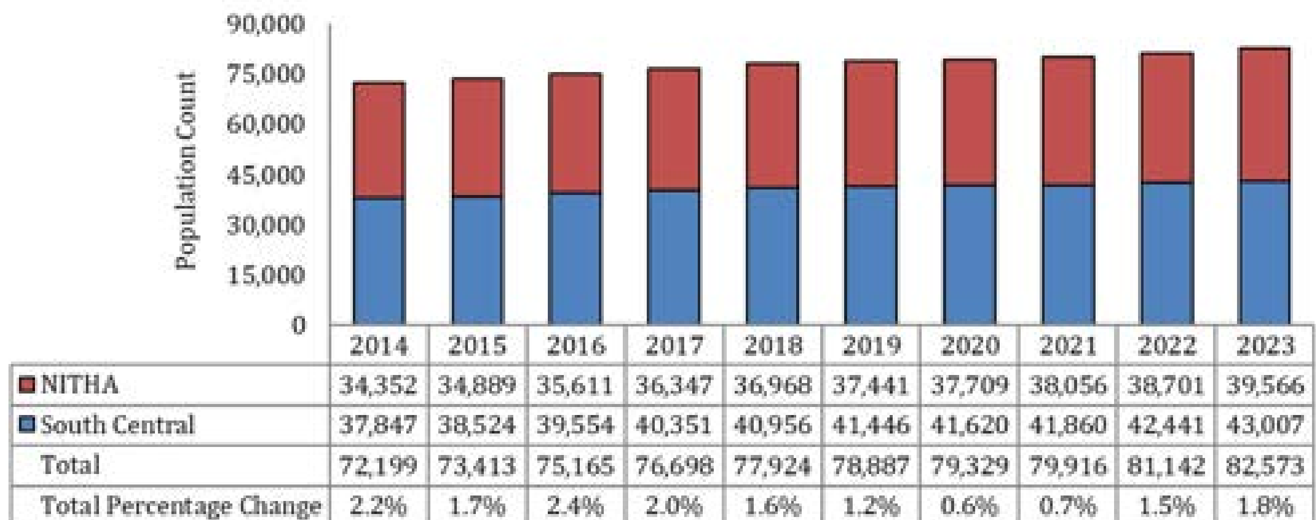
The population of Saskatchewan grew by 3.1% from 2016 to 2021, a slower rate compared to other western provinces. British Columbia, Alberta and Manitoba saw a 7.6%, 4.8%, and 5.0% increase respectively, between 2016 and 2021 [4]. The slower pace of population growth can be attributed to decreasing international migration levels as well as increasing out-of-province emigrations from Saskatchewan. Comparatively, the First Nations communities' population in Saskatchewan grew by 6.3% from 2016 to 2021.

OVER A DECADE OF POSITIVE GROWTH, 2014 – 2023

As of 2023, the overall registered First Nations population in Saskatchewan, which includes the First Nations communities and First Nations people living outside reserve lands, was estimated to be 175,491, of which about 47.1% lived in First Nations communities [5]. The registered First Nations communities' population in Saskatchewan has been steadily increasing from 72,199 in 2014, to 82,573 in 2023. This is an increase of 14.4% during this period. This growth is particularly noticeable in the 50 years and older age group, which saw a 47.3% increase in population during this period. In 2023, the 50 years and older age group made up 17.7% of the total First Nations communities' population in Saskatchewan.

A further break-down of the population of First Nations communities in Saskatchewan (Figure 1.1) shows that in 2023, 43,007 people (52.1%) lived in the southern and central regions of the province, with public health services provided by ISC-SK. The remaining 39,566 people (47.9%) lived in the northern region of the province, with health services provided by the Northern Inter-Tribal Health Authority (NITHA). In the 10 years between 2014 and 2023, the population of First Nations communities in the south central area experienced an overall growth of 13.6%. Meanwhile the population of First Nations communities in the NITHA area had slightly higher growth at 15.2%.

Figure 1.1: Registered First Nations communities' population in Saskatchewan, 2014 - 2023



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NITHA	34,352	34,889	35,611	36,347	36,968	37,441	37,709	38,056	38,701	39,566
South Central	37,847	38,524	39,554	40,351	40,956	41,446	41,620	41,860	42,441	43,007
Total	72,199	73,413	75,165	76,698	77,924	78,887	79,329	79,916	81,142	82,573
Total Percentage Change	2.2%	1.7%	2.4%	2.0%	1.6%	1.2%	0.6%	0.7%	1.5%	1.8%

Source: ISC, 2014 – 2023

A WIDE BASE POPULATION AGE-SEX PYRAMID

A population pyramid provides a visual representation of the age and sex distribution of a population. There are three typical population pyramid shapes, as shown in Figure 1.2: [6]

(A) An expanding pyramid looks like a triangle with a wide base and staircase-like sides, indicative of a young growing population with high birth rates and average life expectancies;
(B) A contracting pyramid is barrel shaped with a narrow top and base. This means there are fewer young people and a shrinking older population; and
(C) A stationary (or near-stationary) pyramid is also barrel-shaped but with only a slight narrowing at the top, showing a population with low birth rates and higher life expectancies.

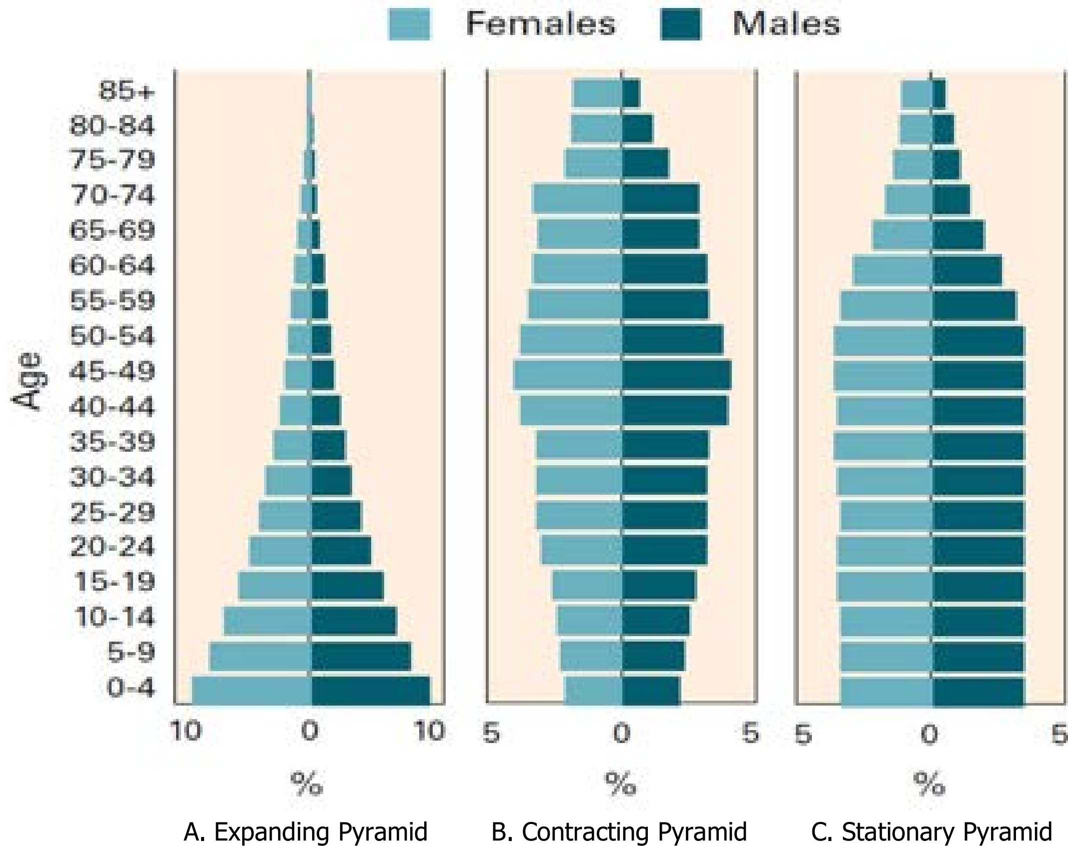
The population of First Nations communities in Saskatchewan is a growing population that is much younger than the overall Saskatchewan population. This growth observed among all Indigenous populations in Canada, can be attributed to two main reasons:

(1) Natural growth, meaning more babies are being born and people are living longer lives; and
(2) Response mobility, meaning more people are identifying as Indigenous perhaps due to personal

reflection, social factors, or external factors (i.e., changes in legislation or court rulings) [7].

The population pyramid for First Nations communities in Saskatchewan displayed in Figure 1.3 is similar to Figure 1.2(A), an expanding pyramid with a wide base and narrow top.

Figure 1.2: Examples of types of population pyramids [6]

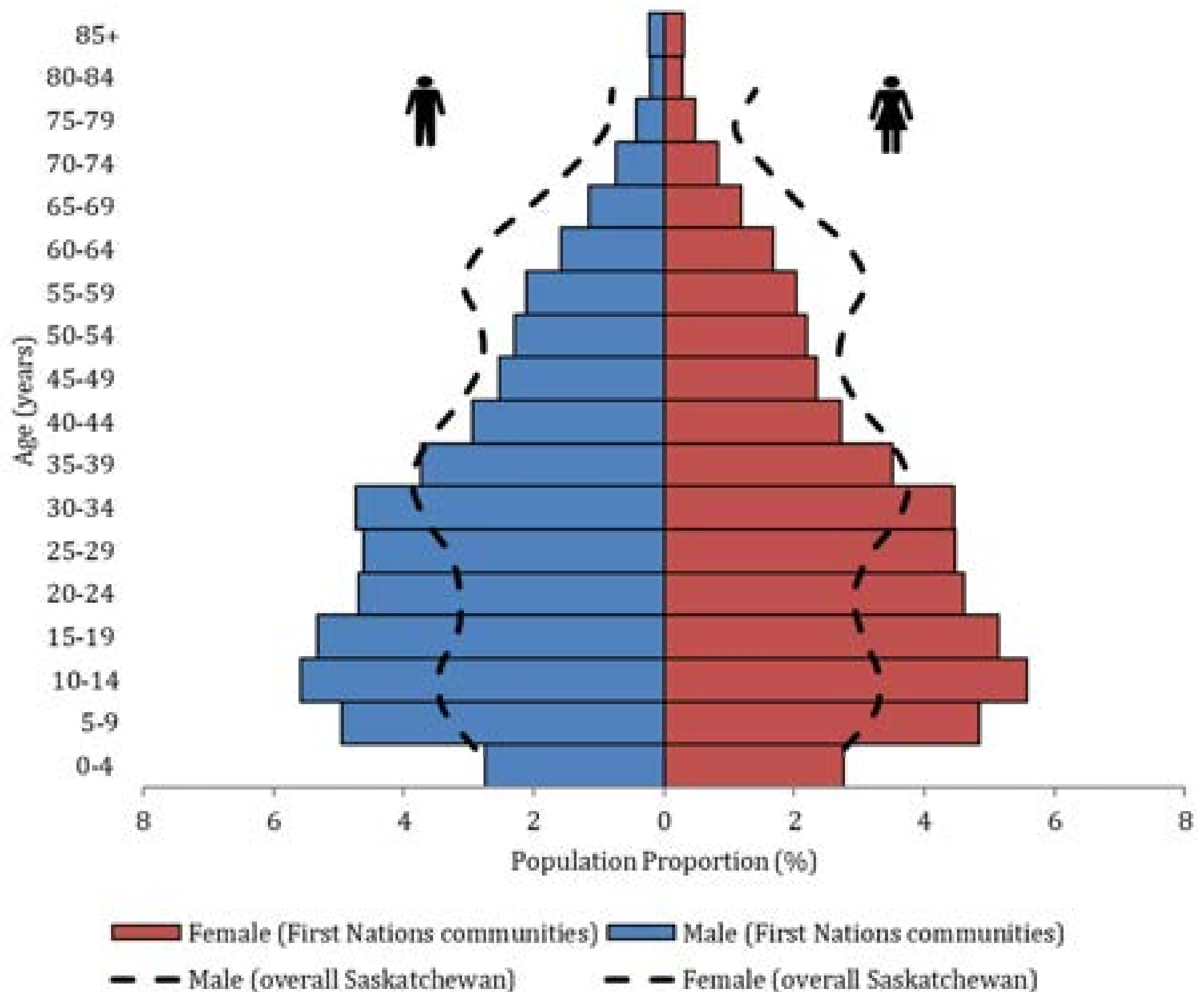


A. Expanding Pyramid B. Contracting Pyramid C. Stationary Pyramid

The population pyramid in Figure 1.3 shows that about half of the population in First Nations communities in Saskatchewan are under 25 years of age. In 2023, this population made up 46.2% of the total population, a decrease from 2014, when the under 25 years of age group accounted for 53.3% of the population. The smaller proportion of children 0 to 4 years of age is likely due to underreporting in the ISC's IRS and the use of unadjusted IRS data, as the population data that was extracted since 2015 has not yet been adjusted for late reporting of life events (i.e., births and deaths). As per ISC, about 70% of all births reported in any particular year actually occurred in a prior year [8]. Therefore, it is more common for Indigenous newborns to be registered in ISC's IRS between the ages of 1 to 5 years. In addition, the number of people 50 years of age and older in the First Nations communities population in Saskatchewan grew by 47.4% between 2014 and 2023. This age group increased to make up 17.8% of the total First Nations communities' population in Saskatchewan in 2023. Whereas, the 50 years and older age group for overall Saskatchewan population remained relatively consistent, at 34.2% in 2023, similar to 2014. As the First Nations communities' population in Saskatchewan ages, there will be challenges for the Saskatchewan health care system. Indigenous populations have historically experienced and continue to experience high rates of infectious and chronic diseases, as well as other physical and mental health conditions [9]. Despite these challenges, many Indigenous seniors, and Elders play important roles in their communities by serving as leaders in their communities, caregivers to their grandchildren, and keepers of their community's cultural knowledge and traditions [10]. As for the assigned sex at birth breakdown, there are an equal proportion of males to females in each age group. However, in the 85 years

and older age group, there are about two females for every male. This reflects the difference in life expectancy between men and women [11].

Figure 1.3: Population pyramid for First Nations communities in Saskatchewan and the overall Saskatchewan populations, 2023



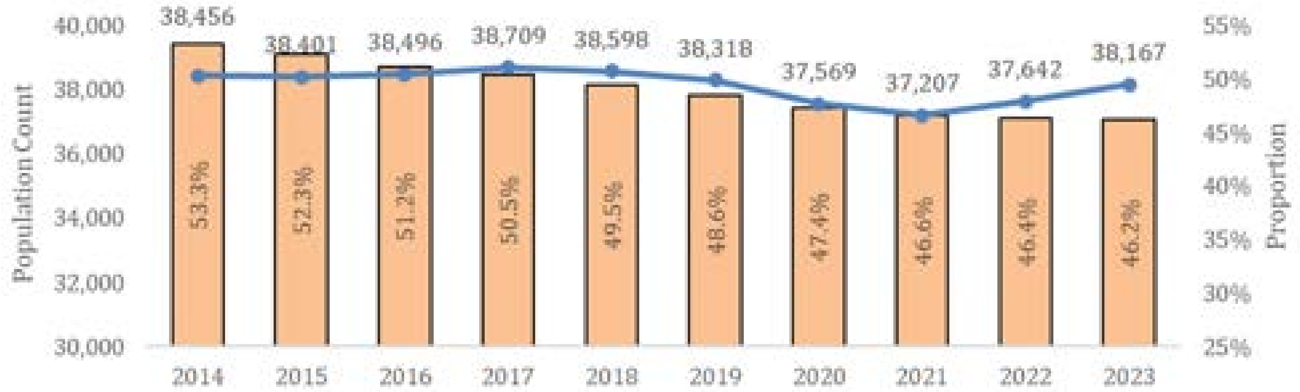
Source: ISC 2023; Saskatchewan Ministry of Health, 2023

FOCUS ON PEOPLE UNDER 25-YEARS OF AGE

Historically, the count of the under 25 years of age First Nations communities' population in Saskatchewan has generally increased. However, for the first time, the under 25 years of age group population bracket has seen a slight decrease in population counts and proportion of the total First Nations communities' population (Figure 1.4). This decrease is especially pronounced between the years 2020 to 2022.

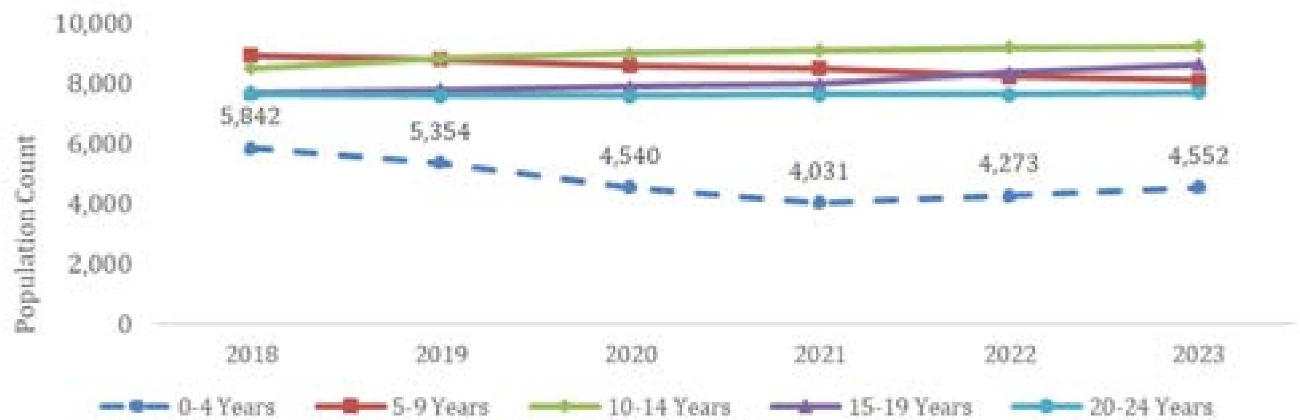
Figure 1.5 shows that the lower counts and proportion of individuals under 25 years of age in First Nations communities in Saskatchewan is due to a significant decrease in 0 to 4 year olds. As mentioned previously, the low proportion of 0 to 4 year olds is likely due to late entries of births in ISC's IRS, which may be exacerbated by the pandemic [8]. As the figure shows, the number of 0 to 4 year olds in the IRS increased in 2023 compared to the pandemic years. Additionally, most age groups apart from the 0 to 4 year age group were stable or slightly increased in population size between 2014 and 2023. Therefore, the decrease in the 0 to 24 year age group may not be as pronounced as figure 1.4 suggests.

Figure 1.4: Counts and proportion of First Nations communities population in Saskatchewan, under 25 years of age, 2014 – 2023



Source: ISC, 2014 – 2023

Figure 1.5: Counts for First Nations communities population in Saskatchewan by age group, under 25 years of age, 2014 – 2023



Source: ISC, 2014 – 2023

PROJECTED GROWTH, 2024-2040

Population projections can provide a range of possibilities as to how the Canadian population will change in the future [12]. Projections serve two purposes:

(1) They help to predict the rate of growth and upcoming changes in the demographics of the population, and, more importantly
(2) They are helpful for planning for future needs and policies in anticipation of these demographic changes [12].

The projected population growth for First Nations communities' population in Saskatchewan presented in this chapter was prepared using Demosim, Statistics Canada's demographic microsimulation model [13]. The base population data was extracted from the Registered Indian population on the IRS and the entire Canadian population as of October 19, 2015. The IRS counts were adjusted for late and under reporting of life events (such as births or deaths) [8]. Data from the medium growth scenario were used (see Appendix).

POPULATION PROJECTIONS FOR FIRST NATIONS COMMUNITIES IN SASKATCHEWAN, 2024–2040

Over the next 16 years, it is projected that the registered First Nations communities' population in Saskatchewan will increase. According to the medium growth scenario, this population will likely grow by 57.4% from its 2023 population of 82,573 to roughly 130,000 by 2040. This growth is based on an average yearly increase of about 1.02% from 2023 to 2040.

The First Nations communities in the NITHA area are projected to grow by 61.8% from 39,566 in 2023 to roughly 64,000 in 2040, This growth rate is similar to the overall registered population living in First Nations communities in Saskatchewan.

The projected medium growth rate scenario for First Nations communities in the south and central area is slightly lower than that of NITHA communities. The population of people living in First Nations communities in south and central area is projected to increase by 58.1% from 43,007 in 2023 to about 68,000 in 2040.

SUMMARY AND PLANNING FOR PROJECTED GROWTH

In general, the age makeup for First Nations communities in Saskatchewan and overall Saskatchewan populations has changed slightly since 2014. Overall, there was an increase in the 50 years and older age group and a decrease in the under 25 years of age group for the First Nations communities' population in Saskatchewan. Despite a slight decrease in proportion of younger individuals, the overall proportion is high relative to the population of Saskatchewan. The high percentage of young people in the First Nations communities' population in Saskatchewan provides opportunities for leaders and decision makers to continue to focus health and employment-related programs and policies for this young population to improve Saskatchewan's future social, political, and economic outlook. In addition, it is important to consider the medium projected growth scenario as it provides insight into the future composition of the First Nations communities population in Saskatchewan. The age structure of the First Nations population is expected to show signs of aging as people have fewer children and because of moderate improvements in life expectancy [14]. This means there will be more older people in the population. To prepare for this change, it is important for leadership to consider initiatives that will maximize socio-economic opportunities and address any unexpected issues that might come with population growth.

APPENDIX

Data Sources

1. Overall Canadian population
   - Total Canadian census population, including First Nations communities and First Nations people living outside reserve lands
   - Data source:
     - Statistics Canada, Canadian Socio-Economic Information Management System (CANSIM), 2016 and 2021

2. Overall Saskatchewan population
   - Total Saskatchewan population, including First Nations communities and First Nations people living outside reserve lands
   - Data source:
     - Saskatchewan Ministry of Health, covered population, 2016 and 2023

3. First Nations communities in Saskatchewan
   - Total population registered to a First Nations band and residing in a First Nations community in Saskatchewan, excluding non-registered First Nations or non-First Nations that may be living in a First Nations community
   - Data source:
     - ISC and IRS, unadjusted population data, 2014 to 2023
     - Note: Although, adjusted Indian Registry System (IRS) data is considered to be the most accurate, updates to the system may take up to five years, thereby limiting the availability of current data for reporting. Therefore, the breakdown of the population may not reflect the true First Nations population in Saskatchewan as these population figures may be slightly higher or lower based on the time of reporting of births and deaths in a particular year [8]. As the same population data source was used in the years covered by this current and previous health status report, it is less likely to affect the reporting of disease trends year to year.

4. Medium growth scenario
   - The scenario is based on the following assumptions:
     1. Constant fertility and constant differentials;
     2. Moderate increase in life expectancy at birth and constant differentials;
     3. Medium assumption for new registrations on the Indian Register because of Bill S-3;
     4. Internal migration based on patterns estimated from the 2001 and 2006 censuses as well as the 2011 NHS; and
     5. Constant intragenerational ethnic mobility [13].

Data Limitations

- The data used in this chapter were unadjusted ISC population data, which had not been adjusted for late reporting of life events such as births and deaths.
- As the place of residence field on the Indian Register is optional and mobility trends associated with those identifying as First Nations are high, information provided in this chapter may not be a true reflection of the proportion of First Nations communities population in Saskatchewan.
- Since the overall Saskatchewan population also includes the First Nations communities' population, it is not possible to make a direct comparison between the First Nations communities population and the rest of the Saskatchewan population. Therefore, differences between populations may be understated, unlike when comparisons are made between two independent populations. This limitation also applies to subsequent chapters in this report.

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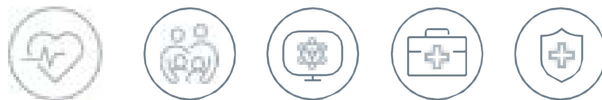
First Nations Health Status Report 2024



Saskatchewan Region
Chapter 2: COVID-19

BACKGROUND OF THE COVID-19 PANDEMIC

In March 2020, the World Health Organization declared the novel coronavirus (COVID-19) a pandemic [1]. As COVID-19 emerged and spread in Canada, it became clear that similarly to other communicable diseases, differences in societal resources influences the chances of acquiring the infection and the severity of the disease for individuals [2]. Indigenous peoples were disproportionality affected by the COVID-19 pandemic because of challenges such as overcrowding, poor housing ventilation, and overall poorer physical and social conditions [3]. Efforts to adapt and contain the spread of COVID-19 led to most resources and personnel being directed to this large public health issue. Therefore, COVID-19 stalled progress or disrupted many public health programs [4]. As a result, routine childhood vaccination coverage dropped, sexually transmitted diseases and bloodborne infections (STBBIs) cases increased, drug toxicity increased, and many other secondary effects were observed as a result of the COVID-19 pandemic. These secondary effects of the COVID-19 pandemic were made worse by the already existing inequities in the social determinants of health for Indigenous peoples.

A priority for ISC-SK region and NITHA is minimizing the inequities in health outcomes between First Nations and non-First Nations Canadians. This chapter reviews the rates of COVID-19 cases, hospitalizations, and deaths that occurred in First Nations communities in Saskatchewan from the start of the pandemic until February 28, 2022 (when reporting was discontinued). It also examines vaccine coverage from the start of vaccinations to the end of 2022. Additionally, the chapter reports on the number of COVID-19 outbreaks as well as numbers of COVID-19 tests conducted. Data are provided for both the NITHA and ISC-SK areas, and compared to rates and coverage for the overall Saskatchewan and Canadian populations, where possible.

Data from First Nations communities comes from Panorama, a comprehensive and integrated Pan-Canadian Public Health Communicable Disease Surveillance and Management System.

HIGHLIGHTS

- On average throughout the duration of the pandemic, COVID-19 case rates were around twice as high in First Nations communities in Saskatchewan compared to the overall Saskatchewan and Canadian populations.
- The 50+ year old age group in First Nations communities in Saskatchewan had significantly higher rates of hospitalization and deaths compared to younger age groups in First Nations communities in Saskatchewan.
- Vaccine uptake was considerably higher among the overall Saskatchewan and Canadian populations when compared to First Nations communities in Saskatchewan, in particular for more than 2 doses.
- Third doses were mostly administered to people aged 50 and older in First Nations communities.
- Most COVID-19 outbreaks in First Nations communities in Saskatchewan were community-wide outbreaks.

Figure 2.1 provides a summary of key events in Saskatchewan and First Nations communities during the COVID-19 pandemic. These events offer context for the trends discussed in this chapter.

- Following the first few cases of COVID-19 reported in Saskatchewan, the Government declared a provincial State of Emergency on March 18, 2020, which brought about limits on social gatherings and closing non-essential services [5, 6]. As case numbers remained low, many public services reopened starting May 4, 2020 [5].
- In October 2020, cases increased dramatically due to fewer restrictions and the start of the respiratory season in the fall. On November 19, 2020, a province-wide mask mandate was introduced [5]. The first COVID-19 vaccines arrived in First Nations on December 19, 2020, and vaccinations started with older adults and at-risk individuals. Cases peaked in January 2021, then began to decrease due to ongoing vaccinations and the end of the respiratory season.
- In March of 2021, a new variant of concern (VOC), Alpha, became dominant in Saskatchewan (see next section for a definition for VOC) [7]. During the spring and summer, cases stayed low, partly because more people continued to get vaccinated. Fourteen percent of all vaccines allotted to Saskatchewan by the federal government, were made available for First Nations, which greatly supported the vaccination efforts [8]. Saskatchewan lifted all remaining restrictions on July 11, 2021 [9].
- A new variant termed Delta emerged in July 2021. The Delta variant was more infectious and virulent, meaning it was more likely to cause spread and result in severe outcomes, like hospitalization or death [7, 10]. This led to the re-introduction of the mask mandate on September 17, 2021. And on October 1, 2021, vaccine passports were introduced to minimize the spread [11]. Vaccine passports were used as a proof of vaccination (or of a negative COVID-19 test in the last 7 days) required to access certain establishments such as indoor restaurants, bars, and gyms [12]. In First Nations communities, the Delta wave activities peaked in October 2021, but then remained low until the end of 2021. Also in October 2021, the Government of Saskatchewan began providing at home self-testing kits (Rapid Antigen Tests or RATs), with 27% of all RATs allocated to First Nations communities [13].
- The Omicron variant emerged in early 2022 and spread at an unprecedented speed due to its increased infectivity, even among vaccinated individuals. Fortunately, the Omicron variant caused less severe disease [14]. During this period, there was a substantial rise in infections, but many cases were not captured because of limited testing [15]. The vaccine passport and all remaining restrictions were dropped on February 14th and 27th, 2022, respectively [16, 17]. On February 28, 2022, Saskatchewan stopped all laboratory testing for the general population, as by this point, RATs had been widely distributed across the province.

Figure 2.1: Timeline of COVID-19-related Events in Saskatchewan and First Nations communities in Saskatchewan, March 2020 – February 2022

Wild-Type Period

Alpha Period

Delta Period

Omicron Period

First case in Saskatchewan Mar 12

Saskatchewan declares state of emergency Mar 18

First case in a First Nations community in Saskatchewan Apr 03

First reopening phase begins May 04

First localized outbreak of COVID-19 in First Nations in Saskatchewan May 20

Mandatory masking in indoor public locations Nov 19

First COVID-19 vaccine administered in First Nations in Saskatchewan Dec 19

Agreement of higher vaccine allocation for First Nations in Saskatchewan Apr 05

Saskatchewan lifts all remaining restrictions (first time) Jul 11

Mask mandate instated for a second time Sep 17

Vaccine passports established in Saskatchewan Oct 01

Boosters available for general Saskatchewan, and First Nations in Saskatchewan people Oct 25

Vaccine passports withdrawn Feb 14

Saskatchewan lifts all remaining restrictions (second time) Feb 27

End of laboratory testing and case surveillance Feb 28

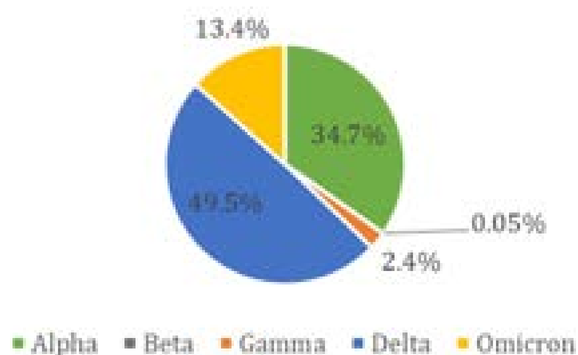
Jan-20 Feb-20 Mar-20 Apr-20 May-20 Jun-20 Jul-20 Aug-20 Sep-20 Oct-20 Nov-20 Dec-20 Jan-21 Feb-21 Mar-21 Apr-21 May-21 Jun-21 Jul-21 Aug-21 Sep-21 Oct-21 Nov-21 Dec-21 Jan-22 Feb-22

VARIANTS OF CONCERN (VOC) IN SASKATCHEWAN

The virus that causes COVID-19 is constantly changing. When enough mutations have occurred to change the characteristics of the virus, it is called a variant. More specifically, a variant becomes a VOC when it affects the disease spread, severity, and vaccine and treatment effectiveness. Throughout the COVID-19 pandemic in Saskatchewan, five COVID-19 VOCs and their sub-lineages appeared in the following order: Alpha (B.1.1.7), Beta (B.1.351), Gamma (P.1), Delta (B.1.617), and Omicron (B.1.1.529) [7].

The variants explored and discussed in further detail in this chapter are the Alpha, Delta, and Omicron variants, along with the original wild-type. This is because Beta and Gamma variants had no period of dominance among the Saskatchewan population. As figure 2.2 shows, the Beta and Gamma variants were considerably less common than the Alpha, Delta and Omicron Variants. Between January 1, 2021, and February 2, 2022[3], there were 20,502 sequenced cases of COVID-19.

Figure 2.2: Proportion of Variants sequenced in Saskatchewan, January 1, 2021 – February 2, 2022 (N = 20,502)



Source: SK Ministry of Health (2021, 2022)

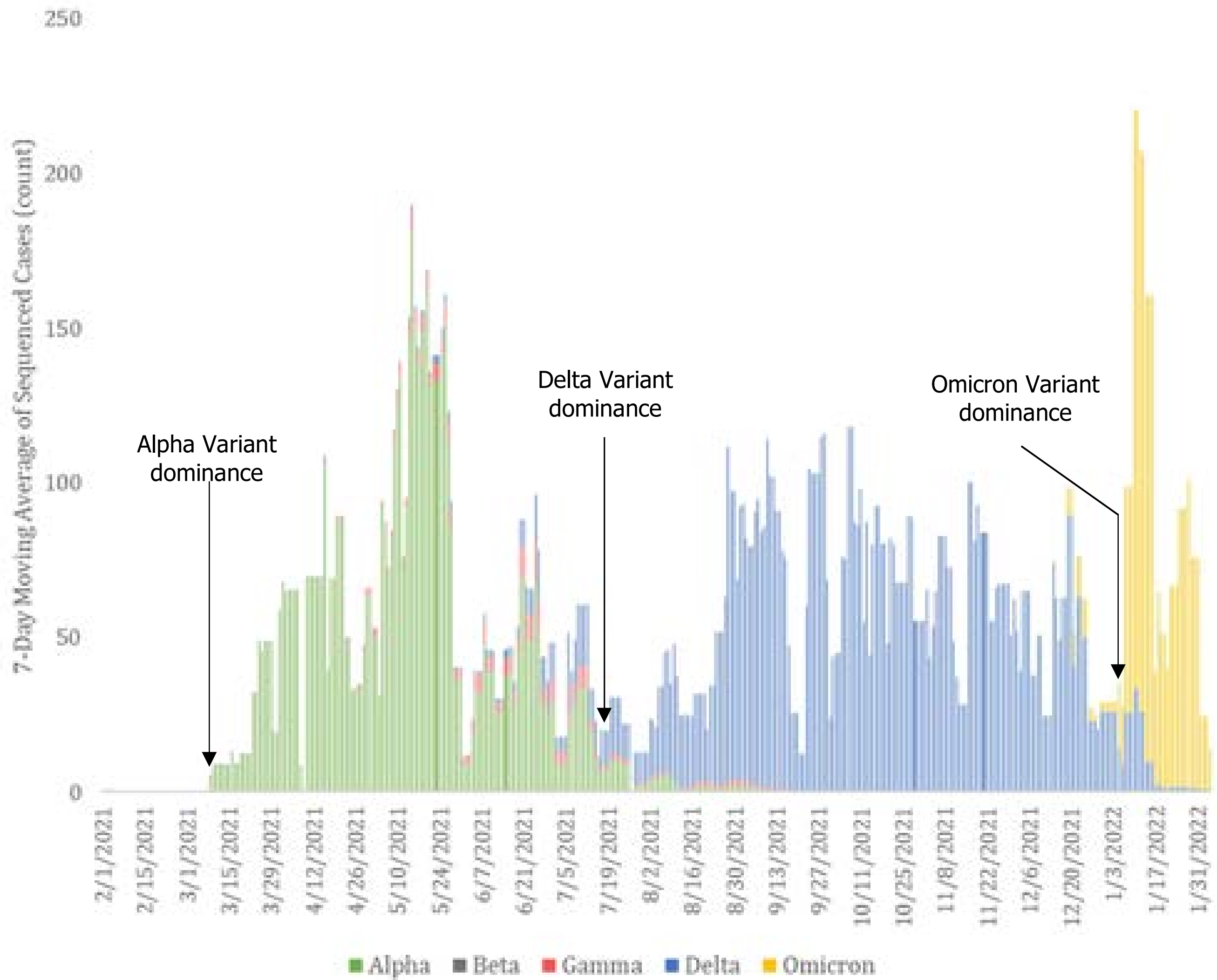
A variant is considered dominant when it is the most common variant causing infections in a given population [18]. A seven-day moving average of sequenced COVID-19 cases was used to determine when variants were most common in Saskatchewan (Figure 2.3). A seven-day moving average is the average number of sequenced cases in the last seven days.
Minimal sequencing was done at the start of the pandemic when the original virus (the wild-type) was spreading. Therefore, the beginning of the Alpha variant was determined when the first few cases of the Alpha variant were identified through sequencing. In summary, as shown in figure 2.2., the timeline of the VOC that were dominant in Saskatchewan are defined as follows:

- Wild-type: March 8, 2020 to March 7, 2021;
- Alpha: March 8, 2021 to July 16, 2021;
- Delta: July 17, 2021 to January 4, 2022; and
- Omicron: January 5, 2022 to February 28, 2022 (when tracking stopped).

It is important to note that which variant is dominant can vary depending on the region, and as a result, the dominance of these variants may be different among First Nations communities in Saskatchewan. Also, simply because a variant is dominant in a population does not indicate that all new infections are of that variant during that time.

[3] The Saskatchewan Ministry of Health stopped supplying variant data on February 2, 2022.

Figure 2.3: Seven-day Moving Average of COVID-19 Variants sequenced in Saskatchewan, February 1, 2021 – February 2, 2022



Source: SK Ministry of Health (2021, 2022)

COVID-19 CASES, HOSPITALIZATIONS, AND DEATHS IN FIRST NATIONS COMMUNITIES IN SASKATCHEWAN, FEBRUARY 2020 – FEBRUARY 2022

Presented in this section are the biweekly rates of cases, hospitalizations and deaths. This represents the rate of cases, hospitalization and deaths over the previous two weeks.

Wild-type period (March 8, 2020 – March 7, 2021)

During the early phase of the pandemic for First Nations communities in Saskatchewan, the biweekly case rate peaked in January 2021, at 1309.3 cases per 100,000 population. Hospitalization and death rates similarly peaked in January 2021, with 46.5 hospitalizations per 100,000 population and 17.6 deaths per 100,000, respectively. The case-hospitalization rate (CHR) and case-fatality rate (CFR) represents the percentage of people who are hospitalized and the percentage of people who die from a specific disease among the total number of people diagnosed with that disease during a certain period of time. During the peak, the CHR was 3.6% and the CFR was 1.3% (Figure 2.4).

Alpha period (March 8, 2021 – July 16, 2021)

Throughout the Alpha variant period, the rate of all three outcomes were relatively low compared to the wild-type in First Nations communities in Saskatchewan. The biweekly case rate peaked in May 2021, at 377.0 cases per 100,000 population in the Alpha period. Similarly, biweekly hospitalization rates for the Alpha variant peaked in May 2021, with 21.4 hospitalizations per 100,000 population. Biweekly death rates peaked during both March and May 2021, with 5.0 deaths per 100,000 population. The CHR and CFR was 5.7% and 1.3%, respectively, during the peak.

Delta period (July 17, 2021 – January 4, 2022)

During the Delta variant, the rate of cases and hospitalizations peaked in First Nations communities in Saskatchewan. Since many people were vaccinated against the virus by this point, the death rates remained relatively low. However, the death rates were still slightly higher compared to the Alpha period. The biweekly case rate peaked in October 2021, at 1328.2 cases per 100,000 population. Similarly, biweekly hospitalization rates also peaked in October 2021, with 56.5 hospitalizations per 100,000 population. Biweekly death rates peaked in both August and October 2021, with 8.8 deaths per 100,000 population. At the peak of the Delta variant in October 2021, the CHR and CFR were 4.3% and 0.67%, respectively.

Omicron period (January 5, 2022 – end of case surveillance, February 28, 2022)

Testing practices changed during the Omicron period, as public health and laboratories could not keep up with the very rapid spread of this variant. For this reason, the number of infections is not accurately reflected in the case rate. However, hospitalization and death rates are more accurate as testing in hospitals did continue [19]. The biweekly case rate peaked in January 2022, with 1051.9 cases per 100,000 population in First Nations communities in Saskatchewan. Biweekly hospitalization and death rates both peaked in February 2022, with 11.1 hospitalizations per 100,000 population and 5.0 deaths per 100,000 population, respectively. During the Omicron period, the CHR and CFR peaked at 1.1% and 0.47%, respectively.

Figure 2.4: Epidemic curve of biweekly rate of cases, hospitalizations and deaths in First Nations communities in Saskatchewan, February 2020 – February 2022

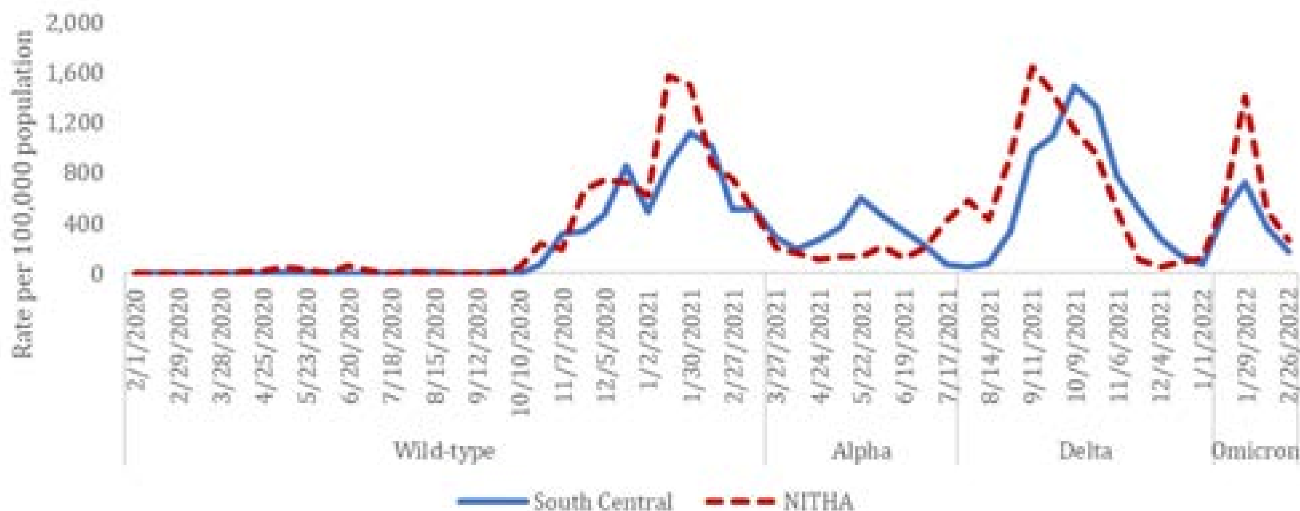
Sources: ISC-SK and NITHA, Panorama (2020 – 2022)

Looking at the biweekly case rate, on average, First Nations communities in the NITHA area had slightly more cases, with 1.15 cases for every one case in First Nations communities in the south central area (Figure 2.5). An exception was during the Alpha period when First Nations communities in the south central area had higher case rates.

However, the biweekly hospitalization rate was, on average, 1.54 times higher among First Nations communities in the south central area when compared to First Nations communities in NITHA (Figure 2.6). Hospitalizations peaked in First Nations communities in the south central area with 91.5 hospitalizations per 100,000 population during the Delta period.

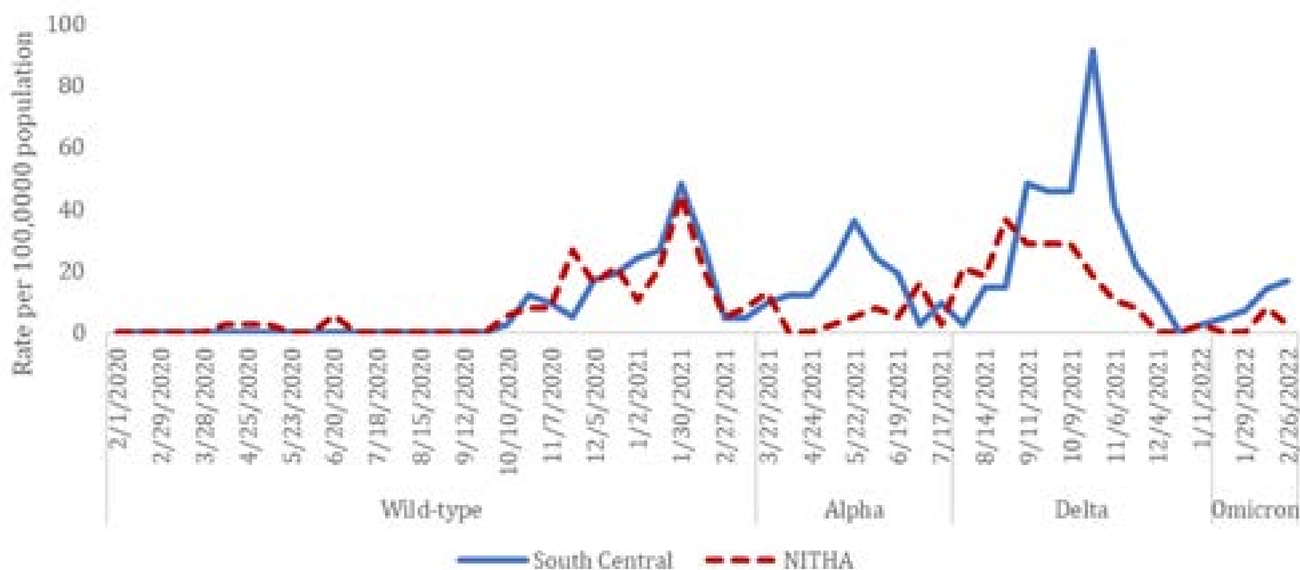
Figure 2.7 shows that on average, First Nations communities in the south central area had a 1.34 times greater death rate due to COVID-19 compared to First Nations communities in the NITHA area.

Figure 2.5: Biweekly COVID-19 case rates in First Nations communities in Saskatchewan by area, February 2020 – February 2022



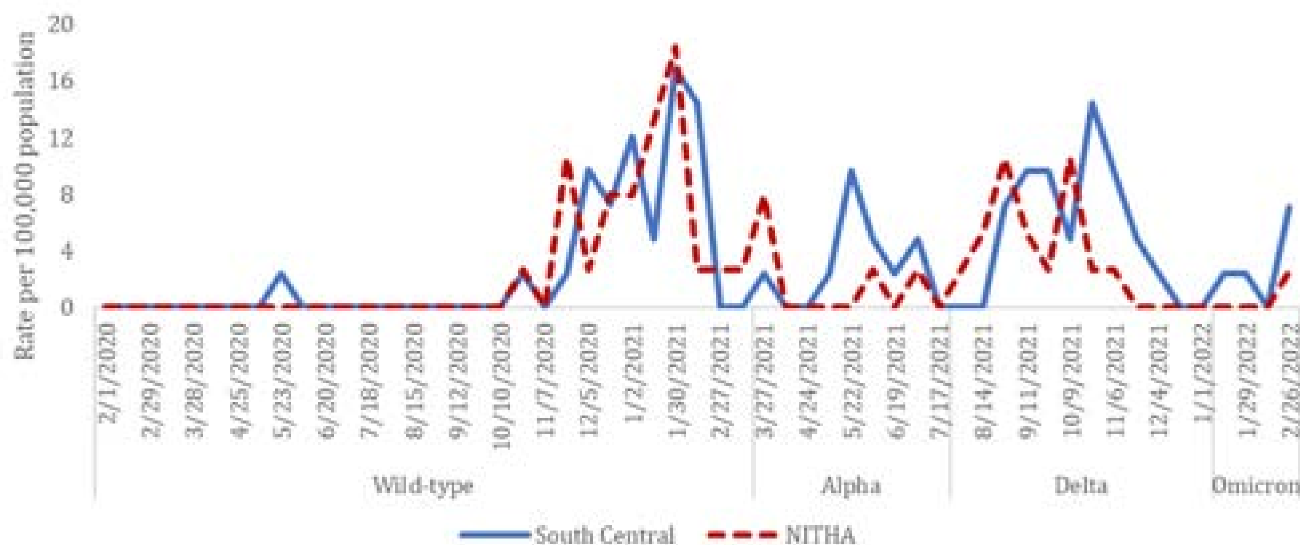
Sources: ISC-SK and NITHA, Panorama (2020 – 2022)

Figure 2.6: Biweekly COVID-19 hospitalization rates in First Nations communities in Saskatchewan by area, February 2020 – February 2022



Sources: ISC-SK and NITHA, Panorama (2020 – 2022)

Figure 2.7: Biweekly COVID-19 death rates in First Nations communities in Saskatchewan by area, February 2020 – February 2022



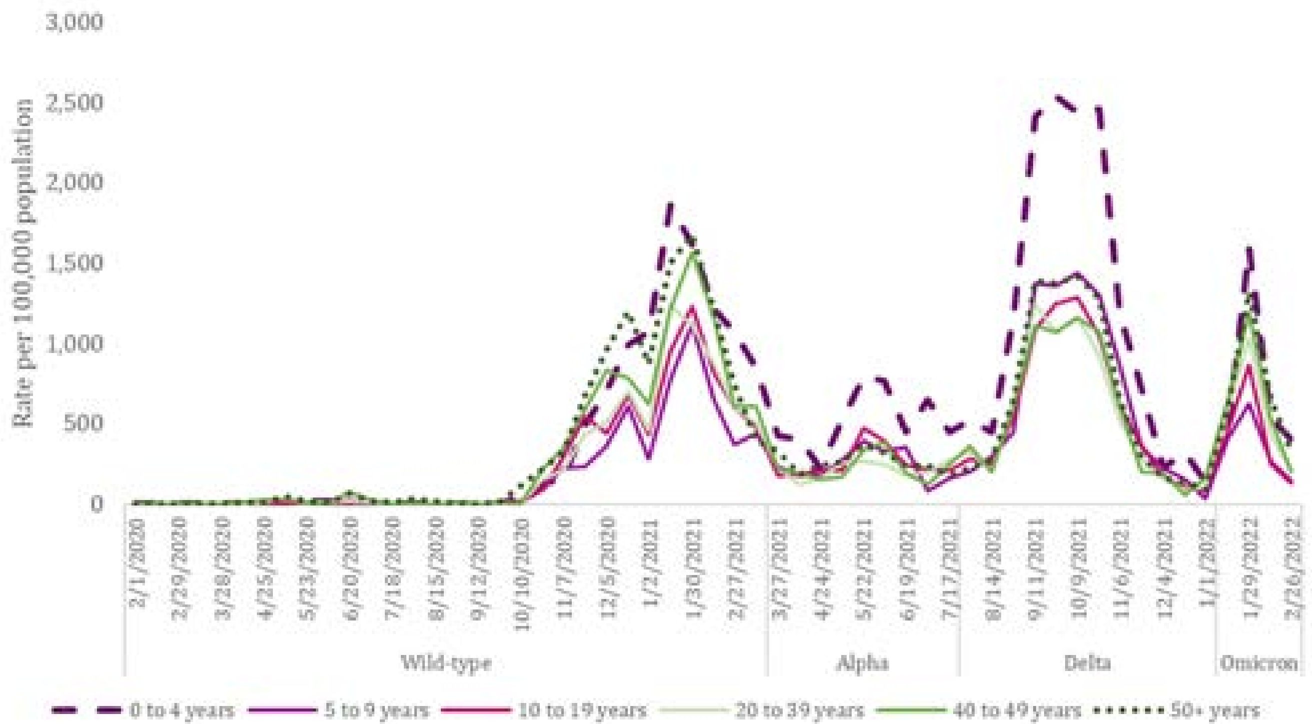
Sources: ISC-SK and NITHA, Panorama (2020 – 2022)

Older age groups typically had slightly higher biweekly rates of infection (Figure 2.8). However, the exception was the 0 to 4 year age group which had the highest case rates in all four variant periods. This was especially the case during the Delta period, with a peak of 2537.3 cases per 100,000 population. This may partially be the result of the lag in introducing the pediatric vaccine. Additionally, it is important to note that there was a substantial number of late entries of births into ISC's Indian Registration System (IRS) during the pandemic. As this value is used for population counts, the rate for the 0 to 4 year old age group is overestimated.

In contrast to the biweekly case rates, the biweekly rates of hospitalization were consistently higher for older age groups (Figure 2.9). The hospitalization rates for those aged 50 years and over were nearly three times higher than the next most affected age group, the 40 to 49 year age group. However, it is important to note that during the Delta wave, the hospitalization rates for children aged 0 to 4 increased to 74.6 hospitalizations per 100,000 population, which was only lower than the 50 plus year old age group (180.5 hospitalizations per 100,000 population). This increase was partly attributable to high vaccination rates in older age groups relative to the 0 to 4 year age group during this period.

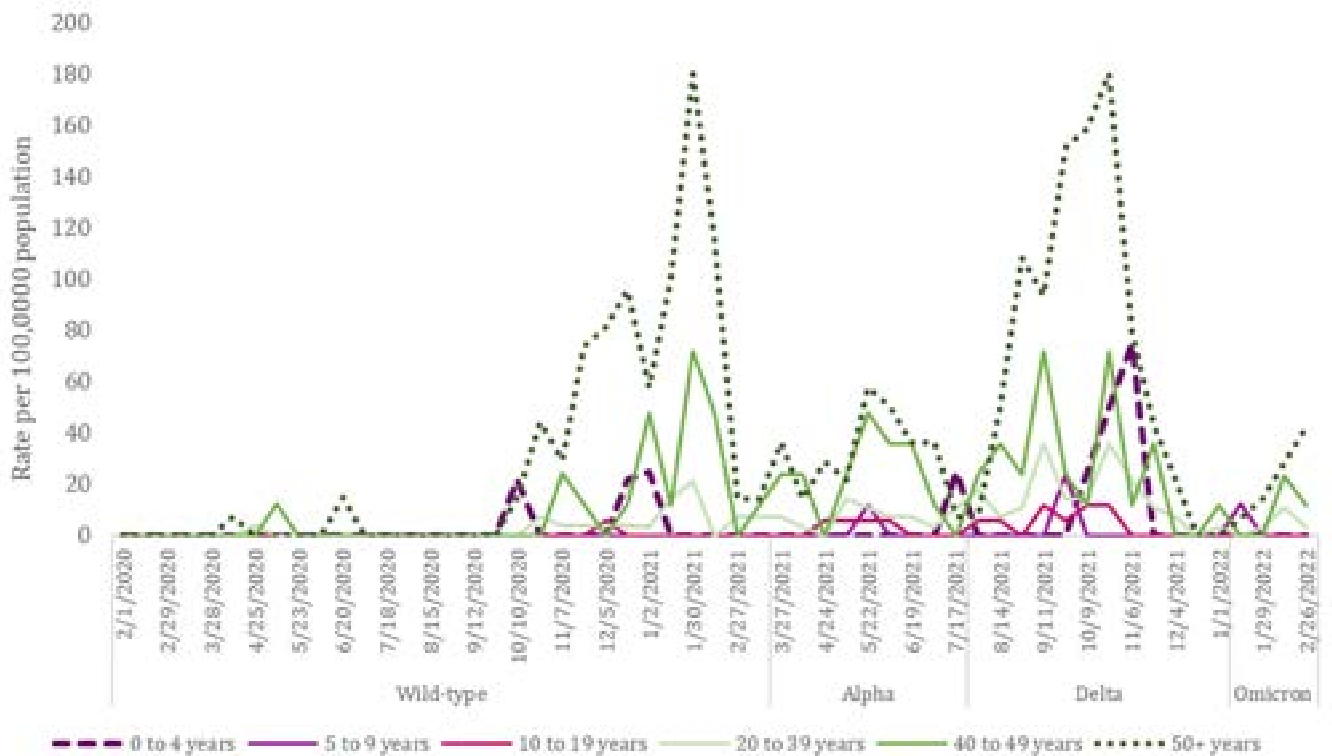
Similar to the biweekly hospitalization rates, the biweekly rates of death were consistently greater for older age groups (Figure 2.10). The biweekly rate of death was almost seven times greater in the 50 years and over age group relative to the 40 to 49 year age group. Note, in First Nations communities in Saskatchewan, there were no reported deaths from COVID-19 in anyone under 20 years old during the time period.

