

# Vaccine Preventable Disease Monitoring Report Polio, 2017 and 2018

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**PREPARED BY POPULATION HEALTH BRANCH, SASKATCHEWAN MINISTRY OF HEALTH**

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**Purpose:**

The Saskatchewan Ministry of Health’s Population Health Branch provides routine surveillance of notifiable diseases at the provincial, Athabasca Health Authority (AHA), former regional health authority (RHA), First Nations and Inuit Health Branch - Saskatchewan (FNIHB-SK) and Northern Inter-Tribal Health Authority (NITHA) levels.

This report presents the most recent data for reportable communicable diseases as collected by Panorama and the Integrated Public Health Information System (iPHIS), and immunization coverage information as collected by Panorama. Limitations associated with these systems have been described elsewhere.

Under *The Public Health Act, 1994* and the accompanying Disease Control Regulations, local medical health officers (MHOs) must report Categories I and II Communicable Diseases, as well as any communicable disease outbreaks to the Chief and Deputy Chief Medical Health Officers. Polio is a Category I disease.

**Report Features:**

- Background
- Epidemiological Summary
- Surveillance Case Definition
- Case Counts by Year
- Case Characteristics
- Vaccine Coverage by AHA and former RHA

**Data Source:**

Panorama (as of July 1, 2019)

## Background

Polio (poliomyelitis) is a crippling and potentially deadly infectious disease, caused by the poliovirus. The virus enters the body through the mouth, multiplies in the intestine and is shed through feces. From the intestine, it can invade the nervous system and cause paralysis.

In situations of poor hygiene and sanitation, the virus can spread rapidly through a community, when feces contaminate food and water.

About 72% of poliovirus infections in children are asymptomatic. Another 25% of individuals will experience mild illness with low-grade fever, sore throat, headache, fatigue and nausea or stomach pain. A smaller proportion may experience paresthesia, meningitis (1%) or paralysis (0.5%). Paralysis can lead to permanent disability or death.

People infected with the virus, symptomatic or not, can spread it before they are ill and up to two weeks after the symptoms appear.

There is no cure for polio. It can be prevented through immunization. Canada uses inactivated polio vaccine (IPV). Many parts of the world continue to use live oral poliovirus vaccine.

The Polio Endgame Strategy 2019–2023 has renewed efforts to eradicate polio globally. The ultimate goal is to complete the eradication and containment of all polioviruses. Global incidence of polio cases has decreased by 99%. Individuals who plan to travel to endemic countries should receive a booster dose of polio vaccine before they leave.

## Immunization

In 1995/96, Canada replaced live attenuated oral polio vaccine (OPV), which was reported to be associated with paralytic polio, with inactivated poliomyelitis vaccine (IPV). The Saskatchewan Routine Childhood Immunization Schedule recommends a four dose primary series of IPV at two, four, six and 18 months of age and a booster dose between four and six years of age. Three doses of IPV are recommended for older children or adults who have never been vaccinated against polio and are travelling to polio-endemic areas or are at higher risk of occupational exposure to polio virus. A single lifetime booster dose of IPV is recommended for adults at an increased risk of exposure to polio virus, even if they were previously immunized with polio vaccine.

More than 95% of individuals develop immunity against all three types of poliovirus (poliovirus type 1, 2 and 3) following the completion of three doses of IPV and almost all develop immunity after the booster dose. Although Canada was certified as free of wild polio viruses by the World Health Organization (WHO), routine immunization against polio is recommended due to the possibility of importing the virus with travel to countries where polio is endemic or recently reported.

## Surveillance

Under *The Public Health Act, 1994*, Saskatchewan health care providers are required to report notifiable communicable disease cases to the local medical health officer (MHO) who then reports the case to the Chief and Deputy Chief Medical Health Officers using the case definition in the Saskatchewan Communicable Disease Control Manual.

Polio is under international surveillance as part of the WHO polio elimination program.

Some communicable diseases occur rarely and

therefore, rates are based on small numbers of cases which can fluctuate dramatically over time. In these situations, year-to-year comparisons should be interpreted with caution.

Surveillance case definitions ensure uniform reporting to allow comparability of surveillance data. The definitions are not intended to be used for clinical or laboratory diagnosis or management of cases.

Currently molecular epidemiology genotyping of polio is done by the National Microbiology Laboratory.