Figure 2.8: COVID-19 case rates in First Nations communities in Saskatchewan by age group, February 2020 – February 2022



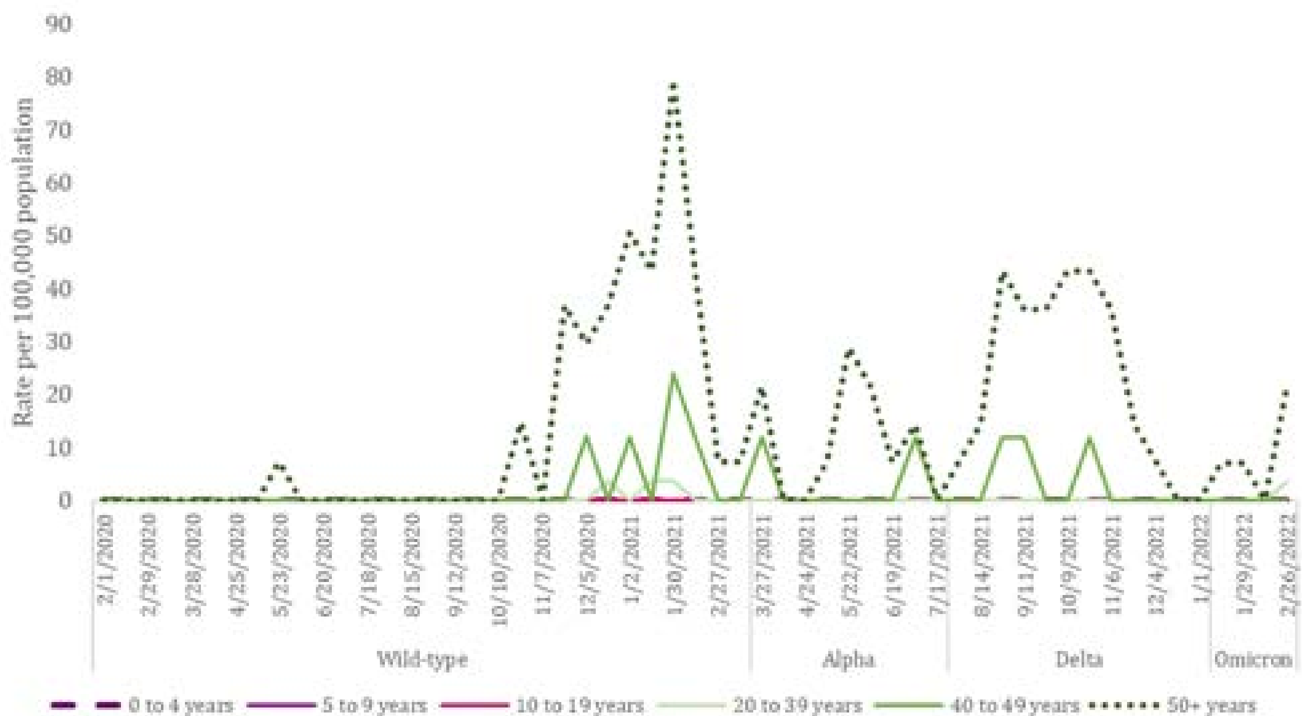
Sources: ISC-SK and NITHA, Panorama (2020 – 2022)

Figure 2.9: COVID-19 hospitalization rates in First Nations communities in Saskatchewan by age group, February 2020 – February 2022



Sources: ISC-SK and NITHA, Panorama (2020 – 2022)

Figure 2.10: COVID-19 death rates in First Nations communities in Saskatchewan by age group, February 2020 – February 2022



Sources: ISC-SK and NITHA, Panorama (2020 – 2022)

COVID-19 CASES AND DEATHS – PROVINCIAL AND NATIONAL COMPARISON TO FIRST NATIONS COMMUNITIES IN SASKATCHEWAN, FEBRUARY 2020 – FEBRUARY 2022

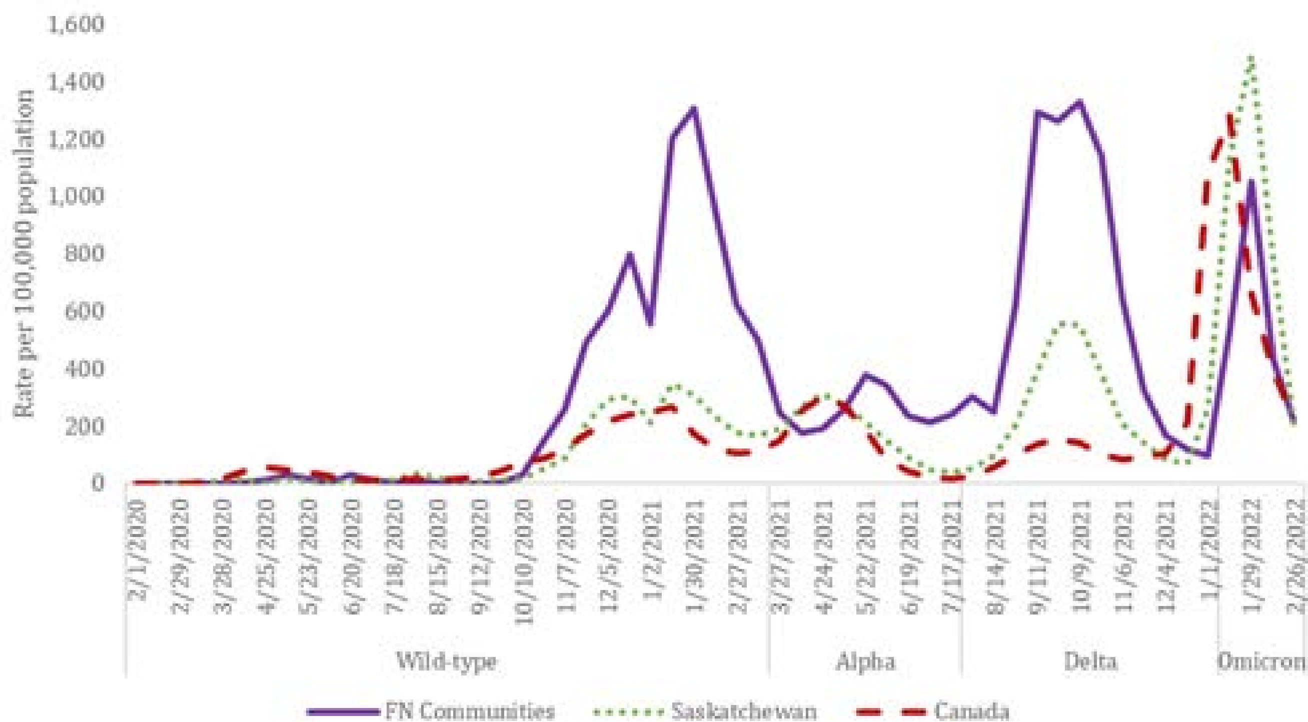
During the peak of the variants, the biweekly case rate of First Nations communities in Saskatchewan was (Figure 2.11):

- Four and five times higher compared to the overall Saskatchewan and Canadian populations, respectively during the wild-type period;
- Only marginally higher than the overall Saskatchewan and Canadian populations during the Alpha period;
- Two and nine times greater compared to Saskatchewan and Canada, respectively during the Delta period; and
- Marginally lower than the overall Saskatchewan and Canadian populations during the Omicron period.

During the peak of the variants, the biweekly death rate in First Nations communities in Saskatchewan was (Figure 2.12):

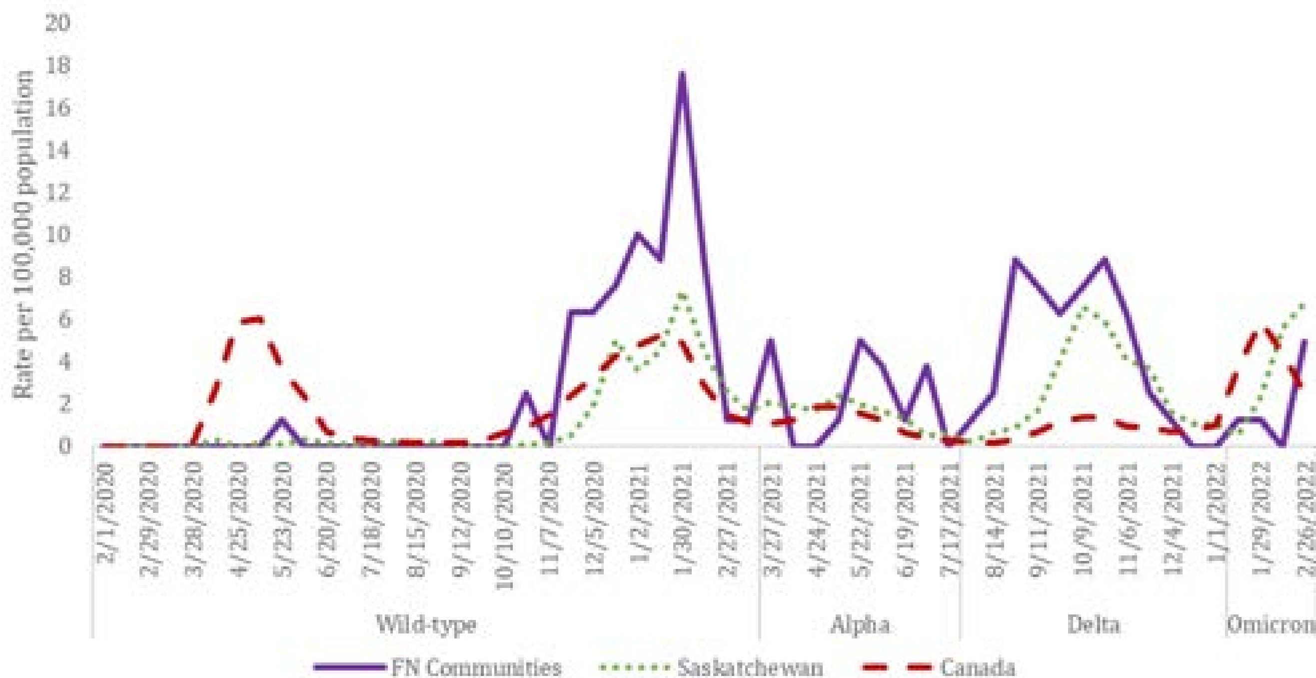
- Two and three times higher compared to the overall Saskatchewan and Canadian populations, respectively during the wild-type period;
- About two times greater compared to both Saskatchewan and Canada during the Alpha period;
- The death rate was similar to the overall Saskatchewan population, but about six times greater than the Canadian population during the Delta period; and
- Similar compared to the overall Saskatchewan and Canadian populations during the Omicron period.

Figure 2.11: Biweekly COVID-19 case rates in First Nations communities in Saskatchewan, and the overall Saskatchewan and Canadian populations, February 2020 – February 2022



Sources: ISC-SK and NITHA, Panorama (2020 – 2022), Government of Canada COVID-19 epidemiology update: Summary (2020 – 2022)

Figure 2.12: COVID-19 death rates in First Nations communities in Saskatchewan, and the overall Saskatchewan and Canadian populations, February 2020 – February 2022



Sources: ISC-SK and NITHA, Panorama (2020 – 2022), Government of Canada COVID-19 epidemiology update: Summary (2020 – 2022)

On average throughout the period in which cases were being reported, the CFR was lower in First Nations communities in Saskatchewan when compared to the overall Saskatchewan population (Table 2.1). This may be in part due to the younger age demographic in First Nations communities in Saskatchewan. However, the Canadian population had significantly lower CFR during the Alpha and Delta periods compared to First Nations communities in Saskatchewan.

Table 2.1: Average COVID-19 Case-Fatality Rate in First Nations communities in Saskatchewan, and the overall Saskatchewan and Canadian populations by variant, February 2020 – February 2022

Wave	First Nations communities in Saskatchewan	Saskatchewan	Canada
Wild-type	1.0%	1.3%	2.4%
Alpha Variant	0.9%	0.9%	0.8%
Delta Variant	0.7%	1.1%	0.4%
Omicron Variant*	0.3%	0.4%	0.6%

Sources: ISC-SK and NITHA, Panorama (2020-2022), Government of Canada COVID-19 epidemiology update: Summary (2020 – 2022)

COVID-19 VACCINATION COVERAGE IN FIRST NATIONS COMMUNITIES IN SASKATCHEWAN, DECEMBER 2020 – 2022

COVID-19 vaccine coverage was calculated based on the 2021 and 2022 ISC population counts and the number of doses administered at a First Nations community service delivery site. At the delivery sites, both First Nations communities and First Nations people living outside reserve lands may have accessed the site to receive vaccination. Therefore, the coverage proportion is overestimated among First Nations communities in Saskatchewan.

Wild-type period (beginning of available vaccines, December 1, 2020 – March 7, 2021)

The first COVID-19 vaccines were administered towards the end of 2020, during the wild-type period. The first vaccine in First Nations communities in Saskatchewan was given on December 19, 2020.

Alpha period (March 8, 2021 – July 16, 2021)

During the Alpha period, an increasing number of people in Saskatchewan received their first and second doses, significantly increasing vaccine coverage (Figure 2.13). The vaccine was initially available for older individuals as well as high-risk groups, then middle-aged adults, and was finally made available to kids aged 12 and older in late May 2021 [19]. As the vaccine became more widely available, the percentage of First Nations communities in Saskatchewan individuals who received one dose increased from 9.5% to 47.9% from the start to end of the Alpha period. Second dose coverage increased from 4.5% to 34.9% during this time period as well.

Delta period (July 17, 2021 – January 4, 2022)

Similar to the Alpha period, there was a steady increase in vaccine coverage among the First Nations population in Saskatchewan during the Delta variant. In November 2021, Health Canada approved the COVID-19 vaccine for 5 to 11 year olds, which added to the growing number of vaccinated people [20]. One dose coverage increased from 47.9% to 69.6%, and two dose coverage increased from 34.9% to 58.4%. Additionally, during the Delta period, people started receiving their third doses, with coverage increasing from 0.0% to 11.0%.

Omicron period (January 5, 2022 – December 31, 2022)

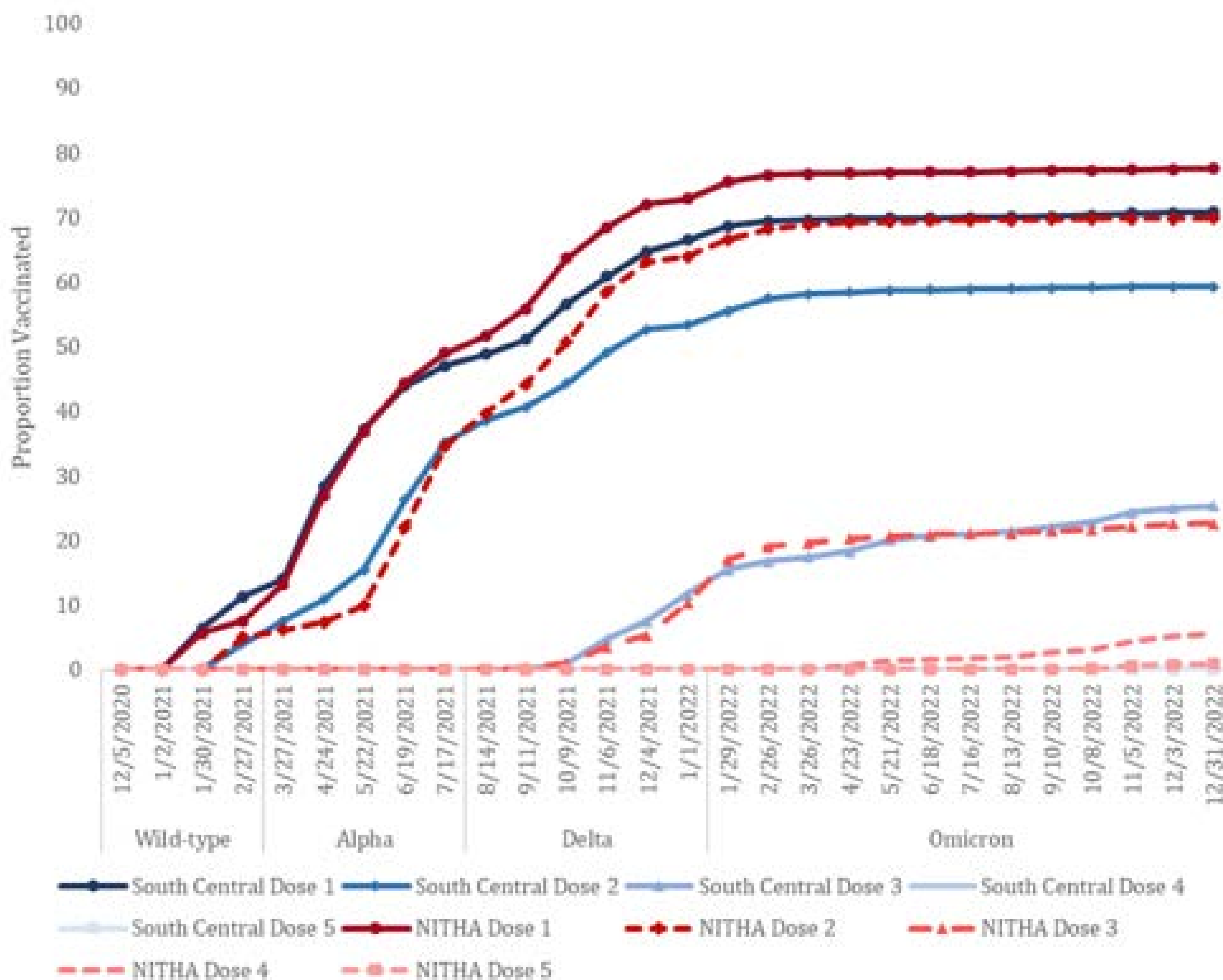
During the early stages of the Omicron period, vaccine coverage was still increasing at a similar rate as during the Delta period. This was partly because vaccine passports were introduced in December 2021, encouraging those who were not vaccinated, or had not received two doses, to get fully vaccinated (with both first and second doses). However, these passports were only in effect until February 2022, which might explain the slower increase in coverage after February 2022. Other reasons for the slow increase in vaccination coverage, could include vaccine saturation (meaning those who wanted to be vaccinated have already received their vaccinations), COVID-19 fatigue, and the high number of cases due to the highly contagious Omicron variant. By December 31, 2022, the percentage of people who got their first dose increased to 74.0%, and those who got their second dose increased to 64.4%. During the Omicron period, most of the vaccines provided were third doses, with coverage increasing from 11.0% to 24.0% by December 31, 2022. Additionally, although fourth and fifth doses became available for the general public, the overall coverage was very low in First Nations communities in Saskatchewan with only 2.7% of individuals receiving a fourth dose, and 0.4% of individuals receiving a fifth dose by December 31, 2022.

Figure 2.13: Total percentage of people vaccinated against COVID-19 in First Nations communities in Saskatchewan by the number of doses, December 2020 – 2022

Sources: ISC-SK and NITHA, Panorama (2020 – 2022)

When a dose of the COVID-19 vaccine first became available, First Nations communities in the south central area had higher COVID-19 vaccine coverage for all doses compared to First Nations communities in the NITHA area (Figure 2.14). Over time, First Nations communities in the NITHA area had higher vaccine coverage for all doses except the third dose. By the end of 2022, the two-dose vaccination coverage was 59.3% for First Nations communities in south central and 69.9% for First Nations communities in NITHA.

Figure 2.14: Total percentage of people vaccinated against COVID-19 in First Nations communities in Saskatchewan by area, December 2020 – 2022



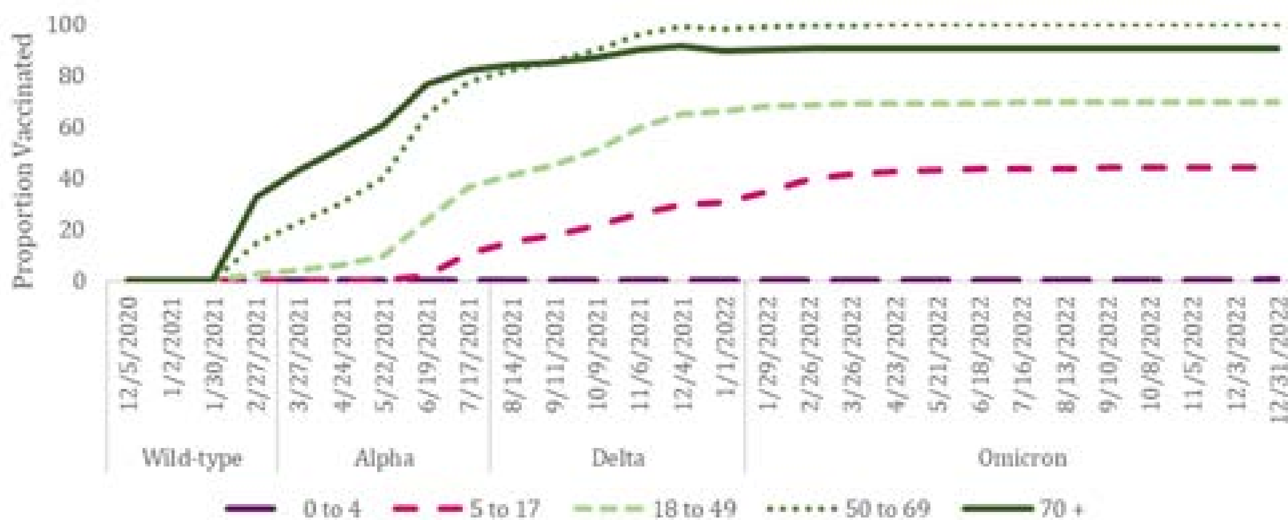
Sources: ISC-SK and NITHA, Panorama (2020 – 2022)

Looking at the two doses of COVID-19 vaccine coverage within First Nations communities in Saskatchewan, it can be observed that older age groups generally had higher vaccine coverage than younger age groups. This was especially true earlier on during the pandemic when the vaccine was first introduced as older people were eligible to receive their vaccines before younger individuals (Figure 2.15). The exception is the 50 to 69 year age group which by the end of 2022, had the highest vaccine coverage, and was greater than the coverage within the 70 years and older age group. By the end of 2022, everyone in the 50 to 69 age group had received their

second dose, along with 90.7% of those the aged 70 years and older, 69.6% of those aged 18 to 49 years, 44.4% of those aged 5 to 17 years, and only 0.8% of those aged 0 to 4 years.

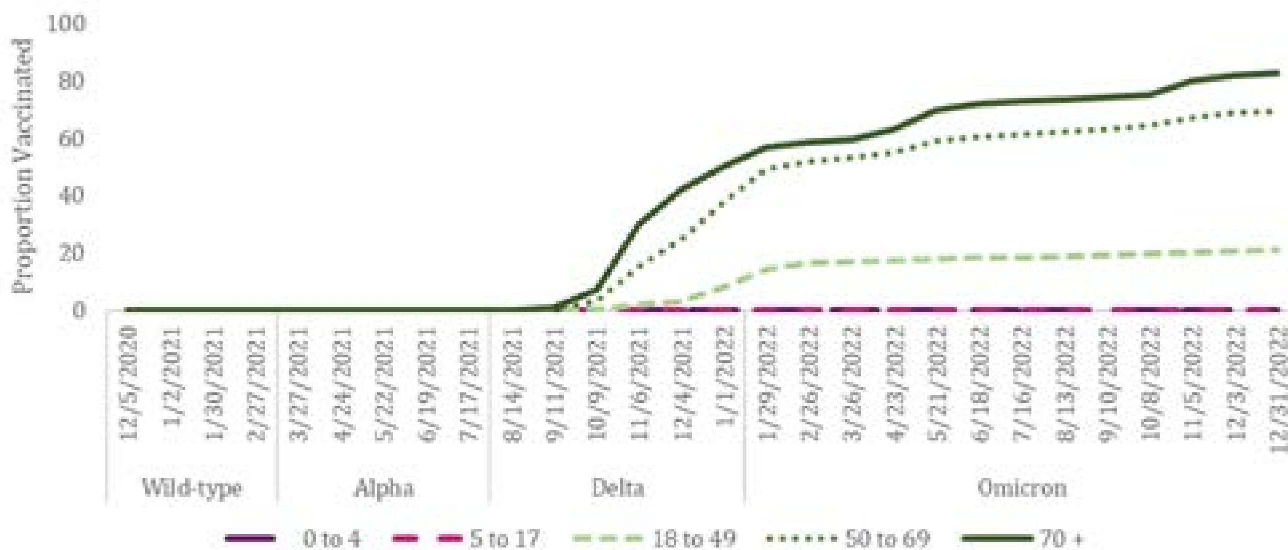
Compared to the two-dose coverage, coverage for the third vaccine dose was considerably lower for all age groups, especially among younger age groups (Figure 2.16). Unlike two dose coverage, older age groups consistently had greater vaccine coverage for the third dose, with the 70 years and older age group having the highest coverage by the end of 2022. By the end of 2022, 82.9% of people aged 70 years and older had received a third dose, along with 69.3% of those aged 50 to 69 years, 20.9% of those aged 18 to 49 years, and 0.0% of those aged 5 to 17 and 0 to 4 years. It is important to note however that unlike the two dose coverage the third dose coverage had not saturated (reached its maximum) by the end of 2022, so it is likely that a substantial proportion of people received their third doses after the end of 2022.

Figure 2.15: Total percentage of people vaccinated against COVID-19 in First Nations communities in Saskatchewan by age – Dose 2, December 2020 – 2022



Sources: ISC-SK and NITHA, Panorama (2020 – 2022)

Figure 2.16: Total percentage of people vaccinated against COVID-19 in First Nations communities in Saskatchewan by age – Dose 3, December 2020 – 2022



Sources: ISC-SK and NITHA, Panorama (2020 – 2022)

As shown in figure 2.13, only a small proportion of First Nations communities individuals living in Saskatchewan received more than three doses for the vaccine. Therefore, analysis stratified by age for more than three doses is not shown. Generally, as the average vaccination coverage increased in First Nations communities in Saskatchewan per variant period, the CFR decreased (Table 2.2). The same trend is observed for the CHR, except for wild-type which had a lower CHR than the other VOCs. CHR in First Nations communities in Saskatchewan peaked at 4.5% during the Alpha variant, and CFR peaked during the wild-type period at 0.95%.

Table 2.2: Average COVID-19 Case-Hospitalized Rate, Case-Fatality Rate, and average 1- and 2-dose coverage in First Nations communities in Saskatchewan by variant, December 2020 – 2022

Wave	CHR	CFR	1-dose coverage	2-dose coverage
Wild-type	2.7%	0.95%	9.3%	3.5%
Alpha Variant	4.5%	0.88%	42.3%	28.9%
Delta Variant	3.6%	0.70%	64.6%	48.8%
Omicron Variant[4]	1.2%	0.33%	73.4%	63.8%

Sources: ISC-SK and NITHA, Panorama (2020 – 2022)

COVID-19 VACCINATION COVERAGE – FIRST NATIONS COMMUNITIES IN SASKATCHEWAN, SASKATCHEWAN AND CANADA, DECEMBER 2020 – 2022

When the COVID-19 vaccine was first approved for use in Canada, First Nations communities were among the first eligible to receive the first and second doses of the vaccine. During the early stages of the pandemic, First Nations communities in Saskatchewan had higher vaccine coverage than the overall Saskatchewan and Canadian populations (Figure 2.17). However, when the vaccine was readily available for the rest of the population, coverage was lower among First Nations communities in Saskatchewan. By the end of 2022, the first dose vaccine coverage in First Nations communities in Saskatchewan was 74.0%, which is considerably lower than the coverage in Saskatchewan (82.1%), and Canada (83.4%).

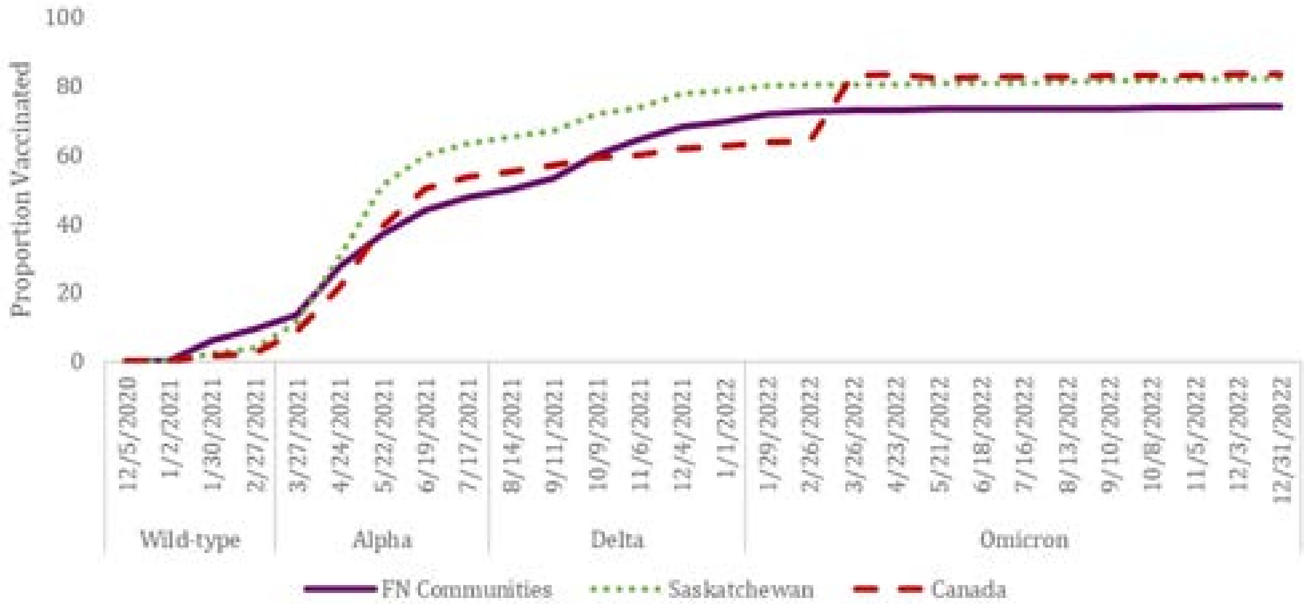
Similar to the first dose, the First Nations population was eligible to receive their second COVID-19 vaccine dose before the general population. Therefore, there was higher coverage among the First Nations communities in Saskatchewan until the second dose become more widely available to the general population on around May to June 2021 (Figure 2.18). By the end of 2022, vaccination coverage for the second dose in First Nations communities in Saskatchewan was 64.4%. This is lower than the 76.8% coverage in Saskatchewan, and 79.9% coverage in Canada.

Compared to the first two doses, the gap between First Nations communities and the overall Saskatchewan, and Canadian populations increased for three doses (Figure 2.19). For the second dose, the coverage for First Nations communities in Saskatchewan was 15.5% lower than the Canadian population, but for the third dose, this difference increased to 26.6% by the end of 2022.

In First Nations communities in Saskatchewan, only a small proportion of the population was vaccinated with four doses of the vaccine (Figure 2.20). By the end of 2022, only 2.7% of the First Nations communities' population in Saskatchewan had received four doses, which is significantly lower than the 21.2%, and 24.9% in the Saskatchewan and Canadian populations, respectively.

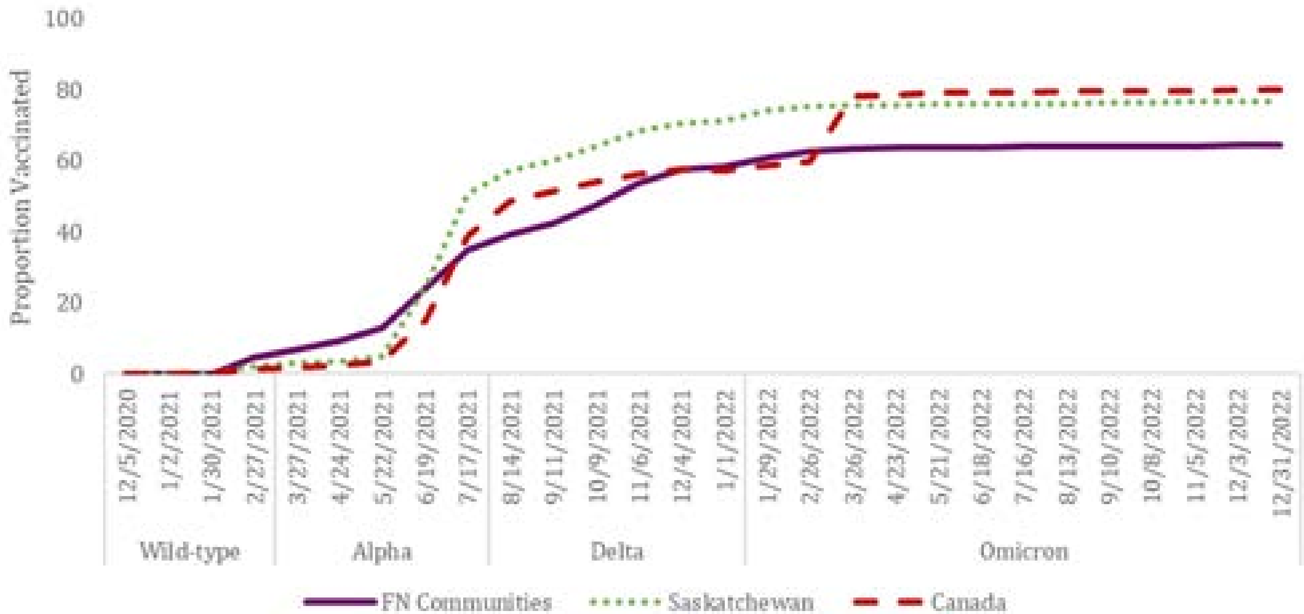
[4] Overestimated CFR due to underestimated case counts [18].

Figure 2.17: Total percentage of people vaccinated against COVID-19 in First Nations communities in Saskatchewan, and the overall Saskatchewan and Canadian populations – Dose 1, December 2020 – 2022



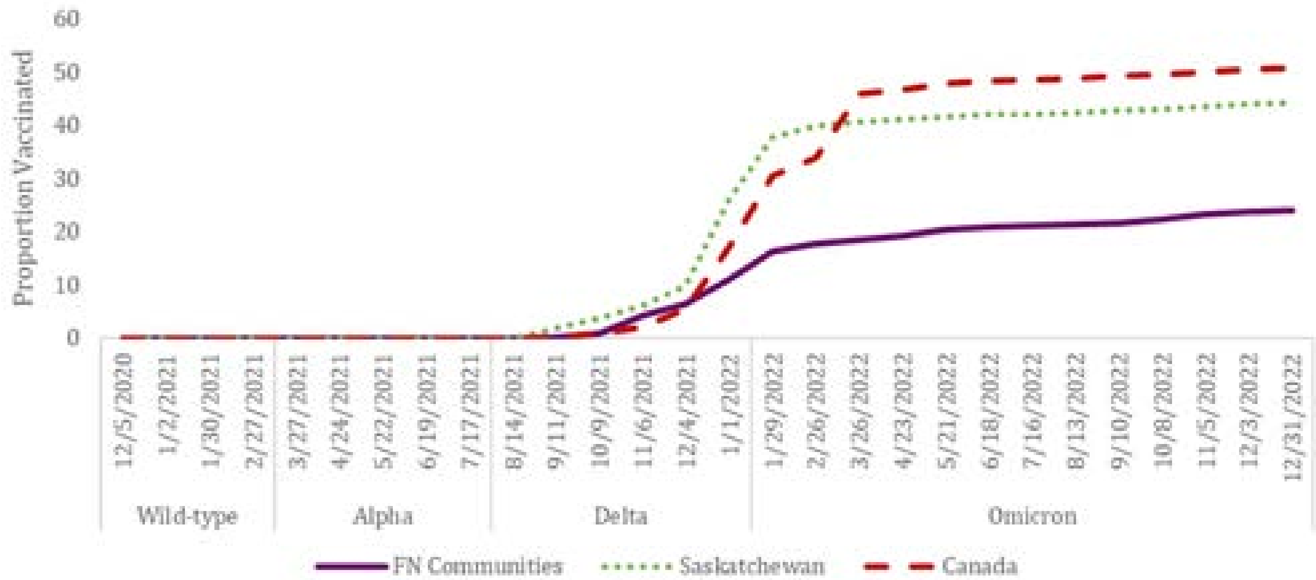
Sources: ISC-SK and NITHA, Panorama (2020-2022)

Figure 2.18: Total percentage of people vaccinated against COVID-19 in First Nations communities in Saskatchewan, and the overall Saskatchewan and Canadian populations – Dose 2, December 2020 – 2022



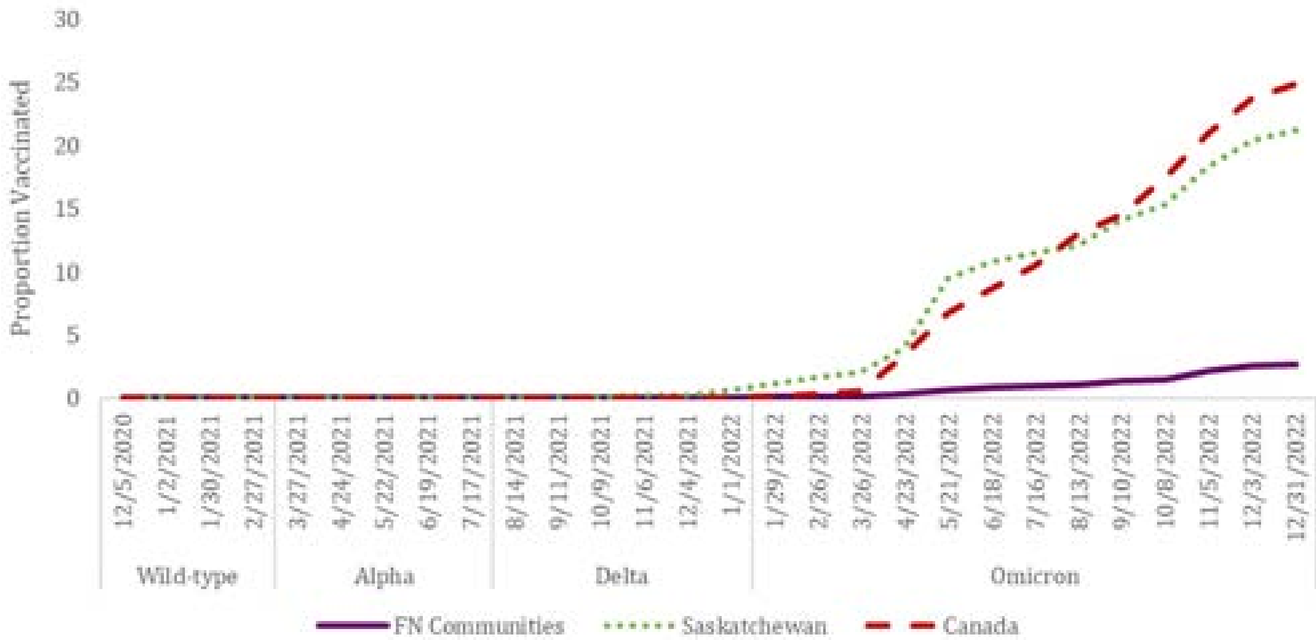
Sources: ISC-SK and NITHA, Panorama (2020 – 2022)

Figure 2.19: Total percentage of people vaccinated against COVID-19 in First Nations communities in Saskatchewan, and the overall Saskatchewan and Canadian populations – Dose 3, December 2020 – 2022



Sources: ISC-SK and NITHA, Panorama (2020 – 2022)

Figure 2.20: Total percentage of people vaccinated against COVID-19 in First Nations communities in Saskatchewan, and the overall Saskatchewan and Canadian populations – Dose 4, December 2020 – 2022



Sources: ISC-SK and NITHA, Panorama (2020 – 2022)

COMMUNITY LEADERSHIP IMPACT IN COVID-19 VACCINE ROLLOUT – SUCCESS STORY

Smylie and colleagues in 2016, reported that appropriate and adequate involvement and participation of Indigenous communities is key for the success of Indigenous programs [21].

NITHA's goal for the COVID-19 vaccine rollout was to ensure that vaccines were delivered timely to communities in a culturally appropriate manner knowing that NITHA's communities vary in cultural practices, values, norms, and religious beliefs. As a result, the NITHA's COVID-19 vaccine rollout involved the participation of Chiefs, Councils, Elders and Health Directors in communities. The participation of Chiefs, Councils, and Elders, who also serve as champions, positively impacted COVID-19 vaccine coverage in NITHA communities.

One community with a success story featuring great leadership support is the Lac La Ronge Indian Band. With the support of Lac La Ronge Indian Band leadership, the band explored non-traditional modes of vaccine administration such as the drive-thru and door-to-door model, and this resulted in increased vaccine coverage. The leadership also supported the use of incentives to encourage community members to receive their vaccine. This approach motivated community members living in First Nations communities to receive their vaccine, and band members living in cities to come home to receive their vaccine. Finally, the Chief of Lac La Ronge Indian Band, Chief Tammy Cook-Searson, and her husband took pictures while receiving the COVID-19 vaccine. These pictures increased COVID-19 awareness during presentations and were used on social media to encourage eligible community members to receive their COVID-19 vaccine.

Chief Tammy Cook-Searson, Lac La Ronge Indian Band, receiving the COVID-19 vaccine.

IMPACT OF VACCINATIONS ON SEVERE OUTCOMES – HOSPITALIZATIONS AND DEATHS

To help in evaluating the impact of vaccinating against COVID-19 in preventing severe outcomes (i.e., hospitalization or death), a risk ratio can be used. The risk ratio helps in providing the strength and direction of the association. If:

- Risk Ratio = 1, there is no association in severe outcomes between vaccinated and unvaccinated;
- Risk Ratio > 1, the risk of a severe outcome is greater for vaccinated compared to unvaccinated individuals; and
- Risk Ratio < 1, the risk of a severe outcome is less for vaccinated compared to unvaccinated individuals.

Note that the analysis is focused on the Alpha and Delta variant periods as this was when the vaccine was available and case counts were most accurate.

Table 2.3: Crude risk ratios for severe outcomes for unvaccinated First Nations communities' population in Saskatchewan compared to individuals who received one or more doses, Alpha (March 8, 2021) – Delta (January 4, 2022)

Doses Received	Hospitalizations Risk Ratio	Deaths Risk Ratio
One dose	0.70 [95% CI 0.48 – 1.01]	0.68 [95% CI 0.29 – 1.60]
Two or more doses	0.38 [95% CI 0.28 – 0.50]	0.38 [95% CI 0.20 – 0.73]

Sources: ISC-SK and NITHA, Panorama (2020 – 2022)

- The risk of hospitalization among people in First Nations communities in Saskatchewan who received one dose is 30% less than the risk among unvaccinated individuals.
- The risk of hospitalization among people in First Nations communities in Saskatchewan who received two or more doses is 62% less than the risk among unvaccinated individuals.
- The risk of death among people in First Nations communities in Saskatchewan who received one dose is 32% less than the risk among unvaccinated individuals.
- The risk of death among people in First Nations communities in Saskatchewan who received two or

more doses is 62% less than the risk among unvaccinated individuals.

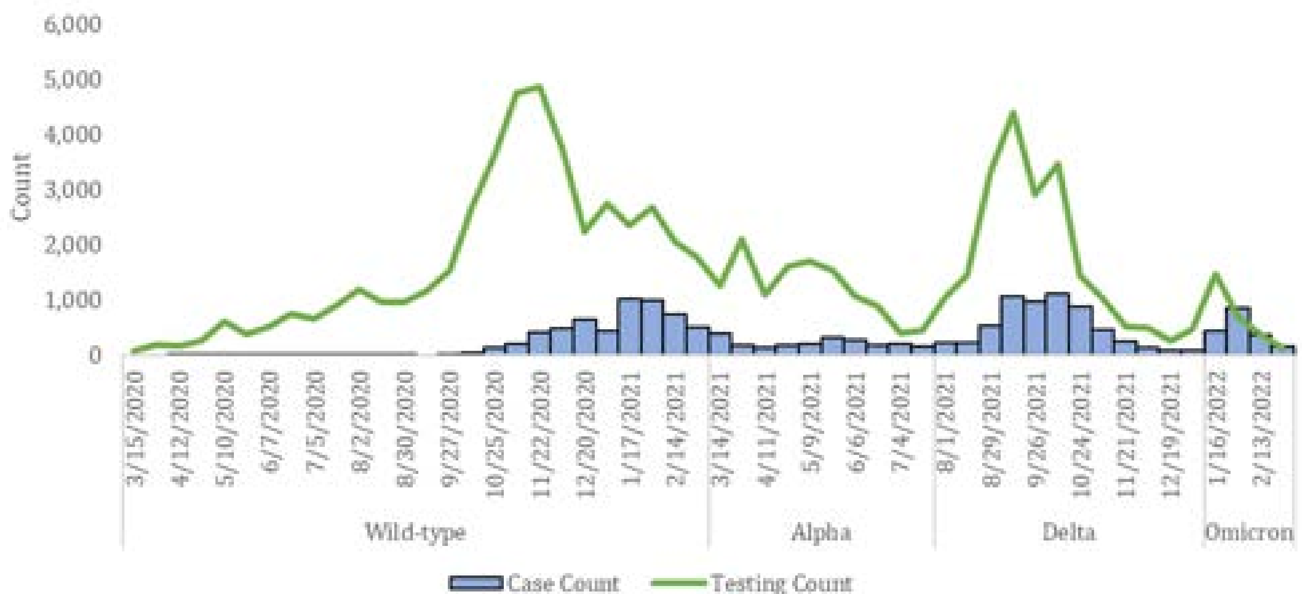
Overall, the data in table 2.3 suggests the importance of receiving the COVID-19 vaccine in preventing severe outcomes. This is especially the case among people who received at least 2 doses of the vaccine, who are almost three times less likely to be hospitalized or death from a COVID-19 infection. In addition, the confidence intervals (CI) depict that individuals with two or more doses of the COVID-19 vaccine had a significantly lower risk of hospitalization and death at the 95% confidence level. However, the reduction in risk for either hospitalization or death for individuals with one dose of the vaccine is not statistically significant at the 95% confidence level. This is because both risk ratio confidence intervals contain 1.0 (or no benefit or harm) from one dose of the vaccine (see appendix for more information).

COVID-19 TESTING – IN AND NEAR FIRST NATIONS COMMUNITIES IN SASKATCHEWAN, MARCH 2020 – FEBRUARY 2022[5]

Testing is vital to detect the presence of a disease to enable timely interventions to control the spread of the disease, protect communities and save lives. Because of this, COVID-19 testing was closely monitored during the pandemic. At the beginning of the pandemic, the majority of tests were lab-confirmed tests, however as the pandemic progressed, more rapid point of care tests, including GeneXpert machines and self-administered RATs, were used. Not all point of care tests were reported, especially during the Omicron period, when public testing was limited, and many people self-tested at home. Tests counted were those administered in and near First Nations communities in Saskatchewan and thus overrepresent those living in First Nations communities.

In general, the number of tests conducted every two weeks in and near First Nations communities peaked slightly before the number of cases went up in First Nations communities in Saskatchewan (Figure 2.21). Most tests were done during the wild-type period, with 4861 tests carried out from November 9, 2020, to November 22, 2020. As point-of-care tests became more common later in the pandemic, there were less traditional laboratory tests conducted.

Figure 2.21: Biweekly COVID-19 test counts in and near First Nations communities in Saskatchewan and case counts, March 2020 – February 2022



Sources: ISC-SK and NITHA, Panorama (2020 – 2022)

[5] Includes laboratory lab-confirmed tests and rapid point of care tests.

COVID-19 OUTBREAKS IN FIRST NATIONS COMMUNITIES IN SASKATCHEWAN, MARCH 2020 – FEBRUARY 2022

An outbreak is defined as an increase in cases of a disease that is greater than what is normally expected [22]. Since a pandemic is essentially a large-scale outbreak that spreads globally, it is important to keep in mind that the following outbreaks discussed here are part of a larger outbreak themselves. In First Nations communities in Saskatchewan, an outbreak was defined as two or more cases in a non-household setting where transmission likely occurred in a non-household setting, or one case in a long-term care facility setting. This is because individuals in a long-term care facility are at a higher risk of severe COVID-19 infection and death.

From the start of the pandemic to February 28, 2022, there were a total of 136 COVID-19 outbreaks in First Nations communities in Saskatchewan, with the first COVID-19 outbreak declared on May 20, 2020, in a First Nations community in the south central area (Figure 2.22). The wild-type period had the most COVID-19 outbreaks with 56, representing 41.1% of all COVID-19 outbreaks. The Delta period had the second highest number of outbreaks declared at 42, making up 29.4% of total outbreaks. It is significant to note that the highest number of outbreaks declared during a two-week period was between January 16 to January 31, 2022, with 11 outbreaks declared during the Omicron period.

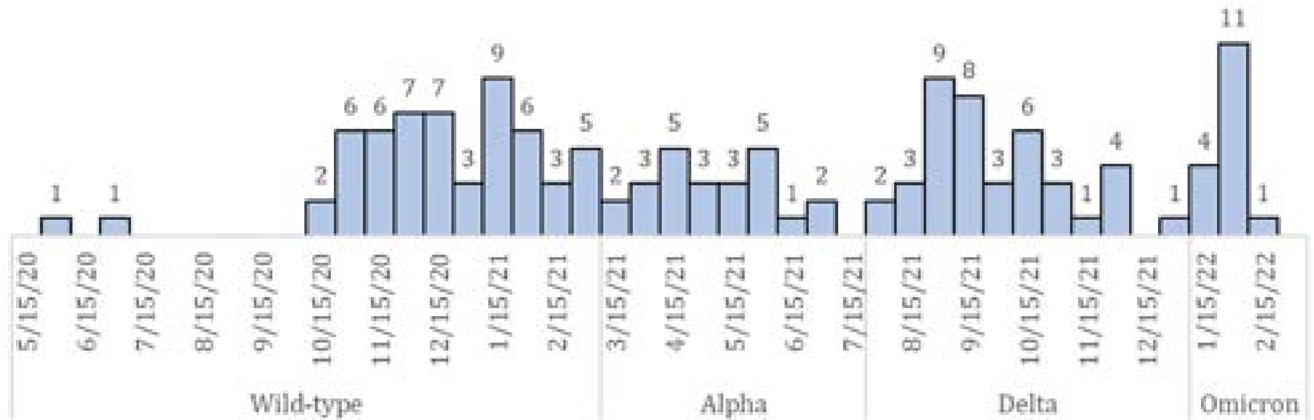
Looking at the length of COVID-19 outbreaks in First Nations communities in Saskatchewan, most lasted under two months (8 weeks or less) (Figure 2.23) [6]. The highest proportion of outbreaks lasted between 22 to 28 days (4 weeks), which made up 17.6% of all COVID-19 outbreaks.

In First Nations communities in Saskatchewan, most outbreaks (58%) resulted in 30 or less confirmed cases of COVID-19 (Figure 2.24). However, there was a total of 20 outbreaks that had at least 100 confirmed cases. Of these 20 outbreaks, eleven were declared during the Delta period. These larger-scale outbreaks likely occurred due to the increased infectiousness of the variant in combination with fewer provincial restrictions in place during the beginning of the Delta period. In addition, nineteen of the 20 outbreaks were community-wide outbreaks.

Figure 2.25 provides a breakdown of the of the origin of the COVID-19 outbreaks that were declared in First Nations communities in Saskatchewan. It is important to note that the following locations are general and only indicate where the outbreak is believed to have started. Facility outbreaks include long-term care homes, group homes, and health care settings. In First Nations communities in Saskatchewan, most COVID-19 outbreaks originated within communities (41.9%). Facility outbreaks made up 21.3% of the outbreaks, while school outbreaks made up 15.4% of the outbreaks.

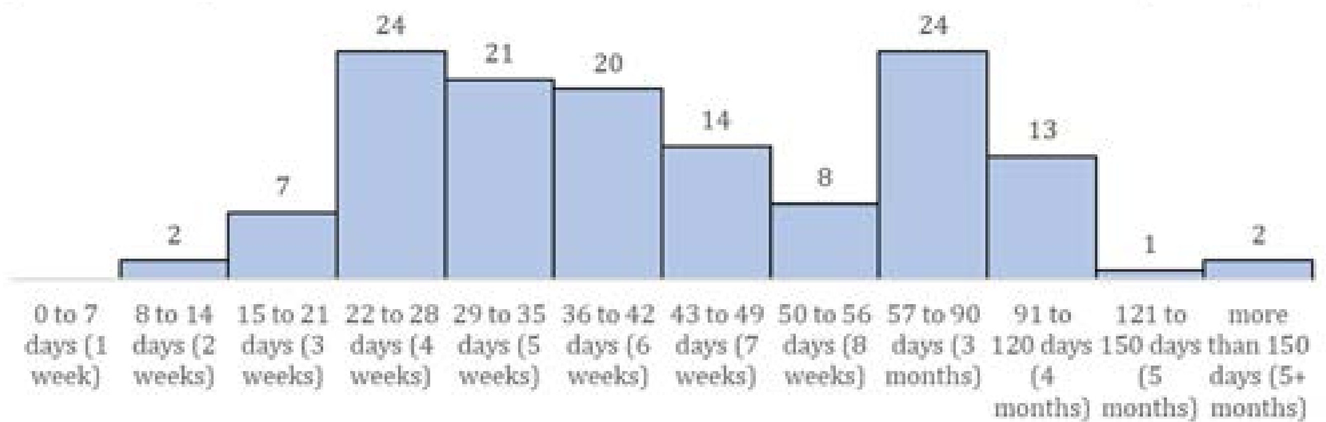
[6] Outbreak duration is defined as the onset date of the last case minus the index case, but this data was not always available. As a result, the date declared over minus the date declared was used to determine the outbreak duration.

Figure 2.22: COVID-19 outbreaks in First Nations communities in Saskatchewan by date declared (N=136) [7]



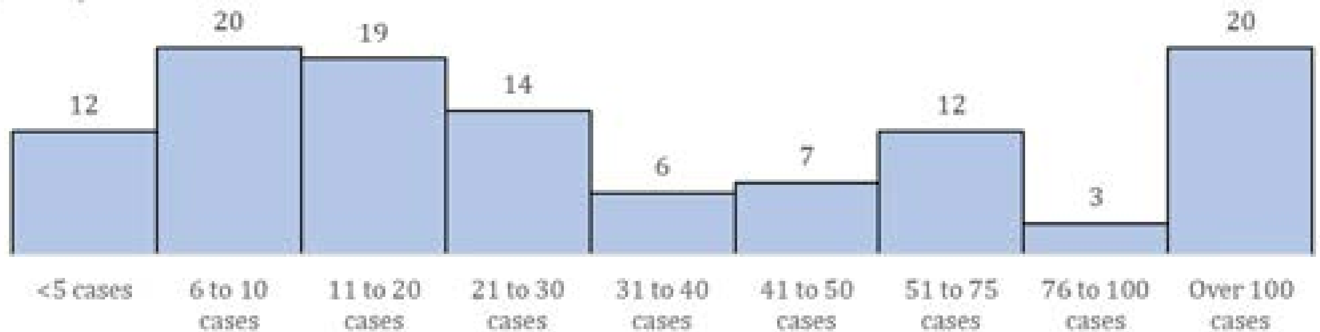
Sources: ISC-SK and NITHA, Panorama (2020 – 2022)

Figure 2.23: Length of COVID-19 outbreaks in First Nations communities in Saskatchewan (N=136)



Sources: ISC-SK and NITHA, Panorama (2020 – 2022)

Figure 2.24: Number of COVID-19 cases per outbreak in First Nations communities in Saskatchewan (N=113) [8]

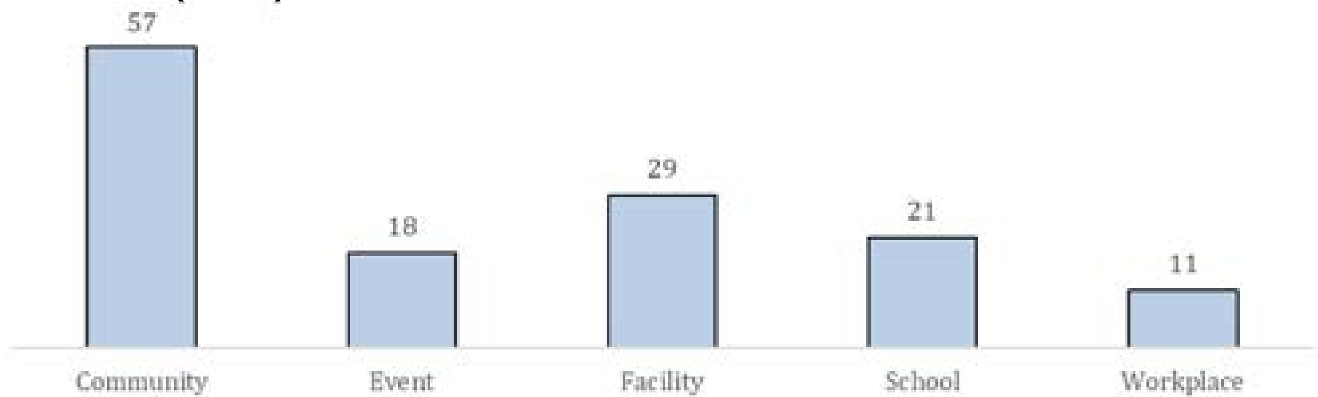


Sources: ISC-SK and NITHA, Panorama (2020 – 2022)

[7] Outbreaks are counted by their declaration date, but extend beyond the date specified. Therefore, there may be more or less outbreaks at a given moment in time than the figure may suggest.

[8] Number of outbreaks is lower than total outbreaks as case information was not known for 23 outbreaks, and are therefore not included in Figure 2.24.

Figure 2.25: Count of the origin of the COVID-19 outbreaks in First Nations communities in Saskatchewan (N=136)



Sources: ISC-SK and NITHA, Panorama (2020 – 2022)

PUBLIC HEALTH IMPLICATIONS

The COVID-19 situation among the First Nations communities in Saskatchewan was shaped by important social determinants of health and inequities faced by Indigenous peoples. Among the social inequities within First Nations communities is poor public health infrastructure. During the pandemic, many communities reported a lack of effective community-led public health structures and responses to the pandemic, lack of personal protective equipment (PPE) and education on how to use PPE, and overall overworked and under-resourced communities [2]. Other social disparities faced by many First Nations communities includes poor or lack of internet access, overcrowding, access to clean water, and limited access to healthcare services [2]. These difficulties contribute to the spread of infectious diseases, including COVID-19. Therefore, social determinants of health and inequities faced by First Nations populations contributed to higher rates of transmission of COVID-19, and an overall increase in the burden of the pandemic. On average across the case reporting period, the COVID-19 case rate in First Nations communities in Saskatchewan was twice as high compared to the overall Saskatchewan and Canadian populations. Furthermore, vaccine coverage among First Nations communities in Saskatchewan was lower than in the overall Saskatchewan and Canadian populations. Building trust and providing education about the safety of vaccination can increase vaccination coverage and decrease disease burden across the communities [23]. This is especially important for younger age groups, where vaccine coverage is lower. To address these health gaps in future pandemics, the infrastructure and social disparity that exists between First Nations and non-First Nations communities needs to be reduced. Fortunately, as of 2023, the age distribution of the population in First Nations communities in Saskatchewan is younger compared to the general population, which helped lessen the impact of COVID-19 on hospitalizations and deaths. However, as the population ages, future pandemics will pose a greater challenge unless public health and structural infrastructure are adapted to address the aging population.

APPENDIX

Data Sources

1. Overall Canadian Population
    - Total Canadian population, including First Nations communities and First Nations people living outside reserve lands
    - Data sources:
        - Public Health Agency of Canada
            - COVID-19 epidemiology update: summary (Feb 1, 2020, to end of case surveillance – Feb 28, 2022)
                - National data for COVID-19 case and death rates
            - COVID-19 vaccination: Vaccination coverage (December 2020 – 2022)
                - National data for COVID-19 vaccine coverage
2. Overall Saskatchewan Population
    - Total Saskatchewan population, including First Nations communities and First Nations people living outside reserve lands
    - Data source:
        - Public Health Agency of Canada
            - COVID-19 epidemiology update: summary (Feb 1, 2020, to end of case surveillance – Feb 28, 2022)
                - Saskatchewan provincial data for COVID-19 case and death rates
            - COVID-19 vaccination: Vaccination coverage (December 2020 – 2022)
                - Saskatchewan provincial data for COVID-19 vaccine coverage
        - Saskatchewan Ministry of Health
            - Tracking variants of the novel coronavirus in Canada
                - Saskatchewan provincial data for COVID-19 sequenced variants (2021 to Feb 2, 2022)
3. First Nations communities in Saskatchewan
    - Total population registered to a First Nations band and residing in a First Nations community in Saskatchewan, excluding non-registered First Nations or non-First Nations that may be living in a First Nations community.
    - Data sources:
        - Saskatchewan Ministry of Health, Panorama (comprehensive and integrated Pan-Canadian Public Health Communicable Disease Surveillance and management system), 2020-2022.
            - First Nations communities in Saskatchewan data
                - Confirmed cases, hospitalizations, and deaths
                - Vaccine doses
                - Testing counts
                - Outbreak counts

Approach to Data Analysis

The 7-day moving average of sequenced cases for determining the dominant COVID-19 variant was calculated by taking the sum of the previous 7-days, and dividing the weekly count by 7.

$$\frac{\begin{array}{c}Number\ of\ new\ cases\ of\ a\ specific\ variant\\(in\ the\ previous\ 7\ days)\end{array}}{7}$$

The case, hospitalization and death rates were calculated biweekly by dividing the total number of cases of COVID-19 in the reported previous 2 weeks, by the total population in the reported year, expressed as the number of new cases in the reported 2 weeks per 100,000 population.

For example, for COVID-19 biweekly case rate:

$$\frac{\begin{array}{c}Number\ of\ new\ cases\ of\ disease\\(in\ the\ previous\ two\ weeks)\end{array}}{\begin{array}{c}Total\ population\\(in\ the\ reported\ year)\end{array}} \times 100{,}000$$

The Case-Fatality Rate (CFR) and Case-Hospitalization Rate (CHR) was calculated by taking the sum of COVID-19 death or hospitalized cases and dividing it by the sum of COVID-19 cases and multiplying it by 100%.

For example, for CFR over a specific period of time:

$$\frac{sum\ of\ deceased\ cases}{sum\ of\ cases} \times 100\%$$

The proportion vaccinated against COVID-19 was calculated by taking the number who

received the COVID-19 vaccine and dividing it by the population of interest in the reported year (I.e. First Nations communities in Saskatchewan, overall Saskatchewan population, or overall Canadian population) and multiplying it by 100.

$$\frac{Number\ of\ population\ vaccinated}{Total\ population\ (in\ the\ reported\ year)} \times 100$$

Risk ratio compares the risk of an event (i.e. hospitalization or death) occurring between two different groups (i.e., vaccinated and unvaccinated against COVID-19). It is calculated by taking the risk in the exposed group (unvaccinated) and dividing it by the risk in the unexposed group (vaccinated) for a particular event. Risk (also known as incidence proportion) is the probability that an individual will experience an event within a specific period. In this case, the risk of developing a severe outcome like hospitalization or death during the Alpha and Delta periods.

For example, the risk of being hospitalized among those unvaccinated:

$$\frac{Number\ of\ COVID19\ cases\ hospitalized}{Total\ population\ unvaccinated\ during\ the\ period}$$

Risk ratio between unvaccinated and vaccinated populations for either hospitalizations or deaths:

$$\frac{Risk\ in\ the\ unvaccinated\ group}{Risk\ in\ the\ vaccinated\ group}$$

Note that the population used was based on the number of people vaccinated at the midpoint between the Alpha and Delta variant periods (August 14, 2021).

The 95% confidence interval calculated for the risk ratios is the range of values one would expect to contain the true risk ratio 95% of the time. That is, if one were to replicate the scenario many times (in this case this is not possible as the course of the pandemic happened once), one would expect the range of values to contain the true risk ratio 95% of the time. It is used to quantify the uncertainty of a point estimate (in this case the risk ratio) to see if the value holds much meaning. For example, if the 95% CI are very wide and engulf the null result (i.e. risk ratio = 1), then the results are not statistically significant and it cannot be determined that the risk in one group is different from another at the 95% CI.

The 95% CI was calculated using STATA 18.0 SE-Standard edition.

$$risk\ ratio\ \pm 1.96\ \frac{\sqrt{\sigma}}{\sqrt{n}}$$

Data Limitations

- COVID-19 data for First Nations communities in Saskatchewan does not capture those who were diagnosed while living outside reserve lands or those who were diagnosed outside of Saskatchewan.
- As COVID-19 data only reflects disease cases that were tested and then reported, there may be an underestimation of the true incidence of the disease. This is especially a limitation during the Omicron period, as during this period, there was limited public testing available. Many individuals were self-testing in a home-setting and were not publicly reported positive cases. As a result, case counts were underestimated during the Omicron period.
- During the pandemic, there was a substantial number of late entries of births into ISC's Indian Registration System (IRS). As this value is used for population counts, the rates for the 0 to 4 year old age group is overestimated in the age-stratified analysis.
    - Additionally, this would mean the proportion vaccinated in the 0 to 4 year old age group is also over estimated.
- The differences in age distribution among the various populations (i.e., First Nations communities in Saskatchewan, and overall Saskatchewan and Canadian populations) can affect the rate of infection, hospitalizations, and deaths. Unfortunately, age-standardized rates cannot be calculated due to a lack of

available and accessible provincial data.

- Data that separates First Nations communities in Saskatchewan, Saskatchewan, and Canada is not available. As a result, comparisons are made between First Nations communities and the total populations of Saskatchewan and Canada. This slightly influences the difference in rates and vaccine coverage, in particular for Saskatchewan, as the First Nations communities population in Saskatchewan makes up a larger proportion of the Saskatchewan population than the Canadian population.
- The point at which the Alpha variant became dominant cannot be determined based on the variant with the highest incidence. This is because there was no wild-type sequencing information. Therefore, the Alpha variant was determined to start when the first few cases of the Alpha variant were sequenced.
- COVID-19 doses were administered at a First Nations community service delivery site, where both First Nations communities and First Nations people living outside reserve lands could access the site. Since only the population in First Nations communities is known (2021 and 2022 ISC), the denominator is underestimated. Therefore, the coverage proportion is overestimated among First Nations communities in Saskatchewan.
- Table 1.4 is showcasing "crude" or "unadjusted" risk ratios and therefore, does not consider how confounders may influence the risk ratio such as age.
- Outbreak duration is defined as the onset date of the last case minus the index case, but this data was not always available. As a result, the date the outbreak was declared over minus the date the outbreak was initiated was used.
- Tests counted were given in and near First Nations communities in Saskatchewan and therefore, over represents the tests administered in First Nations communities in Saskatchewan.

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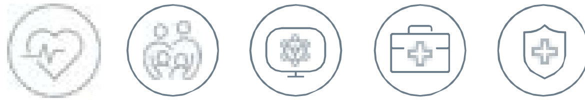
First Nations Health Status Report

2024



Saskatchewan Region

Chapter 3: Immunizations

WHAT IS IMMUNIZATION COVERAGE AND THE IMPACT OF COVID-19

The percentage of children who receive vaccinations within a population is an important measure of health. Vaccines given in childhood are proven to effectively build immunity and protect children and communities from serious and sometimes deadly diseases [1]. In this chapter, the average immunization coverage for routine vaccines from 2014 to 2023, and for specific childhood vaccines from 2017 to 2023 for one-, two-, and seven-year-olds in First Nations communities in Saskatchewan are explored. The immunization coverage estimates will be grouped for First Nations communities with public health services provided by Northern Inter-Tribal Health Authority (NITHA) or Indigenous Services Canada (ISC)-SK. These immunization coverages will be compared to Saskatchewan's overall immunization coverages for select vaccines when available.

In this chapter, immunization coverage refers to the percentage of people who received one or more vaccines in relation to the overall target population [2]. For example, immunization coverage for pertussis in two-year-olds is calculated as the percentage of two-year-olds who got the recommended doses of pertussis vaccine out of all the two-year-olds in the population.

Prior to the COVID-19 pandemic, immunization coverage among all age cohorts in First Nations communities in Saskatchewan were relatively stable. However, from 2020 to 2022, there were significant drops in the number of children getting their routine vaccines, especially among younger children. This was the result of resources and personnel diverted to focused on COVID-19, possible worries of exposure to COVID-19 in healthcare facilities, and logistical challenges such as the disruption to transportation and lockdowns [3]. Older children were not as affected because they had more time to get their shots before the pandemic. Since 2020, there have been catch-up campaigns to address the missed vaccinations, yet one- and two-year-old immunization coverage, in particular, remain well below the coverage goal of 95%.

NATIONAL IMMUNIZATION COVERAGE

The Public Health Agency of Canada tracks immunization coverage in Canada with the help of Statistics Canada, which conducts a survey called the Childhood National Immunization Coverage Survey (CNICS) every two years [4]. The survey asks parents or guardians about the vaccinations received by a randomly selected child in their household (aged 2, 7, 14 or 17). In 2021, 97% of parents said they believe childhood vaccines are safe, and 98% believed that they are effective [5]. Table 3.1 shows the immunization coverage estimates for two- and seven-year-old children in Canada in 2017, 2019 and 2021 [6]. The coverage goal for each vaccine is 95% [7].

HIGHLIGHTS

- The COVID-19 pandemic hindered progress that had been made toward immunization goals for outbreak prevention, despite the general positive upward trend in immunization coverage in preceding years, however, coverage for most vaccines increased in 2023 compared to during the pandemic years.
- The older age cohorts had additional time to be up-to-date with routine vaccinations before the COVID-19 pandemic, and therefore, experienced smaller decreases in vaccine coverage during the 2020 to 2022 period when compared to younger age cohorts.
- Compared to the overall Saskatchewan population, First Nations communities in Saskatchewan generally had higher immunization coverage.
- The First Nations communities in the south central area generally had lower immunization coverage during the COVID-19 pandemic when compared to First Nations communities in the NITHA area.
- Some immunization coverage, such as those for pertussis and rotavirus, are well below the recommended target coverage to prevent outbreaks
- Enhanced measures and supports have been put in place by ISC-SK and NITHA to guide community-led approaches for increasing immunization coverage and reducing infection risk.

Between the three years, the immunization coverage within the two-year-old cohort for specific vaccines remained relatively consistent. However, the immunization coverage for the seven-year-old cohort decreased for most vaccines from 2017 to 2019 and 2021.

Table 3.1: Immunization coverage estimates for two- and seven-year-old children in Canada, 2017, 2019, and 2021

	Two-Year-Old Cohort			Seven-Year-Old Cohort		
	2017	2019	2021	2017	2019	2021
Pertussis (part of DTaP-IPV) [9]	75.8%	77.5%	77.1%	80.5%	78.1%	71.9%
Haemophilus influenza type b (Hib)	73.4%	77.4%	75.3%	83.9%	80.0%	78.5%
Measles	90.2%	90.2%	91.6%	87.0%	83.3%	79.2%
Mumps	89.9%	89.2%	91.5%	86.4%	83.1%	79.5%
Rubella	90.0%	89.4%	91.5%	94.5%	95.9%	94.0%
Varicella	82.9%	82.7%	87.5%			90.7%
Pneumococcal	81.4%	84.4%	85.1%			
Meningococcal	87.6%	91.1%	90.5%			
Rotavirus	78.8%	84.5%	85.6%			

Source: Statistics Canada – CNICS: 2017, 2019, 2021

SASKATCHEWAN IMMUNIZATION COVERAGE DATABASE

Panorama is the comprehensive and integrated Pan-Canadian Public Health Communicable Disease Surveillance and Management system [8]. The purpose of the system is to help public health professionals work together more effectively to manage immunizations, vaccine inventories, and other important public health functions [8]. The immunization module of Panorama provides health care professionals with a number of benefits. This includes the ability to manage individual client immunization records in a single database, create a single client record for a person who receives immunizations, forecast upcoming immunizations for residents and sends reminders when immunizations are due, and provide immunization coverage reports for the province [9].

AVERAGE IMMUNIZATION COVERAGE FOR FIRST NATIONS COMMUNITIES IN SASKATCHEWAN

This section gives details on the average immunization coverage of all vaccines in the routine immunization schedule for each specific age group within the population: one-, two- and seven-year-olds. These averages are based on vaccines delivered as of December 31 of each calendar year. Average immunization coverage is an aggregated measure of the up-to-date coverage for all vaccines included in the immunization schedule for each specific age group in the population. Given individual-level vaccination records are not provided to ISC-SK, but rather aggregate counts of children who have received each vaccine type, an up-to-date immunization coverage cannot be calculated. Instead, presented here is the average of the immunization coverages for the recommended vaccines for each age group. The immunization program for First Nations children follows the Saskatchewan provincial immunization schedule outlined in the Saskatchewan

[9] Pertussis (also known as whooping cough) is part of the DTaP-IPV-Hib (or the Diphtheria-Tetanus-Pertussis-Polio-Haemophilus Influenza B) vaccine and pertussis has the same coverage as diphtheria, tetanus, and polio in the CNICS and are therefore, grouped together.

Immunization Manual [10]. The data for First Nations communities in Saskatchewan is collected through the Childhood Immunization Coverage Reports (CICRs), which enables the detailed reporting of vaccine coverage for First Nations communities.

IMMUNIZATION SCHEDULE FOR ONE-YEAR-OLDS

One-year-old average immunization coverage is calculated for all eligible vaccines offered to children before their first birthday. In Saskatchewan, the routine immunization schedule for one-year-old children includes:

- Three doses of Diphtheria-Tetanus-Pertussis-Polio-Haemophilus Influenza type B (DTaP-IPV-Hib) offered at 2, 4 and 6 months of age;
- Two doses (three, if medically high risk) of Pneumococcal Conjugate-15 (Pneu-C-15) offered at 2, 4, and 6 months of age; and
- Three doses of Rotavirus (Rot-5) offered at 2, 4, and 6 months of age.

ONE-YEAR-OLD AVERAGE IMMUNIZATION COVERAGE

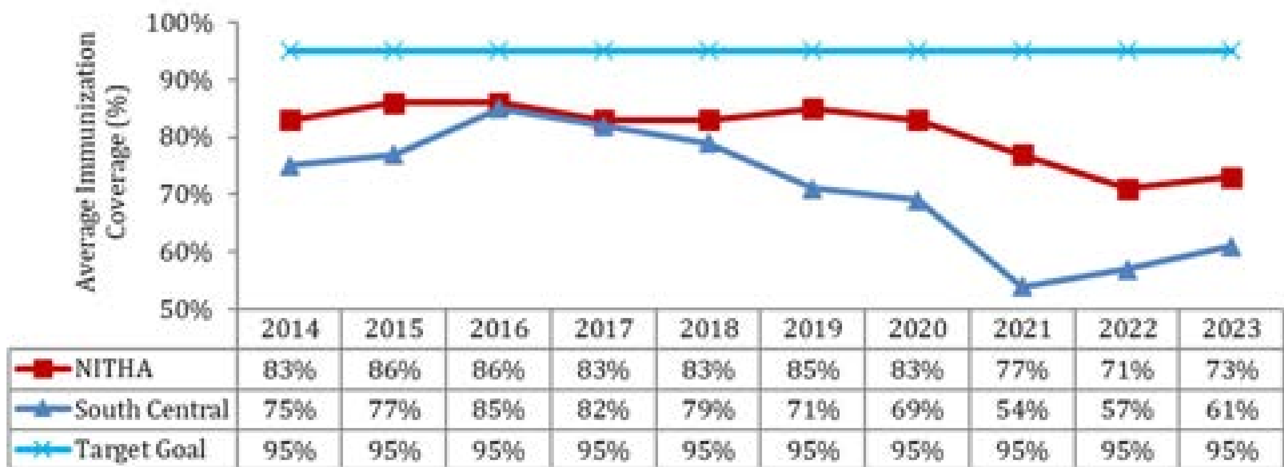
Note that for Figure 3.2, the average immunization coverage does not include vaccinations for the rotavirus vaccine. The rotavirus vaccine has very specific timing requirements: the first dose must be given by 15 weeks minus 1 day of age and the last dose given by 8 months minus 1 day of age [10]. Because of this specific requirement, many 1-year-olds are not categorized as immunized against rotavirus (as seen in figure 3.15 later in this chapter). This significantly lowers the immunization coverage overall. We include both figures to give context on the immunization coverage for the other childhood vaccines for one-year-olds mentioned earlier, without biasing the results.

It is also important to note the difference between average immunization coverage and how this is different from "up-to-date" immunization. Up-to-date immunization is a term that refers to the proportion of children who received all of their recommended routine childhood vaccinations based on age, while the average is the mean coverage of the individual vaccines. The average immunization coverage is an overestimation of the up-to-date immunization coverage.

Over the past ten years, the average immunization coverage for all vaccines (including rotavirus vaccine) for one-year-olds has shown a curved pattern. Coverage increased slightly between 2014 and 2016, before plateauing between 2016 and 2018, declining between 2019 and 2022, and slightly recovering in 2023. The average immunization coverage for one-year olds in First Nations communities in the south central area dropped from the peak of 85% in 2016 to 61% in 2023 (Figure 3.1). The one-year-old average coverage among the First Nations communities in NITHA peaked in 2016 at 86%, and dropped to 73% in 2023.

When excluding the rotavirus vaccine, the average immunization coverage for all vaccines for one-year-olds are between 5% to 13% higher. The average immunization coverage for one-year-olds for First Nations communities in the south central area decreased from a peak of 91% in 2017 to 70% in 2023 (Figure 3.2). Similarly, the one-year-old average immunization coverage among First Nations communities in the NITHA area decreased from a peak of 92% in 2019 to 81% in 2023. In 2023, immunization coverage averages are around 10% greater when excluding rotavirus vaccine from the average.

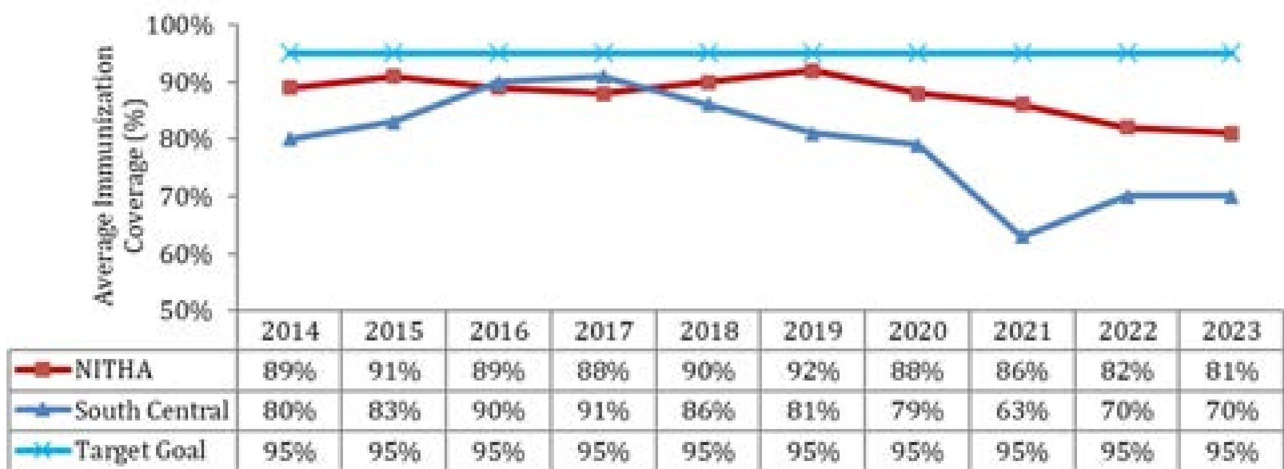
Figure 3.1: Average immunization coverage for one-year-olds for First Nations communities in Saskatchewan, 2014 – 2023 (Rotavirus vaccine included)



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NITHA	83%	86%	86%	83%	83%	85%	83%	77%	71%	73%
South Central	75%	77%	85%	82%	79%	71%	69%	54%	57%	61%
Target Goal	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

Source: ISC-SK and NITHA - CICR reports (2014 – 2023)

Figure 3.2: Average immunization coverage for one-year-olds by First Nations communities in Saskatchewan, 2014 – 2023 (Rotavirus vaccine not included)



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NITHA	89%	91%	89%	88%	90%	92%	88%	86%	82%	81%
South Central	80%	83%	90%	91%	86%	81%	79%	63%	70%	70%
Target Goal	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

Source: ISC-SK and NITHA - CICR reports (2014 – 2023)

IMMUNIZATION SCHEDULE FOR TWO-YEAR-OLDS

The routine immunization schedule for Saskatchewan children under two years of age includes:

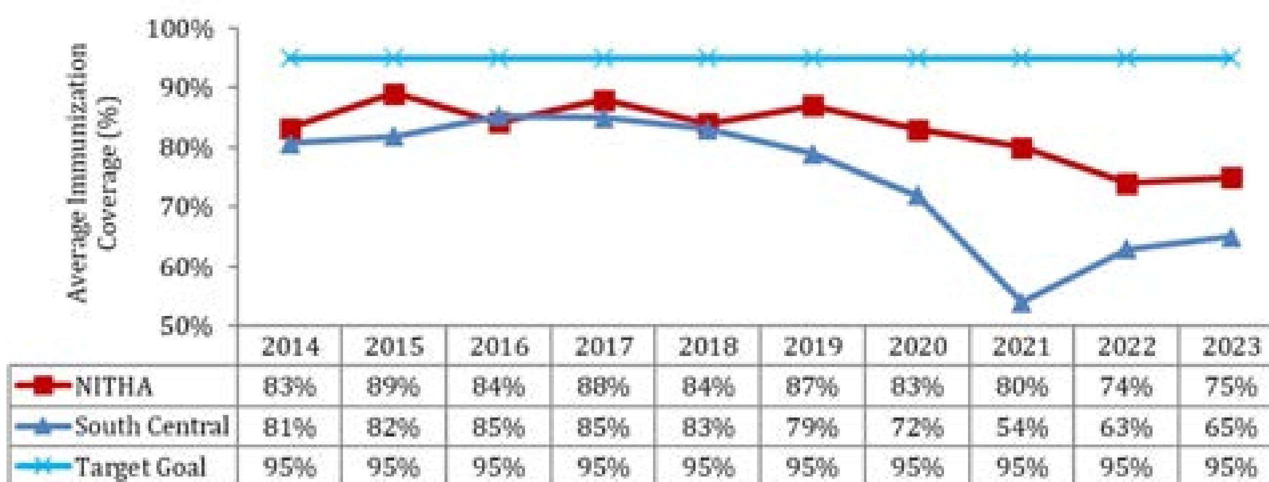
- Four doses of DTaP-IPV-Hib offered at 2, 4, 6 and 18 months of age;
- Three doses (four, if medically high risk) of Pneu-C-15 offered at 2, 4 and 12 months of age;
- Two doses of Measles, Mumps, Rubella and Varicella (MMRV) offered at 12 and 18 months of age;
- One dose of Meningococcal-Conjugate-C (Men-C-C) offered at 12 months of age; and
- two doses of Hepatitis A offered at 12 and 18 months of age. [10]

[10] Hepatitis A vaccine is only offered to children living in First Nations communities, and in selected northern non-First Nations communities in Saskatchewan [10].

TWO-YEAR-OLD AVERAGE IMMUNIZATION COVERAGE

Similar to the one-year-old immunization coverage, the average immunization coverage for all vaccines for two-year-olds has also shown a curved pattern, with the main characteristic is the decrease in coverage since 2019 (Figure 3.3). Specifically, the average immunization coverage for all vaccines for two-year-olds in First Nations communities in south central decreased from a peak of 85% in 2017, to 65% in 2023. Similarly, the two-year-old average coverage in First Nations communities in the NITHA area decreased from a peak of 89% in 2015, to 75% in 2023.

Figure 3.3: Average immunization coverage for two-year-olds in First Nations communities in Saskatchewan, 2014 – 2023



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NITHA	83%	89%	84%	88%	84%	87%	83%	80%	74%	75%
South Central	81%	82%	85%	85%	83%	79%	72%	54%	63%	65%
Target Goal	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

Source: ISC-SK and NITHA - CICR reports (2014 – 2023)

IMMUNIZATION SCHEDULE FOR SEVEN-YEAR-OLDS

The routine vaccines recommended for the seven-year-old population includes:

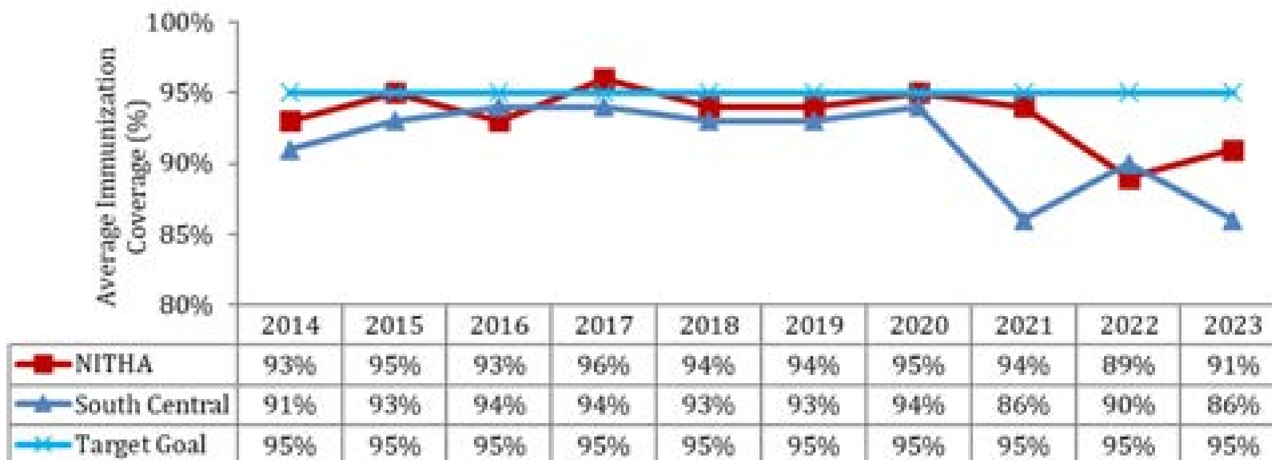
- Four doses of DTaP-IPV-Hib offered by 18 months of age;
- Three doses (four, if medically high risk) of Pneu-C-15 offered at 2, 4 and 12 months of age;
- Two doses of MMRV offered at 12 and 18 months of age;
- One dose of Men-C-C offered at 12 months of age;
- Two doses of Hepatitis A offered at 12 and 18 months of age; and
- Three doses of Rot-5 offered at 2, 4, and 6 months of age.

SEVEN-YEAR-OLD AVERAGE IMMUNIZATION COVERAGE

As seen in Figure 3.4, the average immunization coverage for seven-year-olds in First Nations communities in Saskatchewan are higher when compared to one- and two-year-olds (as seen in Figures 3.2 and 3.3, respectively). This could be because parents had more time to get their children up-to-date with their vaccinations, and because seven-year-olds can receive their vaccines in school from community health nurses. Similar to the younger cohorts, the average immunization coverage among seven-year-olds also decreased after 2019, but not as dramatically. The immunization coverage of all vaccines for seven-year-olds in First Nations communities in the south central area decreased slightly from 91% in 2014, to 86% in

2023. Additionally, the seven-year-old average coverage in First Nations communities in NITHA decreased from 93% in 2014, to 91% in 2023. Before the pandemic in 2019, immunization coverage among First Nations communities in the south central and NITHA areas were slightly higher at 93% and 94%, respectively.

Figure 3.4: Average immunization coverage for seven-year-olds for First Nations communities in Saskatchewan, 2014 – 2023



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NITHA	93%	95%	93%	96%	94%	94%	95%	94%	89%	91%
South Central	91%	93%	94%	94%	93%	93%	94%	86%	90%	86%
Target Goal	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%

Source: ISC-SK and NITHA - CICR reports (2014 – 2023)

IMMUNIZATION COVERAGE BY SPECIFIC VACCINES

In this section, the up-to-date immunization coverage among one-, two- and seven-year-olds for H. influenza type B, pertussis, measles, varicella, pneumococcal, and meningococcal serogroup C vaccines will be presented for First Nations communities in Saskatchewan. The data is collected though the CICRs for First Nations communities in Saskatchewan. The vaccines selected are those that can be compared to publicly accessible Saskatchewan childhood immunization coverage reports to provide a provincial context.

H. INFLUENZAE TYPE B (HIB)

H. influenzae type B (Hib) is a serious disease caused by the bacteria Haemophilus influenzae type b. Infection can lead to bacterial meningitis and other serious invasive infections, and potentially death, especially in young children [11, 12]. Among those that develop meningitis as a result of Hib infection, about 5% may die, and 10-15% may suffer from severe neurologic sequelae [12]. The vaccine to protect against Hib is given as part of the DTaP-IPV-Hib combination vaccine.

One-year-old coverage, 2017 to 2023

One-year-old Hib coverage for all geographic areas was lower than the recommended vaccination goal from 2017 to 2023 (Figure 3.5). Overall, the immunization coverage in First Nations communities in Saskatchewan dropped from 90% in 2017 to 75% in 2023. The immunization coverage in First Nations communities in the south central area decreased from 92% in 2017 to 68% in 2023. Similarly, the immunization coverage in First Nations communities in the NITHA area decreased from 88% in 2017 to 81% in 2023. Across the entire time period, the immunization coverage for the overall Saskatchewan population was comparable to the immunization coverage among First Nations communities, but was slightly higher from 2020 to 2023.

Two-year-old coverage, 2017 to 2023

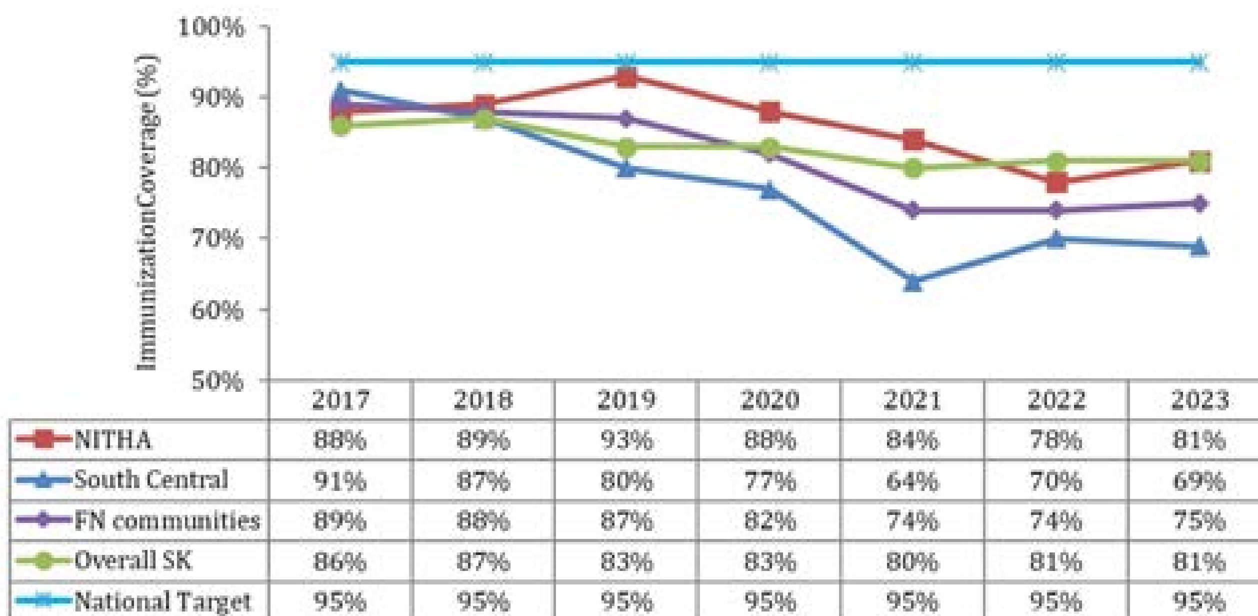
From 2017 to 2023, the two-year-old immunization coverage for Hib followed a downward trend in First Nations communities in Saskatchewan (Figure 3.6). Overall, the immunization coverage decreased from 90% in 2017 to 75% in 2023. Specifically, among First Nations communities in south central, immunization coverage decreased from 92% in 2017 to 68% in 2023.

Similarly, the immunization coverage in First Nations communities in NITHA decreased from 91% in 2017 to 77% in 2023. From 2018 to 2023, the immunization coverage for the overall Saskatchewan population was slightly greater than the immunization coverage among First Nations communities.

Seven-year-old coverage, 2017 to 2023

From 2017 to 2023, seven-year-old coverage for Hib was substantially higher than those reported for one- and two-year olds in First Nations communities in Saskatchewan (Figure 3.7). Overall, the immunization coverage in First Nations communities in Saskatchewan slightly from 95% in 2017 to 91% in 2023. The coverage in First Nations communities in the south central area decreased from 94% in 2017 to 88% in 2023. The immunization coverage in First Nations communities in the NITHA area decreased from 97% in 2017 to 94% in 2023, which is considerably less than First Nations communities in the south central area. Additionally, while still higher than one- and two-year old coverage, the immunization coverage among the overall Saskatchewan population was lower than the coverage in First Nations communities across the time period.

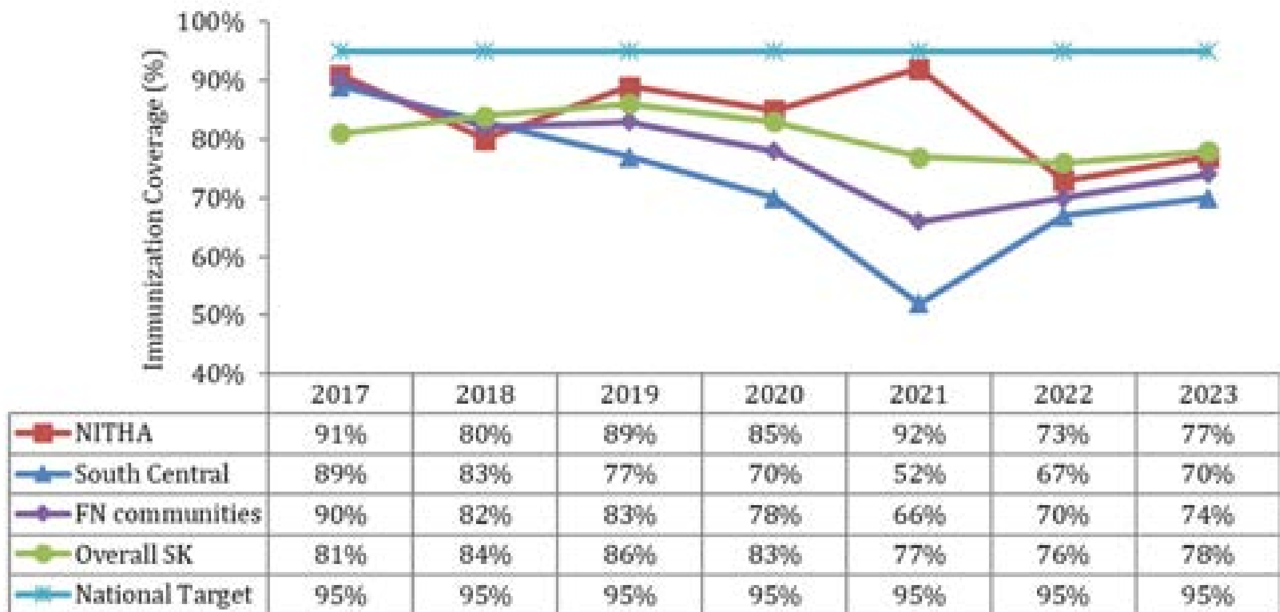
Figure 3.5: Up-to-date H. Influenzae Type B vaccine coverage for one-year-olds by geographical areas, 2017 –2023



	2017	2018	2019	2020	2021	2022	2023
NITHA	88%	89%	93%	88%	84%	78%	81%
South Central	91%	87%	80%	77%	64%	70%	69%
FN communities	89%	88%	87%	82%	74%	74%	75%
Overall SK	86%	87%	83%	83%	80%	81%	81%
National Target	95%	95%	95%	95%	95%	95%	95%

Source: ISC-SK and NITHA - CICR reports; SK Ministry of Health IPHIS (2017 – 2018), Panorama (2018 – 2023)

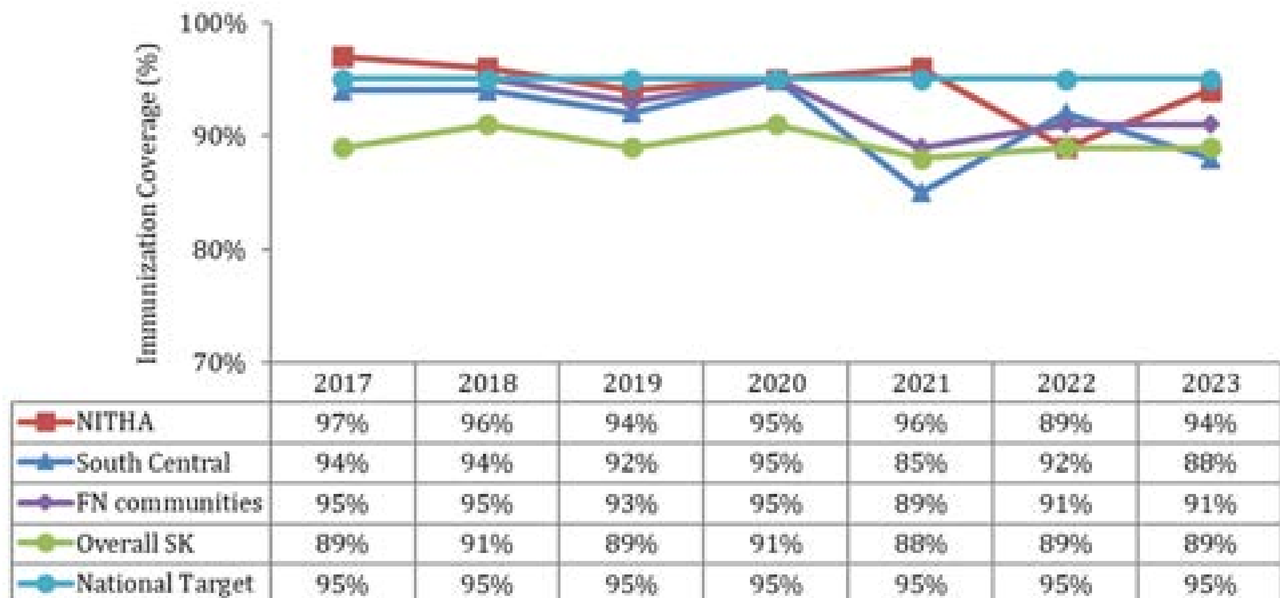
Figure 3.6: Up-to-date H. Influenzae Type B vaccine coverage for two-year-olds by geographical areas, 2017 –2023



	2017	2018	2019	2020	2021	2022	2023
NITHA	91%	80%	89%	85%	92%	73%	77%
South Central	89%	83%	77%	70%	52%	67%	70%
FN communities	90%	82%	83%	78%	66%	70%	74%
Overall SK	81%	84%	86%	83%	77%	76%	78%
National Target	95%	95%	95%	95%	95%	95%	95%

Source: ISC-SK and NITHA - CICR reports; SK Ministry of Health IPHIS (2017 – 2018), Panorama (2018 – 2023)

Figure 3.7: Up-to-date H. Influenzae Type B vaccine coverage for seven-year-olds by geographical areas, 2017 –2023



	2017	2018	2019	2020	2021	2022	2023
NITHA	97%	96%	94%	95%	96%	89%	94%
South Central	94%	94%	92%	95%	85%	92%	88%
FN communities	95%	95%	93%	95%	89%	91%	91%
Overall SK	89%	91%	89%	91%	88%	89%	89%
National Target	95%	95%	95%	95%	95%	95%	95%

Source: ISC-SK and NITHA - CICR reports; SK Ministry of Health IPHIS (2017 – 2018), Panorama (2018 – 2023)

PERTUSSIS

Pertussis, also known as whooping cough, is a highly contagious disease that is caused by the bacterium Bordetella pertussis [13]. Pertussis is endemic in Canada, meaning it is generally circulating at some level in the population, and has a cyclical pattern, increasing in circulation every two to five years [13]. The disease can be very serious in infants 12 months of age or younger, leading to serious complications like pneumonia, atelectasis, seizures, encephalopathy, hernias, and potentially death. In older individuals, especially adolescents and adults, pertussis is usually mild or may not even show symptoms. The vaccine to prevent pertussis is given as part of a combination shot

called DTaP-IPV-Hib.

One-year-old coverage, 2017 to 2023

Overall, the immunization coverage in First Nations communities in Saskatchewan decreased from 87% in 2017 to 72% in 2023 (Figure 3.8). The coverage among First Nations communities in the south central area decreased from 88% in 2017 to 66% in 2023. Similarly, the coverage in First Nations communities in the NITHA area decreased from 86% in 2017 to 79% in 2023. The immunization coverage for the overall Saskatchewan population was slightly higher than the immunization coverage among First Nations communities from 2018 to 2023.

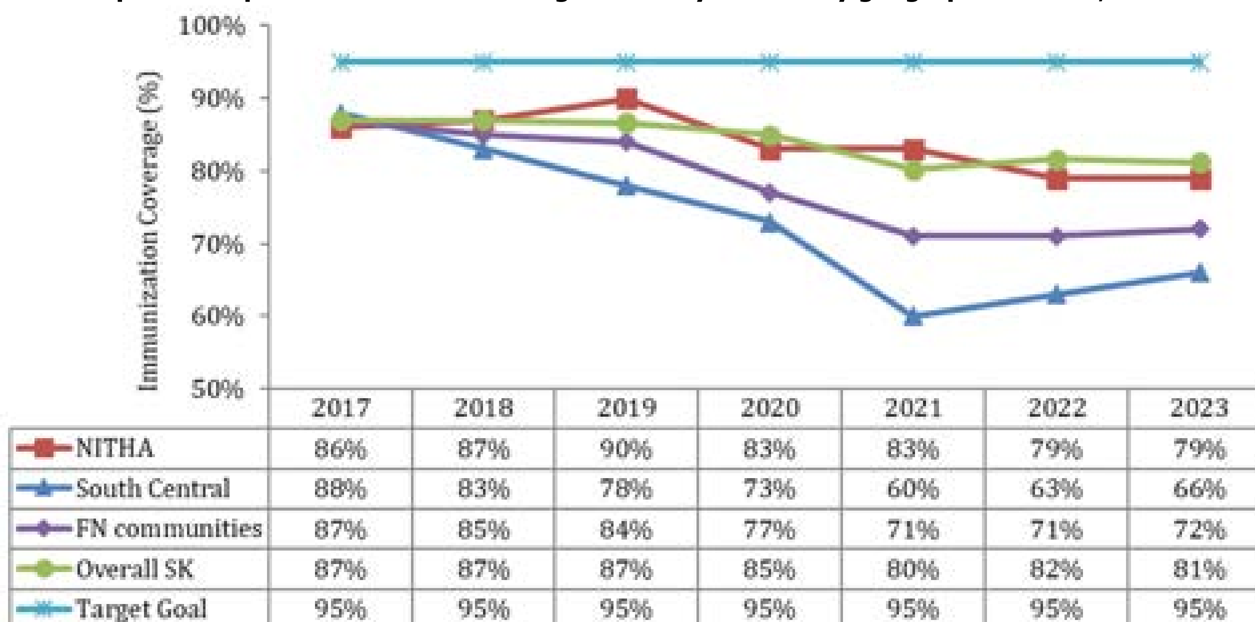
Two-year-old coverage, 2017 to 2023

There were substantial declines in two-year-old coverage for pertussis in all geographical areas from 2017 to 2023 (Figure 3.9). Overall, the immunization coverage in First Nations communities in Saskatchewan decreased from 82% in 2017 to 61% in 2023. The immunization coverage in First Nations communities in the south central area decreased from 79% in 2017 to 52% in 2023. Similarly, the immunization coverage in First Nations communities in the NITHA area decreased from 84% in 2017 to 69% in 2023. In 2023, the immunization coverage for the overall Saskatchewan population (73%) was higher than the coverage among First Nations communities (61%). This was generally the case across the time period, where the overall Saskatchewan population had higher immunization coverage from 2018 to 2023.

Seven-year-old coverage, 2017 to 2023

Between 2017 and 2023, seven-year-old immunization coverage for pertussis was higher than those reported for one- and two-year olds (Figure 3.10). Overall, the immunization coverage in First Nations communities in Saskatchewan declined slightly from 89% in 2017 to 80% in 2023. The coverage in First Nations communities in south central decreased from 89% in 2017 to 75% in 2023. Whereas, the immunization coverage in First Nations communities in the NITHA area decreased from 89% in 2017 to 85% in 2023. The immunization coverage for the overall Saskatchewan population in was considerably lower than the coverage in First Nations communities across the entire time period.