# EPIDEMIOLOGY AND VACCINE COVERAGE SUMMARY

## Polio in Saskatchewan: 2018

- No (0) cases of lab-confirmed polio were reported.

## Polio in Saskatchewan: 2014 to 2018

- No (0) cases of lab-confirmed polio meeting the case definition were reported during this time period.
- The last case of polio in Saskatchewan was in 2008. Since the illness was vaccine-induced from an immunization given in a country outside of North America, the case was not attributed to Saskatchewan.

## Polio Coverage in Saskatchewan: 2014 to 2018

- From 2014 to 2018, provincial immunization coverage rates improved or remained stable in all age groups except 'up-to-date' coverage rate at seven years, which declined slightly.

Table 1: Polio case counts by year

	2018	2017	2016	2015	2014	Total
Saskatchewan	0	0	0	0	0	0
Canada	N/A	0	0	0	0	0

N/A = not available

Table 2: Polio case characteristics, Saskatchewan 2014-2018

	Cases	Percent of Cases
Total	0	0
Sex		
Male	0	0
Female	0	0
Age		
Less than 1 year	0	0
1 - 4 years	0	0
5 - 19 years	0	0
20 – 49 years	0	0
50 years and over	0	0
Hospitalized		
Yes	0	0
No	0	0
Unknown	0	0
Immunization status for polio vaccine		
2 doses	0	0
1 doses	0	0
0 dose	0	0
Too young	0	0
Unknown	0	0
Source		
International	0	0
Canada	0	0
Saskatchewan	0	0
Provincial source		
Domestic Travel	0	0
Epidemiologically-linked to travel case	0	0
Epidemiologically-linked to case with unknown source	0	0
No identified source	0	0
Genotype	Unknown	0

Table 3: Polio vaccine coverage rates for Saskatchewan by age, dose and year, 2014-2018

Age	Doses	2018	2017	2016 <sup>a</sup>	2015 <sup>a</sup>	2014 <sup>b</sup>
3 months	1	86.9%	85.9%	85.0%	85.0%	84.2%
5 months	2	78%	77.5%	76.9%	76.0%	73.8%
8 months	3	80%	78.9%	78.8%	77.3%	76.3%
12 months	3	86.7%	85.9%	85.6%	84.9%	84.5%
20 months	3	90.2%	89.7%	89.0%	88.5%	88.7%
	4	67.7%	63.3%	60.9%	60.4%	60.2%
24 months	3	90.9%	90.6%	89.9%	89.3%	89.6%
	4	80.2%	77.3%	76.8%	74.4%	75.5%
5 years	4	87.5%	85.6%	87.7%	85.0%	87.3%
7 years	Up-to-date	82.6%	83.2%	84.7%	83.8%	85.5%
13 years	Up-to-date	90.5%	90.6%	90.6%	90.3%	90.5%
15 years	Up-to-date	92.5%	92.3%	92.7%	91.6%	90.9%
17 years	Up-to-date	92.3%	91.2%	91.3%	91.6%	91.1%

<sup>a</sup> Vaccine Preventable Disease Monitoring Report: Polio, 2015 and 2016 (Data source: Panorama January 12, 2017)

<sup>b</sup> Vaccine Preventable Disease Monitoring Report: Polio, 2014 (Data source: SIMS January 16, 2015)