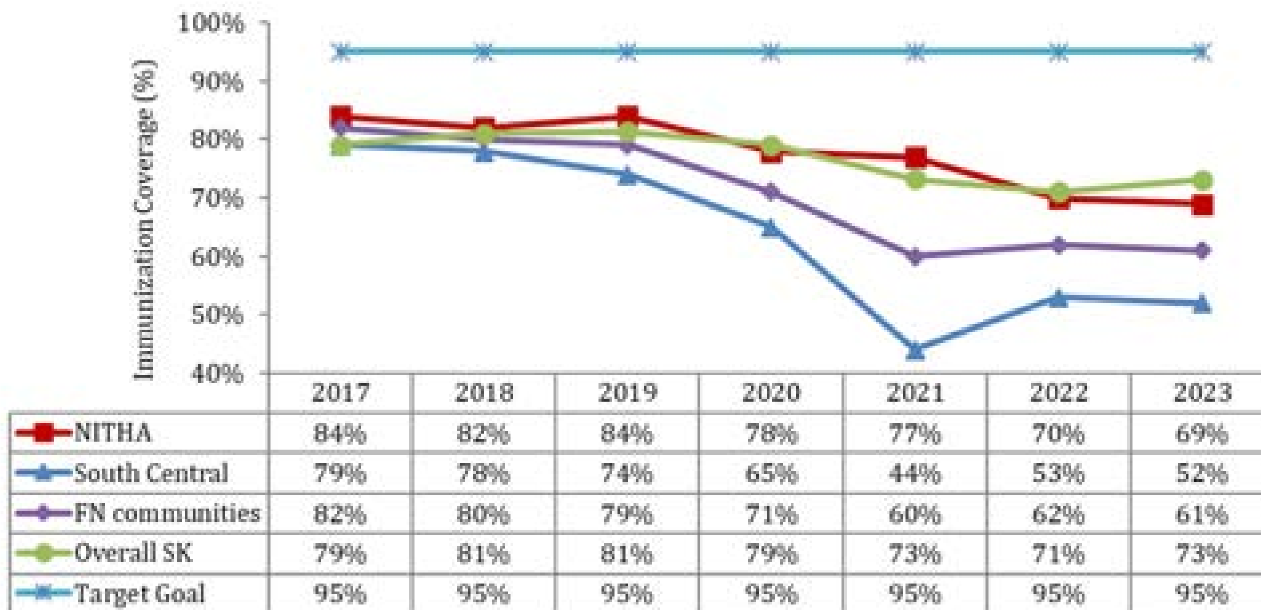
Figure 3.8: Up-to-date pertussis vaccine coverage for one-year-olds by geographical areas, 2017 –2023



	2017	2018	2019	2020	2021	2022	2023
NITHA	86%	87%	90%	83%	83%	79%	79%
South Central	88%	83%	78%	73%	60%	63%	66%
FN communities	87%	85%	84%	77%	71%	71%	72%
Overall SK	87%	87%	87%	85%	80%	82%	81%
Target Goal	95%	95%	95%	95%	95%	95%	95%

Source: ISC-SK and NITHA - CICR reports; SK Ministry of Health IPHIS (2017 – 2018), Panorama (2018 – 2023)

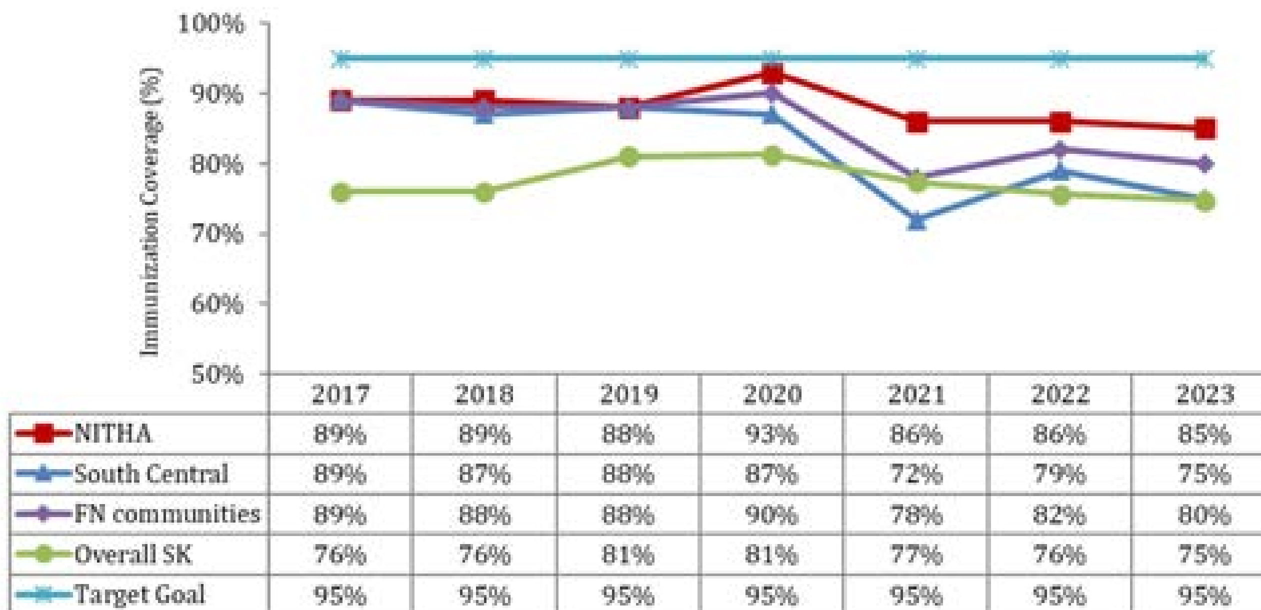
Figure 3.9: Up-to-date pertussis vaccine coverage for two-year-olds by geographical areas, 2017 –2023



	2017	2018	2019	2020	2021	2022	2023
NITHA	84%	82%	84%	78%	77%	70%	69%
South Central	79%	78%	74%	65%	44%	53%	52%
FN communities	82%	80%	79%	71%	60%	62%	61%
Overall SK	79%	81%	81%	79%	73%	71%	73%
Target Goal	95%	95%	95%	95%	95%	95%	95%

Source: ISC-SK and NITHA - CICR reports; SK Ministry of Health IPHIS (2017 – 2018), Panorama (2018 – 2023)

Figure 3.10: Up-to-date pertussis vaccine coverage for seven-year-olds by geographical areas, 2017 – 2023



	2017	2018	2019	2020	2021	2022	2023
NITHA	89%	89%	88%	93%	86%	86%	85%
South Central	89%	87%	88%	87%	72%	79%	75%
FN communities	89%	88%	88%	90%	78%	82%	80%
Overall SK	76%	76%	81%	81%	77%	76%	75%
Target Goal	95%	95%	95%	95%	95%	95%	95%

Source: ISC-SK and NITHA - CICR reports; SK Ministry of Health IPHIS (2017 – 2018), Panorama (2018 – 2023)

MEASLES

Measles is a highly contagious viral disease that is spread when someone with the infection coughs or sneezes, sending tiny droplets through the air [14]. Infants and children less than 5 years of age, malnourished individuals, people who are pregnant, and those with ongoing health problems, are more likely to face complications from measles [14]. The disease can be prevented through the use of the combination measles, mumps, rubella and varicella (MMRV) vaccine.

Two-year-old coverage, 2017 to 2023

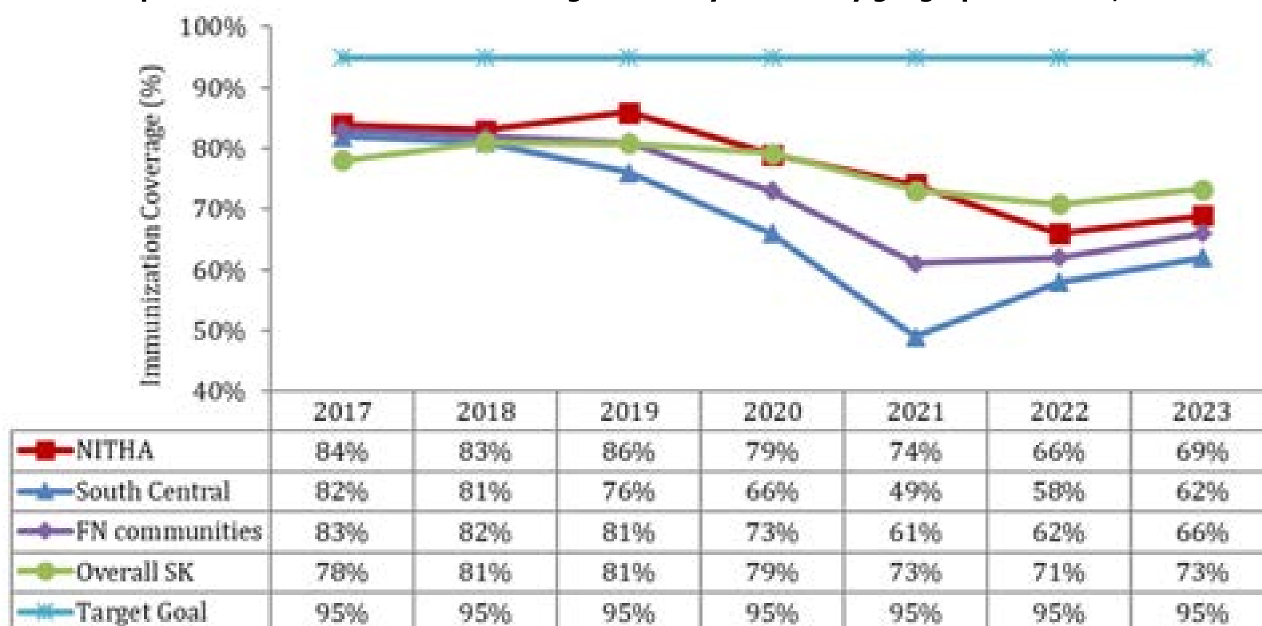
Between 2017 and 2023, the immunization coverage in First Nations communities in Saskatchewan declined from 83% in 2017 to 66% in 2023 (Figure 3.11). The immunization coverage among First Nations communities

in the south central area decreased from 82% in 2017 to 62% in 2023. Whereas, the coverage among First Nations communities in NITHA decreased from 84% in 2017 to 69% in 2023. Immunization coverage among First Nations communities was slightly greater than the overall Saskatchewan population from 2017 to 2018, but lower from 2020 to 2023.

Seven-year-old coverage, 2017 to 2023

For the measles vaccine, the seven-year-old cohort had high immunization coverage in all geographical areas compared to the two-year-old cohort (Figure 3.12). The coverage for First Nations communities in Saskatchewan was, on average, above the target goal of 95%, between 2017 and 2020. However, the immunization coverage in First Nations communities in Saskatchewan decreased to 89% by 2023. The coverage in First Nations communities in the south central area decreased from 96% in 2017 to 87% in 2023. Comparably, the immunization coverage in First Nations communities in the NITHA area decreased from 97% in 2017 to 91% in 2023. In the 2017 to 2023 period, the coverage for the overall Saskatchewan population never reached the 95% target goal, and in 2023 (87%), the coverage was slightly lower than the coverage among First Nations communities (89%).

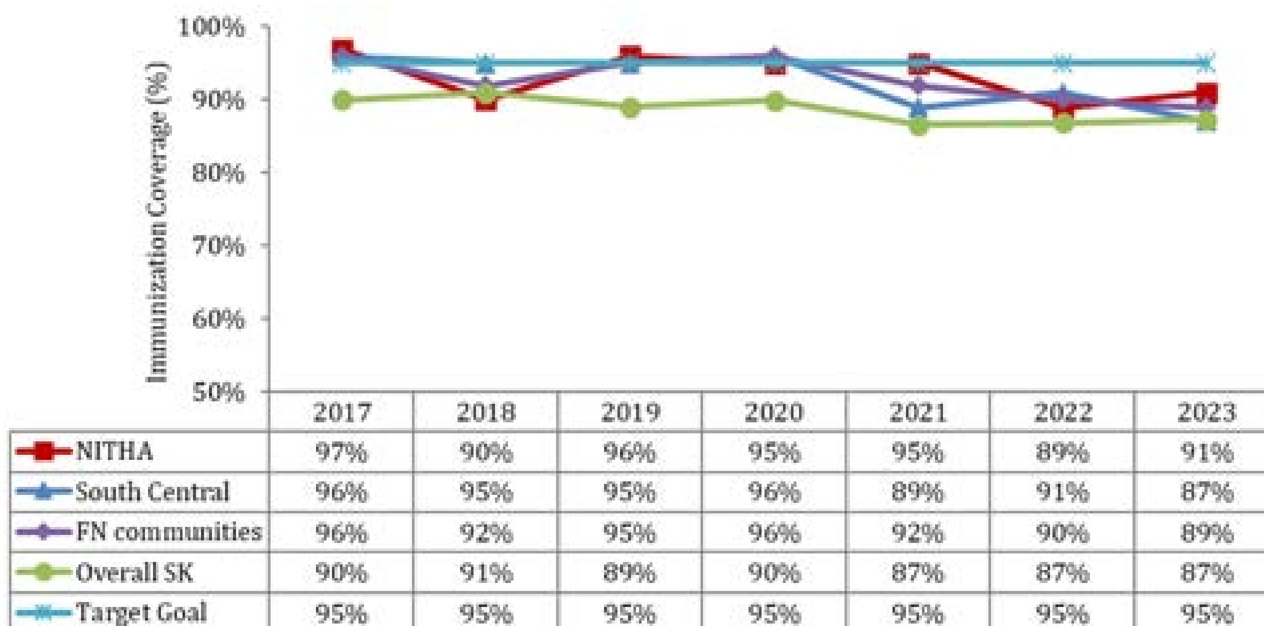
Figure 3.11: Up-to-date measles vaccine coverage for two-year-olds by geographical areas, 2017 –2023



	2017	2018	2019	2020	2021	2022	2023
NITHA	84%	83%	86%	79%	74%	66%	69%
South Central	82%	81%	76%	66%	49%	58%	62%
FN communities	83%	82%	81%	73%	61%	62%	66%
Overall SK	78%	81%	81%	79%	73%	71%	73%
Target Goal	95%	95%	95%	95%	95%	95%	95%

Source: ISC-SK and NITHA - CICR reports; SK Ministry of Health IPHIS (2017 – 2018), Panorama (2018 – 2023)

Figure 3.12: Up-to-date measles vaccine coverage for seven-year-olds by geographical areas, 2017 – 2023



	2017	2018	2019	2020	2021	2022	2023
NITHA	97%	90%	96%	95%	95%	89%	91%
South Central	96%	95%	95%	96%	89%	91%	87%
FN communities	96%	92%	95%	96%	92%	90%	89%
Overall SK	90%	91%	89%	90%	87%	87%	87%
Target Goal	95%	95%	95%	95%	95%	95%	95%

Source: ISC-SK and NITHA - CICR reports; SK Ministry of Health IPHIS (2017 – 2018), Panorama (2018 – 2023)

VARICELLA

Varicella, also known as chickenpox, is caused by a DNA virus called Varicella-zoster virus [15]. Disease is highly infectious and spread by direct contact via skin lesions and airborne routes with symptoms typically appearing 10 to 21 days after infection, and lasting about 2 weeks.

Fortunately, children typically experience a relatively mild disease, characterized by the defining symptom of a blister-like rash leading to severe irritation. However, severe illness is more likely as the patient ages and especially among adults and among people who are immunocompromised. Following the initial infection, the virus becomes dormant in the body and may later re-emerge as herpes zoster, also known as shingles [15].

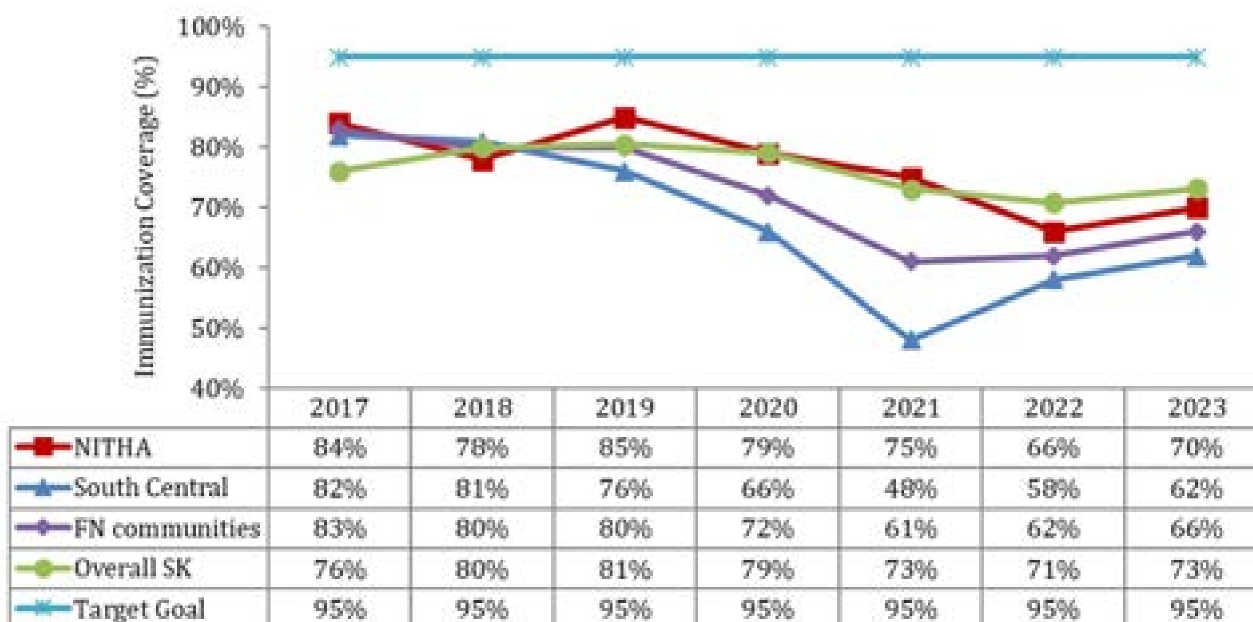
Two-year-old coverage, 2017 to 2023

Between 2017 and 2023, the up-to-date vaccine coverage for varicella for First Nations communities in Saskatchewan decreased from 83% to 66% (Figure 3.13). The coverage among First Nations communities in the south central area decreased from 82% in 2017 to 62% in 2023, while the coverage in First Nations communities in the NITHA area decreased a bit less, from 84% in 2017 to 70% in 2023. The immunization coverage for the overall Saskatchewan population was slightly higher than the coverage in First Nations communities from 2019 to 2023.

Seven-year-old coverage, 2017 to 2023

The immunization coverage for First Nations communities in Saskatchewan was, on average, above the target goal of 95%, between 2017 and 2020. Overall, the immunization coverage in First Nations communities in Saskatchewan decreased from 97% in 2017 to 88% in 2023. The coverage in First Nations communities in the south central area decreased from 97% in 2017 to 87% in 2023. Comparably, the immunization coverage in First Nations communities in the NITHA area decreased from 97% in 2017 to 90% in 2023. The coverage for the overall Saskatchewan population was also quite high across the time period, but lower than First Nations communities.

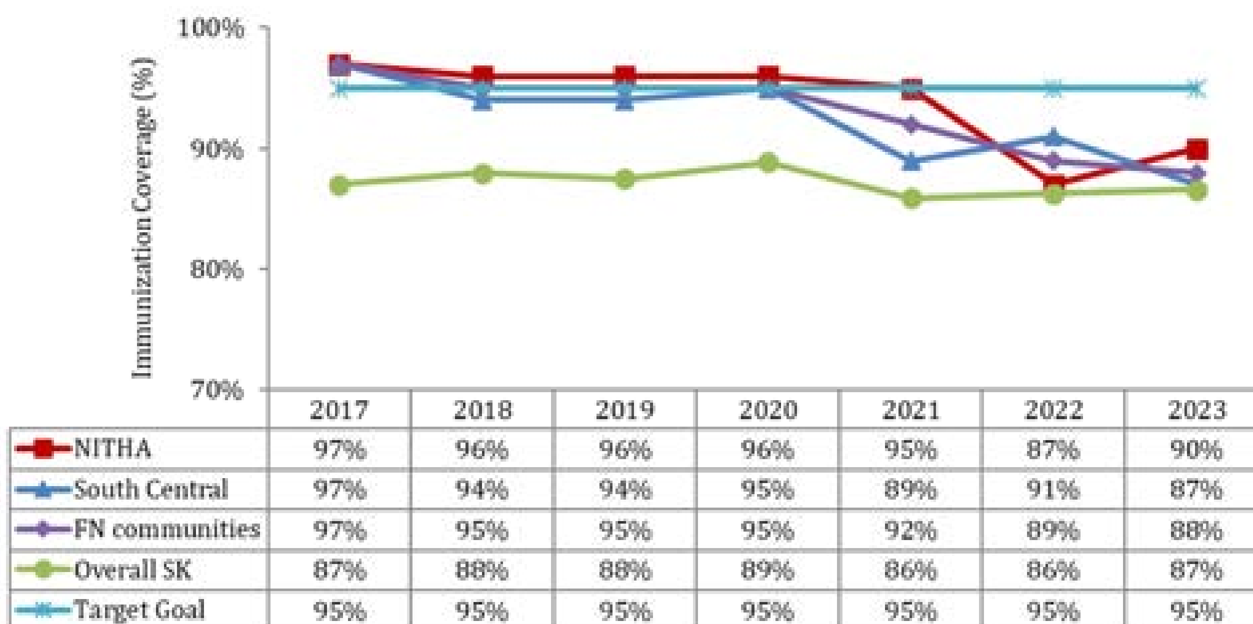
Figure 3.13: Up-to-date varicella vaccine coverage for two-year-olds by geographical areas, 2017 – 2023



	2017	2018	2019	2020	2021	2022	2023
NITHA	84%	78%	85%	79%	75%	66%	70%
South Central	82%	81%	76%	66%	48%	58%	62%
FN communities	83%	80%	80%	72%	61%	62%	66%
Overall SK	76%	80%	81%	79%	73%	71%	73%
Target Goal	95%	95%	95%	95%	95%	95%	95%

Source: ISC-SK and NITHA - CICR reports; SK Ministry of Health IPHIS (2017 – 2018), Panorama (2018 – 2023)

Figure 3.14: Up-to-date varicella vaccine coverage for seven-year-olds by geographical areas, 2017 – 2023



	2017	2018	2019	2020	2021	2022	2023
NITHA	97%	96%	96%	96%	95%	87%	90%
South Central	97%	94%	94%	95%	89%	91%	87%
FN communities	97%	95%	95%	95%	92%	89%	88%
Overall SK	87%	88%	88%	89%	86%	86%	87%
Target Goal	95%	95%	95%	95%	95%	95%	95%

Source: ISC-SK and NITHA - CICR reports; SK Ministry of Health IPHIS (2017 – 2018), Panorama (2018 – 2023)

PNEUMOCOCCAL DISEASE

Pneumococcal disease is caused by the gram-positive bacterium Streptococcus pneumoniae. It is very common for individuals to have pneumococcal bacteria in their nose and throat, but is typically asymptomatic and non-transmissible [16]. When symptomatic in the upper respiratory tract, infections are typically mild and lead to ear and sinus infections. However in a small proportion of people, the bacterium can invade a normally sterile site such as the blood and can lead to invasive pneumococcal disease (IPD). This form of pneumococcal disease can lead to serious infections such as pneumonia, meningitis, and bacteremia, particularly in vulnerable populations such as young children, the

elderly, and individuals with weakened immune systems [17]. In Canada, pneumococcal disease is more commonly spread during the spring and winter is typically spread through respiratory droplets from coughing or sneezing, with symptoms usually appearing within 1 to 3 days after exposure [17]. The severity of the disease can vary, but it typically results in high fever, headaches, vomiting and even death [17, 18].

One-year-old coverage, 2017 to 2023

Overall, the immunization coverage in First Nations communities in Saskatchewan decreased from 92% in 2017 to 80% in 2023 (Figure 3.15). The coverage among First Nations communities in the south central area decreased from 94% in 2017 to 77% in 2023. Similarly, the coverage in First Nations communities in the NITHA area decreased from 90% in 2017 to 83% in 2023. The immunization coverage for the overall Saskatchewan population was significantly lower than the coverage in First Nations communities across the entire time period. The coverage was on average 21% higher in First Nations communities.

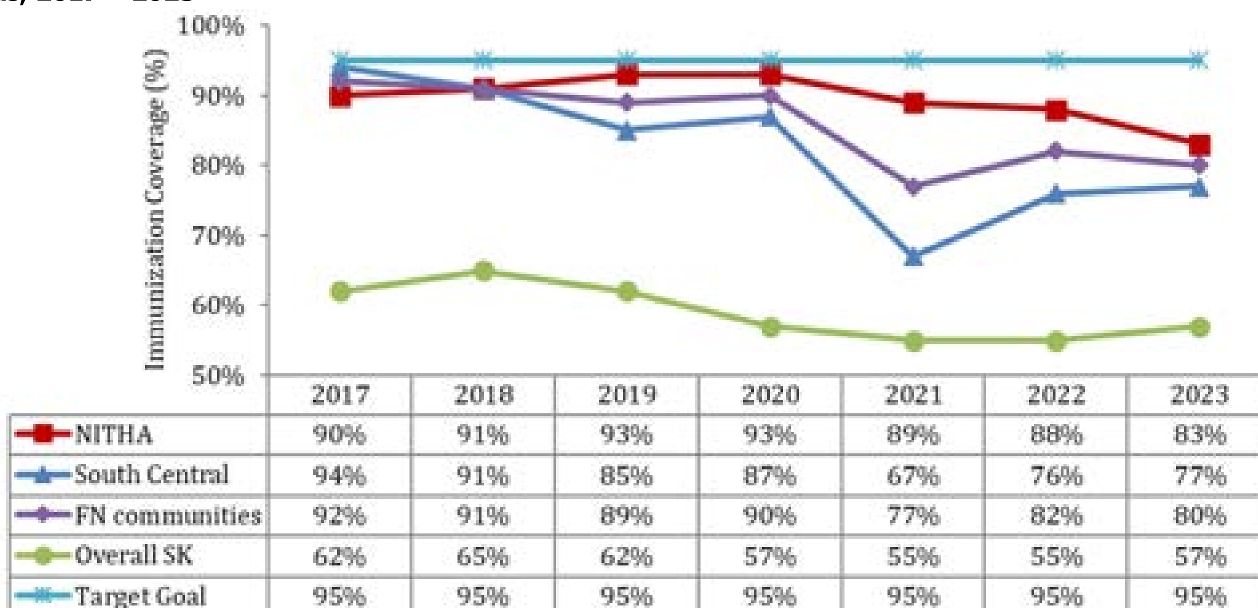
Two-year-old coverage, 2017 to 2023

The immunization coverage of pneumococcal conjugate vaccine for two-year-olds in First Nations communities in Saskatchewan was very similar to one-year-olds. However, coverage decreased slightly less over the pandemic years, especially among First Nations communities in the NITHA area (Figure 3.15). The coverage in First Nations communities in the NITHA area decreased from 92% in 2017 to 87% in 2023, while the coverage among First Nations communities in the south central area decreased from 93% in 2017 to 78% in 2023. The immunization coverage for the overall Saskatchewan population increased substantially compared to the one-year-old coverage and was similar across the entire time period when compared to the coverage in First Nations communities.

Seven-year-old coverage, 2017 to 2023

For the pneumococcal conjugate vaccine, the seven-year-old cohort had high immunization coverage in all geographical areas (Figure 3.17). The coverage for First Nations communities in Saskatchewan was, on average, at the target goal of 95%, between 2017 and 2020. Overall, the immunization coverage in First Nations communities in Saskatchewan decreased slightly from 96% in 2017 to 92% in 2023. The coverage in First Nations communities in the south central area decreased from 96% in 2017 to 90% in 2023. Comparably, the immunization coverage in First Nations communities in the NITHA area decreased from 97% in 2017 to 93% in 2023. From 2017 to 2023, the coverage for the overall Saskatchewan population was slightly lower than the immunization coverage among First Nations communities.

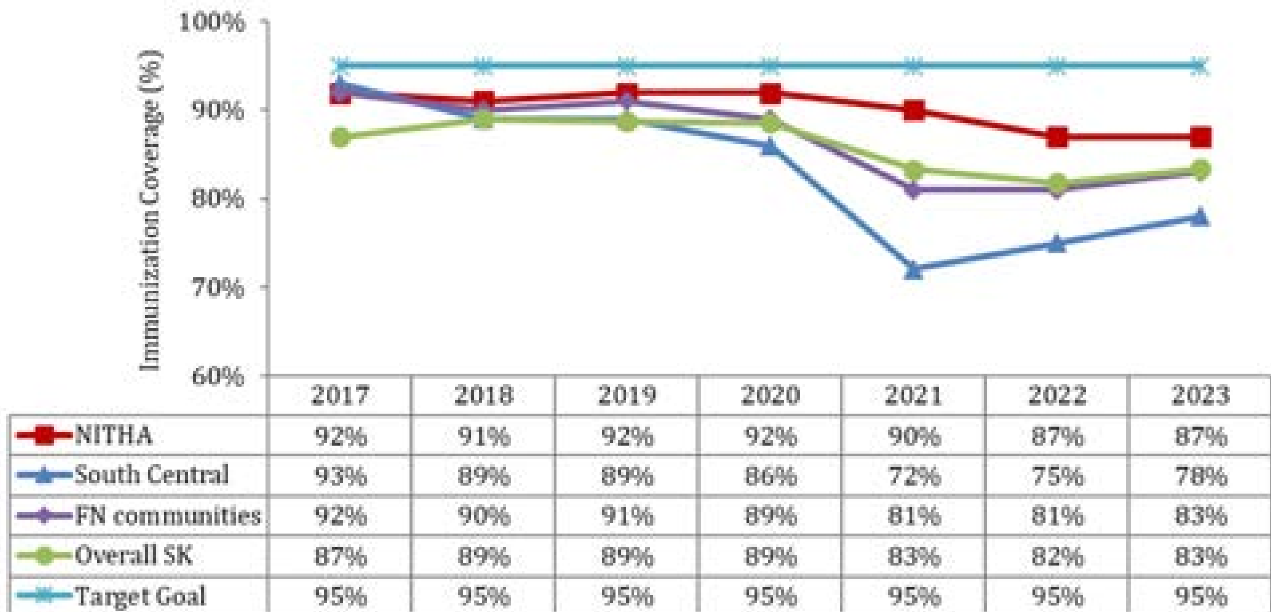
Figure 3.15: Up-to-date pneumococcal conjugate vaccine coverage for one-year-olds by geographical areas, 2017 – 2023



	2017	2018	2019	2020	2021	2022	2023
NITHA	90%	91%	93%	93%	89%	88%	83%
South Central	94%	91%	85%	87%	67%	76%	77%
FN communities	92%	91%	89%	90%	77%	82%	80%
Overall SK	62%	65%	62%	57%	55%	55%	57%
Target Goal	95%	95%	95%	95%	95%	95%	95%

Source: ISC-SK and NITHA - CICR reports; SK Ministry of Health IPHIS (2017 – 2018), Panorama (2018 – 2023)

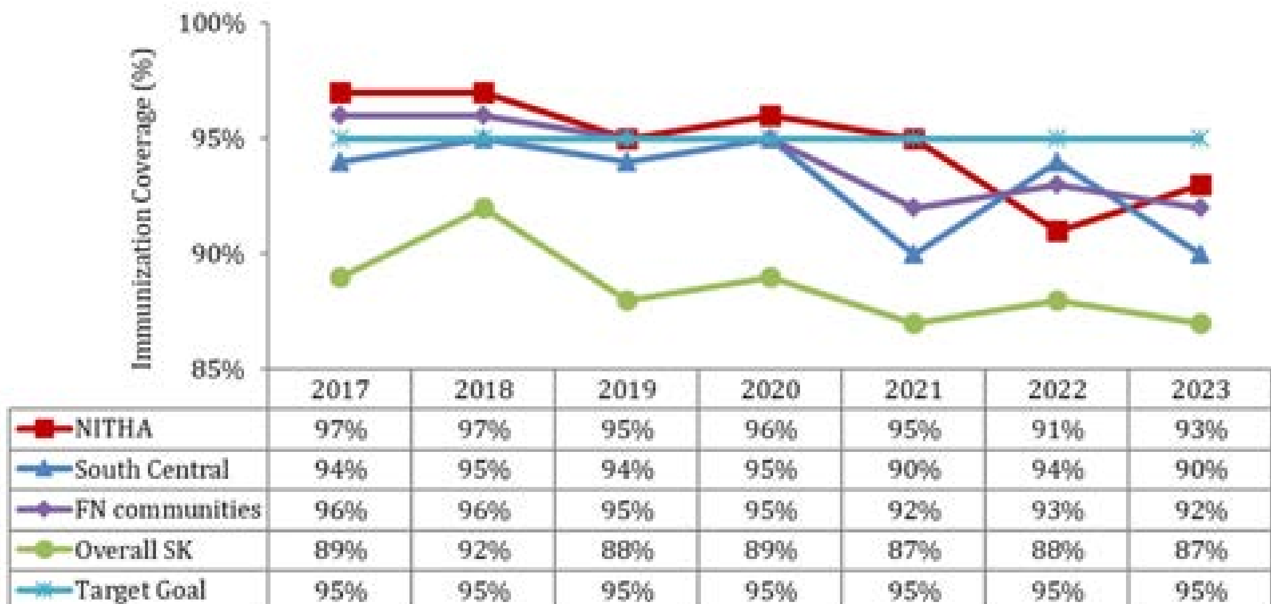
Figure 3.16: Up-to-date pneumococcal conjugate vaccine coverage for two-year-olds by geographical areas, 2017 – 2023



	2017	2018	2019	2020	2021	2022	2023
NITHA	92%	91%	92%	92%	90%	87%	87%
South Central	93%	89%	89%	86%	72%	75%	78%
FN communities	92%	90%	91%	89%	81%	81%	83%
Overall SK	87%	89%	89%	89%	83%	82%	83%
Target Goal	95%	95%	95%	95%	95%	95%	95%

Source: ISC-SK and NITHA - CICR reports; SK Ministry of Health IPHIS (2017 – 2018), Panorama (2018 – 2023)

Figure 3.17: Up-to-date pneumococcal conjugate vaccine coverage for seven-year-olds by geographical areas, 2017 – 2023



	2017	2018	2019	2020	2021	2022	2023
NITHA	97%	97%	95%	96%	95%	91%	93%
South Central	94%	95%	94%	95%	90%	94%	90%
FN communities	96%	96%	95%	95%	92%	93%	92%
Overall SK	89%	92%	88%	89%	87%	88%	87%
Target Goal	95%	95%	95%	95%	95%	95%	95%

Source: ISC-SK and NITHA - CICR reports; SK Ministry of Health IPHIS (2017 – 2018), Panorama (2018 – 2023)

MENINGOCOCCAL SEROGROUP C

Meningococcal disease, caused by a bacterium called Neisseria meningitides type C, is very contagious and can lead to a serious, and life-threatening infection. The bacteria can cause meningitis, which inflames the membrane surrounding the brain and spinal cord or septicemia, which damages blood vessel walls causing internal bleeding [19]. The infection is primarily spread through coughing and sneezing. Meningococcal C disease is very serious and is fatal in 1 out of 10 individuals, even with antibiotic treatment [19].

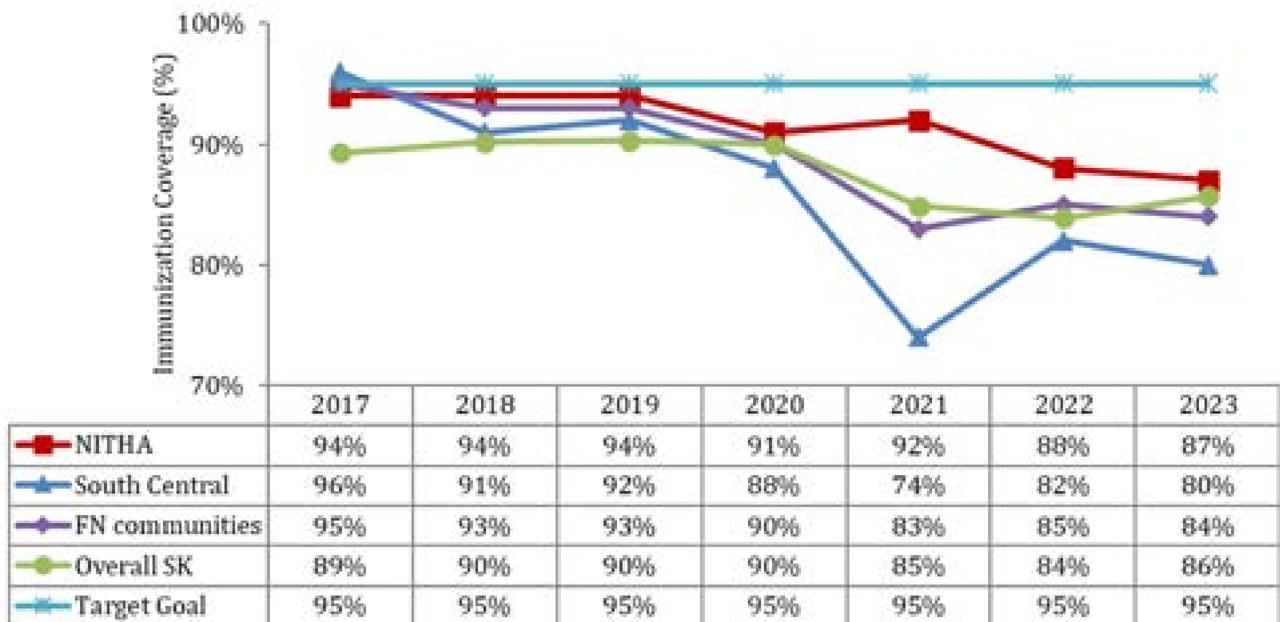
Two-year-old coverage, 2017 to 2023

When looking at the immunization schedule for two-year-olds, meningococcal vaccine has the highest overall immunization coverage. This is likely because children only need one dose to be up-to-date and the severity of infection. Overall, the immunization coverage in First Nations communities in Saskatchewan decreased from 95% in 2017 to 84% in 2023 (Figure 3.18). The immunization coverage among First Nations communities in the south central area decreased from 96% in 2017 to 80% in 2023. Whereas, the immunization coverage in First Nations communities in the NITHA area decreased slightly less from 94% in 2017 to 87% in 2023. The immunization coverage for the overall Saskatchewan population was lower than the coverage among First Nations communities from 2017 to 2019, but similar from 2020 to 2023.

Seven-year-old coverage, 2017 to 2023

The coverage for the meningococcal vaccine was even higher among the seven-year-olds compared to the two-year-olds. Immunization coverage in First Nations communities in Saskatchewan was higher than the 95% target goal between 2017 and 2021. Overall, the immunization coverage among the seven-year-old age group in First Nations communities in Saskatchewan declined slightly from 98% in 2017 to 93% in 2023 (Figure 3.19). The coverage among First Nations communities in south central decreased from 98% in 2017 to 92% in 2023. Similarly, the immunization coverage in First Nations communities in the NITHA area decreased from 98% in 2017 to 94% in 2023. The coverage for the overall Saskatchewan population, while still high, was lower than the immunization coverage in First Nations communities across the entire time period.

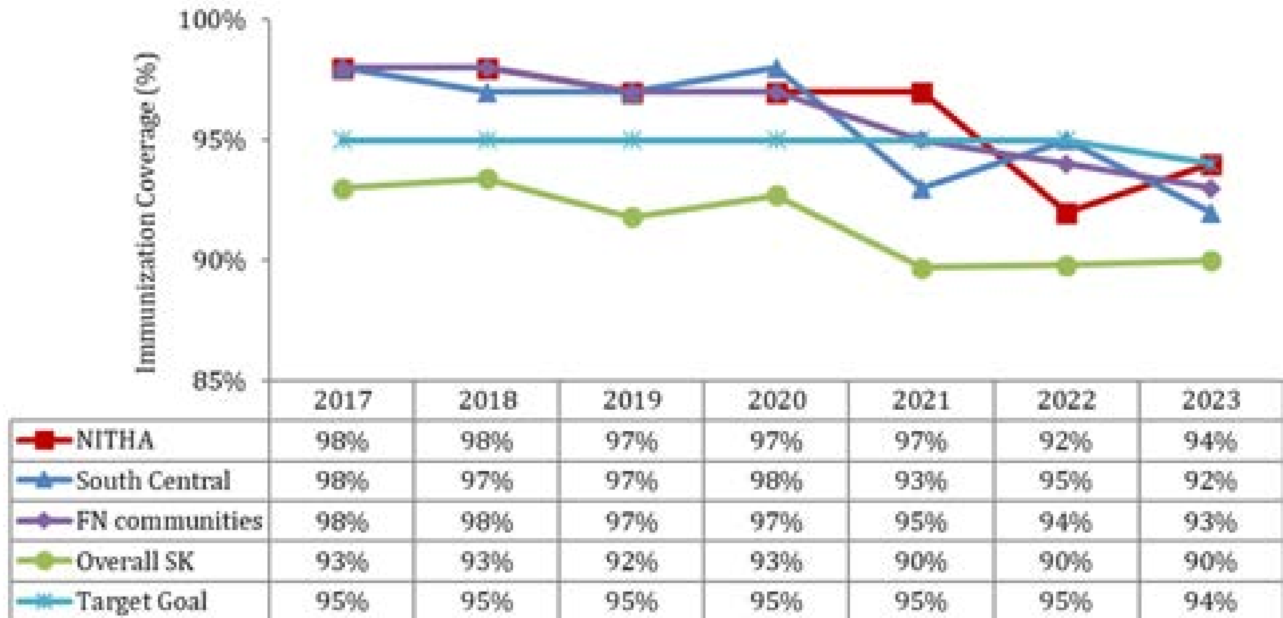
Figure 3.18: Up-to-date meningococcal serogroup C vaccine coverage for two-year-olds by geographical areas, 2017 – 2023



	2017	2018	2019	2020	2021	2022	2023
NITHA	94%	94%	94%	91%	92%	88%	87%
South Central	96%	91%	92%	88%	74%	82%	80%
FN communities	95%	93%	93%	90%	83%	85%	84%
Overall SK	89%	90%	90%	90%	85%	84%	86%
Target Goal	95%	95%	95%	95%	95%	95%	95%

Source: ISC-SK and NITHA - CICR reports; SK Ministry of Health IPHIS (2017 – 2018), Panorama (2018 – 2023)

Figure 3.19: Up-to-date meningococcal serogroup C vaccine coverage for seven-year-olds by geographical areas, 2017 – 2023



	2017	2018	2019	2020	2021	2022	2023
NITHA	98%	98%	97%	97%	97%	92%	94%
South Central	98%	97%	97%	98%	93%	95%	92%
FN communities	98%	98%	97%	97%	95%	94%	93%
Overall SK	93%	93%	92%	93%	90%	90%	90%
Target Goal	95%	95%	95%	95%	95%	95%	94%

Source: ISC-SK and NITHA - CICR reports; SK Ministry of Health IPHIS (2017 – 2018), Panorama (2018 – 2023)

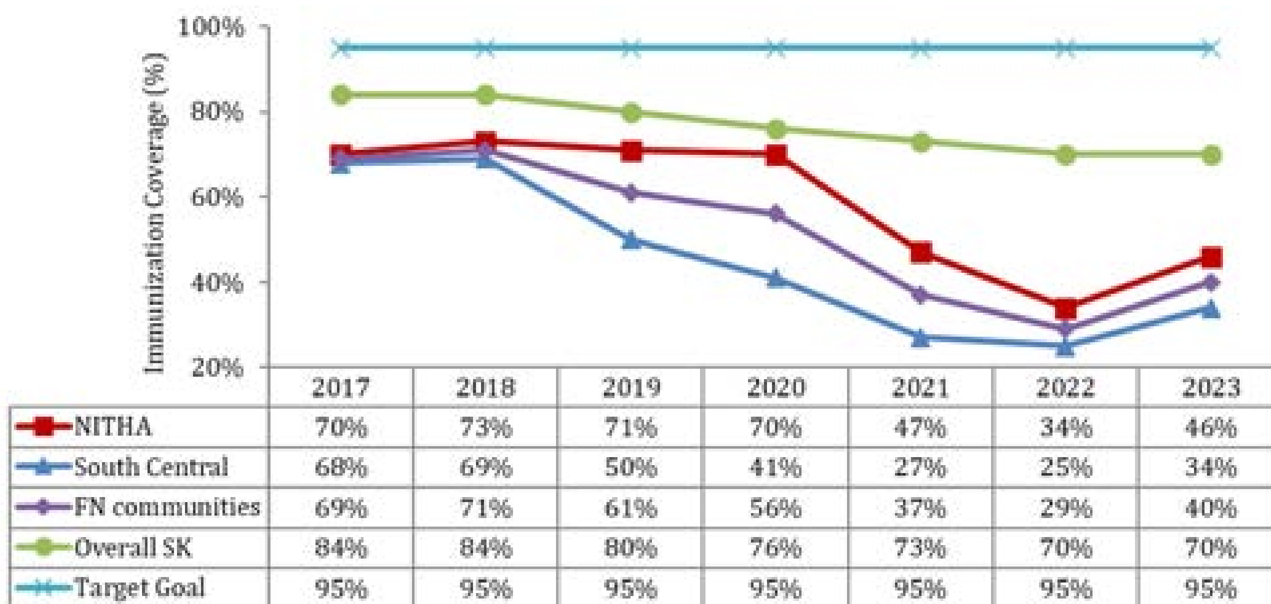
ROTAVIRUS

Rotavirus is a highly contagious virus that can cause fever, vomiting, severe diarrhea and stomach pain in infants and younger children [20]. The first dose of the rotavirus vaccine must be given to infants when they are between 6 to 15 weeks of age, followed by a second dose and third dose 4 to 10 weeks apart. Alternatively, it can be given with other routine vaccines at 4 and 6 months of age. The last dose must be given by a specific time, just before the baby turns 8 months old [10]. The timing of doses makes it challenging to achieve the recommended national coverage target for this vaccine. In Saskatchewan, the rotavirus vaccine was first introduced in November 2012 using the Rot-1 vaccine, and then updated to use the Rot-5 vaccine in April 2018 [21].

One-year-old coverage, 2017 to 2023

Overall, the immunization coverage for the Rot-5 vaccine among the one-year-old population in First Nations communities in Saskatchewan drastically dropped from 69% in 2017 to 40% in 2023 (Figure 3.20). The immunization coverage in First Nations communities in the south central area decreased from 68% in 2017 to 34% in 2023. Whereas, the coverage in First Nations communities in NITHA decreased from 70% in 2017 to 46% in 2023. The immunization coverage in the overall Saskatchewan population was significantly higher across the entire time period when compared to First Nations communities.

Figure 3.20: Up-to-date rotavirus vaccine coverage for one-year-olds by geographical areas, 2017 – 2023



	2017	2018	2019	2020	2021	2022	2023
NITHA	70%	73%	71%	70%	47%	34%	46%
South Central	68%	69%	50%	41%	27%	25%	34%
FN communities	69%	71%	61%	56%	37%	29%	40%
Overall SK	84%	84%	80%	76%	73%	70%	70%
Target Goal	95%	95%	95%	95%	95%	95%	95%

Source: ISC-SK and NITHA - CICR reports; SK Ministry of Health IPHIS (2017 – 2018), Panorama (2018 – 2023)

HUMAN PAPILLOMA VIRUS (HPV) VACCINE FOR SCHOOL AGE POPULATION

HPV is the most common sexually transmitted infection, and it is estimated that over 70% of sexually active Canadians will get an HPV infection at some point in their lives [22]. Fortunately, over 90% will clear the HPV infection naturally over time, and over 100 strains of HPV are categorized as being low-risk [22, 23, 24]. However, there are about 14 strains that are considered high-risk HPV strains, and if the infection persists, it can lead to various cancers [22, 24]. HPV can cause genital warts, with strains like HPV-16 and HPV-18 responsible for approximately 70% of cervical cancers [22]. The virus is spread through vaginal, anal or oral sex. The HPV vaccine is very effective in preventing cervical cancer associated with HPV-16 and HPV-18 [25]. Studies show that immunization of young adolescent girls before they become sexually activity greatly reduces their risk of high-grade cervical abnormalities [26-31].

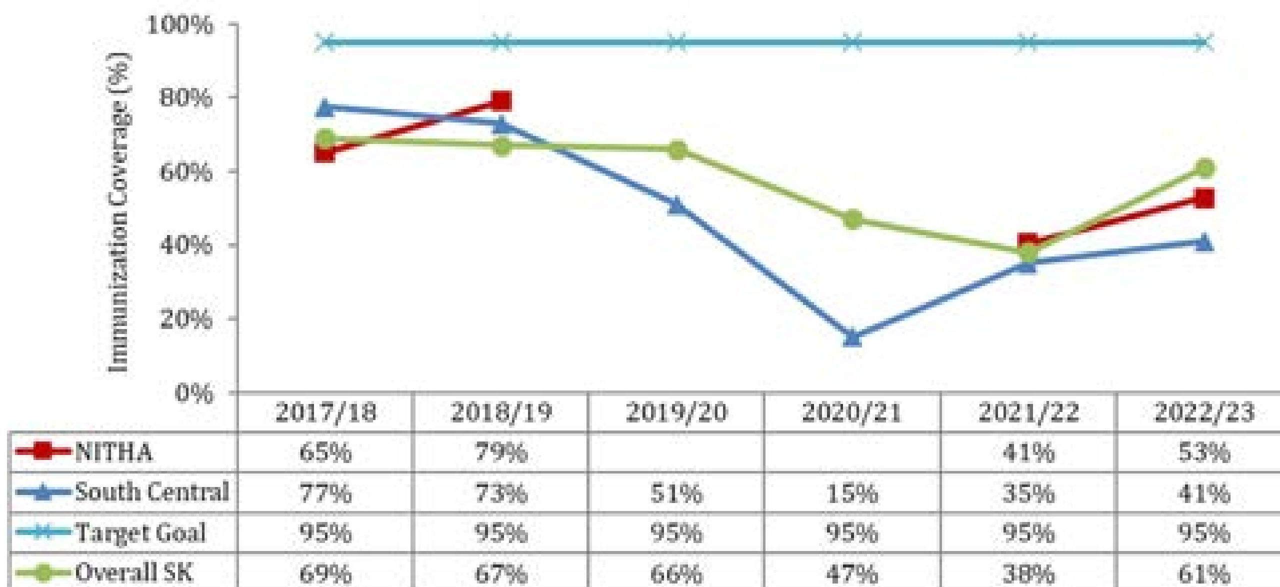
In Saskatchewan, the HPV vaccine is given for free as part of the school immunization program. Since 2008, female students in grade 6 and up have been eligible for a three dose series. The second dose is given 2 months after the first, and the third dose is given 6 months after the first dose [10]. Children who miss getting vaccinated in grade 6 can still get this publicly-funded vaccine until their 27th birthday [10]. In September 2017, the HPV immunization program was expanded to include grade 6 male students as well on the same schedule [21]. In First Nations communities in Saskatchewan, HPV immunization data is collected through the School-Age Immunization Coverage Report (SAICR).

HPV vaccine coverage among grade 6 and 8 female students, 2017/18-2022/23 school years

HPV vaccine immunization coverage for grade 6 students in First Nations communities in the south central area decreased from 77% in the 2017/18 school year to 41% in the 2022/23 school year (Figure 3.21). In the 2021/22 school year, 41% of grade 6 female students in First Nations communities in the NITHA area were immunized against HPV, which was slightly higher than the immunization coverage of 35% among First Nations communities in the south central area. When compared to the overall Saskatchewan population, the coverage was slightly lower from 2019/20 to 2022/23 for First Nations communities in the south central area. HPV vaccine uptake for grade 8 students was higher when compared to the uptake for grade 6 students. In First Nations communities in south central, immunization coverage decreased from 90% in the 2017/18 school year to 65% in the 2022/23 school year (Figure 3.22). In the 2021/22 school year, 65% of grade 6 female students in First Nations communities in the NITHA area were immunized against HPV, which was similar to the

immunization coverage of 64% among First Nations communities in the south central area. From 2017/18 to 2019/20, coverage was significantly higher in First Nations communities in the south central area compared to the overall Saskatchewan population, but was slightly lower from 2021/22 to 2022/23.

Figure 3.21: Up-to-date HPV vaccine coverage for grade six female students by geographical areas, 2017/18 – 2022/23 school years[11,12]



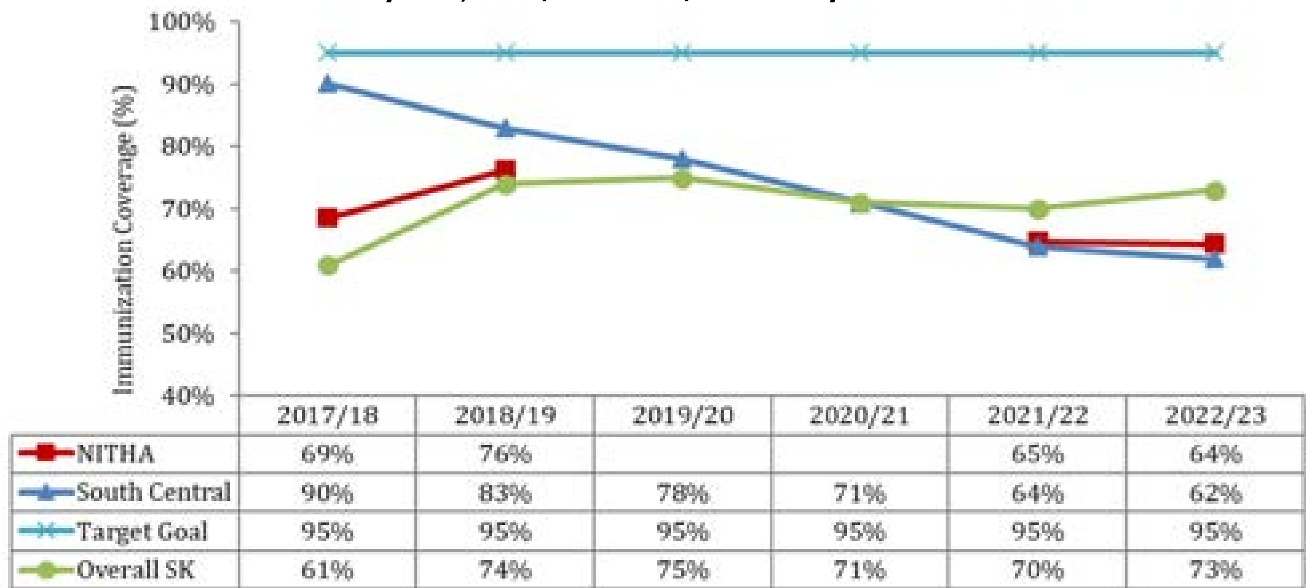
	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
NITHA	65%	79%			41%	53%
South Central	77%	73%	51%	15%	35%	41%
Target Goal	95%	95%	95%	95%	95%	95%
Overall SK	69%	67%	66%	47%	38%	61%

Source: ISC-SK and NITHA – SAICR reports; SK Ministry of Health IPHIS (2017 – 2018), Panorama (2018 – 2023)

[11] Due to disruptions caused by the COVID-19 pandemic, HPV vaccination coverage in grade 6 children has not been published for the 2019/20 and 2020/2021 school years by NITHA.

[12] Data from the Saskatchewan Ministry of Health for the overall Saskatchewan population is by year, not school year. In the x-axis, 2017/18 school year represents 2018 data, 2018/19 school year represents 2019 data, and so forth.

Figure 3.22: Up-to-date HPV vaccine coverage for grade eight female students in First Nations communities in Saskatchewan by area, 2017/18 – 2022/23 school years [13,14]



	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
NITHA	69%	76%			65%	64%
South Central	90%	83%	78%	71%	64%	62%
Target Goal	95%	95%	95%	95%	95%	95%
Overall SK	61%	74%	75%	71%	70%	73%

Source: ISC-SK and NITHA - SAICR reports; SK Ministry of Health IPHIS (2017 – 2018), Panorama (2018 – 2023)

INCREASED VACCINE PREVENTABLE DISEASE ACTIVITIES

Outbreaks of diseases that can be prevented by vaccines, which are also called vaccine-preventable diseases, often happen when not enough people in a community are immunized against a particular disease. When not enough individuals in a community are immunized, the community does not indirectly offer adequate protection to people that are not fully vaccinated or are unable to be vaccinated [32]. When the number of vaccinated people meets or goes above the immunization coverage goal, the risk of outbreaks is greatly reduced.

In terms of recommended vaccines for children, adolescents and adults, as the number of doses in a series increases, challenges arise in locating individuals; therefore, it becomes increasingly difficult to administer subsequent doses of the vaccine within the recommended time frame. During periods of increased disease activities, enhanced surveillance measures are put in place to help prevent, predict and control further spread of disease. These efforts are crucial given the decrease in coverage of all vaccine preventable diseases due to disruptions brought on by the COVID-19 pandemic. In First Nations communities in Saskatchewan, the immunization coverage of many childhood vaccinations is significantly below the national target of 95% vaccination coverage, leaving First Nations communities susceptible to outbreaks. Therefore, increased commitment for vaccination programs and education is essential to advance immunization coverage and prevent outbreaks. ISC-SK and NITHA community health nurses provide support to communities with low immunization coverage by:

- Bringing the information to the attention of the Chief and Council of the community and reviewing their community immunization statistics with them;
- Working with communities by providing information, education and other resources to help support community-led immunization initiatives; and
- Leading discussions on various reasons for the low immunization coverage and assisting with possible solutions to increase coverage.

[13] Due to disruptions caused by the COVID-19 pandemic, HPV vaccination coverage in grade 8 children has not been published for the 2019/20 and 2020/2021 school years by NITHA.

[14] Data from the Saskatchewan Ministry of Health for the overall Saskatchewan population is by year, not school year. In the x-axis, 2017/18 school year represents 2018 data, 2018/19 school year represents 2019 data, and so forth.

Increase in disease activities serve as early warnings of potential disease outbreaks and draw attention to the importance of childhood immunization in population health. As history has shown, increases in disease activities occur among under- and un-immunized populations. Consequently, researchers have suggested that the greatest improvements to immunization coverage and disease prevention can come from understanding the characteristics of the under- and un-immunized populations [33].

APPENDIX

Data Sources

1. Overall Canadian Population
   - Childhood National Immunization Coverage Survey (CNICS)
     - The CNICS estimates immunization coverage by assessing Canadians' knowledge, attitudes and behaviours about immunization. Survey information is randomly collected for a selected child in the household who was aged 2, 7, 14 or 17 years of age as of March 2021. Coverage estimates are measured by (1) calculating the number of people who actually received a certain vaccine; and (2) comparing that number to the number of people who should have received that vaccine.
   - National Coverage Goals
     - Developed for infants, childhood, adolescent and adult vaccines that are publicly funded in all provinces and territories (P/T) in Canada. Vaccine coverage monitoring at the national level takes into account variations in P/T vaccination programs [34].

2. Overall Saskatchewan Population
   - Total Saskatchewan population who access services under the Saskatchewan Health Authority
   - Data source:
     - Saskatchewan Ministry of Health
       - The overall Saskatchewan immunization coverage only includes those children with Saskatchewan health coverage that are registered in Panorama and access services under the Saskatchewan Health Authority. Children with Saskatchewan health coverage who are registered in Panorama under ISC-SK or NITHA areas are excluded. The immunization coverage reported for the overall Saskatchewan province does not include coverage statistics for the entire provincial or regional population [10].

3. First Nations communities in Saskatchewan
   - Total population registered to a First Nations band and residing in a First Nations community in Saskatchewan and access immunization services in a First Nations community. Excludes non-registered First Nations or non-First Nations that may be living in a First Nations community.
   - Data sources:
     - CICRs and SAICRs from ISC-SK and NITHA

Approach to Data Analysis

Immunization coverage formula:

$$\frac{\textit{Number of children in a specific age cohort that have received the recommended number of doses by the specified time interval}}{\textit{Total number of children in a specific age cohort}} x100\%$$

Data Limitations

- Data that separates First Nations communities in Saskatchewan, and Saskatchewan is not available. As a result, the comparison is made between First Nations communities and the total population of Saskatchewan. This slightly influences the difference in immunization coverage.
- Although, most children receive their immunizations by seven years of age, the CICRs may not capture if immunizations were received on time. Delayed immunizations may contribute to a decrease in vaccine effectiveness and an increase in disease outbreaks. Furthermore, immunization coverage may provide a false sense of herd immunity within a community, particularly within a susceptible population, such as infants who are less than one year of age.
- Immunization records are captured where individuals receive their immunizations. Therefore, doses administered to First Nations children off-reserve may not be captured in the CICRs, resulting in an underestimation of vaccine coverage.
- Average immunization coverage is provided for Figures 3.1-3.4, which is an overestimation of the up-to-date immunization coverage.
  - Given individual-level vaccination records are not provided to ISC-SK, but rather aggregate counts of children who have received each vaccine type, an up-to-date immunization coverage cannot be calculated.

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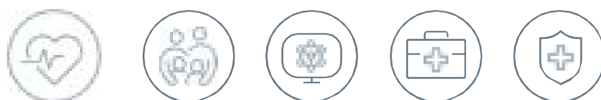
First Nations Health Status Report

2024



Saskatchewan Region
Chapter 4: Communicable Diseases

WHY WE CARE ABOUT COMMUNICABLE DISEASES

Historically, communicable diseases were the leading cause of death worldwide. Fortunately, modern advancements in vaccinations and new treatment and prevention programs have drastically decreased the impact of infectious diseases. Despite this, 14% of the world population still died from infectious diseases in 2019 [1]. This highlights the importance of studying how these diseases spread and who is most at risk. Understanding this can help guide public health policies and lead to better interventions.

Many communicable diseases, including sexually transmitted and blood borne infections (STBBIs), tuberculosis (TB) and their related co-infections, impact the Indigenous population more than the general population [2]. This is due in part to the inequities in societal resources, influenced by social determinants of health (SDOH), which impacts disease rates and outcomes [3, 4]. For more information on SDOH, see chapter 7 of the 2024 Health Status Report. The COVID-19 pandemic has, however, exacerbated existing social determinants, slowing down the efforts in reducing the health disparities experienced by Indigenous Canadians [5]. Indigenous Services Canada – Saskatchewan (ISC-SK) region supports in closing the health status gap between First Nations and non-First Nations populations in Saskatchewan. ISC-SK works collaboratively with the province of Saskatchewan and other levels of government, as well as non-governmental organizations and First Nations to prevent, treat, report, and investigate cases in First Nations communities.

This chapter focuses on the reported rates of STBBIs, TB and other notifiable diseases from 2014 to 2023. Other notifiable diseases include foodborne, waterborne, and vaccine-preventable diseases, as well as diseases transmitted by respiratory routes. COVID-19 and syphilis are covered in detail in Chapters 2 and 5, respectively. Disease rates were provided for both the Northern Inter-Tribal Health Authority (NITHA) and ISC-SK areas, and were compared to rates for the overall Saskatchewan and Canadian populations. Moreover, this chapter also highlights community-driven projects and initiatives with the objective of preventing and controlling communicable diseases in First Nations communities in Saskatchewan.

HIGHLIGHTS

- From 2014 to 2023, rates of chlamydia, gonorrhea, human immunodeficiency virus (HIV), hepatitis C (HCV), and active tuberculosis (TB) were substantially higher in First Nations communities in Saskatchewan when compared to the overall Saskatchewan and Canadian populations.
- In 2020, disease incidence was considerably lower compared to previous years. This may be due to disruptions caused by the COVID-19 pandemic, resulting in decreased access to regular health services, including reduced sexually transmitted and bloodborne infections (STBBIs) testing.
- The Know Your Status (KYS) initiative is a community-driven program focused on prevention and treatment of STBBIs in First Nations communities in Saskatchewan. The initiative has led to increased rates of STBBI testing in and near communities that have implemented the KYS programs.
- The increased use of new testing technology (i.e., Telehealth and GeneXpert), in First Nations communities in Saskatchewan has contributed to improved access to health care services and to TB case management.

SEXUALLY TRANSMITTED AND BLOOD-BORNE INFECTIONS

STBBIs are among the most common infectious diseases in Canada and pose a major public health issue [6]. They spread from person-to-person through sexual contact, and though blood-to-blood contact, such as sharing needles among injection drug users [6]. STBBIs include chlamydia, gonorrhea, syphilis, HIV, Human papillomavirus (HPV), herpes simplex virus, hepatitis B (HBV), and hepatitis C (HCV), among others [7]. This section focuses on the following notifiable STBBIs chlamydia, gonorrhea, HIV, and HCV. Syphilis is discussed separately in Chapter 5, due to its

significant burden on First Nations communities in Saskatchewan [8]. Additionally, HBV is relatively rare in First Nations communities in Saskatchewan compared to other STBBIs and is covered in the vaccine-preventable section in table 4.2.

CHLAMYDIA AND GONORRHEA

Chlamydia and gonorrhea are the most commonly diagnosed sexually transmitted infections (STIs) in Canada and predominantly impact younger adults who are sexually active [6]. In 2021, males and females aged 20 to 24 in Canada had the highest rates of gonorrhea and chlamydia compared to all other age groups [9]. Since STIs mostly affect those under 29 years of age, age-standardized rates are needed to properly compare STI rates among different populations, particularly when the age distributions vary, as is the case between people living in First Nations communities in Saskatchewan and the general Saskatchewan and Canadian populations [9]. In 2023, 47.0% of people living in First Nations communities in Saskatchewan were under 25 years of age, compared to 31.3% of the overall Saskatchewan population [10]. However, due to the lack of available age-specific provincial data, age-standardized rates could not be calculated, and thus crude rates were reported in this chapter.

CHLAMYDIA

Chlamydia is the most commonly diagnosed and reported STI in Canada [6]. It is a bacterial infection that can be transmitted through various forms of sexual contact (including oral, genital, and anal) with an infected individual or from an infected mother to their newborn [11, 12]. Most individuals with chlamydia have no symptoms, making early detection and diagnosis challenging. If untreated, an individual can remain infectious for years. In females, chlamydia can lead to pelvic inflammatory disease, ectopic pregnancy, infertility, chronic pelvic pain, and reactive arthritis. In males, complications of chlamydia can result in inflammation of the testicles and epididymis, and reactive arthritis [12]. In addition, chlamydia infection increases the risk of HIV transmission, and increases the severity of HIV infection in those living with HIV [13]. Co-infection of chlamydia with gonorrhea is also common [13].

Over the past ten years, the rate of chlamydia in First Nations communities in Saskatchewan stayed relatively stable from 2014 to 2017, with a peak in 2018, and dropping to its lowest point in 2020 due to disruptions caused by the pandemic (Figure 4.1). Since then, rates have been rising every year, with 2023 surpassing the peak in 2018, reaching the highest rates in First Nations communities in Saskatchewan in the past decade at 2,045.4 cases per 100,000 population. In 2023, the chlamydia rate in First Nations communities was about four times higher than the overall rate in Saskatchewan (564.4 cases per 100,000 population) and about six times higher than the overall rate in Canada (323.4 cases per 100,000 population).

Over the 10-year period, First Nations communities in the NITHA and south central areas followed a similar trend of chlamydia cases (Figure 4.2). However, the rates were consistently greater in First Nations communities in the NITHA area, with on average, 2.0 times greater rates than First Nations communities in the south central area. Notably in 2023, chlamydia rates increased in First Nations communities in south central, but decreased in First Nations communities in the NITHA area.

From 2014 to 2023, females in First Nations communities in Saskatchewan consistently had higher rates of chlamydia than males (Figure 4.3), which is consistent with national trends. From 2014 to 2023, the rate among females in First Nations communities in Saskatchewan was, on average, 2.5 times greater than among males. Both males and females saw a near identical increase in incidence from 2022 to 2023, with rates rising by 11.1% for both males and females.

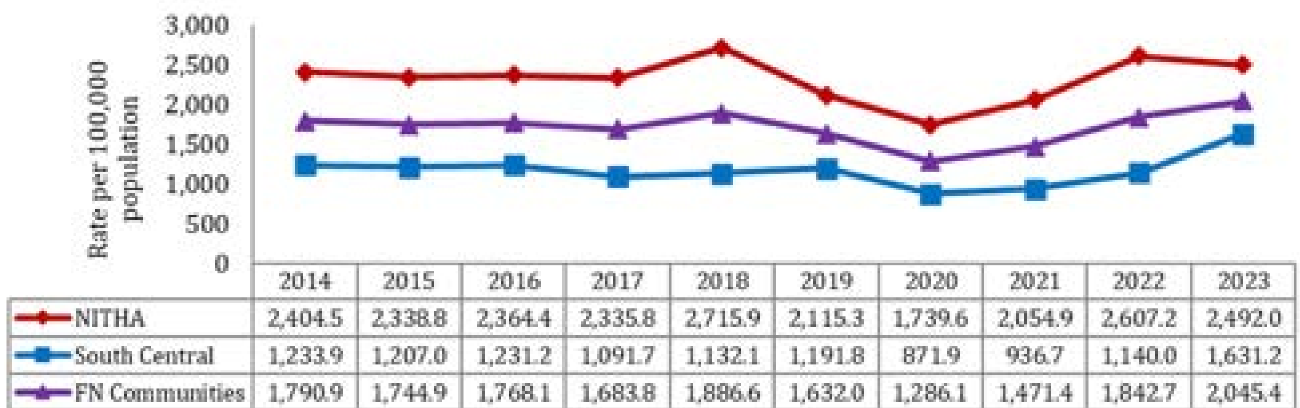
In 2023, females in First Nations communities in Saskatchewan had higher rates of chlamydia across all age groups compared to males except for the 50+ age group (Figure 4.4). The rate of chlamydia in 2023 was highest among those aged 20 to 29 years for both males and females. Among females, the lowest rate was seen in those aged 50 and older, followed by those 14 years and younger. For males, the lowest rates were among those aged 14 years and younger, followed by those 50 and older.

Figure 4.1: Chlamydia rates in First Nations communities in Saskatchewan, and the overall Saskatchewan and Canadian populations, 2014 – 2023[15]

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
FN Communities	1,790.9	1,744.9	1,768.1	1,683.8	1,886.6	1,632.0	1,286.1	1,471.4	1,842.7	2,045.4
Overall SK	516.0	543.4	543.4	564.4	552.7	499.7	440.2	478.5	517.0	564.4
Canada	308.4	326.2	335.7	345.7	360.0	371.0	278.9	273.2	299.2	323.4

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023), PHAC Canadian Notifiable Diseases On-line (2014 – 2023)

Figure 4.2: Chlamydia rates in First Nations communities in Saskatchewan by area, 2014 – 2023



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NITHA	2,404.5	2,338.8	2,364.4	2,335.8	2,715.9	2,115.3	1,739.6	2,054.9	2,607.2	2,492.0
South Central	1,233.9	1,207.0	1,231.2	1,091.7	1,132.1	1,191.8	871.9	936.7	1,140.0	1,631.2
FN Communities	1,790.9	1,744.9	1,768.1	1,683.8	1,886.6	1,632.0	1,286.1	1,471.4	1,842.7	2,045.4

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023)

Figure 4.3: Chlamydia rates in First Nations communities in Saskatchewan by sex, 2014 – 2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Females	2,665.4	2,610.6	2,553.9	2,427.8	2,688.0	2,315.3	1,826.5	1,983.7	2,605.9	2,893.1
Males	943.6	902.9	1,014.1	968.3	1,115.3	972.9	764.0	974.9	1,102.1	1,219.5

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023)

[15] 2023 data is preliminary and subject to change – this applies to all graphs including 2023 data in this chapter.

Figure 4.4: Chlamydia rates in First Nations communities in Saskatchewan by age and sex, 2023

Sources: ISC-SK and NITHA, Panorama (2023)

GONORRHEA

Gonorrhea is a bacterial infection spread through sexual contact. If untreated, gonorrhea can cause pelvic inflammatory disease that can lead to infertility and ectopic pregnancy in women [14]. In men, gonorrhea can cause epididymitis, which leads to painful swelling in the testicles and can also result in infertility [15]. Gonorrhea infection also increases the chances of acquiring and transmitting HIV [15].

In Canada, gonorrhea rates more than doubled between 2014 (45.9 cases per 100,000 population) and 2023 (105.0 cases per 100,000 population) (Figure 4.5). The increase in infections is related to improved screening and laboratory testing, growing resistance of the bacteria to antibiotics, as well as improper and inconsistent use of safe sex methods [15, 16]. Drug-resistant strains of gonorrhea have become more common in Canada, making treatment and control harder for healthcare professionals [17, 18]. However, using combination therapy has been highly effective at treating and preventing the development of drug-resistant gonorrhea [16].

Over the 10-year period, the rate of gonorrhea in First Nations communities in Saskatchewan increased from 2015 to a peak in 2018, and then dropped between 2019 and 2020 (Figure 4.5). In 2021, the rates of gonorrhea increased substantially before decreasing in 2022 and 2023 to 839.1 cases per 100,000 population. In 2023, the rate of gonorrhea in First Nations communities in Saskatchewan was about four times higher than the overall rate in Saskatchewan (213.3 cases per 100,000 population) and eight times higher than the rate in Canada (105.0 cases per 100,000 population).

Between 2014 and 2023, First Nations communities in the NITHA area consistently had higher rates of gonorrhea than First Nations communities in south central with rates being 2.5 times greater on average (Figure 4.6). Additionally, First Nations communities in the south central area did not observe the significant peaks seen in 2018, 2021, and 2022 that were observed in First Nations communities in the NITHA area. In fact, the rates of gonorrhea in First Nations communities in the south central area remained quite stable with minor increases over the past decade.
Both sexes have shown a parallel trend in rates over the past decade. However, similar to chlamydia, females in First Nations communities in Saskatchewan consistently had higher rates of gonorrhea compared to males (Figure 4.7). Across the 10-year period, the rate among females was on average, 52% greater than in males.

In 2023, females in First Nations communities in Saskatchewan had higher rates of gonorrhea across all age groups compared to males except for the 50+ age group (Figure 4.8). For both females and males, the rate of gonorrhea in 2023 was highest among those aged 20 to 29 years and lowest among those aged 14 years and younger, followed by those aged 50 and older.

Figure 4.5: Gonorrhea rates in First Nations communities in Saskatchewan, and the overall Saskatchewan and Canadian populations, 2014 – 2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
FN Communities	613.6	411.4	444.4	580.0	904.6	740.9	765.8	1,159.8	1,085.3	839.1
Overall SK	108.0	83.3	118.0	193.1	220.8	150.4	213.5	266.6	217.1	213.3
Canada	45.9	55.5	65.7	79.4	93.7	94.3	81.1	84.2	92.4	105.0

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023), PHAC Canadian Notifiable Diseases On-line (2014 – 2023)

Figure 4.6: Gonorrhea rates in First Nations communities in Saskatchewan by area, 2014 – 2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NITHA	957.7	613.4	676.8	797.9	1,306.5	977.5	1,031.6	1,779.0	1,728.6	1,127.2
South Central	301.2	228.4	235.1	382.2	539.0	525.4	523.1	592.4	494.0	571.8
FN Communities	613.6	411.4	444.4	580.0	904.6	740.9	765.8	1,159.8	1,085.3	839.1

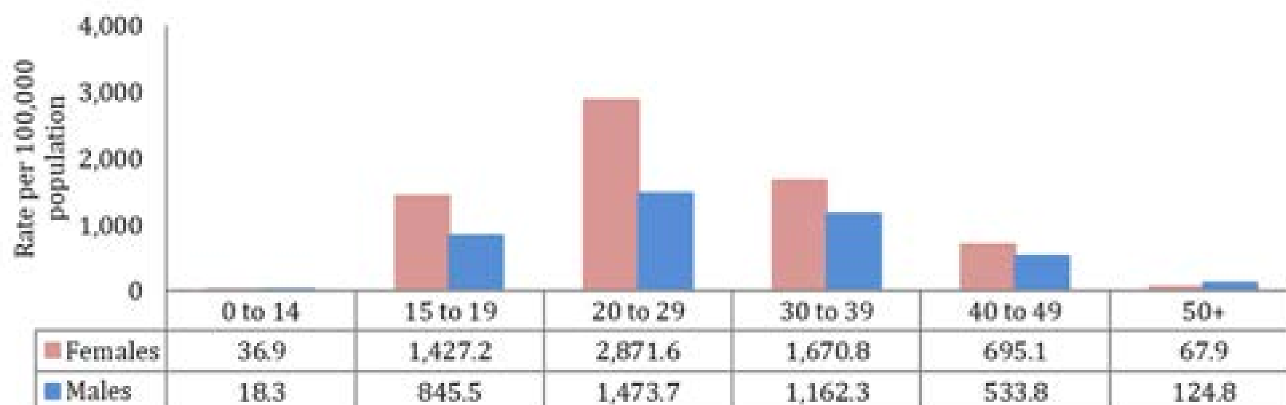
Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023)

Figure 4.7: Gonorrhea rates in First Nations communities in Saskatchewan by sex, 2014 – 2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Females	751.5	522.1	581.4	715.8	1,045.8	902.3	940.3	1,345.5	1,279.1	1,042.4
Males	480.0	303.6	312.8	449.5	768.8	585.2	597.3	979.8	897.3	641.0

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023)

Figure 4.8: Gonorrhea rates in First Nations communities in Saskatchewan by age and sex, 2023



	0 to 14	15 to 19	20 to 29	30 to 39	40 to 49	50+
Females	36.9	1,427.2	2,871.6	1,670.8	695.1	67.9
Males	18.3	845.5	1,473.7	1,162.3	533.8	124.8

Sources: ISC-SK and NITHA, Panorama (2023)

HUMAN IMMUNODEFICIENCY VIRUS

Human immunodeficiency virus (HIV) is a sexually transmitted and blood-borne viral infection that weakens the immune system, making it harder for the body to fight off infections [19]. If left untreated, HIV can progress to acquired immunodeficiency syndrome (AIDS), which is a serious and potentially life-threatening condition. However, with advances in treatment, HIV is managed as a chronic illness. People living with HIV who take antiretroviral medications can have life expectancies similar to those without the infection [20].

In Canada, HIV/AIDS remains a major public health issue, affected by factors like an individual's ability to seek treatment, care and support, as well as an individual's risk of contracting diseases [21]. Despite overall low rates of new HIV/AIDS diagnoses in Canada, Indigenous Peoples experience disproportionately higher rates [22]. Among First Nations communities in Saskatchewan, injection drug use is a primary risk factor for HIV infection. The complex issues faced by people who inject drugs creates obstacles to starting and adhering to HIV treatment. However, harm reduction initiatives, such as providing clean needles and other supplies, have been put in place to reduce HIV transmission [23]. Additionally, progress has been made in implementing rapid, self-testing kits for HIV in First Nations communities in Saskatchewan [24]. These tests allow for earlier detection, and consequently earlier treatment, resulting in better prognosis.

Over the past ten years, there was substantial variability in the rate of HIV in First Nations communities in Saskatchewan (Figure 4.9). There was a considerable drop in the rate of HIV in 2020 due to disruptions caused by the pandemic but peaked to a rate higher than pre-pandemic in 2021. Since then, the rate has slightly decreased in 2022 and 2023. The rate of HIV in First Nations communities was about two times higher than the overall rate in Saskatchewan (19.4 cases per 100,000 population), and seven times higher than the rate in Canada (6.1 cases per 100,000 population) in 2023.

The rate of HIV in First Nations communities in both south central and NITHA areas varied across the 10-year period, with both areas having periods of higher HIV rates. (Figure 4.10) On average between 2014 and 2023, the rate of HIV is about equal for both First Nations communities in the south central and NITHA areas. Additionally, the rate of HIV decreased substantially between 2022 and 2023 in First Nations communities in the NITHA area but increased in First Nations communities in the south central area.

From 2014 to 2023, the rates of HIV among females and males in First Nations communities in Saskatchewan have fluctuated, with similar rates in 2023 (Figure 4.11). However, across the 10-year period, the rate among males was, on average, 47% greater than among females.

Generally, for HIV, younger female age groups are more affected, while slightly older male age groups are more affected. This trend continued in 2023 (Figure 4.12). The highest rates were among those aged 30 to 39 years for both males and females. Among males, the second highest rate was among the 40 to 49 age group. For

females, the second highest rate was among those 50 and older, which is unique to this year, and likely a result of the low case counts, leading to more variability in rates among small groups. There were no HIV cases in males and females in the 0 to 19 age group.

Figure 4.9: HIV rates in First Nations communities in Saskatchewan, and the overall Saskatchewan and Canadian populations, 2014 – 2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
FN Communities	33.2	43.6	45.2	32.7	45.1	31.8	26.6	46.5	43.3	41.3
Overall SK	9.8	13.9	14.5	14.8	14.1	16.4	15.0	19.8	18.5	19.4
Canada	5.4	5.4	6.0	5.9	6.2	5.5	4.3	3.8	4.7	6.1

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023), PHAC Canadian Notifiable Diseases On-line (2014 – 2023)

Figure 4.10: HIV rates in First Nations communities in Saskatchewan by area, 2014 – 2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NITHA	20.4	40.1	28.1	33.0	51.4	40.1	29.2	47.3	51.7	32.9
South Central	44.9	46.7	60.7	32.5	39.4	21.9	21.8	45.8	35.6	49.2
FN Communities	33.2	43.6	45.2	32.7	45.1	31.8	26.6	46.5	43.3	41.3

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023)

Figure 4.11: HIV rates in First Nations communities in Saskatchewan by sex, 2014 – 2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Females	11.3	33.2	46.2	16.0	34.2	20.7	28.3	35.7	47.7	39.4
Males	54.5	53.7	44.3	48.8	55.6	40.0	22.4	56.9	39.0	43.2

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023)

Figure 4.12: HIV rates in First Nations communities in Saskatchewan by age and sex, 2023

	0 to 14	15 to 19	20 to 29	30 to 39	40 to 49	50+
Females	0.0	0.0	53.4	92.0	24.0	67.9
Males	0.0	0.0	26.1	114.8	111.2	41.6

Sources: ISC-SK and NITHA, Panorama (2023)

KNOW YOUR STATUS

In 2011, Big River First Nation (BRFN) implemented an HIV screening program, termed Know Your Status (KYS), in response to growing concerns regarding the lack of access to HIV and STBBI testing and care in First Nations communities in Saskatchewan [25].

The KYS program was developed through the collaborative efforts of the BRFN Chief and Council, community members, health care staff, administration, and provincial stakeholders, in partnership with ISC-SK policy makers [26]. It has since expanded into a comprehensive STBBI program. This community-driven and community-led approach allows for flexible mobilization of STBBI-related services to locations that are best-suited for clients. The KYS model is culturally grounded, multi-disciplinary, and multi-jurisdictional [26].

The core components of the KYS program include:

(1) Comprehensive STBBI testing;
(2) Specialized nursing and outreach services; and
(3) Harm reduction and prevention services [27, 28].

Additional services include education, mental health and addiction supports, as well as access to primary care, infectious disease specialists and laboratory services [27]. Individuals diagnosed with HIV are seen by community health nurses and quickly connected to an infectious disease doctor either in-person or through internet-based videoconferencing technology like Telehealth [25].

Since its inception, the KYS model has been adapted and adopted by many other First Nations communities in Saskatchewan. As of March 31, 2023, 42 communities have access the full KYS program (all three core components) and 32 communities have access to the partial program (one or two core components). Therefore, a total of 74 communities have some level of access to the KYS program. Between the fiscal years 2019/2020 to 2022/23, the average STBBI testing rates in and near First Nations communities in the FNHIB south central area was 51% greater in and near full KYS communities compared to in and near non- and partial KYS communities.

HEPATITIS C VIRUS

The hepatitis C (HCV) virus is a viral infection that can lead to liver disease. The virus can be passed on through sharing needles and other drug equipment, sexual contact, blood transfusion, and any other situation where there is contact with infected blood, vaginal fluids, or semen [29]. Some infected individuals are able to clear the virus from their body soon after being infection, without treatment. However, others develop chronic HCV infection, which can lead to scarring of the liver, liver failure or liver cancer later in life if not treated [30]. While there are no vaccines to prevent HCV infection, treatment is highly effective. Direct-acting antiviral (DAA) treatment is over 90% effective in curing the HCV infection [30].

In 2023, the rate of new HCV diagnoses in First Nations communities in Saskatchewan was 102.1 cases per 100,000 population (Figure 4.13). This was a significant decrease since the peak in 2018. The lower rates in 2020 and 2021 are likely underestimated because the pandemic affected public health services, like HCV

testing. In 2023. the rate of HCV in First Nations communities in Saskatchewan was about three times higher than the overall rate in Saskatchewan (32.3 cases per 100,000 population) and five times higher than the rate in Canada (19.4 cases per 100,000 population).

The rate of HCV in First Nations communities in the south central area was consistently greater than First Nations communities in NITHA across the 10-year period (Figure 4.14). Between 2014 and 2023, on average, the rate of HCV is about two times greater in First Nations communities in the south central area. However, the gap has narrowed with a more pronounced decrease in HCV rates in First Nations communities in the south central area.

Over the last decade, males in First Nations communities in Saskatchewan had higher rates of HCV when compared to their female counterparts (Figure 4.15). The exception being in 2022 when females had a slightly higher rate at 118.1 cases per 100,000 population compared to males 117.0 cases per 100,000 population. From 2021 to 2023, the rates have slightly increased among females, while the rates among males have decreased. Over the 10-year period, the rate among males was, on average, 25% higher than females.

In 2023, females had higher rates of HCV in younger age groups and males had higher rates of HCV in older age groups in First Nations communities in Saskatchewan (Figure 4.16). For females, the highest rate was among those aged 20 to 29 years (200.3 cases per 100,000 population) and there were no cases among those aged 0 to 14 years. For males, the highest rate was highest among those aged 30 to 39 years (229.6 cases per 100,000 population), and, like females, there were no cases among males aged 0 to 14 years.

Figure 4.13: Hepatitis C rates in First Nations communities in Saskatchewan, and the overall Saskatchewan and Canadian populations, 2014 – 2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
FN Communities	144.0	196.2	170.3	184.6	201.0	148.9	84.8	106.8	117.6	102.1
Overall SK	53.4	62.7	61.4	59.3	60.2	54.1	37.1	37.5	34.8	32.3
Canada	29.6	30.6	31.4	32.4	33.9	30.3	20.6	21.2	19.7	19.4

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023), PHAC Canadian Notifiable Diseases On-line (2014 – 2023)

Figure 4.14: Hepatitis C rates in First Nations communities in Saskatchewan by area, 2014 – 2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NITHA	87.3	131.8	92.7	123.8	165.0	90.8	39.8	102.5	95.6	78.4
South Central	195.5	254.4	240.2	239.8	233.8	201.9	125.9	110.8	137.8	124.2
FN Communities	144.0	196.2	170.3	184.6	201.0	148.9	84.8	106.8	117.6	102.1

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023)

Figure 4.15: Hepatitis C rates in First Nations communities in Saskatchewan by sex, 2014 – 2023

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023)

Figure 4.16: Hepatitis C rates in First Nations communities in Saskatchewan by age and sex, 2023

Sources: ISC-SK and NITHA, Panorama (2023)

TUBERCULOSIS

Tuberculosis is an infection caused by the bacterium *mycobacterium tuberculosis*, primarily affecting the lungs and airways. The bacteria spreads through the air via droplets when an infected person coughs or sneezes [31]. Most people's immune systems can kill the bacteria and clear the infection. However, in some people, the bacteria can remain inactive in the body, which is called latent TB infection (LTBI). In this latent state, those infected with TB do not experience symptoms and do not transmit the bacteria to others [32]. However, LTBI can become active TB at any time. Infants, young children, and individuals with health conditions that weaken their immune systems (such as cancer, HIV/AIDS, and other immunosuppressive conditions) are at high risk of developing active TB within the first two years of infection [22, 31]. Fortunately, TB can be cured through a full course of recommended antibiotics [32].

In First Nations communities in Saskatchewan, the rate of active TB increased substantially during the pandemic years of 2020 to 2022 but decreased considerably in 2023 (Figure 4.17). The rate of active TB in First Nations communities in Saskatchewan was 57.7 cases per 100,000 population in 2023. The rate of active TB in First Nations communities was about five times higher than the overall rate in Saskatchewan (11.3 cases per 100,000 population), and about ten times higher than the overall rate in Canada (5.5 cases per 100,000 population) in 2023.

The COVID-19 pandemic notably attributed to this significant increase in First Nations communities in Saskatchewan. Many homes in First Nations communities are overcrowded and poorly ventilated, and public health restrictions as a result of the pandemic led to people being in enclosed spaces more frequently. Preexisting infections in First Nations communities allowed for the rapid spread of TB. Between 2021 and 2023, First Nations communities in Saskatchewan experienced four TB outbreaks. These outbreaks lead to a total of 133 active TB cases, representing 78% of all active TB cases

during this period in First Nations communities in Saskatchewan.

As shown in Figure 4.18, active TB was significantly more common in the NITHA area than in the south central area. In fact, First Nations communities in the NITHA area drive the overall trends for active TB in First Nations communities in Saskatchewan. Between 2014 and 2023, First Nations communities in the NITHA area had about 25 times the rate of active TB compared to First Nations communities in south central.

From 2014 to 2023, males in First Nations communities in Saskatchewan had higher rates of active TB compared to females (Figure 4.19). Additionally, the trend in active TB rates was similar for males and females across the time period. Over the 10-year period, the rate among males was, on average, 35% higher than among females.

In 2023, in First Nations communities in Saskatchewan, the rate of active TB for females was generally higher among younger age groups and lower among older age groups (Figure 4.20). For females, the highest rate of active TB was among those aged 15 to 19 years (95.7 cases per 100,000 population) and the lowest rate was among those aged 40 to 49 years, with no cases. For males, the highest rate of active TB was among those aged 50 years and older (125.4 cases per 100,000 population) and the lowest rate among those aged 15 to 19 years (23.0 cases per 100,000 population).

In First Nations communities in Saskatchewan between 2014 and 2023, all pediatric TB cases were within First Nations communities within the NITHA area (Figure 4.21). Similar to the rates of active TB across the 10-year period, there was a large increase in pediatric TB rates in 2021 and 2022 relative to previous years, but this was followed by a decrease in 2023.

Figure 4.17: Active tuberculosis rates in First Nations communities in Saskatchewan, and the overall Saskatchewan and Canadian populations, 2014 – 2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
FN Communities	40.2	35.4	45.2	53.7	24.5	25.5	21.5	62.8	92.8	57.7
Overall SK	7.8	6.2	7.8	7.8	6.7	5.4	8.4	10.0	11.9	11.3
Canada	4.6	4.6	4.9	5.0	4.9	5.1	4.7	4.9	5.1	5.5

Source: TBIS (2014 – 2023), PHAC Canadian Notifiable Diseases On-line (2014 – 2023)

Figure 4.18: Active tuberculosis rates in First Nations communities in Saskatchewan by area, 2014 – 2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NITHA	81.5	74.5	87.1	107.3	46.0	50.7	42.4	131.4	186.0	113.7
South Central	2.6	0.0	7.6	5.0	4.9	2.4	2.4	0.0	7.1	4.8
FN Communities	40.2	35.4	45.2	53.7	24.5	25.5	21.5	62.8	92.8	57.7

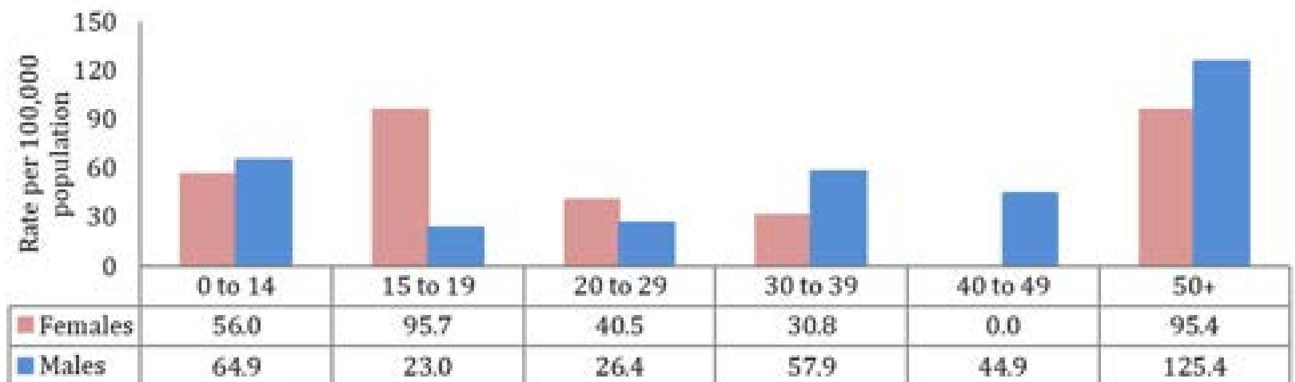
Source: TBIS (2014 – 2023)

Figure 4.19: Active tuberculosis rates in First Nations communities in Saskatchewan by sex, 2014 – 2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Females	12.5	17.7	22.6	34.7	18.4	18.1	15.5	58.7	80.4	54.7
Males	26.3	13.6	16.0	71.9	30.3	32.5	27.4	66.8	104.8	60.6

Source: TBIS (2014 – 2023)

Figure 4.20: Active tuberculosis rates in First Nations communities in Saskatchewan by age and sex, 2023



	0 to 14	15 to 19	20 to 29	30 to 39	40 to 49	50+
Females	56.0	95.7	40.5	30.8	0.0	95.4
Males	64.9	23.0	26.4	57.9	44.9	125.4

Source: TBIS (2023)

USE OF TECHNOLOGY FOR QUICKER AND TIMELY ACCESS TO TUBERCULOSIS DIAGNOSIS IN REMOTE COMMUNITIES

In recent years, First Nations communities in Saskatchewan have increased the use of technology to improve access to health care for managing TB. Some of the technologies implemented include [33]

1. **Telehealth:** Internet-based videoconferencing used for providing health care services, including education and training and for health care providers to assess clients.
2. **Remote Presence Robotic Technology:** A combination of a maneuverable robot and a portable device called "Doc-in-the-box" that enables face-to-face communication between a patient and health care provider. This technology has been deployed in one community.
3. ***GeneXpert-MTBC/RIF** (M. tuberculosis complex/resistance to rifampin): Diagnostic technology deployed in First Nations communities in northern Saskatchewan with high rates of active TB [33]. Two machines are operated within First Nations communities, while additional GeneXpert-MTBC/RIF capacity is based in provincial hospitals and public health systems.
4. **Electronic Directly Observed Therapy (E-DOT)**: A videoconferencing application that allows a TB Nurse Clinician to directly observe TB clients taking their medications. E-DOT has been approved for use on a case-by-case basis.

*GeneXpert is used in addition to routine TB screening to reduce diagnostic delays, especially in remote and isolated northern areas, and to detect drug resistant TB earlier [34]. Specimens from suspected TB clients can be tested by GeneXpert. If negative, TB can be quickly ruled out. If positive, treatment can start while the specimen is sent for further diagnostic testing [33]. The primary goal of rapid diagnostic technology use is to reduce the spread of TB spread within the community [34].

INITIATIVES TO COMBAT THE RISING ACTIVE TUBERCULOSIS RATES IN FIRST NATIONS COMMUNITIES IN SASKATCHEWAN

Since 2020, there has been a significant increase in TB cases in First Nations communities in Saskatchewan. In response, more health supports and resources for TB infection have been added to support diagnosis and treatment efforts [35]. This includes additional nurses and specially trained TB workers to deliver medication, along with further Medical Health Officer (MHO) and epidemiological support to help combat the rising TB rates. The number of TB clinics nearly doubled from 41 in 2020 to 75 in 2021. Between October 2021 and March 2022, the number of TB workers working in First Nations communities in the NITHA area have also doubled, and portable chest x-ray machine were provided to First Nations communities in Saskatchewan in 2022 to improve access to health services, with only a few of these machines have been made available across all of Canada. GeneXpert machines, initially deployed in response to the COVID-19 pandemic, have been used to process TB samples, allowing for earlier diagnosis and treatment.

In addition to tangible supports, ISC-SK and NITHA have worked to reduce the stigma and discrimination faced by First Nation clients who are infected with TB, when receiving care in urban health settings. Significant strides have been made to diagnose and treat TB clients within their local communities to help clients in receiving care in their home community as often as possible. For instance, TB program workers, under the guidance of Community Health Nurses, can deliver DOT treatments within the First Nations communities where clients reside. Efforts are also underway to address the inequities in the social determinants of health among First Nations communities in Saskatchewan, which are the root cause of poorer health outcomes. Initiatives for better housing, healthy food, clean drinking water, and access to social services are underway. Overall, ISC-SK and NITHA continue collaborative efforts to raise awareness, finding and treat TB, and work towards the national goal of eliminating TB in Canada by 2030 [35].

COMMUNICABLE DISEASE SUCCESS STORY

The Public Health Agency of Canada notes that efforts to control the spread of communicable diseases are often hampered by the stigma and discrimination individuals face when seeking health and social services, such as testing and treatment [36]. First Nations individuals often face racism, discrimination, and are stigmatized when accessing urban health care centres. Therefore, this plays a role in the large inequity in communicable disease incidence and prevalence in First Nations individuals compared to non-First Nations Canadians. To reduce the inequity in health, the ISC has invested significant resources to reduce stigma and normalize testing.

In 2022, ISC assisted the launch of the first ever First Nation Health Ombudsperson's office, located in Saskatoon [37]. The office is an Indigenous-led service, which is critical in addressing anti-Indigenous racism in the Canadian health system. The purpose of the office is to ensure that First Nations individuals have a clear point of contact where they feel safe to report instances of discrimination when accessing health care services in Saskatchewan. The Ombudsperson's office uses the feedback to work with federal and provincial health care organizations for resolution and overall system improvements.

OTHER NOTIFIABLE DISEASES

This section provides a brief summary of other notifiable diseases in which five or more cases have been reported in a calendar year in First Nations communities in Saskatchewan. These diseases include enteric and vaccine-preventable diseases, as well as diseases transmitted via respiratory routes.

ENTERIC DISEASES

Enteric diseases cause infection in the gastrointestinal tract, through bacteria, chemicals, biological toxins, parasites, or viruses that enter the body after ingesting contaminated food or water [38]. Other routes of exposure include contact with the vomit or feces of an infected person or contact with infected animals. Symptoms of enteric diseases can include nausea, vomiting, diarrhea, fever, and stomach cramps [38]. Food- and water-borne illnesses caused by enteric pathogens can affect millions of Canadians each year. In fact, food-borne illnesses affect about four million Canadians each year [38, 39]. There are approximately 30 pathogens known to cause food-borne illness, with most typically resulting in mild symptoms [40]. However, at-risk populations, including those with weakened immune systems (i.e., those living with diabetes), young children, the elderly, and pregnant women may experience severe symptoms. Each year in Canada, there are about 11,600 hospitalizations and 238 deaths from food-borne illnesses [40, 41]. Despite most enteric disease cases being mild, the illness imposes significant costs associated with hospitalization, lost productivity, and other related expenses [39].

From 2014 to 2023, the highest case counts of enteric diseases in First Nations communities in Saskatchewan were attributable to salmonellosis, campylobacteriosis, vancomycin-resistant enterococci, and giardiasis (Table 4.1).

VACCINE-PREVENTABLE DISEASES

Vaccine-preventable diseases are communicable diseases that can be prevented from causing serious complications, such as meningitis, pneumonia, brain swelling, amputations, and even death, through routine immunization of the general population [42].

From 2014 to 2023, the highest number of cases of vaccine-preventable diseases in First Nations communities in Saskatchewan was due to pertussis with 133 cases (Table 4.1). Efforts to increase immunity and control the spread of vaccine-preventable diseases among First Nations communities in Saskatchewan are detailed in Chapter 3.

DISEASES TRANSMITTED VIA RESPIRATORY ROUTES

There are a several diseases that primarily infect the body through the respiratory system. The diseases reported in this chapter, which are also vaccine-preventable diseases, include: invasive meningococcal, pneumococcal and streptococcal diseases, and

influenza[16]. From 2014 to 2023, the highest number of diseases transmitted via respiratory routes in First Nations communities in Saskatchewan were due to influenza, streptococcal A-invasive and pneumococcal-invasive (Table 4.1).

The spread of Invasive Group A streptococcal (iGAS) infection has become a growing concern across Canada, with incidence growing steadily since the early 2000s [43]. This form of streptococcal infection is severe and can cause pneumonia, meningitis, sepsis, streptococcal toxic shock syndrome, and necrotizing fasciitis (also known as 'flesh eating disease') [44]. From 2009 to 2019, the incidence rate of iGAS doubled from 4.0 cases per 100,000 population to 8.2 cases per 100,000 population among the overall Canadian population. [45] In 2020, the most common strains of iGAS in Canada were types emm 49, 76, 1, and 81 [45].

The most commonly reported risk factors for iGAS infection in First Nations communities in Saskatchewan were risk factors related to homelessness, and suppressed immunity related to HCV and HIV infections. Additionally, the medical risk factors reported in First Nations communities in Saskatchewan included diabetes, chronic renal and chronic heart diseases. PHAC and ISC-SK currently have a sub-working group to explore the underlying factors contributing to the increase and outbreaks of iGAS infections.

[16] COVID-19 is not reported in this chapter, for more information refer to Chapter 2 of the 2024 Health Status report – COVID-19.

Table 4.1: Case count of notifiable diseases in First Nations communities in Saskatchewan (excluding STBBIs and TB) by year, 2014 – 2023[17]

Enteric, Food and Waterborne Diseases	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total (2014 to 2023)
Aeromonas	S	0	0	0	0	0	0	0	0	0	S
Amoebiasis	0	0	0	0	0	0	0	0	0	0	0
Camplyobacteriosis	9	10	10	S	S	7	S	S	S	S	50
Cryptosporidiosis	S	S	S	0	0	0	0	0	0	0	6
Giardiasis	S	7	S	S	S	S	S	S	S	S	28
Hepatitis A	0	0	0	0	0	0	S	S	0	0	S
Listeriosis	0	0	0	0	0	S	0	0	0	0	S
Salmonellosis	6	22	18	7	8	7	6	7	S	5	90
Shigellosis	0	0	0	0	0	0	0	0	0	S	S
Tularemia	0	0	S	S	0	0	0	0	0	0	S
Vancomycin-resistant enterococci	0	9	22	0	0	0	0	0	0	0	31
Verotoxigenic E. coli	S	S	S	S	S	0	0	0	0	0	10
Yersinia enterocolitica	S	0	S	0	0	0	0	0	0	0	S
Vaccine-Preventable Diseases											
Varicella (chicken pox)	0	S	S	6	S	0	S	S	0	0	17
Diphtheria	0	S	0	0	0	S	0	0	S	0	5
Hepatitis B (Acute, Carrier)	S	S	0	0	S	S	0	0	0	S	6
H. influenza-invasive	S	S	0	S	S	S	6	S	5	5	32
Mumps	0	S	0	0	0	0	0	0	0	S	S
Mpox	0	0	0	0	0	0	0	0	0	0	0
Pertussis	24	16	12	60	7	13	S	0	0	0	133
Diseases Transmitted by Respiratory Routes											
Meningococcal-invasive	S	0	0	0	0	0	S	0	S	S	7
Parvovirus B19	S	0	0	S	0	0	0	0	0	0	5
Pneumococcal-invasive	19	23	15	12	11	17	17	20	26	60	220
Streptococcal A-invasive	12	14	18	21	17	17	40	19	24	43	225
Influenza	70	50	149	44	273	13	11	0	10	12	632

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023)

[17] S: Number of reported cases are less than 5, thus suppressed

PUBLIC HEALTH IMPLICATIONS

The epidemiology of communicable diseases among people living in First Nations communities in Saskatchewan over the past decade indicated that progress was made in addressing the burden of infectious diseases, especially in the pre-pandemic period. With the start of the COVID-19 pandemic in 2020, the rates of many STBBIs and TB decreased in First Nations communities in Saskatchewan. This decrease was likely due to strict public health measures resulting in decreased transmission [46]. However, the lower rates of communicable diseases during the pandemic may also be partly attributable to:

(1) Disruptions in service delivery by healthcare providers; and
(2) Declines in health-seeking behaviour by infected individuals [47].

Despite the potential underestimation caused by these factors during the pandemic, incidence rates in 2022 and 2023 in First Nations communities in Saskatchewan were high. Most communicable diseases (with the exception of HCV) returned to, or surpassed pre-pandemic levels. The high rates are partially due to the COVID-19 pandemic amplifying the inequities faced by Indigenous Peoples, including overcrowding and poor sanitary measures, which impacted both the incidence and severity of many communicable diseases [5]. Specifically, delays in public health programs and decreased access to health services led to more severe infections of communicable diseases, but unfortunately, this data is not available to be discussed further [5].

When compared to the overall Saskatchewan and Canadian populations, the rates of STBBIs and TB in First Nations communities in Saskatchewan were significantly greater for all years between 2014 and 2023. Recently, programs targeting the rapidly increasing disease rates have been implemented and expanded, including the KYS program, self-testing of HIV and syphilis, refined telehealth resources, and additional health care support for TB in First Nations communities in the NITHA area. These programs provide faster access to testing, earlier detection, and better treatment outcomes. However, the inequity in health remains high and more programs and initiatives are needed. One recommendation is to ensure the availability of additional supplies and services for First Nations communities even during times without crises [5]. Establishing an emergency fund at all levels including federal, provincial, territorial, regional, and local First Nations health authorities would allow for better preparedness in case of an emergency [5]. It is imperative that all strategies implemented to reduce communicable disease burden in First Nations communities in Saskatchewan must first acknowledge and consider the cultural context of the situation; including the intergenerational legacy of colonialism, residential schools, and social determinant of health issues that exist for all Indigenous Peoples in Canada [48].

APPENDIX

Data Sources

1. Overall Canadian Population
    - Total Canadian population, including First Nations communities and First Nations people living outside reserve lands
    - Data sources:
        - Public Health Agency of Canada (PHAC)
            - Canadian Notifiable Disease Surveillance System (2014 to 2023)
                - National data on chlamydia, gonorrhea, human immunodeficiency virus (HIV), and hepatitis C (HCV)
            - PHAC Tuberculosis surveillance in Canada summary report: 2014 to 2023

2. Overall Saskatchewan Population
    - Total Saskatchewan population, including First Nations communities and First Nations people living outside reserve lands
    - Data sources:
        - Saskatchewan Ministry of Health (2014 to 2023)
            - Provincial data on chlamydia, gonorrhea, human immunodeficiency virus (HIV), and hepatitis C (HCV)
        - Tuberculosis Information System (TBIS), 2014 to 2023
            - Provincial data on TB
                - Saskatchewan provincial data for COVID-19 sequenced variants (2021 to Feb 2, 2022)

3. First Nations communities in Saskatchewan

Prior to October 2018, in First Nations communities in the NITHA and south central areas, STBBIs and other notifiable disease data were obtained from the Saskatchewan integrated Public Health Information System (IPHIS). From October 2018, data was extracted from Panorama, a comprehensive and integrated Pan-Canadian Public Health Communicable Disease Surveillance and Management system. Additionally, TB data were obtained from the Tuberculosis Prevention and Control Saskatchewan (TBPC-SK) Tuberculosis Information System (TBIS).

- Total population registered to a First Nations band in Saskatchewan and residing in a First Nations community in Saskatchewan, excluding non-registered First Nations or non-First Nations that may be living in a First Nations community
    - Also excluding Whitecap Dakota First Nations residents as surveillance is reported to the SHA
- Data sources:
    - Saskatchewan Ministry of Health, Integrated Public Health Information System (IPHIS), 2014 to 2018
        - First Nations communities in Saskatchewan data (i.e., confirmed cases of infection/ disease) on STBBI and other notifiable diseases.
    - Saskatchewan Ministry of Health, Panorama (comprehensive and integrated Pan-Canadian Public Health Communicable Disease Surveillance and Management system), 2018 to 2023
        - First Nations communities in Saskatchewan data (i.e., confirmed cases of infection/ disease) on STBBI and other notifiable diseases.
    - TBIS, 2014 to 2023
        - First Nations communities in Saskatchewan data on TB

Approach to Data Analysis

The surveillance of reportable diseases in Saskatchewan was conducted via IPHIS when the reporting system was established in 2004. In 2018, a new provincial reporting system, Panorama, was implemented for the purpose of reportable disease surveillance. Notably, TB surveillance data has historically been and continues to be collected under the Tuberculosis Prevention and Control Program, since the reporting system's inception in 1986.

The crude incidence rates of all reported communicable diseases were calculated by dividing the total number of new cases of the disease in the reported year by the total population in reported year, expressed as the number of new cases in the reported year per 100,000 population.

$$\frac{Number\ of\ new\ cases\ of\ disease\ (in\ the\ reported\ year)}{Total\ population\ (in\ the\ reported\ year)} x100{,}000$$

Data Limitations

- Communicable disease data for First Nations communities in Saskatchewan does not capture those who were diagnosed while living outside

reserve lands or those who were diagnosed outside of Saskatchewan.

- As communicable disease data only reflects disease cases that were tested and then reported, there may be an underestimation of the true incidence of the disease.
  - This may be exacerbated during the COVID-19 pandemic due to disruptions in healthcare services and decreased health-seeking behaviour.
- Given the differences in age distribution among the various populations (i.e., First Nations communities in Saskatchewan, and overall Saskatchewan and Canadian populations), the higher proportion of young people living in First Nations communities may explain the higher incidence of some diseases among the population. Unfortunately, age-standardized rates could not be calculated due to a lack of available and accessible provincial data.
- Data that separates First Nations communities in Saskatchewan, Saskatchewan, and Canada is not available. As a result, comparisons are made between First Nations communities and the total populations of Saskatchewan and Canada. This slightly influences the difference in rates, in particular for Saskatchewan, as the First Nations communities population in Saskatchewan makes up a larger proportion of the Saskatchewan population than the Canadian population.
- Increasing communicable disease incidence may not necessarily reflect a true increase in infection rates because increases may be a result of changes in screening and testing methods, as well as the frequency of testing.

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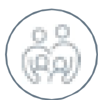
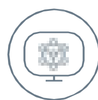



Saskatchewan Region
Chapter 5: Syphilis

INTRODUCTION TO SYPHILIS

Syphilis, caused by Treponema pallidum, is a highly contagious disease that can be transmitted through sexual contact, including oral, vaginal, and anal sex, as well as through sex toys [1]. Unlike Chlamydia, Gonorrhea, Hepatitis B, and genital Herpes, syphilis can also be transmitted from mother to child during pregnancy. In fact, the transmission rate can be as high as 90% when the mother's infection is left untreated [2]. This can result in congenital syphilis, which can cause severe harm to the baby, including stillbirth and neonatal death [3].