# EPIDEMIOLOGY AND VACCINE COVERAGE SUMMARY

**Table 4: Polio vaccine coverage by Athabasca Health Authority and former health region, 2018**

Jurisdiction (with former health region by Peer Group)	Immunization coverage (% immunized), by age and dose												
	3 months	5 months	8 months	12 months	20 months	24 months	5 years	7 years	13 years	15 years	17 years		
	1 dose	2 doses	3 doses	3 doses	3 doses	4 doses	3 doses	4 doses	4 doses	up-to-date	up-to-date	up-to-date	up-to-date
<b>Saskatchewan</b>	<b>86.9</b>	<b>78</b>	<b>80</b>	<b>86.7</b>	<b>90.2</b>	<b>67.7</b>	<b>90.9</b>	<b>80.2</b>	<b>87.5</b>	<b>82.6</b>	<b>90.5</b>	<b>92.5</b>	<b>92.3</b>
<b>Saskatchewan Health Authority</b>	<b>86.9</b>	<b>78</b>	<b>80</b>	<b>86.7</b>	<b>90.2</b>	<b>67.7</b>	<b>90.9</b>	<b>80.2</b>	<b>87.5</b>	<b>82.6</b>	<b>90.5</b>	<b>92.6</b>	<b>92.3</b>
<b>Peer Group A</b>													
Regina Qu'Appelle	91.4	79.7	82	87	89.3	69.6	90	77.5	86.2	83.4	91.3	93.1	93.2
Saskatoon	83.1	77	78.6	86.3	90.5	63.8	90.9	81.1	85	77.8	89.3	92.2	92.2
<b>Peer Group D</b>													
Cypress	83.8	76.9	83.7	91.5	92.8	74.7	93.8	84.5	92.5	91.7	92.5	94.2	94.5
Five Hills	89.6	80.9	82.8	89.9	92.3	75.8	92.8	82.6	91	84.1	91.7	93.3	94.1
Heartland	90.3	84.1	82.4	90.9	93	77	92.8	88.1	93.4	90.7	91.8	95.6	93
Kelsey Trail	93.7	82.1	87.9	93.1	96.1	84	95.6	90.2	95.6	88.7	93.9	95.8	93
Sun Country	94.4	91.4	92.8	95.4	94.4	87	95.3	92.2	95.1	93.6	95.2	95.2	97.1
Sunrise	87	80.3	81.8	86	89.7	68.8	91.9	83.2	90.3	85.8	92	93.2	94.3
<b>Peer Group F</b>													
Athabasca Health Authority	85.3	71.4	82.1	100	93.3	70	100	68.6	100	86.7	95	87.2	86.4
Keewatin Yatthé	78.2	64.3	71.4	79.2	90.1	45.7	90.3	65.2	84.7	81.1	78.3	90	87.1
Mamawetan Churchill River	80.1	63.4	72.4	88.2	94.9	72	96.4	81.8	96.7	81	88.4	87.2	85.6
<b>Peer Group H</b>													
Prairie North	85.9	73.5	75.9	82.3	86.1	62	87.5	75.1	87.9	82.2	85.4	86.6	87.1
Prince Albert Parkland	81.8	68	66.2	77.6	85.8	53.6	87.7	70.6	85.7	80.4	92.5	92.7	89

**Table 5: Polio vaccine coverage by Athabasca Health Authority and former health region, 2017**

Jurisdiction (with former health region by Peer Group)	Immunization coverage (% immunized), by age and dose												
	3 months	5 months	8 months	12 months	20 months	24 months	5 years	7 years	13 years	15 years	17 years		
	1 dose	2 doses	3 doses	3 doses	3 doses	4 doses	3 doses	4 doses	4 doses	up-to-date	up-to-date	up-to-date	up-to-date
<b>Saskatchewan</b>	<b>85.9</b>	<b>77.5</b>	<b>78.9</b>	<b>85.9</b>	<b>89.7</b>	<b>63.3</b>	<b>90.6</b>	<b>77.3</b>	<b>85.6</b>	<b>83.2</b>	<b>90.6</b>	<b>92.3</b>	<b>91.2</b>
<b>Saskatchewan Health Authority</b>	<b>85.9</b>	<b>77.5</b>	<b>78.9</b>	<b>85.9</b>	<b>89.6</b>	<b>63.4</b>	<b>90.6</b>	<b>77.3</b>	<b>85.6</b>	<b>83.2</b>	<b>90.6</b>	<b>92.3</b>	<b>91.2</b>
<b>Peer Group A</b>													
Regina Qu'Appelle	86.7	78	78.7	85.2	88.8	61	89.2	74.4	84.7	83.7	90.8	92.8	91.2
Saskatoon	84.6	76.8	79.1	86.1	88.9	60.9	90.6	78.1	83.3	80.1	90.7	92.3	91.3
<b>Peer Group D</b>													
Cypress	88.4	79	80.1	88.4	93.1	72	92.1	82.4	91.3	89.5	93.3	92.9	93.9
Five Hills	88.9	83	82.3	85.9	92	71.2	93.9	81	86.3	85.5	89.9	94.4	92.9
Heartland	84.7	79.5	87.4	90.3	94	73.4	93.9	86.4	93.3	92.6	91.5	92.8	93.3
Kelsey Trail	90.8	85.1	89.4	93.3	95.1	75.9	96.7	86	91.1	90.2	93.3	94.5	89.4
Sun Country	93.9	90	90.4	93.8	95	84.1	94.9	89.6	93.9	92.7	93.1	95.3	94.1
Sunrise	84.7	79.8	82.7	88.3	91	70.3	91	79.7	87.4	82.2	91.5	93.5	93.7
<b>Peer Group F</b>													
Athabasca Health Authority	92	86.4	76.7	91.4	97.6	43.9	97.2	72.2	93.1	85.4	90.2	95.5	94.2
Keewatin Yatthé	76.7	57.2	53.1	74.2	87	43.8	85	63.1	86.1	79.2	83.2	85.4	83.1
Mamawetan Churchill River	82.9	69.1	66.9	83	93.3	62.4	92.8	71.9	94.4	85.5	87.6	88.7	84.7
<b>Peer Group H</b>													
Prairie North	84.9	74.2	74.2	82.5	87.5	59.7	88.1	71.9	83.9	80.4	86.7	88.2	86.9
Prince Albert Parkland	82.5	67.6	68.6	79.1	85.6	51.8	87.6	69	84.5	79.8	90	90.8	90.6