Syphilis progresses through different stages: primary, secondary, latent (early latent and late latent) and tertiary syphilis, each with different symptoms, with some stages being asymptomatic. [4] In the primary stage, approximately three to 90 days after exposure, painless sores typically appear on genitals, rectum or mouth. Syphilis then progresses to secondary stage, usually within two weeks to six months after exposure, and marked by a rough, bumpy rash in one or more areas of the body and other non-specific symptoms such as fever, sore throat, headache, and hair loss. Syphilis then advances to the early latent stage, where there are no visible signs and symptoms, but the person is still infectious as 25% of early latent syphilis cases can relapse to secondary syphilis infection [5, 6]. People with untreated syphilis are infectious for 12 months after exposure, with or without symptoms. After 12 months in the infectious period, syphilis moves into the late latent stage of syphilis. At this point, people don't show any symptoms and can no longer spread the disease to others. In the late latent stage, syphilis can remain dormant in the body for years and can progress to tertiary syphilis, which can affect multiple organs and be life-threatening. Nonetheless, the early stages of syphilis can be easily treated with a single dose of penicillin, while advanced stages (such as late latent), and those infected during pregnancy may require additional doses and/or combined antibiotic treatment.

Syphilis has historically been more common in low- and middle-income countries, however in recent years, case rates have risen significantly in high income countries [7]. Since the early 2000s, many Western countries have seen a surge in syphilis rates, with increases of over 300% [8, 9, 10, 11]. In Canada, infectious syphilis was one of the least commonly reported Sexually Transmitted Infections (STIs) in the early and mid-2010s. However, there has been a recent resurgence of syphilis cases, especially during the early years of the pandemic, posing a serious public health threat [12]. Many provinces have reported syphilis outbreaks as well as increases in early congenital syphilis cases and syphilitic stillbirths. The prairie provinces, including Saskatchewan, have been especially hard-hit, with the First Nations population in Saskatchewan being disproportionately affected by the rapid increase in syphilis infections.

To support First Nations communities in Saskatchewan in maintaining their health and well-being, Indigenous Services Canada - Saskatchewan Region (ISC-SK) continues to work closely with the First Nations communities and Tribal Councils in Saskatchewan, the Northern Inter-Tribal Health Authority (NITHA), the Government of Saskatchewan, the Saskatchewan Health

Highlights

- Prior to 2018, the rate of infectious syphilis was lower among First Nations communities in Saskatchewan compared to the Canadian population. Since then, the rates among First Nations communities in Saskatchewan have been consistently higher than the provincial and Canadian rates.
- Since 2018, syphilis (both infectious and late latent) rates for females have been consistently higher compared to male rates.
- Females aged 20 to 24 years and males aged 25 to 29 years had the highest average age-specific rates for infectious syphilis between 2019 and 2023.
- No condom use before sex, history of previous STI, and alcohol use were the most common risk factors for acquiring syphilis.
- In 2023, the proportion of women who were pregnant when they acquired syphilis has shown a decline when compared to the pandemic years.

Authorities, and other partners. Communicable disease control, including the management of outbreaks, remains a key focus for ISC-SK and First Nations communities in Saskatchewan to close gaps in health outcomes. However, since 2019, syphilis outbreaks in First Nations communities in Saskatchewan have significantly impacted these efforts to improve the general health of the population. The situation worsened during the pandemic years and First Nations communities in Saskatchewan now have some of the highest syphilis rates in Canada.

This chapter of the health status report outlines syphilis rates in First Nations communities in Saskatchewan and compares them to the overall rates in Saskatchewan and Canada. Factors such as age, sex, risk factors, disease stage, treatment, testing, and contacts are also examined. The syphilis chapter is organized into four sections: infectious syphilis, late latent syphilis, syphilis among pregnant females and newborns, and syphilis testing. The infectious syphilis section includes cases in the primary, secondary and early latent stages of infection, in which infection can be transmitted during sexual contact. The late latent syphilis section includes cases diagnosed after the infectious period (i.e., more than a year after the infection).

INFECTIOUS SYPHILIS

Before 2018, infectious syphilis rates in First Nations communities in Saskatchewan were lower than provincial and national rates, but have since been consistently higher (Figure 5.1). In 2022, the infectious syphilis rate in First Nations communities peaked, and was about six times higher than the provincial rate and around 29 times higher than the national rate. The sharp increase was in part due to limited access to testing and public health services due to pandemic-related resource shifts. In 2023, the rate of infectious syphilis for First Nations communities in Saskatchewan decreased to 840.3 cases per 100,000 population, which was a 21% decrease from 2022. This decline is reflective of the ongoing public health efforts to improve screening, thereby enabling early detection and treatment, as well as reducing transmission rates.

From 2015 to 2020, case rates were higher in First Nations communities in the south central area compared to those in the NITHA area, however, since 2021, the trend has reversed, with the NITHA area seeing substantially higher rates (Figure 5.2). In 2023, infectious syphilis case rates for First Nations communities in the NITHA area was 968.0 cases per 100,000 population, which was 34% greater than the rate of 719.9 cases per 100,000 population seen among First Nations communities in the south central area.

Overall, between 2014 and 2023, most infectious syphilis cases in First Nations communities in Saskatchewan were diagnosed while individuals were in the primary stage of infection (50%), followed by the early latent (31%) and secondary stages (19%) (Figure 5.3). However, there have been important changes over time. For instance, the percentage of syphilis cases diagnosed in the primary stage of infection dropped from 67% in 2019 to 46% in 2023. The percentage of cases diagnosed in the early latent stage increased from 17% in 2019 to 31% in 2023. This shift towards detecting cases in later stages of infection suggests delays in diagnosis, likely due to changes in the testing protocol, the impact of COVID-19 on public health resources and the shifting public health priorities during the pandemic.

Between 2014 and 2017, infectious syphilis rates among males in First Nations communities in Saskatchewan were generally similar to or higher than among females (Figure 5.4). Since 2018, rates among females have been consistently higher when compared to males, being 44% greater on average from 2018 to 2023. In 2023, the infectious syphilis rate for females was 1,070.7 cases per 100,000 population, which was around twice the rate of males at 615.6 cases per 100,000 population.

Between 2019 to 2023, the rates of infectious syphilis were consistently higher among females than among males for all age groups, except for those aged 40 and older (Figure 5.5). For females, the highest rate for infectious syphilis was observed in the 20 to 24 year age group (2,174.7 cases per 100,000 population), and then followed by the 25 to 29 year age group (1,700.1 cases per 100,000 population). For males, the rate was highest among the 25 to 29 year age group (1,168.3 cases per 100,000 population), followed by the 30 to 39 year age group (993.2 cases per 100,000 population).

Starting in 2018, infectious syphilis case rates began to increase among all age groups for males (Figure 5.6). Among males in First Nations communities in Saskatchewan, case rates have generally been highest among the 25 to 29 year age group since 2019. However, the highest peak case rate in males was among the 20 to 24 year age group in 2022 with 1,878.1 cases per 100,000 population. Notably between 2020

and 2023, the rate of infectious syphilis among the age groups between 20 to 39 years increased at a greater rate than the other age groups. In 2023, males aged 25 to 29 years had the highest rate (1,674.2 per 100,000 population).

Similar to males, females in First Nations communities in Saskatchewan had very little case activities prior to 2019 (Figure 5.7). Between 2020 and 2023, the highest case rates were exclusively found among females in the 20 to 24 year age group. In this age group, cases peaked in 2022 with 3,398.1 cases per 100,000 population before slightly decreasing to 3,331.6 cases per 100,000 population in 2023.

Between 2019 and 2023, the most commonly reported risk factors for infectious syphilis among females were no condom use during sex (71.6%), a history of previous STIs (59.8%), alcohol use (45.1%), contact with a known case (44.3%), and more than two sexual partners in the past three months (22.6%) (Figure 5.8). About one in five (19.0%) female cases were diagnosed with syphilis while pregnant.

Between 2019 and 2023, the most commonly reported risk factor for infectious syphilis among males was also no condom use during sex (74.9%), alcohol use (55.0%), a history of previous STI infections (54.2%), and more than two sexual partners in the past three months (25.7%) (Figure 5.9).

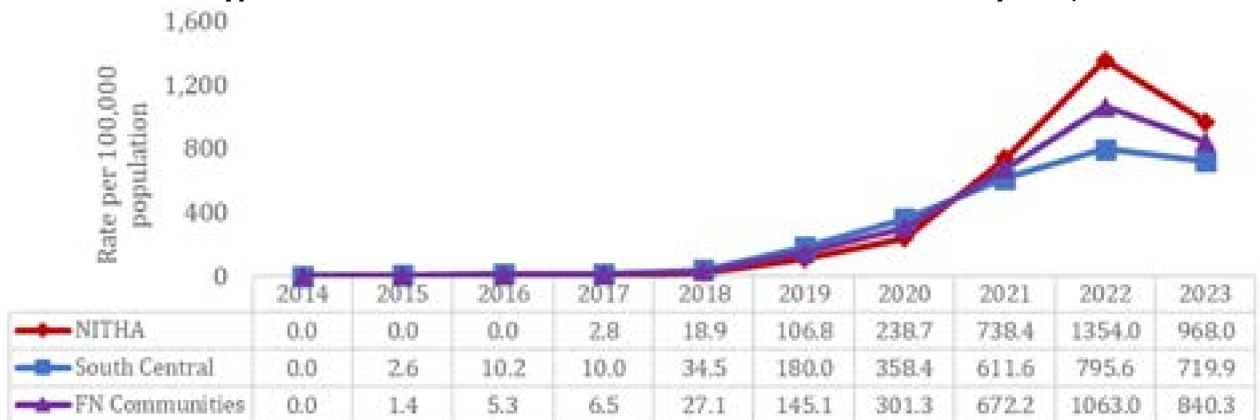
Note that while some of these risk factors may not directly lead to a syphilis infection, they can contribute to unsafe sexual behaviour that increase the risk of becoming infected with syphilis.

Figure 5.1: Infectious syphilis rates in First Nations communities in Saskatchewan, the overall Saskatchewan and Canadian populations, 2014 – 2023[18]

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
FN Communities	0.0	1.4	5.3	6.5	26.9	144.5	300.0	669.5	1063.0	840.3
Overall SK	2.5	2.1	7.2	10.1	11.8	32.9	75.4	161.0	180.6	159.3
Canada	6.8	9.0	10.7	11.3	17.0	24.6	24.7	30.0	36.1	30.5

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023), PHAC Canadian Notifiable Diseases On-line (2014 – 2023)

Figure 5.2: Infectious syphilis rates in First Nations communities in Saskatchewan by area, 2014 – 2023



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NITHA	0.0	0.0	0.0	2.8	18.9	106.8	238.7	738.4	1354.0	968.0
South Central	0.0	2.6	10.2	10.0	34.5	180.0	358.4	611.6	795.6	719.9
FN Communities	0.0	1.4	5.3	6.5	27.1	145.1	301.3	672.2	1063.0	840.3

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023)

[18] 2023 data is preliminary and subject to change – this applies to all subsequent graphs using 2023 data in this chapter.

Figure 5.3: Infectious syphilis rates for First Nations communities in Saskatchewan by stage of infection, 2014 – 2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Primary Syphilis	0.0	1.4	2.7	2.6	18.0	98.0	160.8	335.5	523.5	379.1
Secondary Syphilis	0.0	0.0	0.0	2.6	3.9	22.9	41.8	125.7	188.1	195.1
Early Latent	0.0	0.0	2.7	1.3	5.2	25.5	98.7	211.1	351.5	267.4

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023)

Figure 5.4: Infectious syphilis rates in First Nations communities in Saskatchewan by sex, 2014 – 2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Males	0.0	2.7	5.2	10.2	25.2	122.1	243.0	589.1	909.5	615.6
Females	0.0	0.0	5.4	2.7	28.8	167.7	359.0	752.3	1221.3	1070.7

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023)

Figure 5.5: Infectious syphilis rates in First Nations communities in Saskatchewan by age group and sex, 2019 – 2023

	0 to 14	15 to 19	20 to 24	25 to 29	30 to 39	40+
Females	20.3	909.1	2174.7	1700.1	1249.0	224.8
Males	3.6	338.1	976.3	1168.3	993.2	363.6

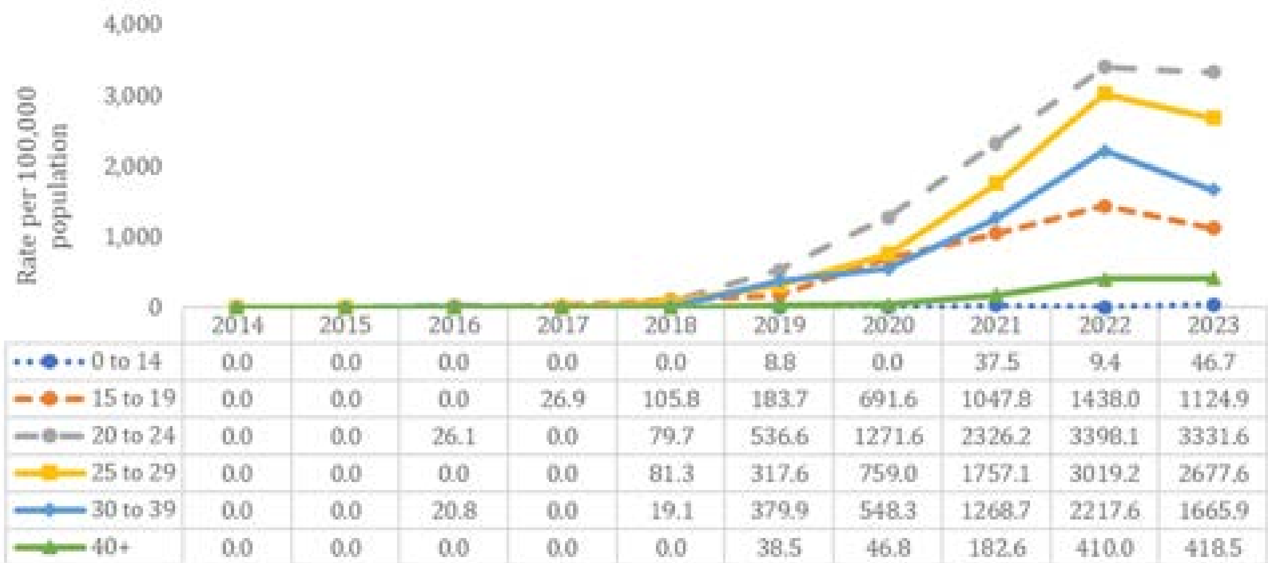
Sources: ISC-SK and NITHA, Panorama (2019 – 2023)

Figure 5.6: Age specific rates for male cases with infectious syphilis, First Nations communities in Saskatchewan, 2014 – 2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
0 to 14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.2	9.2	0.0
15 to 19	0.0	25.8	25.9	0.0	0.0	25.4	228.5	374.3	548.3	484.0
20 to 24	0.0	0.0	0.0	51.0	129.4	235.0	492.7	1010.1	1878.1	1255.2
25 to 29	0.0	0.0	0.0	26.1	50.3	346.4	597.5	1448.9	1838.4	1674.2
30 to 39	0.0	0.0	19.0	0.0	35.2	320.0	435.4	1274.5	1811.7	1012.7
40+	0.0	0.0	0.0	9.9	9.6	55.9	172.1	390.6	725.8	447.1

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023)

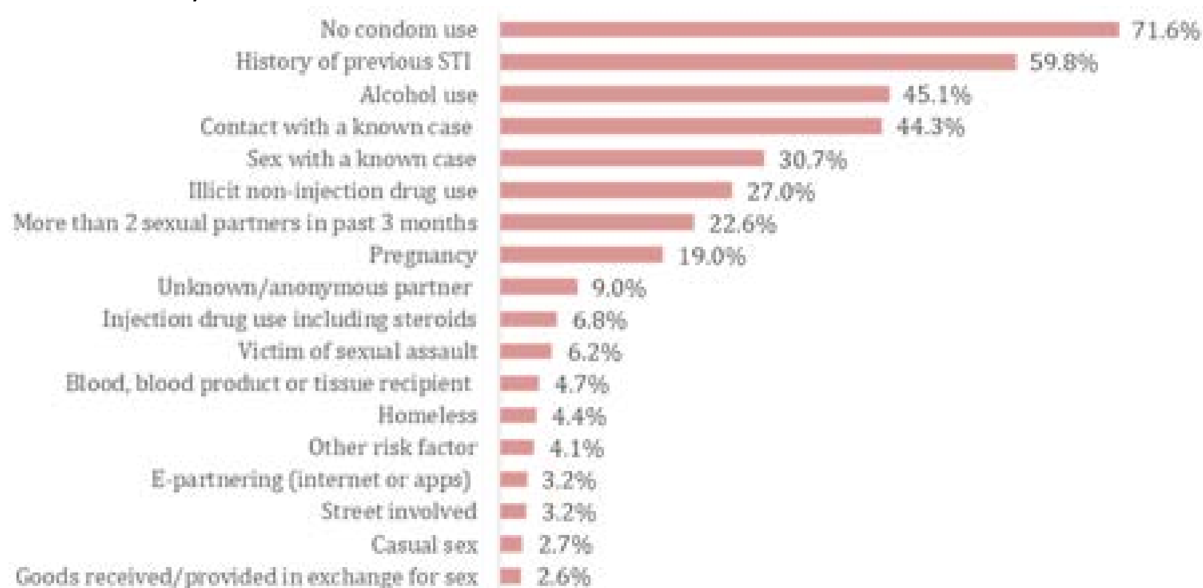
Figure 5.7: Age specific rates for female cases with infectious syphilis, First Nations communities in Saskatchewan, 2014 – 2023



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
0 to 14	0.0	0.0	0.0	0.0	0.0	8.8	0.0	37.5	9.4	46.7
15 to 19	0.0	0.0	0.0	26.9	105.8	183.7	691.6	1047.8	1438.0	1124.9
20 to 24	0.0	0.0	26.1	0.0	79.7	536.6	1271.6	2326.2	3398.1	3331.6
25 to 29	0.0	0.0	0.0	0.0	81.3	317.6	759.0	1757.1	3019.2	2677.6
30 to 39	0.0	0.0	20.8	0.0	19.1	379.9	548.3	1268.7	2217.6	1665.9
40+	0.0	0.0	0.0	0.0	0.0	38.5	46.8	182.6	410.0	418.5

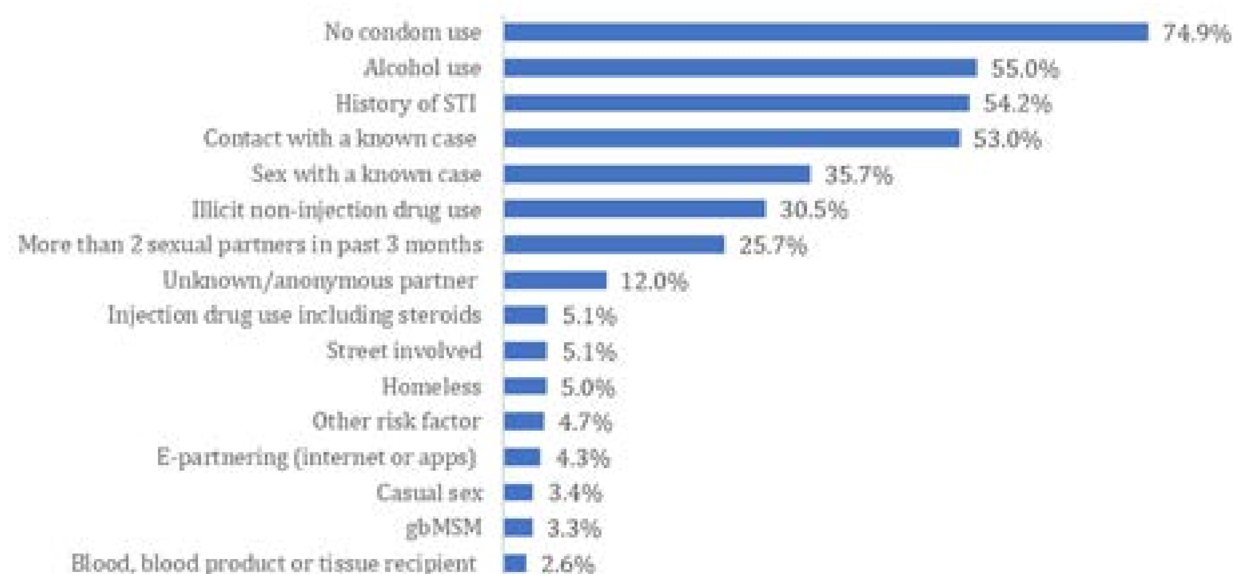
Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023)

Figure 5.8: Risk Factors for infectious syphilis among female cases, First Nations communities in Saskatchewan, 2019 – 2023



Source: ISC-SK and NITHA, Panorama (2019 – 2023)

Figure 5.9: Risk Factors for infectious syphilis among male cases, First Nations communities in Saskatchewan, 2019 – 2023



Source: ISC-SK and NITHA, Panorama (2019 – 2023)

LATE LATENT SYPHILIS

Late latent syphilis infection, while being asymptomatic and non-infectious, can still lead to serious health issues for the infected individual when left untreated. Moreover, a substantial risk for transmission from mother to child remains with untreated late latent syphilis [13]. Late latent syphilis infection points to delayed diagnoses, while ongoing monitoring and reporting highlights trends on the stage of infection when syphilis cases are being diagnosed. This information, in turn, informs program planning, resource allocation and targeted public health interventions, with the ultimate aim of reducing severe complications.

Similar to infectious syphilis, the rate of late latent syphilis in First Nations communities in Saskatchewan was also relatively low between 2014 and 2018, before

increasing substantially from 2019 to 2023. Until 2021, the rates of late latent syphilis were generally higher among First Nations communities in the south central area. However, in 2022 and 2023, the rates were higher in First Nations communities in the NITHA area. Rates in both areas peaked in 2023, with 54.8 cases per 100,000 population in the south central area, and 70.8 cases per 100,000 population in NITHA (Figure 5.10).

Nearly two-thirds (62.2%) of the late latent syphilis cases reported from 2013 to 2023 were among females with approximately 18.6% of the female cases being pregnant when diagnosed with late latent syphilis (Table 5.1). The most commonly reported risk factors for late latent syphilis included no condom use (76.2%), history of a previous STI (59.8%), alcohol use (45.1%), and illicit non-injection drug use (34.4%). Almost all (98.6%) cases reported between 2019 and 2023 were linked to treatment.

Between 2014 and 2017, the late latent syphilis case rates among males were similar to, or higher than, those among females in First Nations communities in Saskatchewan (Figure 5.11). Starting in 2018, the rates among females consistently surpassed those among males. In 2023, the rate of late latent syphilis among females was 74.5 cases per 100,000 population, which was about 1.5 times higher than the rate among males (50.9 cases per 100,000 population).

Between 2019 and 2023, the average age-specific rates for late latent syphilis have been consistently higher among females than males for all age groups, except for those aged 40 years and older (Figure 5.12). Among females, the highest average age-specific rates were observed among the 20 to 24 years age group (139.6 cases per 100,000 population), followed by the 25 to 29 years age group (105.9 cases per 100,000 population). Among males, rates were highest among the 30 to 39 years age group (80.7 cases per 100,000 population), followed by the 15 to 19 years age group (34.3 cases per 100,000 population).

Prior to 2019, rates of late latent syphilis were nil or minimal for both males and females in First Nations communities in Saskatchewan (Figure 5.13 and 5.14). After 2019, case rates among males were generally highest among the 30 to 39 years age group with a peak of 144.7 cases per 100,000 population in 2023 (Figure 5.13). A significant increase in case rates were observed over the pandemic years (i.e., 2020 to 2022) for all age groups except for those under the age of 15 years.

Case rates of late latent syphilis among females were on average, the highest among the 20 to 24 years age group with a peak of 269.7 cases per 100,000 population in 2022 (Figure 5.14). The next highest case rates were observed among the 25 to 29 years and 30 to 39 years age groups. Late latent syphilis rates among women aged 0 to 14 years and 40+ years were relatively low.

Figure 5.10: Late latent syphilis rates in First Nations communities in Saskatchewan by area, 2014 – 2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NITHA	0.0	0.0	2.8	2.8	8.1	0.0	13.3	26.3	62.0	70.8
South Central	2.7	2.6	7.6	2.5	7.4	21.9	17.0	33.7	52.3	54.8
FN Communities	1.4	1.4	5.3	2.6	7.7	11.5	15.2	30.2	56.9	62.6

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023)

Table 5.1: Select characteristics of late latent syphilis cases in First Nations communities in Saskatchewan, 2014 – 2023[19]

Characteristic	Count (n)	Proportion (%)
Sex (2014-2023)		
Male	59	37.8%
Female	97	62.2%
within child-bearing age[20]	92	94.8%
Risk Factors (2019-2023)		
No condom use during sex	93	76.2%
History of STI	73	59.8%
Alcohol use	55	45.1%
Illicit non-injection drug use	42	34.4%
Contact to a known case	41	33.6%
Pregnancy at the time of infection	18	18.6%
More than 2 sexual partners in past 3 months	18	14.8%
Unknown/anonymous partner	15	12.3%
Injection drug use (including steroids)	12	9.8%
Treatment status (2019-2022)		
Linked to treatment	140	98.6%

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023)

Figure 5.11: Case counts and rates for late latent syphilis by sex, First Nations communities in Saskatchewan, 2014 – 2023

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023)

[19]Risk factor and treatment data were only available for cases reported between 2019 and 2023.

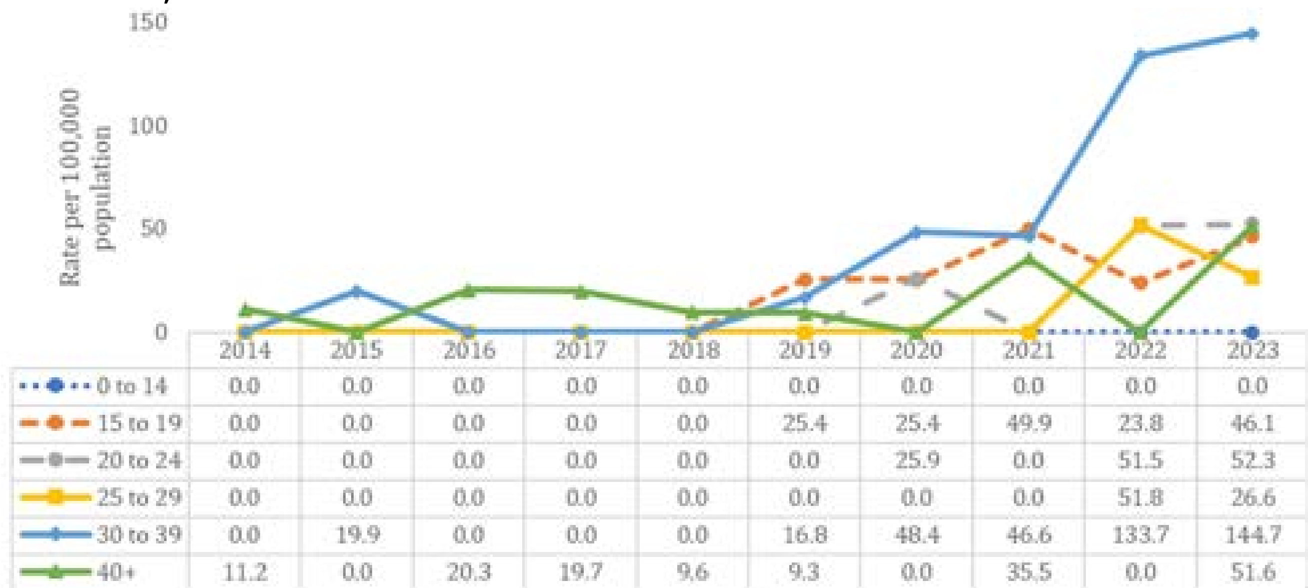
[20]Women aged 15 to 45 years are considered to be within child-bearing age.

Figure 5.12: Rates of late latent syphilis by age group and sex, First Nations communities in Saskatchewan, 2019 – 2023

	0 to 14	15 to 19	20 to 24	25 to 29	30 to 39	40+
Females	1.8	35.2	139.6	105.9	106.0	7.3
Males	0.0	34.3	26.0	15.2	80.7	19.6

Sources: ISC-SK and NITHA, Panorama (2019 – 2023)

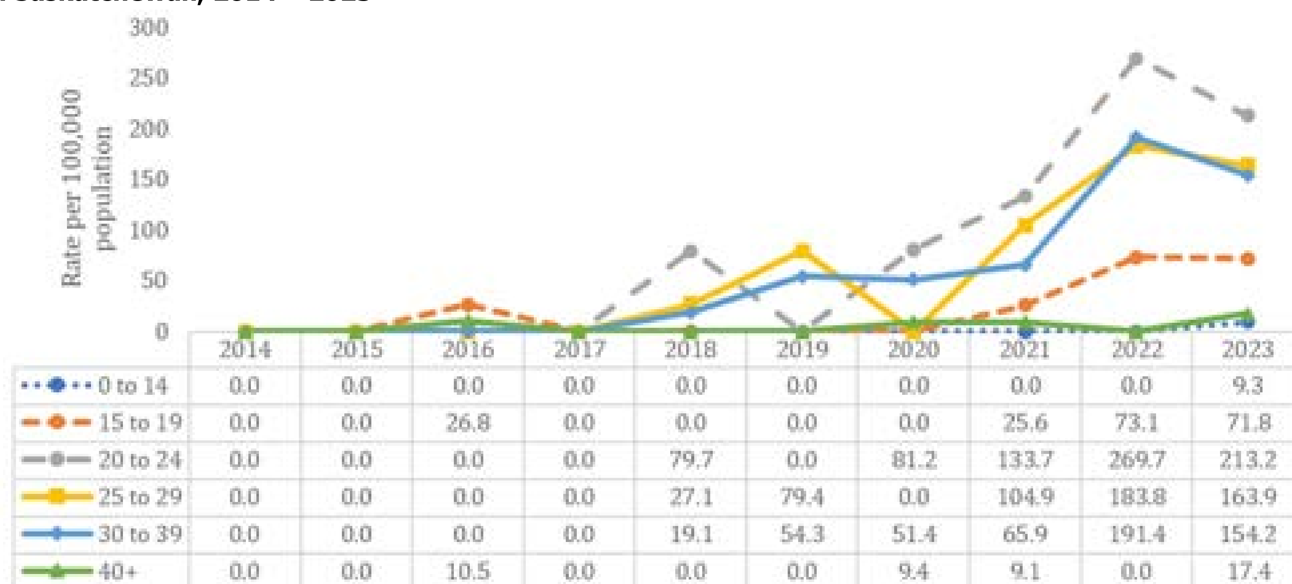
Figure 5.13: Age-specific rates among male cases with late latent syphilis, First Nations communities in Saskatchewan, 2014 – 2023



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
0 to 14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15 to 19	0.0	0.0	0.0	0.0	0.0	25.4	25.4	49.9	23.8	46.1
20 to 24	0.0	0.0	0.0	0.0	0.0	0.0	25.9	0.0	51.5	52.3
25 to 29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.8	26.6
30 to 39	0.0	19.9	0.0	0.0	0.0	16.8	48.4	46.6	133.7	144.7
40+	11.2	0.0	20.3	19.7	9.6	9.3	0.0	35.5	0.0	51.6

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023)

Figure 5.14: Age-specific rates among female cases with late latent syphilis, First Nations communities in Saskatchewan, 2014 – 2023



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
0 to 14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.3
15 to 19	0.0	0.0	26.8	0.0	0.0	0.0	0.0	25.6	73.1	71.8
20 to 24	0.0	0.0	0.0	0.0	79.7	0.0	81.2	133.7	269.7	213.2
25 to 29	0.0	0.0	0.0	0.0	27.1	79.4	0.0	104.9	183.8	163.9
30 to 39	0.0	0.0	0.0	0.0	19.1	54.3	51.4	65.9	191.4	154.2
40+	0.0	0.0	10.5	0.0	0.0	0.0	9.4	9.1	0.0	17.4

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023)

SYPHILIS AMONG PREGNANT FEMALES AND NEWBORNS

A syphilis infection during pregnancy can lead to serious health problems for the fetus and newborn. If maternal infection is not detected and treated early in pregnancy, syphilis can be passed to the fetus through the placenta. The infection can also be transmitted to the baby during vaginal birth if the baby comes into contact with a syphilis sore. The risk of transmission is higher if the mother is in the primary or secondary stage of infection during pregnancy [12, 14].

Between 2019 and 2023, about one in five women (19%) were pregnant at the time of their syphilis diagnosis. The highest proportion was observed in 2021 and 2022 at 22%, which decreased to 14% in 2023 (Figure 5.15). Syphilis transmission from an untreated, infected mother to child can result in serious complications such as premature delivery, stillbirth, and congenital syphilis. An increase in reporting of early congenital syphilis and syphilitic stillbirths reflects a health system failure as these outcomes can be easily prevented with timely intervention. Early diagnosis, treatment of the infected mother, and comprehensive prenatal care can reduce the risk of harm to both mother and baby [15, 16].

Between 2019 and 2023, there were 28 early congenital syphilis and 6 syphilitic stillbirth cases reported in First Nations communities in Saskatchewan. Most cases were reported in 2021 and 2022, with 13 cases each year (Figure 5.16). It is important to note that the 2022 and 2023 case counts for early congenital syphilis may change as some baby contacts as well as suspect and probable cases of early congenital syphilis can be monitored up to the first 18 months of life, which may later become a confirmed early congenital syphilis case.

Baby contacts, whose mothers were adequately treated for syphilis during pregnancy, are followed for up to 18 months after delivery to monitor for any possible syphilis transmission. If the baby has a negative serology result for syphilis prior to 18 months of age, the investigation will be closed prior to the 18 month bloodwork being completed [4]. A total of 261 baby contacts (i.e. babies born to confirmed female syphilis case) were reported between 2019 and 2023, with the majority (79%) being reported after 2021 (Figure 5.17).

Figure 5.15: Proportion of female cases diagnosed with syphilis during pregnancy, First Nations communities in Saskatchewan, 2019-2023

	2019	2020	2021	2022	2023
% pregnant syphilis cases	13%	22%	22%	18%	14%

Sources: ISC-SK and NITHA, SK Ministry of Health IPHIS (2014 – 2018), Panorama (2018 – 2023)

Figure 5.16: Number of early congenital and syphilitic stillbirth cases reported in First Nations communities in Saskatchewan, 2019-2023[21]

	2019	2020	2021	2022	2023
Early congenital syphilis and syphilitic stillbirth cases	0	S	13	13	S

Sources: ISC-SK and NITHA, Panorama (2019 – 2023)

Figure 5.17: Number of baby contacts born to confirmed female syphilis cases, First Nations communities in Saskatchewan, 2019 – 2023

	2019	2020	2021	2022	2023
Baby contacts to a syphilis case (Mother)	S	10	45	99	107

Sources: ISC-SK and NITHA, Panorama (2019 – 2023)

PUBLIC HEALTH IMPLICATIONS

Infectious and non-infectious syphilis rates have both increased in First Nations communities in Saskatchewan during the pandemic years (2020 to 2022). Since 2018, rates among females had consistently been higher than among males and the majority of these female cases were of reproductive age. A substantial increase in early congenital and syphilitic stillbirths was also observed over the pandemic years, and a similar trend has been observed in terms of baby contacts. Despite the shifting public health priorities during this time, there has been focused efforts in detecting syphilis cases early and providing timely treatment. Although there was a significant decline in the 2023 infectious syphilis rate in First Nations communities in Saskatchewan, the rate

[21] S: Number of reported cases are less than 5, thus suppressed

remains substantially higher than the provincial rate. Ongoing effort is needed to reduce the incidence of syphilis in the communities, especially among women and newborns.

To control the increasing rates of syphilis in First Nations communities in Saskatchewan, several programs targeting STBBIs have been expanded in recent years, including increased availability of educational materials and prevention programs, rapid testing of syphilis and HIV, targeted testing for STI among high risk persons and pregnant women, refined telehealth resources, and additional health care support for reduction of syphilis activities. These programs increase awareness about safer sex practices, provide faster access to testing, and ensure earlier detection and better treatment outcomes. However, the inequity in health among First Nations communities in Saskatchewan remains high, and more programs and initiatives are needed. Therefore, it is imperative that all strategies implemented to reduce the burden of syphilis in First Nations communities in Saskatchewan target the significant inequities in social determinants of health experienced by First Nations people.

APPENDIX

Data Sources

1. Overall Canadian Population
    - Total Canadian population, including First Nations communities and First Nations people living outside reserve lands
    - Data sources:
        - Public Health Agency of Canada (PHAC)
            - Canadian Notifiable Disease Surveillance System (2014 to 2023)
                - National data on infectious syphilis

2. Overall Saskatchewan Population
    - Total Saskatchewan population, including First Nations communities and First Nations people living outside reserve lands
    - Data sources:
        - Saskatchewan Ministry of Health (2014 to 2023)
            - Provincial data on infectious syphilis

3. First Nations communities in Saskatchewan

Prior to October 2018, syphilis data for First Nations communities in the NITHA and south central areas were obtained from the Saskatchewan Integrated Public Health Information System (IPHIS). From October 2018 onwards, data was extracted from Panorama, a comprehensive and integrated Pan-Canadian Public Health Communicable Disease Surveillance and Management system

- Total population registered to a First Nations band in Saskatchewan and residing in a First Nations community in Saskatchewan, excluding non-registered First Nations or non-First Nations that may be living in a First Nations community
    - Also excluding Whitecap Dakota First Nations residents as surveillance is reported to the SHA
- Data sources:
    - Saskatchewan Ministry of Health, Integrated Public Health Information System (IPHIS), 2014 to 2018
        - First Nations communities in Saskatchewan data (i.e., confirmed cases of infection/ disease) on syphilis
    - Saskatchewan Ministry of Health, Panorama (comprehensive and integrated Pan-Canadian Public Health Communicable Disease Surveillance and Management system), 2018 to 2023
        - First Nations communities in Saskatchewan data (i.e., confirmed cases of infection/ disease) on syphilis.

Approach to Data Analysis

The surveillance of reportable diseases in Saskatchewan was conducted using IPHIS, beginning in 2004 when the reporting system was established. In 2018, a new provincial reporting system, Panorama, was implemented for the purpose of reportable disease surveillance.

The crude incidence rates were calculated by dividing the total number of new cases of the disease in question within the reported year by the total population in reported year, and the rate is expressed as the number of new cases in the reported year per 100,000 population.

$$\frac{Number\ of\ new\ cases\ of\ disease\ (in\ the\ reported\ year)}{Total\ population\ (in\ the\ reported\ year)} x100{,}000$$

Data Limitations

- Communicable disease data for First Nations communities in Saskatchewan does not capture those who were diagnosed while living outside reserve lands or those who were diagnosed outside of Saskatchewan.
- As communicable disease data only reflects disease cases that were tested and then reported, there may be an underestimation of the true incidence of the disease.
    - This may be exacerbated during the COVID-19 pandemic due to disruptions in healthcare services and decreased health-seeking behaviour.
- Given the differences in age distribution among the various populations (i.e., First Nations communities in Saskatchewan, and overall Saskatchewan and Canadian populations), the higher proportion of young people living in First Nations communities may explain the higher incidence of some diseases among the population. Unfortunately, age-standardized rates cannot be calculated due to a lack of available and accessible provincial data.
- Data that separates First Nations communities in Saskatchewan, Saskatchewan, and Canada is not available. As a result, comparisons are made between First Nations communities and the total populations of Saskatchewan and Canada. This

slightly influences the difference in rates, in particular for Saskatchewan, as the First Nations communities population in Saskatchewan makes up a larger proportion of the Saskatchewan population than the Canadian population.

- The increasing incidence of syphilis may not necessarily reflect a true increase in the infection rate as increases may be a result of changes in screening and testing methods, as well as the frequency of testing.
- Rates of early congenital syphilis and syphilitic stillbirth could not be calculated as the number of births occurring in First Nations communities in Saskatchewan is unavailable.

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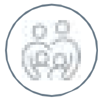
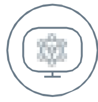
First Nations Health Status Report

2024  

Saskatchewan Region
Chapter 6: Environmental Indicators

The Environment Indicators health status report chapter is focused on select environment-related issues within First Nations communities in Saskatchewan. This chapter will provide information on drinking water advisories (DWAs) and animal bites and wounds (animal bites, scratches and or other altercations) affecting First Nations communities in Saskatchewan. DWA data was provided by Indigenous Services Canada (ISC) – Saskatchewan (SK) Region, Environment and Public Health Branch for First Nations bands. This data includes all DWAs that occurred within the 70 bands (which represents the 82 First Nations communities) in the Northern Inter-Trial Health Authority (NITHA) and ISC-SK geographic areas. Animal bites and wounds data comes from ISC-SK, NITHA, as well as the Saskatchewan Health Authority (SHA).

HIGHLIGHTS

- The majority of drinking water advisories (DWAs) in First Nations bands in Saskatchewan are shorter than two weeks in length.
- The number of long-term drinking water advisories (LTDWAs) in First Nations bands in Saskatchewan have decreased over time however, there are a few LTDWAs that still need to be resolved.
- The overall count of advisories and proportion of bands with at least one advisory are quite consistent per year.
- The rate of animal bites and wounds increased since the pandemic years (2020 to 2023).
- In First Nations communities in Saskatchewan, the rate of animal bites and wounds was greater among males than females, especially among the 0 to 14-year age group.
- Dogs are the most common animal involved in animal bites and wounds.

DRINKING WATER ADVISORIES

As of the end of 2023, 94.9% of households on First Nations communities in Saskatchewan are served by a water system with treatment. The rest of the 5.1% of households are served by individual systems, typically wells. DWAs are generally precautionary, meaning they are typically issued before drinking water quality problems occur [1]. The advisories can take three forms: boil water advisories (BWA), do not consume advisories (DNC), and do not use advisories (DNU).

BWAs may be put in place if there are concerns with the water treatment process (such as low chlorine residuals) or if the water could potentially be contaminated with harmful viruses, bacteria, or parasites. However, a precautionary BWA may also be issued due to equipment issues, operational problems, or other water quality indicators that might not directly affect water safety [2]. DNC advisories may be issued if the water contains exceedances such as manganese that cannot be removed by boiling. DNU advisories are for situations when using the water poses an immediate health risk [3].

Addressing the disparity of access to clean water for Indigenous Canadians is a major priority for ISC. In November 2015, the Government of Canada committed to lifting all long-term DWAs (LTDWA) on public water systems in First Nations communities by March 31, 2021 – see definition for LTDWA in the "Long-term Drinking Water Advisories" section below [4, 5]. However, the COVID-19 pandemic led to delays in completing water system infrastructure projects in First Nations communities, which slowed down efforts to eliminate LTDWA [5]. In Canada by the end of 2023, 84% of LTDWAs in place had been lifted, with an additional 10% completed (with lift pending) [6]. Furthermore, all remaining LTDWAs were in various stages of progress, including construction, design, or planning phases [6]. In addition to resolving LTDWAs, ISC is not only committed to ending LTDWAs, but also ensuring sustainable access to drinking water for future generations. To accomplish this goal, ISC is collaborating with First Nations communities towards improving water and wastewater infrastructure, keeping water systems running and properly staffed, and supporting First Nations' control of water delivery [6].

SHORT-TERM DRINKING WATER ADVISORIES

Short-term Drinking Water Advisories (STDWAs) are DWAs that are in place for less than one year. It is important to note that water systems with frequently recurring and lengthy STDWAs may indicate deficiencies that, if unaddressed, could lead to long-term advisories [5]. Fortunately, most STDWA are due to operational maintenance, depressurization, power outages, or regular routine checkups and are shorter than two months. In this chapter, STDWAs will be sorted into STDWAs that are two months and less in length, and STDWAs that are longer than two months, but less than one year.

LONG-TERM DRINKING WATER ADVISORIES

Long-term Drinking Water Advisories (LTDWAs) are DWAs that are in place for one year and longer. LTDWAs often result from ongoing issues like equipment breakdown or the system not working properly to treat water to the required quality [4].

ANALYSIS OF DRINKING WATER ADVISORIES

The following analysis of DWAs includes all DWAs that were active at any point between 2017 and 2023. This includes DWAs that started before 2017 but ended during the time period, as well as those that remain active beyond 2023.

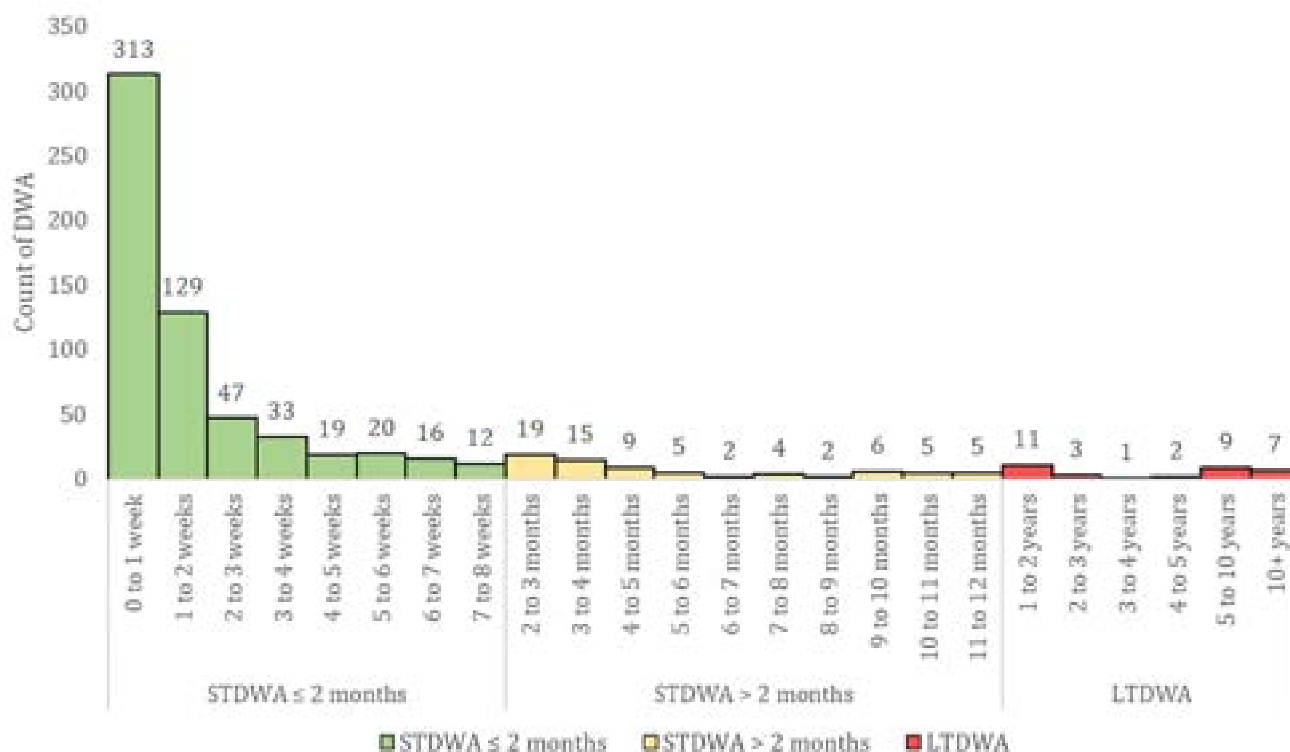
To assess the length of DWAs, a Time-To-Event analysis was conducted per each year. DWAs are characterized by a start date and an end date and can span across multiple years. The yearly count of DWAs is calculated by the status of the advisory (STDWA ≤2 months, STDWA > 2 months, or LTDWA) at the end of a given year (December 31). Therefore, if a DWA spans multiple years, the same advisory will be counted multiple times. Note that when counts are not stratified on a per year basis such as in Figure 6.1, the same DWA cannot be counted multiple times. For more information and an example, refer to the "Approach to Data Analysis – Drinking water Advisories" in the appendix section.

In First Nations bands in Saskatchewan between 2017 and 2023, 85% of all DWAs were less than two months in length (Figure 6.1). In fact, almost half of all DWA lasted less than a week. However, there were 16 LTDWA that had been in place for at least 5 years.

It is also important to note that 18 of 680 DWAs from 2017 to 2023 had not been lifted by the end of 2023 and are designated, "right censored" (indicating that the exact length of these DWAs is unknown because they were still active at the time of data collection, the end of 2023). Of the right censored DWAs, two are STDWAs that are currently two months and less in length, four are STDWAs spanning longer than two months, and 12 are LTDWA. Therefore, six DWAs could develop into LTDWAs.

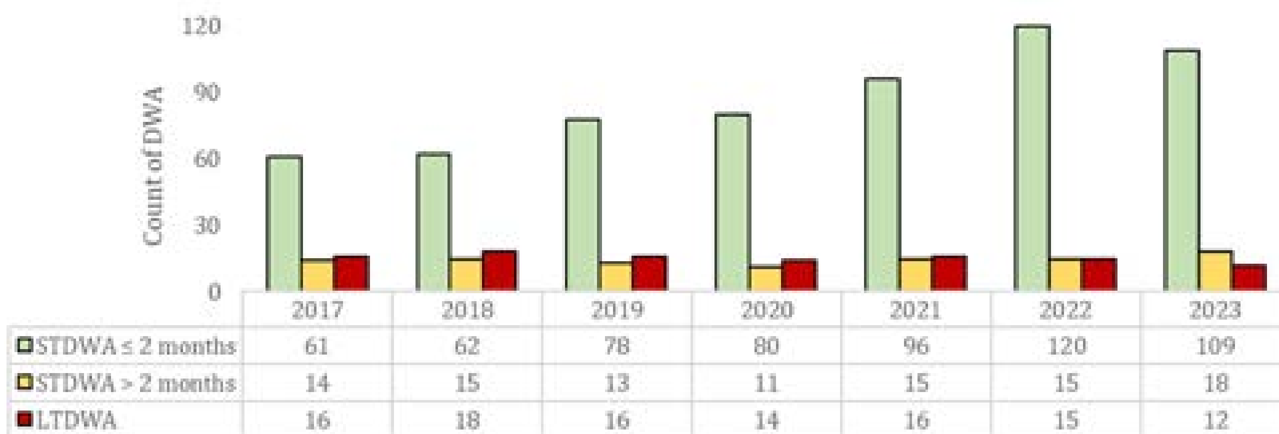
Like figure 6.1, figure 6.2 shows that between 2017 and 2023 in First Nations bands in Saskatchewan, most DWAs were STDWAs that are two months and less in length. The number of STDWA that are two months and less increased over the 7-year period. There was also a slight increase of STDWA lasting longer than two months since 2020. As previously mentioned from figure 6.1, the number of LTDWAs decreased over the time period.

Figure 6.1: Length of all Drinking Water Advisories in First Nations bands in Saskatchewan, 2017 – 2023 (N = 694)[22, 23]



Source: ISC-SK Environment and Public Health (2017 – 2023)

Figure 6.2: Number of Drinking Water Advisories by length of the advisory issued in First Nations bands in Saskatchewan, 2017 – 2023



	2017	2018	2019	2020	2021	2022	2023
STDWA ≤ 2 months	61	62	78	80	96	120	109
STDWA > 2 months	14	15	13	11	15	15	18
LTDWA	16	18	16	14	16	15	12

Source: ISC-SK Environment and Public Health (2017 – 2023)

[22] Saskatchewan Tribal Council (STC) did not report DWA prior to February 2022, which includes 6 of 70 First Nations bands in Saskatchewan with no reported data prior to this date.

[23] Note, there are 70 First Nations bands representing 82 First Nations communities in Saskatchewan.

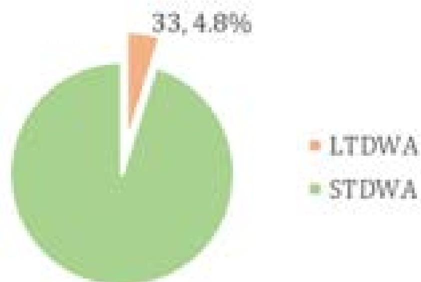
FOCUS ON LONG-TERM DRINKING WATER ADVISORIES

Of the 694 DWAs active in First Nations bands in Saskatchewan between 2017 and 2023, 33 were LTDWAs, which is 4.8% of all advisories (Figure 6.3). Of the 680 DWAs, 11 were DNC advisories, which is 1.6% of all DWA between 2017 and 2023. There were no DNU advisories reported during this time period.

The count of LTDWAs in First Nations bands in Saskatchewan have slowly decreased over time, with 2023 having the lowest count of LTDWAs with 12 (Figure 6.4).

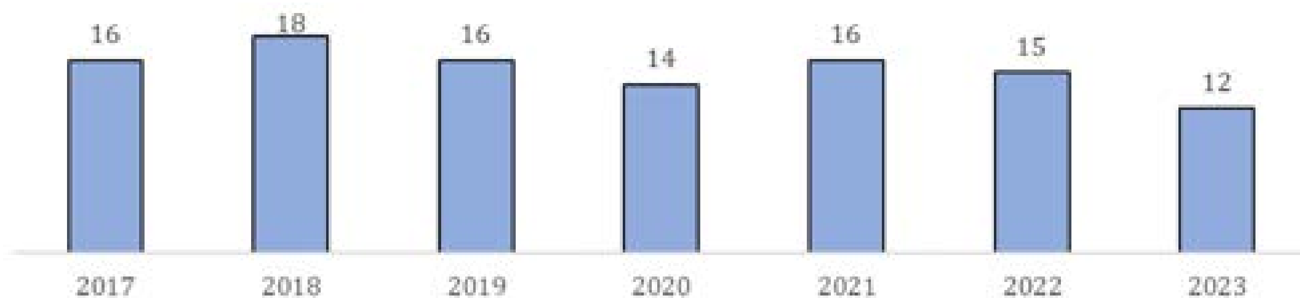
Between 2017 and 2022 in First Nations bands in Saskatchewan, more LTDWAs were lifted than added (Figure 6.5). On average, around three LTDWAs were put in place each year, while four were lifted.

Figure 6.3: Proportion of Long-Term Drinking Water Advisories issued in First Nations bands in Saskatchewan, 2017 – 2023



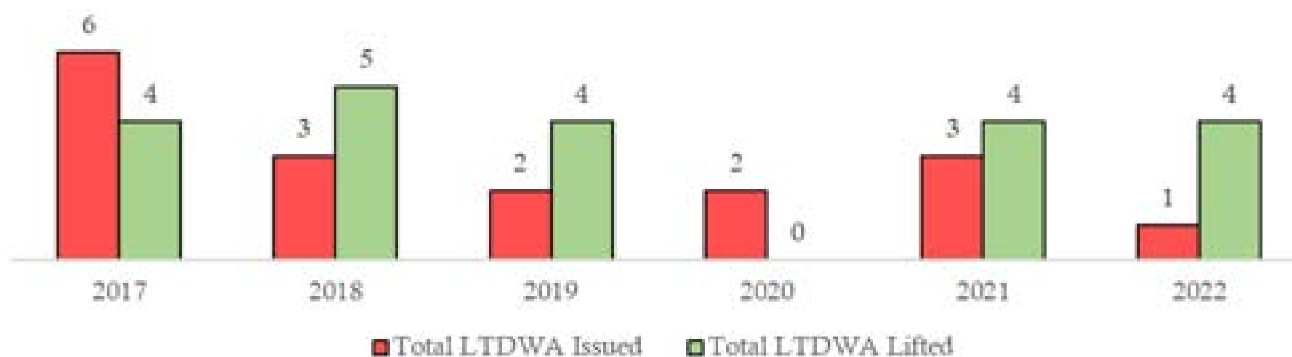
Source: ISC-SK Environment and Public Health (2017 – 2023)

Figure 6.4: Count of Long-Term Drinking Water Advisories active in First Nations bands in Saskatchewan, 2017 – 2023



Source: ISC-SK Environment and Public Health (2017 – 2023)

Figure 6.5: Count of Long-Term Drinking Water Advisories issued and lifted in First Nations bands in Saskatchewan, 2017 – 2022



Source: ISC-SK Environment and Public Health (2017 – 2023)

STAR BLANKET CREE NATION SUCCESS STORY

In July of 2024, Star Blanket Cree Nation had a grand opening for its new water treatment plant [7]. This project included drilling a new raw water well, construction of a raw water line, restoration of an existing raw water well and flushing of the water distribution system. ISC invested over $10.5 million to develop the plant and to train a water treatment operator to ensure the system is adequately staffed and under First Nation's control.

The new water treatment plant is truly a state-of-the-art facility, using biological filtration and membrane treatment to clean the source water in an efficient and effective manner. The new water system provided all Star Blanket Cree Nation residents, as well as community buildings such as the band office, healthcare facility and early learning centre, access to a reliable water source.

Star Blanket Cree Nation Chief Michael Starr addressing the community during the grand opening

Federation of Sovereign Indigenous Nations Chief Bobby Cameron joined to celebrate the grand opening

DRINKING WATER ADVISORIES LASTING LONGER THAN TWO MONTHS

Among First Nations bands in Saskatchewan, the number of DWAs that were issued lasting longer than two months did not significantly vary between 2017 and 2023. Towards the end of the 7-year time period, there were more DWA in First Nations bands in the south central area compared to the NITHA area (Figure 6.6).

In First Nations bands in the south central area, there were 17 DWAs in 2017, and 18 DWA in 2023. The number of DWAs among First Nations bands in NITHA was 12 in 2023, similar to the 12 observed in 2017. Across the 7-year period, the number of First Nations bands in Saskatchewan that experienced at least one DWA longer than two months in length decreased over time (Figure 6.7). In 2023, 30.0% of all First Nations bands in Saskatchewan experienced at least one DWA longer than two months, whereas in 2017, 37.5% of all First Nations bands in Saskatchewan experienced at least

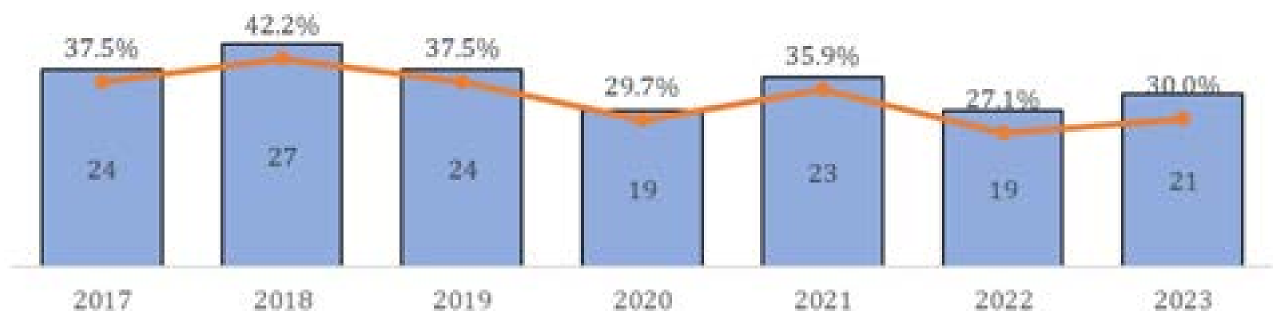
one DWA longer than two months.

Figure 6.6: Number of Drinking Water Advisories (excluding Short-term Drinking Water Advisories ≤ 2 months) in First Nations bands in Saskatchewan by area, 2017 – 2023

	2017	2018	2019	2020	2021	2022	2023
NITHA	13	17	14	13	14	11	12
South Central	17	16	15	12	17	19	18
FN Communities	30	33	29	25	31	30	30

Source: ISC-SK Environment and Public Health (2017 – 2023)

Figure 6.7: Number and proportion of First Nations bands in Saskatchewan with at least one Drinking Water Advisory that lasted more than 2 months, 2017-2023[24]



Source: ISC-SK Environment and Public Health (2017 – 2023)

PUBLIC HEALTH IMPLICATIONS OF DRINKING WATER ADVISORIES

DWAs can pose significant issues within First Nations bands in Saskatchewan. When LTDWAs persist, they can erode trust in the water treatment and distribution system, or public service as a whole, among residents. This may prompt people to resort to using other potentially unsafe water sources, even after the advisory is lifted [5]. However, other safe modes of water are provided during DWAs such as boiling recommendations or providing bottled water. Additionally, bands with LTDWAs may face economic and social disparities as a result of the advisories. Businesses and services may be hesitant to operate, leading to loss of income, reduced quality of life, and exacerbating housing shortages in these bands [7]. Therefore, it is important to quickly address DWAs and completely eliminate LTDWAs to help minimize the health disparities faced by First Nations bands.

[24] STC service area did not report DWA to Regional Operations (RO) prior to February 2022, therefore denominator for 2017-2021 is 64 bands, while it is 70 bands for 2022 and 2023.

ANIMAL BITES AND WOUNDS

One Health is an approach aimed at achieving optimal health outcomes through collaborative, interdisciplinary efforts. It acknowledges the interconnectedness of human, animal, and environmental health, recognizing that their well-being is intertwined and impacts each other. From a One Health approach, it is crucial to understand and prevent animal bites for the well-being of both human and animal health. In the United States, one percent of emergency room visits are due to animal bites [8]. These incidences usually involve domesticated animals such as dogs and cats and can range from minor injuries, such as scratches, to serious and even fatal wounds [8]. The most common animal bites and wounds between humans and animals involves dogs. Dogs are the most common domesticated pets, and their larger size compared to other pets can lead to more frequent bites and scratches when the dog feels threatened. However, dogs usually do not bite without warning, and is typically the result of the situation, and not the dog itself that determines when a negative interaction will happen. Dogs will give warning signals if they are anxious or fearful, and understanding these signals is important in preventing bites and wounds. Early training and socializing of dogs are key preventative measures to promote positive interactions between dogs and humans. Socialized animals are much less likely to engage in harmful behaviour compared to stray or feral dogs [9].

Moreover, animal bites can transmit rabies virus to humans through an infected animal's saliva. Rabies infection in humans leads to a serious neurological illness and once symptoms appear, it is nearly always fatal within seven to 14 days [10]. Wild animals are the main carriers for rabies, and when an infected wild animal bites an unvaccinated domestic animal (or human directly), and the infected domestic animal bites a human, the rabies virus can spread. In Saskatchewan, wild animals such as skunks in south and central Saskatchewan (Saskatoon and Regina surrounding areas), foxes in northern Saskatchewan (predominately in Athabasca health region), and bats throughout the entire province can carry rabies. Fortunately, the risk of rabies is low, and First Nations communities in Saskatchewan have historically never experienced a known case of rabies. In Canada, there have been only 28 known cases of rabies since 1924, with two cases reported in Saskatchewan [11]. In Canada, the most recent case of rabies occurred in 2024 in Ontario from a rabid bat [11]. However, rabies is not as uncommon among animals. In 2023, the Canadian Food Inspection Agency collected 255 animal samples in Saskatchewan and 10 samples were positive for rabies, nine from bats and one from foxes [12]. Although the risk of rabies in First Nations communities in Saskatchewan is extremely low, it is important to take any risk seriously.

In this chapter, the reported numbers and rates of animal bites and wounds will be broken down by the area, by the type of negative interaction, by sex, by age, and the type of animal involved. In this report, animal bites and wounds are classified as animal bites, scratches, or a combination of both. Data were provided for both NITHA and ISC-SK areas. For ISC-SK, all animal bites and wounds that occurred within south central First Nations communities are included, regardless of if the individual involved was a resident within a south central First Nations community. However, for NITHA, only clients in First Nations communities were included.

ANALYSIS OF ANIMAL BITES AND WOUNDS

The rate of animal bites and wounds among First Nations communities decreased during the pandemic years between 2020 and 2022 (Figure 6.8). In 2023, the rate of animal bites and wounds increased to rates greater than pre-pandemic in 2019. In 2023 in First Nations communities in the NITHA area, the rate was 679.9 cases per 100,000 population. Comparably, the rate of animal bites and wounds among First Nations communities in the south central area was 727.1 cases per 100,000 in 2023, which was substantially greater than in 2019.

Across the 5-year period, bites were the most common, with bites making up 79.4% of all animal bites and wounds (Figure 6.9). Among First Nations communities in Saskatchewan in 2023, there was 591.3 bites per 100,000 population which was 84.0% of all bites and scratches. Interactions that involved both scratches and bites were the second most prevalent, and scratches were the least common.

Figure 6.8: Rate of animal bites and wounds in First Nations communities in Saskatchewan by area, 2019 – 2023

	2019	2020	2021	2022	2023
NITHA	622.3	472.0	525.5	571.0	679.9
South Central	450.0	411.7	508.1	558.1	727.1
FN Communities	532.1	440.5	516.4	564.3	704.2

Sources: ISC-SK and NITHA, and Saskatchewan Health Authority (SHA) (2019 – 2023)

Figure 6.9: Rate of animal bites and wounds in First Nations communities in Saskatchewan by type of interaction, 2019 – 2023

	2019	2020	2021	2022	2023
Bite	395.9	357.0	439.8	435.6	591.3
Scratch	49.6	35.4	45.2	50.7	49.1
Bite/Scratch	58.6	44.3	32.7	45.8	61.3
Unknown	35.6	21.5	11.3	32.2	2.5

Sources: ISC-SK and NITHA, and SHA (2019 – 2023)

MALES AND CHILDREN ARE MOST AT RISK FOR ANIMAL BITES AND WOUNDS

Across the 5-year period between 2019 and 2023, males in First Nations communities in Saskatchewan consistently had higher rates of animal bites and wounds compared to females (Figure 6.10). In 2023, the rate of animal bites and wounds among males in First Nations communities in Saskatchewan was 748.9 cases per 100,000 population. Comparably, the rate of animal bites and wounds among females in 2023 was 613.6 cases per 100,000 population, which was 18.1% less than the rate among males.

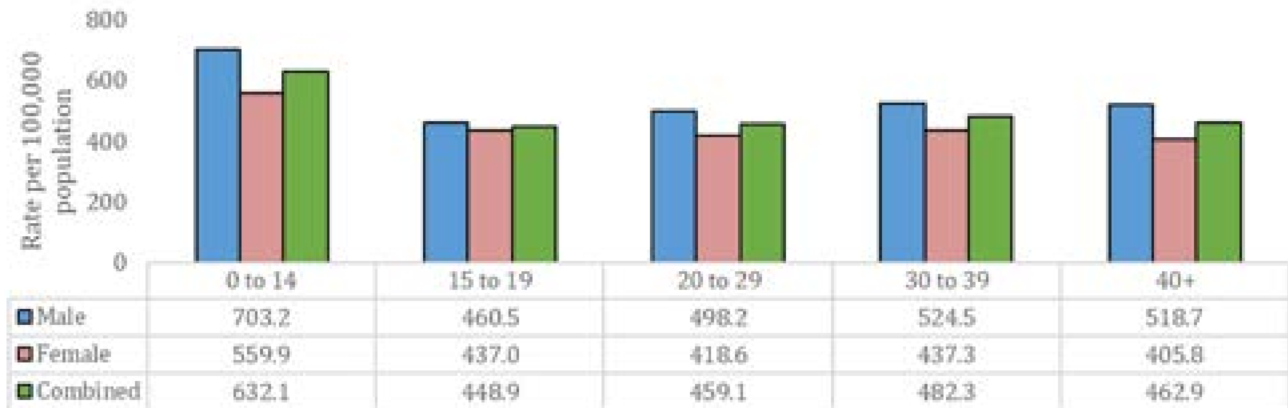
Across the 5-year period average, the rate of animal bites and wounds was highest among the youngest age group, 0 to 14 year olds with 632.1 cases per 100,000 population. Between the sexes, the rate of animal bites and wounds was higher among males in for all age groups (Figure 6.11). Among males in First Nations communities in Saskatchewan, the rate of animal bites and wounds was highest in the 0 to 14 year age group (703.2 cases per 100,000 population), and lowest among the 15 to 19 year age group (460.5 cases per 100,000 population). Among females in First Nations communities in Saskatchewan, the rate was also highest in the 0 to 14 year age group (559.9 cases per 100,000 population), but lowest among the 40+ year age group (405.8 cases per 100,000 population). Note that there were also 94 cases where the sex of the cases was unknown, and are therefore excluded from Figure 6.11.

Figure 6.10: Rate of animal bites and wounds in First Nations communities in Saskatchewan by sex, 2019-2023[25]

	2019	2020	2021	2022	2023
Females	438.2	394.2	431.5	502.6	613.6
Males	595.2	445.5	566.6	563.2	748.9

Sources: ISC-SK and NITHA, and Saskatchewan Health Authority (SHA) (2019 – 2023)

Figure 6.11: Rate of animal bites and wounds in First Nations communities in Saskatchewan by age group, 2019 – 2023



	0 to 14	15 to 19	20 to 29	30 to 39	40+
Male	703.2	460.5	498.2	524.5	518.7
Female	559.9	437.0	418.6	437.3	405.8
Combined	632.1	448.9	459.1	482.3	462.9

Sources: ISC-SK and NITHA, and SHA (2019 – 2023)

DOGS INVOLVED IN MOST ANIMAL BITES AND WOUNDS

Dogs were the most common animals involved in animal bites and wounds in First Nations communities in Saskatchewan, averaging 510.4 cases per 100,000 population over the 5-year period (Figure 6.12). Dogs were involved in 16 times as many cases as the next most common animal, cats, which were involved in 32.0 cases per 100,000 population on average over the 5-year period.

[25] 83 clients have unknown sex and age identity and are therefore excluded from the analysis. Also applies for figure 6.11.

Figure 6.12: Average 5-year rate of animal bites and wounds in First Nations communities in Saskatchewan by type of animal involved, 2019-2023 [26]

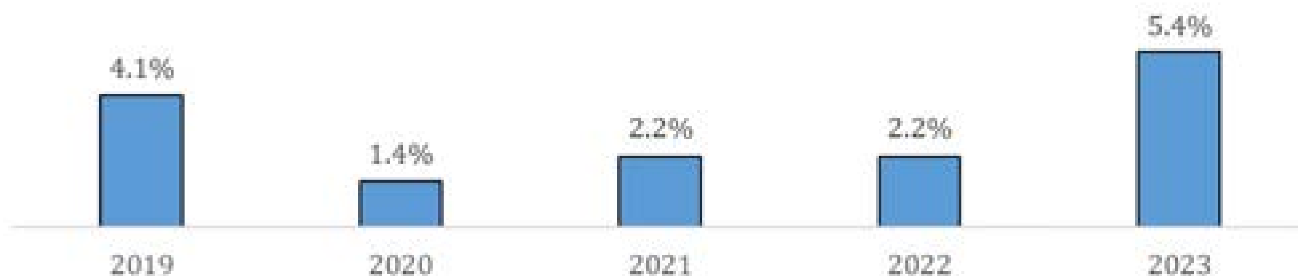
Sources: ISC-SK and NITHA, and SHA (2019 – 2023)

POST-EXPOSURE TREATMENT FOR RABIES

Only a small proportion of clients who experienced an animal bite or wound were given post-exposure prophylaxis (PEP) treatment for rabies. In 2023, of 574 animal bites and wounds, 31 clients received post-exposure treatment for rabies, equaling 5.4% of incidences (Figure 6.13).

Overall, the percentage of clients receiving PEP for rabies was quite low as PEP is recommended only under certain circumstances. If the animal who caused the incident can be observed and is not showing any abnormal behaviour and is healthy, then PEP is not recommended. However, if a severe bite occurred, especially to the face or heard on a small child, or if the animal is unknown, or if the incident occurred with a wild animal, or if the animal is behaving abnormally, then PEP is administered. Essentially, if it cannot be determined with 100% certainty that the animal is free of rabies or vaccinated against rabies, then PEP treatment should be given.

Figure 6.13: Percentage of animal bites and wounds in First Nations communities in Saskatchewan that received post-exposure rabies treatment, 2019-2023



Sources: ISC-SK and NITHA, and SHA (2019-2023)

PUBLIC HEALTH IMPLICATIONS OF ANIMAL BITES AND WOUNDS

Preventing animal bites and wounds is important for the health and safety of both people and animals. Animal bites can lead to serious injuries and although rare, can spread diseases like rabies, a serious and life-threatening condition. In addition, these animal bites and wounds can lead to the entrapment or harming of the animal involved in the altercation. The most common people affected by animal bites and wounds are young children between ages 0 to 14, and males. First Nations communities, especially children, should continue to receive education on domestic and wildlife interactions,

[26] Rodents* includes mice, rats, beavers, gophers, hamsters, muskrats, racoons, squirrels, and weasels; Wild animals ǂ includes bats, bears, coyotes, horses, and eagles.

access to health care services, and community initiatives for animal control and prevention. Education is necessary to mitigate the risk of these animal bites and wounds and promote the well-being of all.

APPENDIX

Data Sources – Drinking Water Advisories

- Includes all drinking water advisories that occurred in First Nations bands in Saskatchewan, including those on privately owned water systems
- First Nations bands in Saskatchewan
  - Data source:
    - ISC, Environmental Public Health Division, 2017 to 2023

Data Sources – Animal bites and wounds

- ISC-SK data includes any animal bites and wounds that occurred within First Nations communities in the south central area; and NITHA data includes only individuals who reside within First Nations communities in the NITHA area in Saskatchewan.
- First Nations communities in Saskatchewan
  - Total population registered to a First Nations band in Saskatchewan and residing in a First Nations community in Saskatchewan, excluding non-registered First Nations or non-First Nations that may be living in a First Nations community
    - Data source:
      - ISC-SK, NITHA, and SHA, 2019 to 2023

Approach to Data Analysis – Drinking Water Advisories

The surveillance of DWAs in First Nations bands in Saskatchewan is tracked by the Environmental Public Health Division of ISC.

Methods to calculating counts of length of Drinking Water Advisories

The length of DWA was calculated using Time-To-Event data analysis per each year (2017 to 2023). DWAs have a start date and revoked date that can span across multiple years. DWA counts for a specific year are calculated by the status of the advisory (STDWA ≤2 months, STDWA > 2 months, or LTDWA) at the end of a given year (December 31). Therefore, if a DWA spans multiple years, the same advisory will be counted multiple times. For LTDWA for example, if the DWA starts in a specific year, it will not be counted as a LTDWA for the year it was set. Instead, it will be counted for all subsequent years when the advisory is active (i.e., if an advisory starts in 2017 and ends in 2020, then it will not be counted as a LTDWA for 2017 but will be counted for 2018-2020).

I.e. DWA start date = November 29, 2017; DWA end date = Feb 20, 2020

- By the end of 2017, the length of the DWA = Dec 31 – Nov 29 = 31 days;
  - Therefore, in 2017, the DWA is a STDWA < 2 months;
- By end of 2018, the length of DWA = Dec 31, 2018 – Nov 29, 2017 = 396 days;
  - Therefore, in 2018, the DWA is a LTDWA; and
- So forth until the end of the DWA.

Note that when counts are not stratified on a per year basis such as in Figure 6.1, the same DWA cannot be counted multiple times.

Calculating proportion of LTDWA:

$$\frac{Number\ of\ LTDWA}{Number\ of\ DWA\ in\ total} x100\%$$

Calculating proportion of bands that had at least one DWA in a given year:

$$\frac{At\ least\ one\ DWA > 2\ months\ in\ the\ specific\ year}{Number\ of\ First\ Nations\ bands\ in\ Saskatchewan\ reporting\ to\ Regional\ Operations} x100\%$$

Data Limitations – Drinking Water Advisories

- The length of time of the DWAs influences the count, even if a DWA is in place for one day in a specific year, it is counted.
  - Note that DWAs spanning across multiple years are counted multiple times.
- Saskatoon Tribal Council (a total of six bands) did not provide DWA data prior to 2022, therefore there is underreporting of DWA in First Nations bands in Saskatchewan before 2022.
- Reporting of DWAs has improved gradually over the years, as recently, there has been additional emphasis on reporting to receive funding from regional operations (RO).
  - This results in surveillance bias, where more existing DWAs are reported in recent years, also meaning that there was underreporting in

previous years.
- All DWAs are included, regardless of if they are financially supported by ISC. Of 694 DWAs in total, 17 are unknown or not supported financially by ISC.
  - Six of the 33 LTDWA are unknown or not financially supported by ISC.
- No provincial and National data available for comparison.

Approach to Data Analysis – Animal bites and wounds

The surveillance of animal bites and wounds is tracked by the SHA and reported to ISC-SK and NITHA. There are a few animal bites and wounds that come directly from First Nations communities.

The crude incidence rates of reported animal bites and wounds were calculated by dividing the total number of animal bites and wounds in the reported year by the total population in the reported year, expressed as the new number of animal bites and wounds per 100,000 population.

$$\frac{\text{Number of new animal bites and wounds (in the reported year)}}{\text{Total population (in the reported year)}} x100{,}000$$

For figures 6.11 and 6.12 which have a rate averaged over multiple years, the population is averaged over the duration.

To calculate the average of the population count over a specific period of years:

$$\frac{\text{Sum of population (over the reported period)}}{\text{Number of years over the reported period}} x100{,}000$$

The overall formula:

$$\frac{\text{Number of new animal bites and wounds (over the reported period)}}{\text{Average of population (over the reported period)}} x100{,}000$$

Data Limitations – Animal bites and wounds

- ISC-SK data includes all animal bites and wounds that occurred in First Nations communities in the south central area, which can include people living outside of reserve lands. ISC-SK data also includes animal bites and wounds that involved animals living in First Nations communities in the south central area. This includes where the area of incidence was off of reserve lands or within people living off of reserve lands. NITHA data only includes animal bites and wounds that occurred within status clients within First Nations communities in the NITHA area. The difference is from differing data collection practices.
  - Therefore, there is overestimation of animal bites and wounds in First Nations communities in the south and central area.
- Clients with unknown age and sex who had an animal bite or wound are excluded from the relevant figures.
- Animal bites and wounds data only reflects incidences that were reported and there is no requirement that these negative interactions be reported.
  - Therefore, there may be an underestimation of the true incidence of animal bites and wounds.
- There is no available provincial and national data available for comparison with First Nations communities in Saskatchewan.

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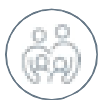
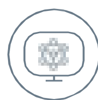
First Nations Health Status Report

2024  

Saskatchewan Region
Chapter 7: Social Determinants of Health

SOCIAL DETERMINANTS OF HEALTH HAVE A SIGNIFICANT INFLUENCE ON POPULATION HEALTH

Medical care is estimated to be responsible for approximately 10-20 percent of all factors that can be changed to improve overall health outcomes in a population. The remaining 80-90 percent are the result of Social Determinants of Health (SDOH) [1]. The SDOH are the social, environmental, and economic conditions in which people live and work that affect the health of individuals and communities. SDOH include but is not limited to personal income, education, employment opportunities, food security and housing [2]. Health inequities are shaped by the distribution of money, power and resources and lead to the unfair and avoidable differences in health outcomes between different populations. The SDOH does not focus on factors such as traditional clinical care, but instead focuses on the impact of broader social factors on health inequities.

The World Health Organization (WHO) Global Commission on the SDOH recognizes three critical areas that require action to minimize health inequities:

(i) Improving daily living conditions, so people can live healthier lives;
(ii) Addressing the unfair distribution of power, money, and resources that exist among populations, which creates these health inequalities; and
(iii) Measuring and understanding the problem, as well as evaluating public health actions [3].

The WHO has also expressed that action needs to be universal, while also focused on those who face the biggest disadvantages [3].

In Canada, the SDOH also include additional factors such as geography and Indigenous ancestry (see Figure 7.1) [4]. The Government of Canada is working to address health inequities by:

(i) Strengthening the evidence base to inform decision-making;
(ii) Engaging stakeholders beyond the health sector; and
(iii) Sharing knowledge of action across Canada [2].

Public policies play a key role in influencing the SDOH of a population, and it is crucial that policies are implemented towards reducing inequities in health [4].

HIGHLIGHTS

- Cree (18.3%), Dene (8.3%) and Plains Cree (6.3%) were the Indigenous Languages most commonly spoken by First Nations communities in Saskatchewan.
- Indigenous people living outside reserve lands were about 50% more likely to be food insecure as the general Saskatchewan population.
- The proportion of Indigenous households in Saskatchewan that were crowded decreased by 1.3% between 2016 and 2021.
- The proportion of people aged 25 to 54 in First Nations communities in Saskatchewan who completed their high school education increased from 26.4% in 2016 to 32.2% in 2021.
- The median income increased by 77.8% between 2016 and 2021 among First Nations communities aged 25 to 54-year-old in Saskatchewan.

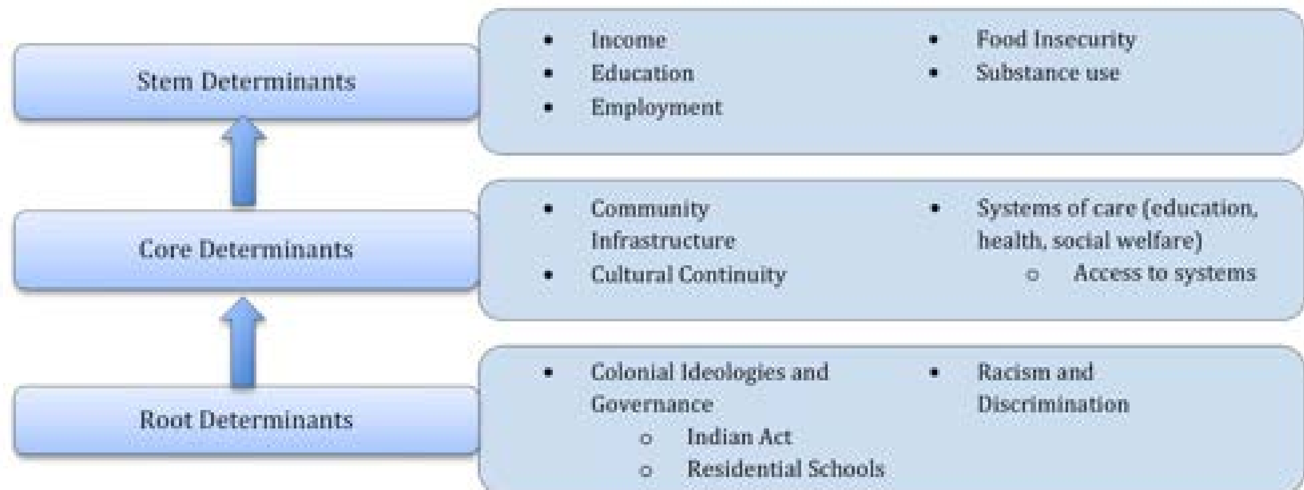
Figure 7.1. Key Social Determinants of Health identified within the Canadian societal context [4]

The SDOH that are unique to Indigenous Peoples[27] in Canada, include colonization, racism, intergenerational trauma, discrimination, and self-determination [4]. Certain government policies and regulations, such as the establishment of residential schools and the *Indian Act*, have contributed to the emergence and persistence of health inequities among Indigenous Peoples in Canada [4].

The unique Indigenous-specific SDOH can be visualized through a tree metaphor, where the tree is broken down into three main components: root – core – stem (see Figure 7.2) [5]. The tree represents the dynamic nature of the SDOH, in which resources originate in the foundational roots, travel through the core, and ultimately reach the stems and leaves, contributing to the growth and maintenance of the tree. Within the context of Indigenous-specific SDOH, the root determinants are deeply embedded historic and political structures that influence the core determinants, and therefore, shape the wellness of entire communities. The core determinants symbolize the community infrastructure, shaping aspects such as education, health, and social welfare systems. Inequities at this level arises from policies, practices, and representation, which determine access to the core systems. The stem SDOH are determinants that more directly impact individual and community well-being. This includes SDOH such as education, income, employment, and food security. In this chapter, the data mostly represents the stem SDOH, as this is the data readily available from the 2016 and 2021 Census of Population of Canada. However, as the tree metaphor illustrates, addressing the root and core determinants should be the primary focus of health promotion policies, programs, and interventions. Targeting these upstream factors more effectively improves the health of individuals and communities [5].

[27] "Indigenous Peoples" is the term used by Statistics Canada to describe those who identify as First Nations, Métis and/or Inuit.

Figure 7.2. Key Social Determinants of Health of Indigenous Peoples in Canada [5, 6]



This chapter provides information about the SDOH of First Nations people in Saskatchewan, gathered from the 2016 and 2021 Census of Population of Canada. Terminology of First Nations in the Census is defined as "off reserve" and or "on reserve". However in the 2024 Health Status Report, "First Nations people living on a reserve" are defined as *people living in First Nations communities* or simply, *First Nations communities* and "First Nations people living off a reserve" are defined as *First Nations people living outside reserve lands*. The shift in language is to be more inclusive and move away from colonial language such as using the terms on- and off-reserve[28].

In this chapter, the SDOH for First Nations communities (when available) is compared to First Nations people living outside reserve lands and non-First Nations people in Saskatchewan. Information on SDOH such as Indigenous language knowledge, food security, housing, education, income, and employment were limited to available data (see Appendix) from the 2021 Census of Population. Some of the health disparities faced by First Nations communities in Saskatchewan are highlighted in other chapters of the 2024 Health Status Report. Health disparities within First Nations communities in Saskatchewan are largely driven the SDOH leading to the many health inequities people living in First Nations communities face.

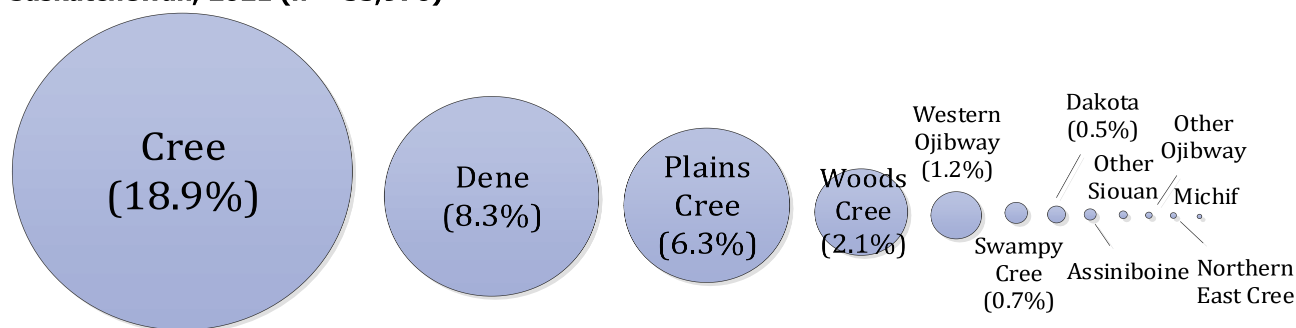
CULTURE AND LANGUAGE

Culture and language are important SDOH among Indigenous Peoples in Canada [7]. The revitalization of Indigenous cultures and languages can significantly improve the health of Indigenous Peoples [7]. Taking part in cultural activities and learning traditional language helps foster a strong sense of cultural identity, which can improve spiritual, mental, emotional and physical health. In 2023, the Government of Canada included $1.5 million in program budgets to support Indigenous groups in protecting and reviving their languages and cultures. This was part of the "Listen, Hear Our Voices" initiative. The Saskatchewan Indigenous Cultural Centre was one of the organizations that received some of this funding [8]. The Saskatchewan Indigenous Cultural Centre is dedicated to protecting, preserving, and promoting the languages and cultures of the eight Indigenous language groups in Saskatchewan.

According to the 2021 Census, at least 10 different Indigenous languages are spoken by people living in First Nations communities in Saskatchewan. However, the proportion who speak at least one Indigenous language decreased from 41% in 2016 to 38% in 2021. Cree (18.9%), Dene (8.3%) and Plains Cree (6.3%) were the most common Indigenous languages spoken by the First Nations communities in Saskatchewan in 2021 (Figure 7.3).

[28] For more information, see "Terminology in the Report" in Chapter 1 – Demographics of the 2024 Health Status Report

Figure 7.3: Indigenous languages spoken among people living in First Nations communities in Saskatchewan, 2021 (n = 53,970)



Source: Statistics Canada, 2021 Census of Population

FOOD SECURITY – OVER A THIRD OF INDIGENOUS PEOPLE LIVING OUTSIDE RESERVE LANDS ARE EXPERIENCING FOOD INSECURITY

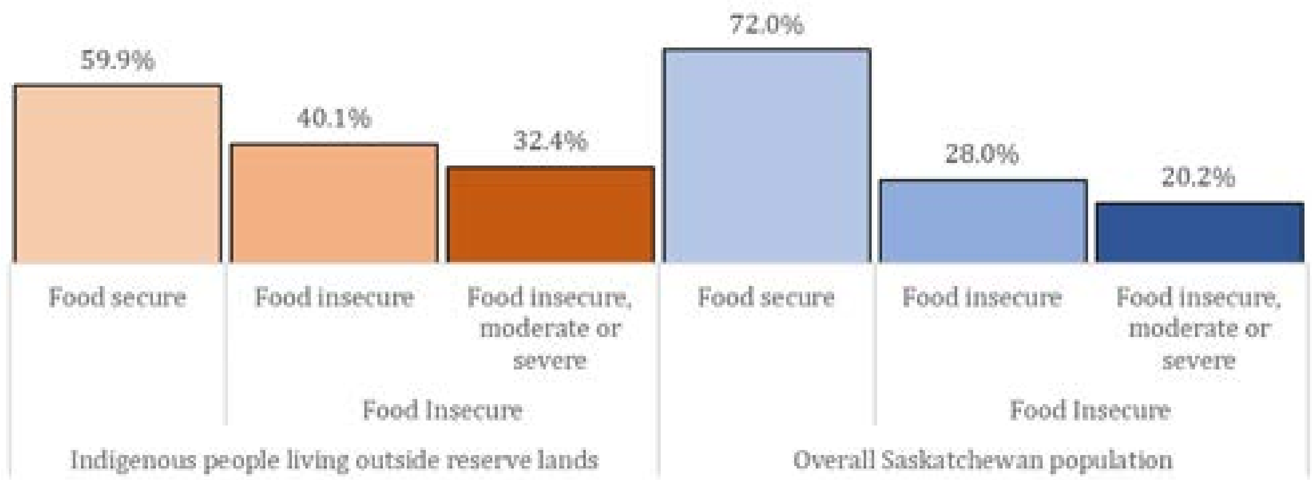
Food insecurity refers to an individual's inability or uncertainty in obtaining or consuming a diet of sufficient quality or quantity [8]. Food insecurity can lead to both poor mental and physical health and increases the need for health care services. Additionally, food insecurity is also linked to increased risk of long-term health issues, such as high blood pressure, hypocholesteremia and diabetes [4, 9]. For children, food insecurity can be especially harmful as it affects their learning and social development, which has lasting effects throughout their lives [8].

The main cause of food insecurity is insufficient household income to buy nutritionally dense and sufficient food. As Indigenous households tend to have a lower-than-average household income and a higher-than-average cost of living (due to living in First Nations communities or in remote areas), food insecurity is particularly common [8]. In the following figure 7.4, marginal food insecurity is defined as worrying about running out of food or experiencing limited food selection due to a lack of money for food. Moderate food insecurity is defined as relying on lower quality and quantity of food due to lack of money for food, and severe food insecurity is defined as missing meals, reducing food intake, and regularly experiencing food shortages that in extreme cases, can last day(s) [10].

In 2022, 40.1% of Indigenous people living outside reserve lands in Saskatchewan were classified as experiencing marginal, moderate or severe food insecurity. More specifically 32.4% experienced moderate or severe food insecurity in 2022. In comparison, 28.0% of the overall Saskatchewan population was classified as food insecure, with 20.2% of the overall Saskatchewan population being categorized as moderately or severely food insecure. Therefore, Indigenous people living outside reserve lands were about 50% more likely to be food insecure and moderately or severely food insecure compared to the general Saskatchewan population in 2022.

Note that the food security section includes only Indigenous people living outside reserve lands in Saskatchewan. As will be seen in the income section, people living in First Nations communities tend to have lower median income than First Nations people living outside reserve lands. Since 99% of Registered or Treaty Indigenous people living in a community in Saskatchewan are First Nations, it can be inferred that food insecurity is worse among people living in First Nations communities compared to the Indigenous people living outside reserve lands in figure 7.4 [11].

Figure 7.4: Income-related household food insecurity among Indigenous people living outside reserve lands and the overall Saskatchewan population, 2022



Source: Statistics Canada, 2022 Canadian Income Survey

In response to the high percentage of food insecurity among First Nations people in Saskatchewan, many communities are leading projects to improve access to food. The next section highlights a successful project led by Muskeg Lake Cree Nation community. These kinds of culturally respectful, community-led initiatives are needed to improve the health and wellbeing of individuals and communities.

MUSKEG LAKE CREE NATION SUCCESS STORY

Muskeg Lake Cree Nation worked together with the Canadian Feed the Children (CFTC), a national non-profit organization, to tackle food insecurity in their community. CFTC supports projects led by communities, focusing on reconnecting people with their traditional practices around food and nutrition, food culture, and agriculture.

Fruit producing tree in the Food Forest, Muskeg Lake Cree Nation

Muskeg Lake Cree Nation started a pilot program called the "Food Forest." The goal was to create a sustainable source of healthy food, such as fruit trees and berries. They also wanted it to be a place of gathering. The Food Forest started in 2018, and after much planning, as of August 2021, they have planted more than 400 different trees and shrubs. They have also built various amenities, including a garden, a gazebo and an outdoor kitchen powered by solar energy. Muskeg Lake Cree Nation held the grand opening in July 2021, and has been providing produce to households in need ever since. Plans for continued expansion, with community involvement and traditional practices, are underway. Council members have also

highlighted the importance of the Food Forest as a teaching tool for sustainable practices and application of the holistic approach [12, 13].

The success of the Food Forest in Muskeg Lake Cree Nation has led to similar initiatives in other communities [12, 13].

Growth of the vegetable garden

HOUSING – OVER ONE IN TWENTY INDIGENOUS HOMES ARE CROWDED

Proper housing and living conditions are necessary for the health and wellbeing of individuals and their families [4]. When homes are crowded, it becomes easier for illnesses to spread [4]. In addition, overcrowding has also been shown to increase the severity of infection. For example during the COVID-19 pandemic, First Nations and Métis living in crowd housing had almost three times the risk of dying from COVID-19 compared to First Nations and Métis in non-crowded houses after controlling for appropriate characteristics [14]. Living within poor housing conditions is also linked with poorer mental health, which may lead to unhealthy coping habits [4]. A crowded dwelling is based on the Persons Per Room (PPR) definition, which defines crowding as more than 1.0 persons per room (referring to all rooms within a dwelling excluding bathrooms, halls, vestibules and rooms used solely for business purposes) [15].

In 2021 in Saskatchewan, Indigenous households[29] were more than twice as likely to be crowded compared to non-Indigenous households. About 5.2% of Indigenous households were crowded, while only 2.1% of non-Indigenous households were crowded (Figure 7.5). The proportion of crowding among Indigenous households in Saskatchewan went down slightly from 6.5% in 2016 to 5.2% in 2021.

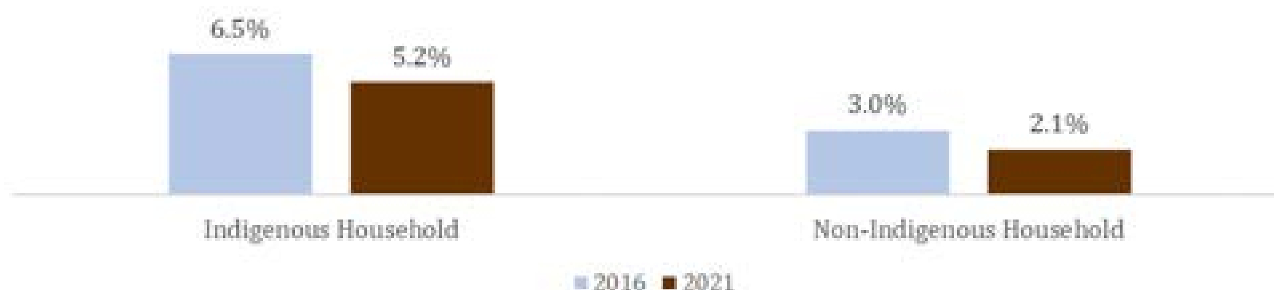
It is important to note that the proportion of crowded households differs significantly compared to the proportion of people living in crowded households. To highlight this difference, 35.7% of status people living in First Nations communities in Canada lived in crowded housing in 2021 based on the 2021 Census of Population [16]. In addition in Saskatchewan, 34.3% of First Nations people living either in community or outside reserve lands lived in crowded housing [16]. Based on other SDOH markers, it can be hypothesized that only among people living in First Nations communities, the proportion is likely higher than 34.3%. While these statistics look at First Nations, and figure 7.5 highlights Indigenous households, 99% of Registered or Treaty Indigenous people living in a community in Saskatchewan are First Nations [11]. It can therefore be reasonably estimated that a large proportion of people living in First Nations communities live in a much smaller proportion of households.

Besides crowding, needing major housing repairs is an important indicator of housing inadequacy, and affects the health of the residents. Issues with the structure of the building related to plumbing, heating, or electrical are examples of major housing deficiencies [4, 17]. In 2021, Indigenous households in Saskatchewan were nearly three times more likely to need major repairs

[29] A non-family or family household where at least 50 percent of the residents, or one spouse or partner self-identified as Indigenous – includes First Nations, Métis or Inuit.

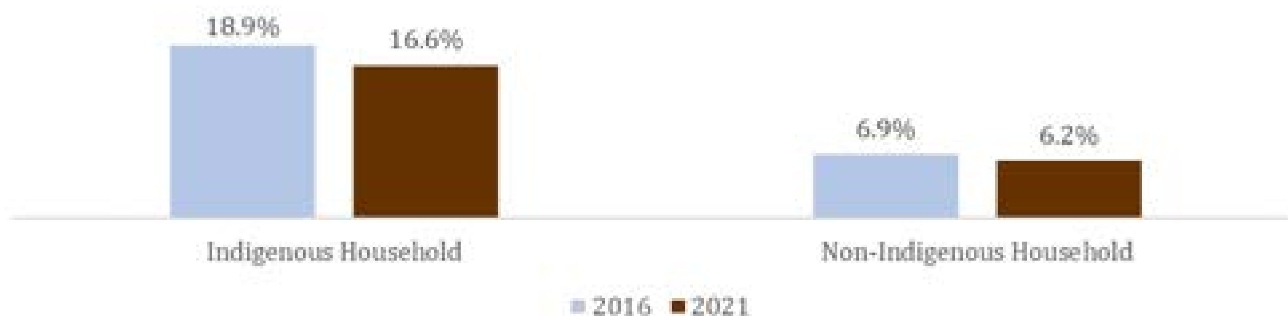
compared to non-Indigenous households. About 16.6% of Indigenous homes needed major repairs, compared to 6.2% of non-Indigenous households. (Figure 7.6). However, the proportion of major repairs required among Indigenous households in Saskatchewan decreased from 18.9% in 2016 to 16.6% in 2021.

Figure 7.5: Crowding among Indigenous and non-Indigenous households in Saskatchewan, 2016 and 2021



Source: Statistics Canada, 2016 and 2021 Census of Population

Figure 7.6: Major repairs needed among Indigenous and non-Indigenous households in Saskatchewan, 2016 and 2021



Source: Statistics Canada, 2016 and 2021 Census of Population

HOUSING SUCCESS STORY

The Canadian Mortgage and Housing Corporation (CMHC) is a federal government organization that plays a key role in Canada's housing. CMHC's main objective is to contribute to the stability, sustainability, and well-being of the Canadian housing market. They do this by offering mortgage insurance, conducting research on housing trends, and supporting affordable housing initiatives. CMHC also provides funding and partnership opportunities to develop, maintain and enhance Indigenous housing through the Rapid Housing Initiative (RHI) [18].

In April 2021, the CMHC provided $17 million to improving housing conditions in First Nations communities in Saskatchewan through RHI. The plan called for immediate construction of 84 affordable homes in First Nations communities in Saskatchewan, including Beardy's and Okemasis First Nation, Big River First Nation, Kahkewistahaw First Nation, Kinistin Saulteaux Nation, Lac La Ronge Indian Band, Muskoday First Nation, Saulteaux First Nation, Waterhen Lake First Nation, and Witchekan Lake First Nation [19]. In May 2023, CMHC added another $12 million to the RHI Project Stream. The money will be used to build 50 new homes in southern First Nations communities in Saskatchewan, including 10 homes in Pasqua First Nation and 10 homes in Piapot First Nation [20]. Likewise in September 2023, the CMHC added an additional $22.9 million to build 117 new affordable homes for Indigenous Peoples living in Saskatchewan, with funding under the RHI. This includes 45 new homes in Onion Lake Cree Nation, 14 mobile home units in Pelican Narrows, and 20 new single-family homes in Clearwater River Dene Nation [21].

EDUCATION – OVER HALF OF ADULTS LIVING IN FIRST NATIONS COMMUNITIES HAVE A HIGH SCHOOL DIPLOMA OR HIGHER

Education is an important SDOH as it is closely related to many other SDOH including income, employment security, and working conditions [4]. In addition, individuals with higher education also tend to have better health outcomes. This is because well-educated individuals tend to be more conscious about their health, have better cognitive and emotional skills, and have healthier relationships with others [22].

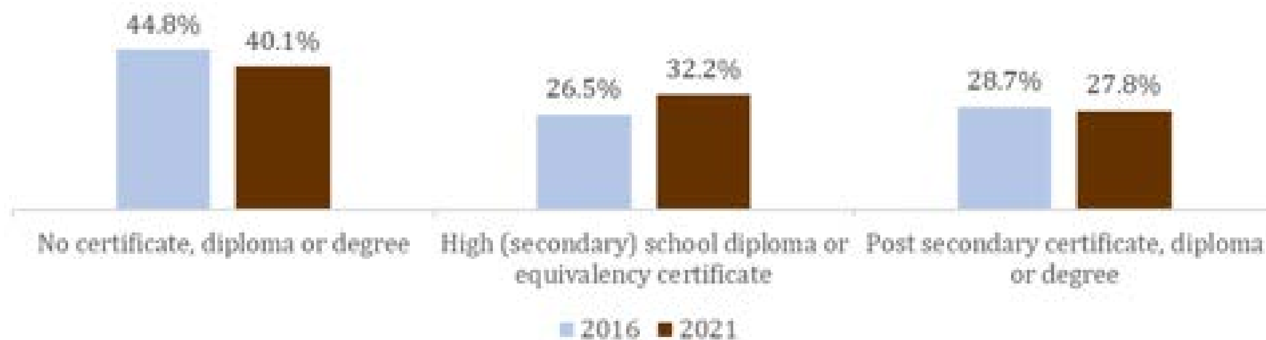
Between 2016 and 2021, more First Nations people aged 25 to 54 years living in First Nations communities in Saskatchewan completed at least their high school diploma (Figure 7.7). From 2016 to 2021, the proportion of individuals with no certificate, diploma or degree decreased from 44.8% to 40.1%, while the proportion with a secondary school diploma increased substantially from 26.4% to 32.2%. Overall between 2016 and 2021, the percentage of people living First Nations communities with at least a high school diploma or equivalent certificate increased from 55.2% to 59.9%.

Even though a higher proportion of people living in First Nations communities received additional education since 2016, the proportions remain lower than First Nations people living outside reserve lands and non-First Nations people in Saskatchewan (Figures 7.8 and Figure 7.9).

In 2021, among First Nations people living outside reserve lands aged 25 to 54 years in Saskatchewan, 76.7% obtained at least a high school or equivalent diploma (Figure 7.8). This is 16.8% higher than people living in First Nations communities.

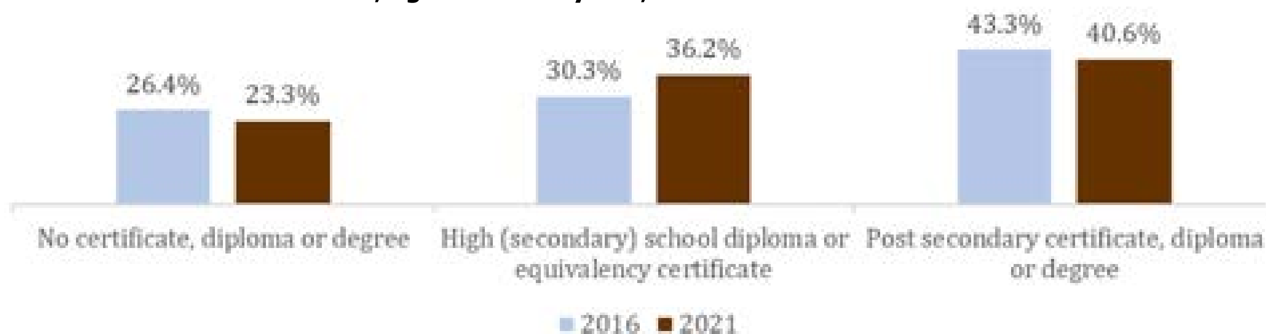
When comparing people living in First Nations communities with non-First Nations people in Saskatchewan, the inequity is even greater. In 2021, among non-First Nations people aged 25 to 54 year-old in Saskatchewan, 93.6% obtained at least a high school (or equivalent) diploma (Figure 7.9). This is 33.6% higher than people living in First Nations communities.

Figure 7.7: Highest certificate, diploma or degree attained among people living in First Nations communities in Saskatchewan, aged 25 to 54 years, 2016 and 2021



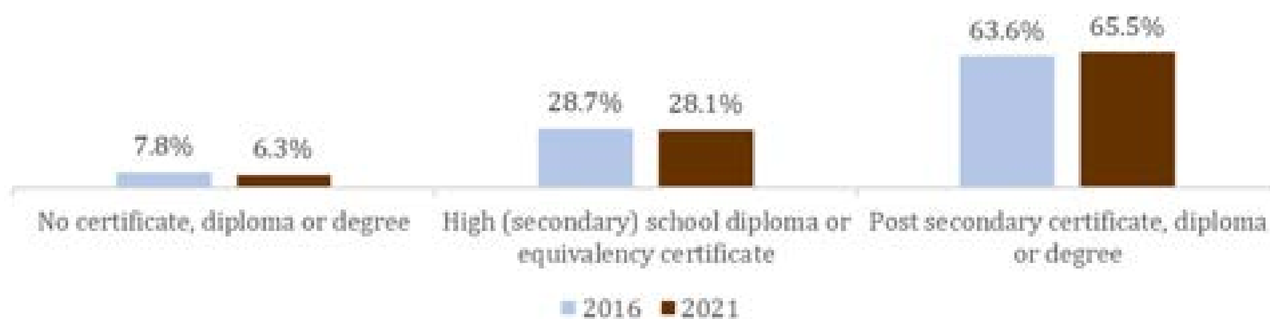
Source: Statistics Canada, 2016 and 2021 Census of Population

Figure 7.8: Highest certificate, diploma or degree attained among First Nations people living outside reserve lands in Saskatchewan, aged 25 to 54 years, 2016 and 2021



Source: Statistics Canada, 2016 and 2021 Census of Population

Figure 7.9: Highest certificate, diploma or degree attained among non-First Nations people in Saskatchewan, aged 25 to 54 years, 2016 and 2021



Source: Statistics Canada, 2016 and 2021 Census of Population

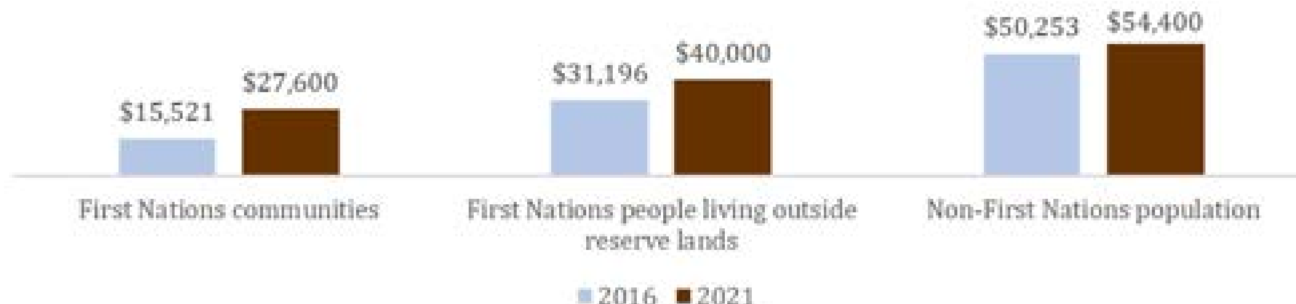
INCOME – NON-FIRST NATIONS PEOPLE HAVE TWICE THE INCOME OF PEOPLE LIVING IN FIRST NATIONS COMMUNITIES

Like education, income is an important SDOH. Income is directly related to living conditions (including food security and housing), which in turn affects physical and mental functioning. In Canada, income has also been shown to be closely linked with several health outcomes, including birthweight, injury, early childhood development, mental wellness, health service utilization, chronic diseases, infectious diseases, mortality, and life expectancy [4].

Between 2016 and 2021, the median income increased by $12,079 (77.8%) in First Nations communities aged 25 to 54 years in Saskatchewan (Figure 7.10). Despite the substantial increase in median income among First Nations communities, income levels remain lower than First Nations people living outside reserve lands, and non-First Nations people in Saskatchewan. In 2021, the median income among people living in First Nations communities aged 25 to 54 years in Saskatchewan was $27,600; whereas the 2021 median income among First Nations living outside reserve lands and non-First Nations people in Saskatchewan was $40,000 and $54,400, respectively.