- Two years of coverage data in thirteen age-dose/up-to-date categories are provided by Athabasca Health Authority (AHA) and former RHA. Yellow highlighted numbers indicate rates below the provincial coverage rate.
- Polio vaccine is recommended at two, four, six and 18 months, with a booster dose between four and six years of age. If the primary series is delayed or interrupted, the schedule can be adjusted to bring the child up-to-date for protection. Data for three, five, eight, 12, 20, and 24 months; and five, seven, 13, 15 and 17 years are shown with seven, 13, 15 and 17 years reported as up-to-date.
- Up-to-date:
  - children who received the four-dose primary series and one booster; and
  - children and adolescents who received either three or four doses with the last dose administered after the fourth birthday and six months after the previous dose.
- In the two most recent years, immunization coverage either improved or remained stable from 2017 to 2018 at the provincial level.
- In 2018, the four-dose coverage rate was higher among the 24-month age group compared to the 20-month age group: 80.2% vs. 67.7%. It was even higher among the five-year age group at 87.5%.
- At 20 months (4 doses), 24 months (3 doses), 5 years and 13 years of age for 2018, eight former RHAs and AHA exceeded the provincial average and four were below.
- In 2018, one former RHA was below the provincial coverage rate in all thirteen age-dose/up-to-date categories and one was below in all but one age-dose/up-to-date category.
- In 2018, four former RHAs were above the provincial rate in all thirteen age-dose/up-to-date categories and two were above in all but two age-dose categories.
- Coverage rates for health regions in Peer Groups F and H should be interpreted with caution (see Data Notes).

# SURVEILLANCE CASE DEFINITION: SASKATCHEWAN CDC MANUAL

<b>Polio</b>	
<p><b>Notification Timeline:</b>                      From Lab/Practitioner to Public Health: Immediate.                      From Public Health to Ministry of Health: Immediate.                      Public Health Follow-up Timeline: Initiate within 24-48 hrs.</p>	
<p>Case Definition (adopted from Public Health Agency of Canada, 2008)</p>	
<b>Confirmed Case</b>	<p>Clinical illness<sup>1</sup> with laboratory confirmation of infection:</p> <ul style="list-style-type: none"> <li>isolation of polio virus (vaccine or wild-type) from an appropriate clinical specimen</li> </ul> <p style="text-align: center;"><b>OR</b></p> <ul style="list-style-type: none"> <li>detection of polio virus RNA</li> </ul> <p style="text-align: center;"><b>OR</b></p> <p>Clinical illness<sup>1</sup> in a person who is epidemiologically linked to a laboratory-confirmed case.</p> <p>Confirmed cases of poliomyelitis can be further subdivided into the following two categories:</p> <p>1) Wild virus                      Laboratory investigation implicates wild-type virus. This group is further subdivided as follows:                      Imported: travel in or residence in a polio-endemic area 30 days or less before onset of symptoms.                      Import-related: epidemiologic link to someone who has travelled in or resided in a polio-endemic area within 30 days of onset of symptoms.                      Indigenous: no travel or contact as described above.</p> <p>2) Vaccine-associated virus                      Laboratory investigation implicates vaccine-type virus. This group is further subdivided as follows:                      Recipient: the illness began 7-30 days after the patient received oral polio vaccine (OPV).                      Contact: the patient was shown to have been in contact with an OPV-recipient and became ill 7-60 days after the contact was vaccinated.                      Possible contact: the patient had no known direct contact with an OPV-recipient and no history of receiving OPV, but the paralysis occurred in an area in which a mass vaccination campaign using OPV had been in progress 7-60 days before the onset of paralysis.                      No known contact: the patient had no known contact with an OPV-recipient and no history of receiving OPV, and the paralysis occurred in an area where no routine or intensive OPV vaccination had been in progress. In Canada, this would include all provinces and territories.</p>
<b>Probable Case</b>	<p>Clinical illness<sup>1</sup> without detection of polio virus from an appropriate clinical specimen and without evidence of infection with other neurotropic viruses but with one of the following laboratory confirmations of infection:</p> <ul style="list-style-type: none"> <li>significant rise (e.g., fourfold or greater) in polio IgG titre by any standard serologic assay between acute and convalescent sera</li> </ul> <p style="text-align: center;"><b>OR</b></p> <ul style="list-style-type: none"> <li>positive serologic test for polio IgM antibody in the absence of recent immunization with polio virus-containing vaccine.</li> </ul>
<b>Suspect Case</b>	<ul style="list-style-type: none"> <li>Clinical illness<sup>1</sup> and no laboratory confirmation of infection (no polio virus detection or serologic evidence), including negative test results and inadequate or no investigation.</li> </ul>