Despite the decrease in the differences in income between 2016 and 2021, there remains a significant gap in income between First Nations people and non-First Nations people in Saskatchewan. This difference is also seen within the First Nations groups in Saskatchewan, with people living in First Nations communities having a 45% lower median income than First Nations people living outside reserve lands in Saskatchewan. This is also further perpetuated by the average cost of living which is substantially greater than in First Nations communities compared to outside reserve lands [9]. Therefore, the difference in what people can buy with their money is bigger than just the difference in their incomes, further widening health inequities, in particular, among First Nations communities.

Figure 7.10: Median income in First Nations communities, First Nations people living outside reserve lands, and non-First Nations people in Saskatchewan, aged 25 to 54 years, 2016 and 2021



Source: Statistics Canada, 2016 and 2021 Census of Population

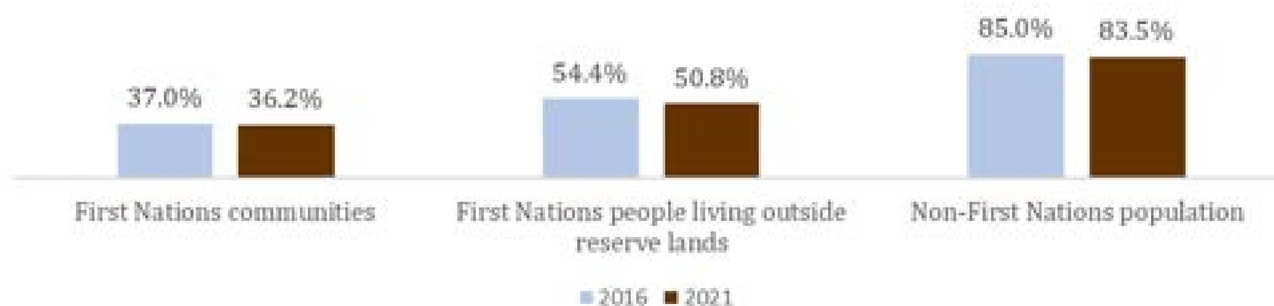
EMPLOYMENT – ONLY ONE IN THREE PEOPLE LIVING IN FIRST NATIONS COMMUNITIES ARE EMPLOYED

An individual's employment status affects their financial status, self-identity, and the relationships they develop. Lack of employment is linked with poor health, including physical and mental health issues such as depression and anxiety. This can occur through social isolation and feeling stressed, as well as the adoption of unhealthy ways of coping [4]. Research has shown that women, people from ethnic minorities, those with disabilities and those with low educational attainment are more likely to work low-paying jobs [4].

From 2016 to 2021, the employment rate slightly decreased from 37.0% to 36.2% among people living in First Nations communities aged 25 to 54 years in Saskatchewan (Figure 7.11). The First Nations communities also experienced much lower employment rates compared to First Nations people living outside reserve lands and non-First Nations people in Saskatchewan. In 2021, the employment rate among First Nations communities was 14.6% and 47.3% lower than First Nations people living outside reserve lands, and non-First Nations people, respectively.

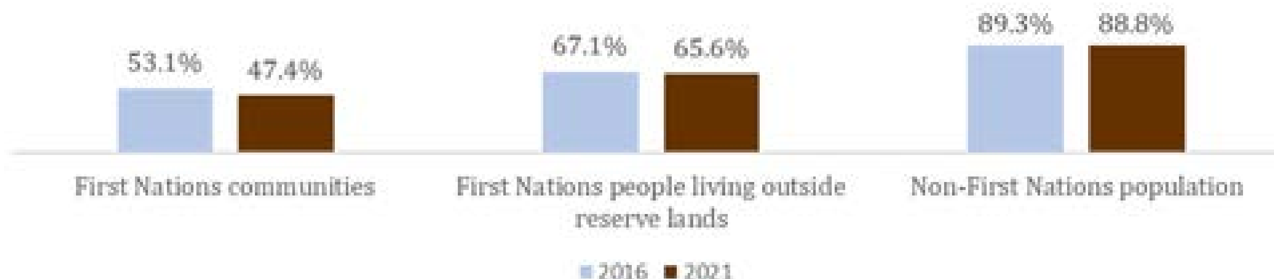
Likewise to the employment rate, from 2016 to 2021, the percentage of people that are either employed or actively looking for work (also termed, the participation rates)[30] also decreased for all groups in Saskatchewan. Among people living in First Nations communities aged 25 to 54 years, participation rates between 2016 and 2021 decreased from 53.1% to 47.4% (Figure 7.12). And again, First Nations communities experienced significantly lower participation rates compared to First Nations people living outside reserve lands, and non-First Nations people in Saskatchewan. In 2021, the participation rate among First Nations communities was 18.2% and 41.4% lower than First Nations people living outside reserve lands, and non-First Nations people, respectively.

Figure 7.11: Employment rates in First Nations communities, First Nations people living outside reserve lands, and non-First Nations people in Saskatchewan, aged 25 to 54 years, 2016 and 2021



Source: Statistics Canada, 2016 and 2021 Census of Population

Figure 7.12: Participation rates in First Nations communities, First Nations people living outside reserve lands, and non-First Nations people in Saskatchewan, aged 25 to 54 years, 2016 and 2021



Source: Statistics Canada, 2016 and 2021 Census of Population

[30] Participation rate is defined as the percentage of the working age (age 15 and older, however, figure 7.12 includes ages 25 to 54 years) population that is either employed or actively looking for work.

ADVERSE CHILDHOOD EXPERIENCES

Adverse Childhood Experiences (ACEs) are traumatic experiences that happen during childhood, such as physical and emotional violence, abuse, neglect, and overall household dysfunction. ACEs are common, with about 64% of adults having experienced at least one ACE, and one in six adults having experienced four or more ACEs in the United States [23]. ACEs happen more to some groups of people, with ACEs being linked to historical, social, and economic environments in which a child is raised. Unfortunately, historical, and ongoing inequities faced by First Nations families makes it more likely for them to experience ACEs. Additionally, it is hypothesized that ACEs experienced by previous generations can negatively affect the biology of current generations [24]. ACEs are known to increase the risk of many chronic health problems, mental illness, and substance abuse problems in adolescence and adulthood, especially if individuals been through more than four ACEs before they turn 18 years of age [23]. However, having positive outlets that promote resilience, such as being involved in Indigenous youth, cultural, or social extracurriculars, can help mitigate the increased risk to co-morbidities [24]. More work is needed to understand the true impact of ACEs within First Nations families to best address, and to help prevent ACEs in the future.

INTERSECTIONALITY – CRUCIAL FOR MORE TARGETED IMPROVEMENTS

The health of an individual or a community is affected by a combination of social factors. The SDOH are interconnected, and when they overlap, they may lead to different health outcomes among individuals and communities. Because these social factors interact with each other, looking at several factors at the same time can help us better understand health inequities between certain groups and social characteristics. By studying how different social factors overlap in First Nations communities, more targeted and effective ways to help improve the health of First Nations communities can be discovered.

CONCLUSIONS

The First Nations people living in Saskatchewan continue to face health disparities compared to the general Saskatchewan population. This is especially true for people living in First Nations communities (as described in COVID-19, communicable diseases, syphilis, environmental indicators, and drug toxicity chapters). There are SDOH contributing to these health disparities that are specific to the Indigenous population including colonization, racism, and experiences with residential school, as well as inequities in housing, education, income, and food security. As noted throughout the chapter, some positive trends have been observed with improvements in housing conditions, educational attainment, and median income since 2016. Additionally, the gap in educational attainment, and median income between First Nations communities and non-First Nations people has also decreased. However, between 2016 and 2021 there was a decrease in employment and participation rates for all groups. Note that there are many other SDOH that are not captured in the census such as access to healthcare and mental health services, neighbourhoods and physical environments, gender and more. It is evident from the report that there are many areas that require further public health action, as well as community-led, culturally-safe initiatives to reduce the health inequities faced by Indigenous Peoples. Addressing SDOH is as important as addressing more traditional access to care.

APPENDIX

Data Sources

1. Canadian Income Survey, Statistics Canada, 2022
   - Statistical data provided for food insecurity among First Nations people living outside reserve lands in Saskatchewan.

2. Census of population, Statistics Canada, 2016 and 2021
   - A statistical portrait of Canada is provided in terms of language, housing, education, income and employment.
   - Further information on the data source and quality can be accessed via the reference guides [25, 26].

Approach to Data Analysis

Most data from the Census of Population of Canada are in terms of population counts in each category.

To calculate the proportion, the following formula was used, with employment rate in First Nations communities in 2021 as an example:

$$\frac{\text{Number of people aged 25 to 54 living in First Nations communities who are employed}}{\text{Total population aged 25 to 54 living in First Nations communities}} x100\%$$

Data Limitations

- SDOH data was not available on racism, colonization and experiences with residential schools.
- As food security data was not specifically available for First Nations communities in Saskatchewan, and not available for all First Nations people. Instead, data for Indigenous households outside reserve lands in Saskatchewan was available and used. Similarly, housing data was also not specifically available for First Nations communities' households in Saskatchewan, or available for all First Nations households. Therefore, data for Indigenous households in Saskatchewan were used. As a result, the food security and housing results presented in this chapter may not be representative of First Nations communities in Saskatchewan.
- For the food security data, the overall Saskatchewan population includes the Indigenous people living outside reserve lands.
- Residual confounding may have occurred as some continuous SDOH indicators (i.e. educational attainment) were collapsed into discrete categories.
- Detailed limitations of the census data (2016 and 2021) are outlined in their reference guides [25, 26].

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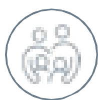
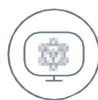
First Nations Health Status Report

2024  

Saskatchewan Region
Chapter 8: Drug Toxicity

DRUG TOXICITY

Drug toxicity refers to the diverse array of adverse effects that are brought about through substance use [1]. There are two categories of drug toxicity, acute and chronic drug toxicity. In this report, the focus will be on acute drug toxicity, specifically confirmed deaths caused by drug toxicity each year in Saskatchewan, with an emphasis on First Nations people. Acute drug toxicity, often referred to as drug overdose or drug poisoning, occurs shortly after a person knowingly or mistakenly ingests a higher dose of a substance than their body can manage [2].

The drug toxicity data in this chapter comes from the Saskatchewan Coroners Services and uses the Ministry of Justice determination of First Nations identity which differs from ISC determination. Coroners speak to the family members and collects demographic information such as the deceased person's name, address, date of birth, marital status, race, etc. The coroners also look for treaty cards and discuss with the Royal Canadian Mounted Police and healthcare professionals who may have additional information. The coroners service does not distinguish between status and non-status First Nations, nor does it distinguish between who lived in First Nations communities and who lived off reserve lands. "Status" First Nations refers to people who are registered to a First Nations band. For the ISC definition of population counts, refer to the definition in chapter 1: demographics.

Note that the drug toxicity deaths reported in this report (death counts and rates) only represent a fraction of all those affected as shown in Figure 8.1 [3]. That is because not all instances of drug toxicity are fatal.

Figure 8.1. Drug toxicity injury pyramid representing the varying levels of health care sectors demands

Over the past decade, the drug toxicity crisis has been predominately considered as the opioid crisis, given that the majority of drug toxicity deaths involved opioids, particularly fentanyl [4]. However, in the last couple of years, the crisis has escalated and become increasingly complex. Among the factors contributing to the escalation of the crisis has been the mixing of other substances in the illegal drug supply, in particular stimulants and benzodiazepines and its analogues [5, 6]. The mixing of substances, also known as polysubstance, has become a regular occurrence

HIGHLIGHTS

- Between 2016 and 2023, there were 2075 drug toxicity deaths reported in Saskatchewan, of which, 46% (952) were among First Nations people.
- In recent years, the opioid crisis has shifted towards a polysubstance crisis.
- First Nations people had a higher proportion of polysubstance toxicity deaths compared to non-First Nations people, with the proportion increasing significantly since 2020.
- In 2023, the rate of opioid toxicity deaths among First Nations people was six times greater than the non-First Nations population in Saskatchewan.
- On average between 2016 and 2023, First Nations males had a higher rate of opioid toxicity deaths than First Nations females.
- The gap in opioid toxicity rates between First Nations and non-First Nations populations widened from 2016 to 2023, especially among females, who had around an eight times higher rate of death compared to non-First Nations females in 2023.
- From 2021 to 2023, most opioid toxicity deaths among First Nations people occurred in the 20 to 39 year age group.
- For First Nations people, the rates of drug toxicity deaths involving stimulants and benzodiazepines have increased significantly since 2020.

rather than the exception among people who use substances [7, 8]. In the past couple of years in Canada, most drug toxicity deaths involve polysubstance use, and the opioid crisis has progressed into a polysubstance crisis [6, 8].

DRUG TOXICITY DEATHS IN SASKATCHEWAN

In Saskatchewan, 2075 confirmed drug toxicity deaths were reported between 2016 and 2023. Confirmed drug toxicity deaths are deaths that have been investigated and closed by the Saskatchewan Coroners Service with the cause of death determined as drug toxicity. Drug toxicity deaths increased from 2020 onward, with a peak of 406 confirmed deaths in 2021 (Figure 8.2). Most of these deaths (90%) were due to accidental drug toxicity.

In 2023, 18% of drug toxicity deaths are deemed suspect and had not yet been confirmed when the data was extracted. All figures in the remainder of this chapter only include "confirmed" drug toxicity deaths. Therefore, the drug toxicity deaths for 2023 are likely slightly underestimated.

Between 2016 and 2023, there was a total of 952 confirmed drug toxicity deaths among First Nations people (Figure 8.3). The count of drug toxicity deaths increased over the time period, peaking in 2021 with 198 confirmed deaths. The majority of the deaths were accidental, with 95% falling into this manner of death.

Figure 8.2: Count of suspected and confirmed drug toxicity deaths by manner of death in Saskatchewan, 2016 – 2023[31]

	2016	2017	2018	2019	2020	2021	2022	2023
Suspected	0	0	0	0	0	0	8	83
Undetermined	S	8	6	S	S	8	S	S
Homicide	0	0	0	0	0	0	0	0
Suicide	13	16	32	21	18	16	26	19
Accident	92	96	147	155	306	382	336	363

Source: Saskatchewan Coroners Service, Ministry of Justice, Government of Saskatchewan (2016 – 2023)

Figure 8.3: Count of drug toxicity deaths by manner of death among First Nations people in Saskatchewan, 2016 – 2023

	2016	2017	2018	2019	2020	2021	2022	2023
Undetermined	S	S	S	S	S	S	0	S
Homicide	0	0	0	0	0	0	0	0
Suicide	S	0	5	8	S	6	S	6
Accident	38	41	53	69	145	190	180	190

Source: Saskatchewan Coroners Service, Ministry of Justice, Government of Saskatchewan (2016 – 2023)

[29] S: Number of reported cases are less than 5, thus suppressed

WHY ARE WE CONCERNED WITH POLYSUBSTANCE TOXICITY

Polysubstance use refers to using multiple classes of drugs at the same time. However, people who use drugs may not be using multiple drugs intentionally [9]. Although there are many definitions of polysubstance use, this report looks at the combinations of the three most common classes of substances aside from alcohol observed in Saskatchewan mortality data. The three substances are opioids, stimulants, and benzodiazepines and its analogues. While people who use drugs may combine drug classes for a variety of reasons or be unaware of an additive in the drugs they use, polysubstance use is particularity dangerous because the combined effect leads to an unpredictable response [10]. Since the onset of the COVID-19 pandemic, there has been a large increase in substance-related hospitalizations and deaths in Canada [10, 11]. This increase has been driven by a more toxic and unpredictable drug supply, increased feelings of isolation, stress, anxiety, depression, as well as reduced access to health and social services, including life-saving harm reduction and treatment programs, and polysubstance use. Polysubstance has become standard practice rather than the exception among people who use substances [7, 8]. In 2022 across Canada, 56% of accidental apparent opioid toxicity deaths involved a stimulant, and 78% of accidental apparent stimulant toxicity deaths involved an opioid [6]. Additionally, benzodiazepines and their analogues have been increasingly identified in the unregulated drug supply [12]. These facts highlight the polysubstance crisis in Canada [6, 8].

In this report, the cause of death due to a drug toxicity can be from a single, or a combination of drugs (polysubstance use). Therefore, when discussing opioids, stimulants or benzodiazepines, many of the drug toxicity deaths involve multiple drug groups. Between 2016 and 2023 among First Nations people in Saskatchewan, on average, 61% of drug toxicity deaths involved multiple drug classes (Figure 8.4). However, the proportion increased significantly compared to the pre-pandemic years. On average in the pre-pandemic years (2016 to 2019), the proportion of drug toxicity deaths involving polysubstance use was 46%, which compares to 77% on average during 2020 to 2023. The proportion peaked in 2023 with 85% of all drug toxicity deaths involving polysubstance use. This suggests that polysubstance use is a major driver of the large increase of drug toxicity deaths among First Nations people in Saskatchewan. Additionally, a higher proportion of drug toxicity deaths among First Nations people in Saskatchewan involved polysubstance use, compared to non-First Nations people.

At the beginning of this time period, in particular between 2016 and 2019, there were not many polysubstance drug toxicity deaths among First Nations people in Saskatchewan (Figure 8.5). During this period, the majority of polysubstance deaths that occurred were due to a combination of opioids and stimulants. However in 2020, the trend began to shift towards polysubstance deaths involving benzodiazepines and its analogues. Between 2021 and 2023, the majority of polysubstance toxicity deaths involved a combination of all three classes of substances discussed in the report, and peaked in 2023 with 122 deaths. Interestingly, it is important to note that benzodiazepines and its analogues are not typically involved in drug toxicity deaths when used on their own, or when mixed with stimulants. The majority of benzodiazepine and analogue toxicity deaths involved concurrent opioid use.

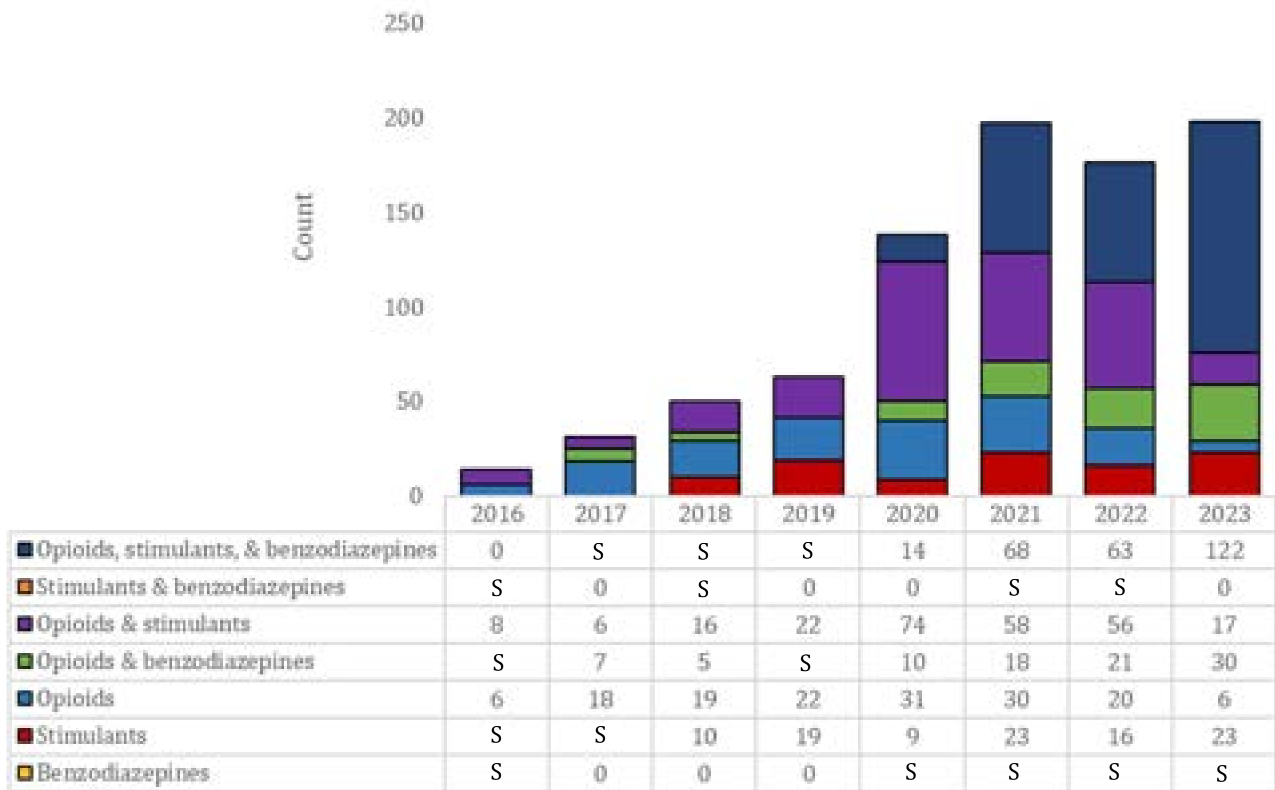
Among First Nations people in Saskatchewan, there has been a clear rise in the number and proportion of deaths involving polysubstance use (Figure 8.6). From 2016 to 2023, the rate of these deaths significantly increased from 7.8 deaths per 100,000 population in 2016, to 96.3 deaths per 100,000 population in 2023. While a similar upward trend has also been observed among the non-First Nations population, the rates were much lower, increasing from 1.5 deaths per 100,000 population in 2016 to 13.8 deaths per 100,000 population in 2023. Therefore, the gap in polysubstance toxicity death rates increased between First Nations and the non-First Nations population in Saskatchewan over the period. In 2016, First Nations people had about a five times greater rate of polysubstance toxicity deaths compared to the non-First Nations population, but this increased to around eight times greater by 2020.

Figure 8.4: Proportion of drug toxicity deaths that involve polysubstance use among First Nations and Non-First Nations populations in Saskatchewan, 2016 – 2023

	2016	2017	2018	2019	2020	2021	2022	2023
First Nations	60%	39%	46%	40%	71%	73%	78%	85%
Non-First Nations	45%	34%	39%	41%	48%	67%	62%	79%

Source: Saskatchewan Coroners Service, Ministry of Justice, Government of Saskatchewan (2016 – 2023)

Figure 8.5: Count of drug toxicity deaths involving opioids, stimulants, benzodiazepines and analogues, and polysubstance use among First Nations people in Saskatchewan, 2016 – 2023



	2016	2017	2018	2019	2020	2021	2022	2023
Opioids, stimulants, & benzodiazepines	0	S	S	S	14	68	63	122
Stimulants & benzodiazepines	S	0	S	0	0	S	S	0
Opioids & stimulants	8	6	16	22	74	58	56	17
Opioids & benzodiazepines	S	7	5	S	10	18	21	30
Opioids	6	18	19	22	31	30	20	6
Stimulants	S	S	10	19	9	23	16	23
Benzodiazepines	S	0	0	0	S	S	S	S

Source: Saskatchewan Coroners Service, Ministry of Justice, Government of Saskatchewan (2016 – 2023)

Figure 8.6: Rates of polysubstance toxicity deaths with breakdown by First Nations and non-First Nations populations in Saskatchewan and rate ratio, 2016 – 2023

	2016	2017	2018	2019	2020	2021	2022	2023
First Nations	7.8	8.9	15.7	16.6	59.7	87.0	82.5	96.3
Non-First Nations	1.5	2.1	4.0	3.8	7.3	12.9	10.3	13.8
Rate ratio	5.3	4.2	3.9	4.4	8.2	6.7	8.0	7.0

Source: Saskatchewan Coroners Service, Ministry of Justice, Government of Saskatchewan (2016 – 2023)

WHY ARE WE CONCERNED ABOUT ACUTE OPIOID TOXICITY

Opioids are a class of drug typically used to manage moderate to severe pain. They are also used because opioids produce feelings of euphoria. In high doses, opioids can cause difficulty breathing, dizziness and confusion, coma and death [13, 14]. There are over 100 types of opioids with varying strength [15].

Since national surveillance began in 2016, Canada has reported a significant increase in opioid toxicity deaths [4]. Between 2016 and 2023, the rate of opioid toxicity deaths increased by 171% nationwide and 248% in Saskatchewan [32] [4]. Additionally in 2023, Saskatchewan had the fourth-highest rate of opioid-related hospitalizations in Canada, with 22.9 hospitalizations per 100,000 population, 11% higher than the national rate of 20.7 hospitalizations per 100,000 population [4]. The rise in opioid toxicity is driven by the increased availability of illegally sourced opioids, especially fentanyl [11, 16, 17]. Fentanyl and its analogues are responsible for most opioid drug toxicity deaths and are the most commonly detected opioid among drug seizures by law enforcement in Canada [11].

OPIOID TOXICITY DEATHS: COUNTS, PROPORTIONS, AND RATES

Of the 2075 drug toxicity deaths between 2016 and 2023 in Saskatchewan, 1640 (79%) of the deaths involved opioids (Figure 8.7). The proportion of opioid toxicity deaths increased slightly since 2020 to 83% and has remained relatively stable since then.

Of the 1640 opioid toxicity deaths in Saskatchewan, 800 (49%) were among First Nations people. Between 2016 and 2023, opioid toxicity deaths among the First Nations population rose from 32 in 2016 to a high of 170 in 2021, and then to 166 in 2023 – five times higher than in 2016 (Figure 8.8). Additionally, the COVID-19 pandemic disproportionately impacted the First Nations population, with the proportion of opioid toxicity deaths steadily increasing. In 2019, before the pandemic, First Nations people accounted for 46% of opioid toxicity deaths, rising to 53% by 2023.

Between 2016 and 2023, the rate of opioid toxicity deaths among First Nations people in Saskatchewan rose significantly from 20.8 deaths per 100,000 population in 2016, to 94.6 deaths per 100,000 population in 2023, reaching its highest point in 2021 at 102.0 deaths per 100,000 population (Figure 8.9). While the non-First Nations population also saw an increase, it was at a lower rate (5.4 deaths per 100,000 in 2016 to 15.1

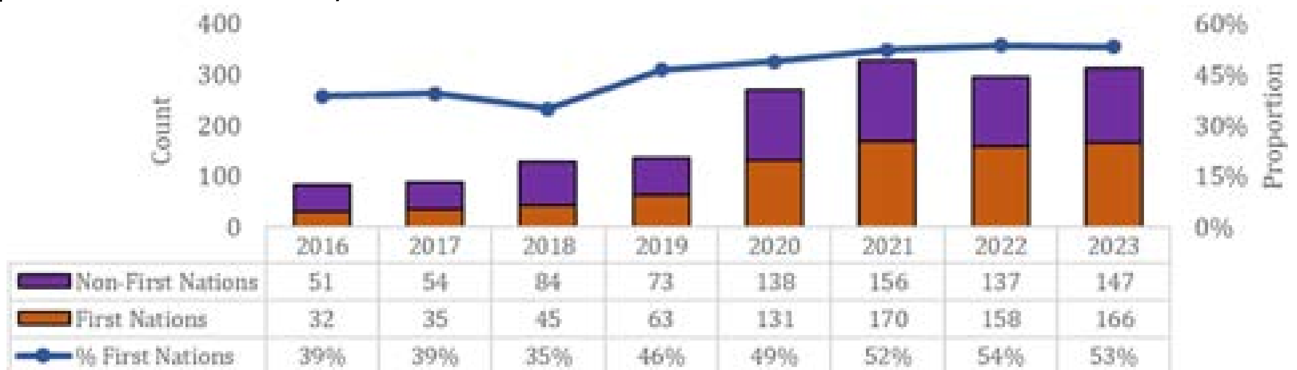
[32] Note that the slightly different percentage increase compared to Figure 8.3 could be due to the data being pulled from the Saskatchewan Coroner's Service at different times.

deaths per 100,000 in 2023). As a result, the gap between the two groups widened. In 2016, the First Nations people had an opioid toxicity death rate about four times higher compared to the non-First Nations population, increasing to roughly six times higher by 2023.

Figure 8.7: Counts of opioid and all drug toxicity deaths, and proportion of deaths that involve opioid drugs in Saskatchewan, 2016 – 2023

Source: Saskatchewan Coroners Service, Ministry of Justice, Government of Saskatchewan (2016 – 2023)

Figure 8.8: Counts and proportion of opioid toxicity deaths by First Nations and non-First Nations populations in Saskatchewan, 2016 – 2023



Source: Saskatchewan Coroners Service, Ministry of Justice, Government of Saskatchewan (2016 – 2023)

Figure 8.9: Rates of opioid toxicity deaths with breakdown by First Nations and non-First Nations populations in Saskatchewan and rate ratio, 2016 – 2023

Source: Saskatchewan Coroners Service, Ministry of Justice, Government of Saskatchewan (2016 – 2023)

OPIOID TOXICITY DEATHS: AGE AND SEX

Of the 800 opioid toxicity deaths among First Nations people from 2016 to 2023, males accounted for 452 (57%) and females 348 (43%) of deaths (Figure 8.10). The proportion of deaths among males increased over this period, from 47% in 2016 to 61% in 2023. Interestingly, this is quite different from the Canadian figures, where in 2023, the proportion of opioid toxicity deaths in males was 72% [4].

From 2016 to 2018, the rate of opioid toxicity deaths was similar for First Nations males and females. However, from 2020 to 2023, the rate of opioid toxicity deaths was greater among First Nations males compared to First Nations females (Figure 8.11). In 2023, the rate of opioid toxicity deaths among First Nations females was around seven times greater than non-First Nations females, while First Nations males had rates around five times higher than non-First Nations males. Over this period, the gap in opioid toxicity death rates between First Nations and non-First Nations people has widened significantly, with the disparity being most pronounced among females.

Among accidental opioid toxicity deaths between 2021 and 2023, the largest proportion of deaths were among those aged 20 to 39 years (51%), followed by 40 to 59 years (41%), 60 plus years (5%), and lastly, the 0 to 19 years (3%) (Figure 8.12).

Figure 8.10: Sex-specific counts and proportion of opioid toxicity deaths among First Nations people in Saskatchewan, 2016 – 2023

	2016	2017	2018	2019	2020	2021	2022	2023
Female	17	17	28	31	52	75	63	65
Male	15	18	17	32	79	95	95	101
Male proportion	47%	51%	38%	51%	60%	56%	60%	61%

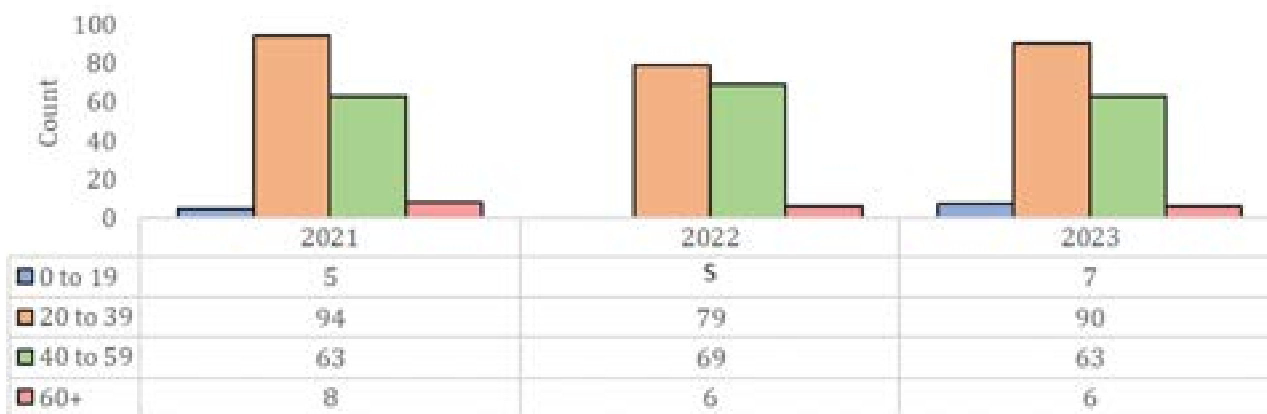
Source: Saskatchewan Coroners Service, Ministry of Justice, Government of Saskatchewan (2016 – 2023)

Figure 8.11: Sex-specific rates of opioid toxicity deaths breakdown by First Nations and non-First Nations populations in Saskatchewan, 2016 – 2023

	2016	2017	2018	2019	2020	2021	2022	2023
Female FN	21.9	21.4	34.7	37.8	62.6	88.7	72.7	73.0
Female Non-FN	4.4	4.8	6.3	4.6	8.5	7.2	8.4	9.4
Male FN	19.8	23.2	21.6	40.0	97.6	115.6	112.7	116.7
Male Non-FN	6.4	6.6	11.4	10.7	20.3	25.2	19.9	20.9
Female Rate Ratio	4.9	4.4	5.5	8.2	7.4	12.3	8.6	7.7
Male Rate Ratio	3.1	3.5	1.9	3.7	4.8	4.6	5.7	5.6

Source: Saskatchewan Coroners Service, Ministry of Justice, Government of Saskatchewan (2016 – 2023)

Figure 8.12: Age-specific counts of accidental opioid toxicity deaths in First Nations people in Saskatchewan, 2021 – 2023



	2021	2022	2023
0 to 19	5	5	7
20 to 39	94	79	90
40 to 59	63	69	63
60+	8	6	6

Source: Saskatchewan Coroners Service, Ministry of Justice, Government of Saskatchewan (2021 – 2023)

OPIOID TOXICITY DEATHS: DRUG TYPE

Opioid drugs can be categorized into three main types: natural opioids; semi-synthetic opioids; and high-potency synthetic opioids [18]. High-potency synthetic opioids, like fentanyl and its analogues, are more powerful than most naturally occurring opioids. For instance, fentanyl is a very powerful pain reliever and is 100 times more potent than morphine. Fentanyl has become widely used because it is relatively inexpensive to produce as a street drug, compared to other opioids. One of the main reasons why fentanyl and its analogues may be frequently found among drug toxicity deaths is because it is consumed in unpredictable quantities. Often times, fentanyl and its analogues are unknowingly mixed in other substances, causing the user to take a much higher dose than intended [19]. When combined with characteristics such as its potency, and its odourless and

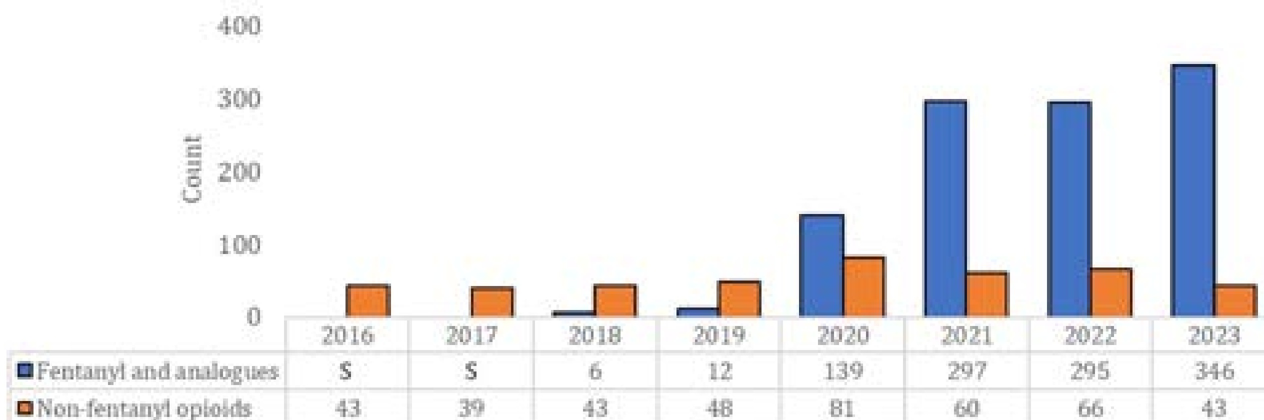
tasteless characteristics, it often results in users consuming unpredictable amounts of opioids, leading to accidental drug toxicity [3]. This is also an issue within the fentanyl analogues. An analogue such as carfentanil is up to 100 times more potent than regular fentanyl. If a user is used to consuming regular fentanyl and understands the dose typically consumed, having an analogue like carfentanil mixed in results in an unpredictable dose and a much higher likelihood of drug toxicity [20]. In contrast, natural opioids, such as morphine and codeine, are less potent and carry a lower risk of acute drug toxicity as the amount consumed is often more predictable [18].

The data on opioids identified in opioid toxicity deaths show that multiple drugs can be detected in a single case (Figure 8.13 A-C), so adding the counts would overestimate the burden of each opioid drug. For instance, methadone, a long-lasting opioid, often used as a to treat opioid dependency by preventing cravings without causing a high, is sometimes found in deaths involving shorter-acting opioids like fentanyl [138]. Therefore, drug toxicity deaths involving methadone likely involved other shorter-lasting opioids.

Among First Nations people in Saskatchewan, non-fentanyl opioids were identified in most opioid drug toxicity deaths between 2016 and 2019 (Figure 8.12 A). Methadone and hydromorphone were the most frequently identified non-fentanyl opioids during this time (Figure 8.12 B). Since 2020, many opioid toxicity deaths began involving fentanyl and its analogues, with the most frequently detected fentanyl analogues in 2023 being fentanyl and para-fluorofentanyl.

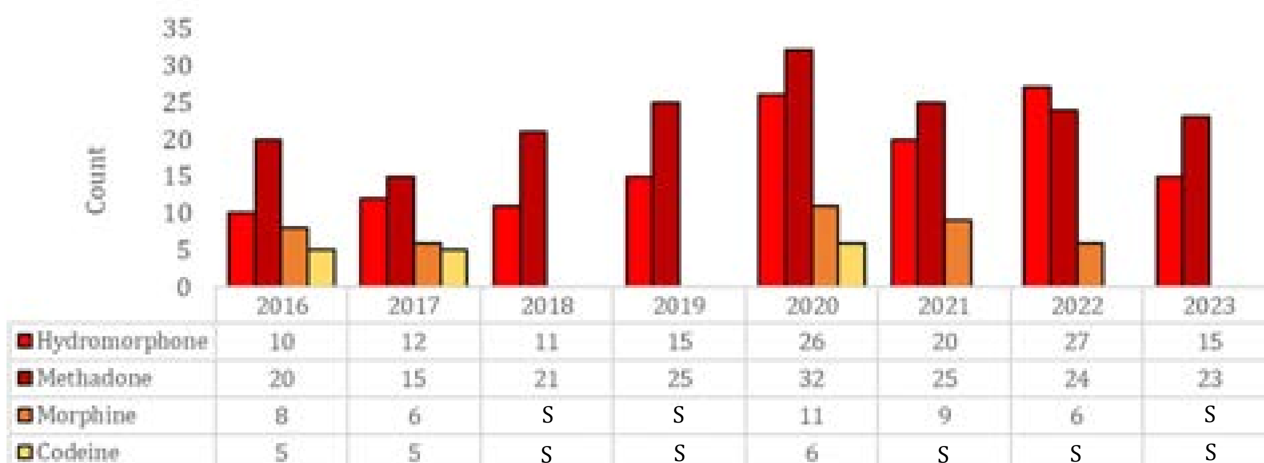
Prior to the COVID-19 pandemic years of 2016 to 2019, only a very small proportion of drug toxicity deaths involving opioids included fentanyl and its analogues (Figure 8.14). However, the proportion increased dramatically in 2020, and increased to a peak of 87% of all opioid toxicity deaths involving fentanyl and its analogues.

Figure 8.13 A: Most commonly detected opioid classes in drug toxicity deaths among First Nations people in Saskatchewan, 2016 – 2023



	2016	2017	2018	2019	2020	2021	2022	2023
Fentanyl and analogues	S	S	6	12	139	297	295	346
Non-fentanyl opioids	43	39	43	48	81	60	66	43

Figure 8.13 B: Non-fentanyl opioids detected (top 4 most frequently detected) in drug toxicity deaths among First Nations people in Saskatchewan, 2016 – 2023



	2016	2017	2018	2019	2020	2021	2022	2023
Hydromorphone	10	12	11	15	26	20	27	15
Methadone	20	15	21	25	32	25	24	23
Morphine	8	6	S	S	11	9	6	S
Codeine	5	5	S	S	6	S	S	S

Figure 8.13 C: Fentanyl and analogues detected in drug toxicity deaths among First Nations people in Saskatchewan, 2016 – 2023

	2016	2017	2018	2019	2020	2021	2022	2023
Fentanyl	S	S	5	10	74	140	116	138
Acetyl fentanyl	0	0	0	S	61	106	80	73
Para-fluorofentanyl	0	0	0	0	0	43	57	130
Carfentanil	0	S	S	S	S	8	42	5

Source: Saskatchewan Coroners Service, Ministry of Justice, Government of Saskatchewan (2016 – 2023)

Figure 8.14: Count and proportion of opioid toxicity deaths where fentanyl and fentanyl analogues were detected among First Nations people in Saskatchewan, 2016-2023

	2016	2017	2018	2019	2020	2021	2022	2023
Fentanyl and analogues	S	S	8	11	77	141	123	145
Fentanyl proportion	6%	6%	18%	17%	59%	83%	78%	87%

Source: Saskatchewan Coroners Service, Ministry of Justice, Government of Saskatchewan (2016 – 2023)

TREATMENT FOR OPIOID TOXICITY

Naloxone is a fast-acting drug that temporarily reverses the effects of opioid toxicity. Opioid drugs can cause breathing to slow, and in high quantities, can cause unconsciousness and death. Naloxone works by displacing the opioids from the receptors in the brain, allowing the user to breathe again. However, naloxone only works for 30 to 120 minutes after being administered, while the effects of opioids typically last much longer. Repeated doses of naloxone should be given if the initial dose does not restore breathing within two to three minutes [22].

Take home injectable naloxone kits are available for free through the Take Home Naloxone (THN) Program. Saskatchewan residents who are at risk or who may witness a drug toxicity event, are able to receive free training and a free THN kit. However, nasal naloxone, a more easily administered form of naloxone, is not subsidized for the general Saskatchewan population, unlike in Ontario and Quebec. However, nasal naloxone is available at no cost through the Non-Insured Health Benefits (NIHB) federal program to status First Nations and Inuit when prescribed or recommended by a pharmacist [23]. Naloxone is also able to be purchased at pharmacies across Saskatchewan without a prescription [24].

Additionally, there are treatment options for people who use opioids. Opioid Agonist Therapy (OAT) is used when people have an opioid dependence to help reduce or discontinue opioid use. These medications reduce withdrawal symptoms, and cravings. These treatments

include methadone, and buprenorphine/naloxone [24].

WHY ARE WE CONCERNED WITH STIMULANTS

Stimulants are drugs that speed up the central nervous system (brain), increasing energy, alertness and wakefulness [25, 26]. In 2022, stimulants were involved in 63% of all apparent opioid toxicity deaths in Canada [6]. Between 2018 and 2023, the rate of stimulant toxicity deaths increased by 86% in Canada and 209% in Saskatchewan. In 2023, Saskatchewan had the second highest rate of stimulant toxicity deaths across Canada, with a rate of 22.3 deaths per 100,000 population, which was 59% greater than the national rate of 14.0 deaths per 100,000 population. In Canada, most stimulant-related toxicity deaths involve illegal stimulants like cocaine, and methamphetamine [6].
Between 2016 and 2023, the rate of drug toxicity deaths involving stimulants among First Nations people in Saskatchewan had significantly increased from 6.5 deaths per 100,000 in 2016, to 92.3 deaths per 100,000 population in 2023 (Figure 8.15). The upward trend was also observed among the non-First Nations population but at a lower rate (1.6 deaths per 100,000 population in 2016, and 13.8 deaths per 100,000 population in 2023). Therefore, the gap in stimulant toxicity death rates increased between First Nations and the non-First Nations population in Saskatchewan over the period. In 2016, First Nations people had about a four times greater rate of stimulant toxicity deaths compared to the non-First Nations population, but this increased to around seven times greater by 2023.

Figure 8.15: Rates of stimulant toxicity deaths with breakdown by First Nations and non-First Nations populations in Saskatchewan and rate ratio, 2016 – 2023

	2016	2017	2018	2019	2020	2021	2022	2023
First Nations	6.5	7.0	18.8	25.9	59.1	90.0	79.6	92.3
Non-First Nations	1.6	3.1	5.5	5.3	8.2	12.0	10.8	13.8
Rate ratio	4.1	2.3	3.4	4.9	7.2	7.5	7.3	6.7

Source: Saskatchewan Coroners Service, Ministry of Justice, Government of Saskatchewan (2016 – 2023)

STIMULANT TOXICITY DEATHS: METHAMPHETAMINE

Methamphetamine is a powerful synthetic stimulant [27]. Like opioids, it is used for its euphoric and energizing effects. Methamphetamine can lead to intense cravings and toxicity is associated with a whole host of psychological, and physical effects. The risks from high doses include convulsions, coma, heart and lung complications which can often lead to death. Methamphetamine use is often linked with the use of other substances such as opioids and alcohol, which greatly increases the risk of accidental drug toxicity [27, 28].

Among First Nations people in Saskatchewan, the proportion of deaths involving methamphetamine has increased rapidly since 2017 (Figure 8.16). Since 2020, methamphetamine has been involved in at least half of all drug toxicity deaths. In 2023, it was identified in 71% of drug toxicity deaths.

Figure 8.16: Count and proportion of drug toxicity deaths involving methamphetamine among First Nations people in Saskatchewan, 2016 – 2023

	2016	2017	2018	2019	2020	2021	2022	2023
Methamphetamine	10	6	20	37	76	128	115	139
Methamphetamine proportion	23%	14%	33%	47%	51%	65%	63%	71%

Source: Saskatchewan Coroners Service, Ministry of Justice, Government of Saskatchewan (2016 – 2023)

WHY ARE WE CONCERNED ABOUT BENZODIAZOPINES AND ITS ANALOGUES

Benzodiazepines and their analogues are a class of drugs that slow down the central nervous system (brain). Medical benzodiazepines are typically used to treat conditions like sleeping problems, seizures and anxiety. Therefore, they are commonly used within healthcare but have also become prevalent in the illegal drug supply through non-medical synthetic benzodiazepines [5]. These synthetic benzodiazepines are increasingly being mixed into the unregulated opioid supply, often leading to the unintentional consumption of these drugs. This complicates drug toxicity responses due to atypical symptoms, amplified sedative effects, and leads to unintentional physiological dependency among users [5]. Most drug toxicity involving benzodiazepines and analogues occurs when they are used with other drugs, especially with other sedatives such as alcohol, and or opioids [29].

Similar to trends seen with opioids and stimulants, the rate of drug toxicity deaths involving benzodiazepines and its analogues among First Nations people in Saskatchewan significantly increased between 2016 and 2023. The rate rose from 3.3 deaths per 100,000 population in 2016 to 87.2 deaths per 100,000 population in 2023 (Figure 8.17). A similar upward trend was observed among the non-First Nations population, but at a lower rate, increasing from 1.0 deaths per 100,000 population in 2016 to 12.8 deaths per 100,000 population in 2023.

The gap between First Nations and non-First Nations populations widened over this period. In 2016, First Nations people had about a three times greater rate of benzodiazepine and analogue toxicity deaths compared to the non-First Nations population. By 2022, this disparity grew to around eight times greater by 2022 and reaching seven times greater in 2023. Notably, benzodiazepines and its analogues saw the largest post-pandemic increase in death rates compared to the other drug classes. Among First Nations people, there was a 28 times increase in the rate of deaths involving benzodiazepines and analogues in 2023 when compared to 2019.

Figure 8.17: Rates of benzodiazepine and analogues toxicity deaths with breakdown by First Nations and non-First Nations populations in Saskatchewan and rate ratio, 2016 – 2023

	2016	2017	2018	2019	2020	2021	2022	2023
First Nations	3.3	5.1	5.6	3.1	15.2	52.8	51.5	87.2
Non-First Nations	1.0	1.1	1.3	1.0	2.7	9.4	6.3	12.8
Rate ratio	3.4	4.8	4.5	2.9	5.6	5.6	8.2	6.8

Source: Saskatchewan Coroners Service, Ministry of Justice, Government of Saskatchewan (2016 – 2023)

ADDRESSING THE DRUG TOXICITY CRISIS

The Government of Canada is committed to a comprehensive public health approach to the drug toxicity crisis that is focused on reducing harms, saving lives, and getting people the supports they desire and need [30]. The key elements of addressing the drug toxicity crisis (which includes the opioid crisis) are:

- Prevention and education efforts;
- Evidence to inform decision-making;
- Substance use services and supports;
- Increased access to treatment and harm reduction programs; and
- Substance controls.

Addressing the crisis requires and involves collective efforts and engagement activities between multiple health sectors, law enforcement, community partners, and governmental and non-governmental organizations. The trends highlighted in this report shed light on drug toxicity patterns among First Nations people in Saskatchewan. Public health policies and programs should continue to provide evidence-based interventions in the form of THN programs, OAT, drug toxicity response education, and treatment programs.

PUBLIC HEALTH IMPLICATIONS

The epidemiological data on drug toxicity deaths during the 2016 to 2023 period indicates the severity of the drug toxicity crisis among First Nations people. While over the time period there was a significant increase in drug toxicity deaths in the overall Saskatchewan population, First Nations people continue to experience significantly higher rates of drug toxicity deaths. Prior to the COVID-19 pandemic, drug toxicity deaths among First Nations people, while unacceptably high, remained relatively stable. However, since the onset of the pandemic in 2020, there have been significant increases in the count and rate of drug toxicity deaths across the major drug categories explored in this chapter – opioids, stimulants, and benzodiazepines and its analogues. The pandemic has also exacerbated existing inequities, with First Nations people in Saskatchewan experiencing disproportionately higher rates of drug toxicity deaths. Since 2020, the rate of drug toxicity deaths involving either opioids, stimulants, or benzodiazepines doubled among First Nations people compared to the non-First Nations population.

Additionally, the rising prevalence of polysubstance deaths should be targeted for public health interventions. The concurrent use of different drug classes, whether intentional or otherwise, poses unique challenges in drug toxicity response as the mixing of substances can lead to unusual effects and strong sedation effects [31]. Treatment for acute drug toxicity is usually administered using naloxone, however, naloxone will only reverse the effects of an opioid if

present. Naloxone is not able to act on other substances causing toxicity [22]. Additionally, as exemplified in Figure 8.1, the report does not present many details on the broader impacts of drug toxicity beyond deaths. This represents only a small fraction of those affected by substance use, and overlooks the broader impacts of substance on individuals, families and communities. To comprehensively address this crisis, resources must not only aim to prevent drug toxicity deaths but also mitigate the wider downstream effects of substance use.

It is also important to consider that people who use substances face stigma and discrimination, which can cause a person to avoid seeking help due to a fear of judgement from loved ones or facing repercussions professionally or legally. It can also lead to people hiding their drug use or using drugs alone, which can delay toxicity response [32]. The stigma surrounding substance use intersects with the many systemic challenges that First Nations people face, including the intergenerational legacy of colonialism, residential schools, as well as the social determinant of health inequities affecting Indigenous People in Canada. The intersectionality of these social determinants of health influence substance use and may lead to an increased risk than the individual social determinants may suggest. Therefore, public health interventions need to help reshape the attitude towards drugs to help end stigma around substance use, while incorporating First Nations knowledge, promote community-led responses, and address systemic barriers such as inadequate access to treatment and culturally safe care [33].

Appendix

Data Sources

First Nations population in Saskatchewan

- Status and non-status First Nations: This population includes Registered or Treaty Indian status, and non-registered or Treaty Indian that identify as First Nations [34, 35].
- Data source:
  - Saskatchewan Coroners Service, 2016 – 2023
    - Confirmed and suspected drug toxicity deaths. Including all drug toxicity, opioids, stimulants, benzodiazepines and its analogues, and polysubstance use.

Approach to Data Analysis

The incidence rates of drug toxicity deaths were calculated by dividing the total number of new deaths in the reported year by the total population in reported year, expressed as the number of new deaths in the reported year per 100,000 population.

$$\frac{Number\ of\ new\ deaths\ due\ to\ drug\ toxicity\ (in\ the\ reported\ year)}{Total\ population\ (in\ the\ reported\ year)} x100\ 000$$

The proportion is calculated by dividing the part (the numerator) from the whole (the denominator). The fraction represents how much of the total something makes up. In this report, an example is the percentage of drug toxicity deaths involving opioids.

$$\frac{Sum\ of\ opioid\ deaths}{Sum\ of\ all\ drug\ toxicity\ deaths} x100\%$$

The rate ratio is a measure that compares the incidence rate of two groups, in the instance of the report, between status and non-status First Nations and the non-First Nations populations in Saskatchewan.

$$\frac{Incidence\ rate\ of\ the\ First\ Nations\ population\ (in\ the\ reported\ year)}{Incidence\ rate\ of\ the\ non-First\ Nations\ population\ (in\ the\ reported\ year)} x100{,}000$$

Data Limitations

- The data is not able to distinguish status and non-status First Nations. Therefore, non-status First Nations are captured in the First Nations population.
  - First Nations people living in communities and First Nations people living outside reserve lands are also captured together.
  - Non-status First Nations are excluded from the population (denominator), slightly overestimating rates.
- Suspected drug toxicity deaths are excluded from figure 8.2 and onward.
  - In 2021, 2022, and primarily 2023, not all death investigations have been concluded. This means that the counts and rates of drug toxicity are underestimated, in particularly for 2023.
- Data for the sections on polysubstance, stimulants, and benzodiazepines were gathered at a later time than the drug toxicity and opioid drug toxicity sections. Therefore, more suspected cases were confirmed for this data and may lead to some discrepancies when comparing numbers from these sections.
- The higher proportion of First Nations involved in opioid toxicity deaths (Figure 8.8) is also in part due to a faster growing population relative to the overall Saskatchewan population.
  - In addition, the First Nations population in Saskatchewan is a younger population than the general Saskatchewan population, and this group is more likely to partake in illicit drug activities.
  - For more information on demographics, refer to chapter 1 of the 2024 Health Status report.
- Note that for figure 8.12, only accidental opioid toxicity data is available. This is unlike the previous figures which had data for all confirmed opioid toxicity deaths including accidental, suicide, homicide, and undetermined. However, this still provides accurate trends in age data as the majority of opioid toxicity deaths are accidental. Age data prior to 2021 is not available.
- Residents of Saskatchewan who had a drug toxicity death outside of Saskatchewan are excluded.

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