Photo Courtesy of Centers for Disease Control

- <sup>1</sup> Clinical illness is characterized by all of the following:
- acute flaccid paralysis of one or more limbs
  - decreased or absent deep tendon reflexes in the affected limbs
  - no sensory or cognitive loss
  - no other apparent cause (including laboratory investigation to rule out other causes of a similar syndrome) neurologic deficit present 60 days after onset of initial symptoms, unless the patient has died.

## DATA NOTES

Case Data Source: Panorama and the Integrated Public Health Information System (iPHIS) are information systems that support public health surveillance. Confirmed cases must meet the provincial surveillance case definition. Panorama replaced iPHIS on October 1, 2018.

Genotyping is a tool for establishing the strain of polio and differentiating wild strain polio from vaccine-associated disease. It also tracks polio virus importations, establishing connections between current polio cases and use of oral polio vaccines in countries of origin or visitation in order to establish the absence of acquired polio within Canada. Genotyping is performed by the National Medical Laboratory (NML).

There are 10 peer groups used by Statistics Canada, each identified by a letter (A to J). A peer group consists of former health regions with similar socio-economic characteristics which facilitates comparisons within a peer group. The twelve former health regions and one health authority in Saskatchewan fall into four groups identified by letters A, D, F and H. The peer groups in this report are based on Statistics Canada 2011 peer groupings and should not be compared to current Statistics Canada peer groupings (2014).

Vaccine Coverage Data Source: Panorama is a comprehensive, integrated public health information system. Of the five modules in the system, four have been implemented: vaccine inventory, immunization, investigations and outbreaks management. When fully functional, it will help public health professionals work together to effectively manage vaccine inventories,

immunizations, investigations, outbreaks and family health. To learn more, please visit: [www.ehealthsask.ca/services/panorama/Pages/default.aspx](http://www.ehealthsask.ca/services/panorama/Pages/default.aspx).

Many FNIHB and NITHA communities are not currently using Panorama. Therefore, immunization data for many First Nations children are missing or are incomplete. This report includes only those children with Saskatchewan health coverage and registered in Panorama under a former health region or AHA as of July 1, 2019. In other words, children with Saskatchewan health coverage and registered in Panorama under FNIHB-SK or NITHA jurisdiction are excluded (including those from FNIHB-SK and NITHA communities in AHA). This means this report does not include coverage statistics for the entire provincial or regional population.

The four-dose primary series IPV-containing vaccine is administered as diphtheria, tetanus, acellular pertussis, inactivated polio & *Haemophilus influenzae* type b (DTaP-IPV-Hib) and the one-dose booster IPV-containing vaccine is administered as diphtheria, tetanus, acellular pertussis & inactivated polio (DTaP-IPV). Immunization coverage is based on those who turned three, five, eight, 12, 20 and 24 months, and five, seven, 13, 15, and 17 years by December 31 in 2017 and 2018. For example, the immunization coverage for seven-year-old children in 2018 is based on clients who were born in 2011 and the immunization doses they received by their seventh birthdays.