

Vaccine Preventable Disease Monitoring Report Polio, 2015 and 2016

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Purpose:

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

This report presents the most recent data for reportable communicable diseases as collected by the Integrated Public Health Information System (iPHIS) and immunization coverage information as collected by the Saskatchewan Immunization Management System (SIMS) and 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 provincial 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 RHA

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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 food and water are contaminated by feces.

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). Live oral poliovirus vaccine continues to be used in many parts of the world.

There is a global polio eradication initiative. 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

Live oral polio vaccine (OPV) is associated with paralytic polio. In 1995/96, Canada replaced live attenuated OPV 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.

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.

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

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

Some communicable diseases occur rarely and therefore,

EPIDEMIOLOGY AND VACCINE COVERAGE SUMMARIES

Polio in Saskatchewan: 2015

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

Table 1: Polio case counts by year

	2016*	2015	2014	2013	2012	2011	Total
Saskatchewan	0	0	0	0	0	0	0
Canada	N/A	N/A	0	0	0	0	0

*preliminary counts to date, May 2017

N/A = not available

Polio in Saskatchewan: 2011 to 2015

- 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.
- In 2012, vaccine type polio virus was lab detected in an under-immunized child presenting with non-paralytic symptoms. Exposure occurred while visiting a country where oral polio vaccine is used. This case did not meet the polio case definition.

Table 2: Polio case characteristics, 2011-2015

Characteristics of polio cases – Saskatchewan 2011 - 2015		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	4 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	0

Polio Coverage in Saskatchewan: 2012 to 2016

- From 2012 to 2016, provincial immunization coverage rates improved in all age groups except seven and 13 years, which declined slightly.

Table 3: Polio vaccine coverage for Saskatchewan, 2012-2016

Age	Doses	2016	2015	2014	2013	2012
3 months	1	85.0%	85.0%	84.2%	83.4%	83.1%
5 months	2	76.9%	76.0%	73.8%	73.8%	72.3%
8 months	3	78.8%	77.3%	76.3%	75.7%	74.7%
12 months	3	85.6%	84.9%	84.5%	84.4%	84.6%
	4	89.0%	88.5%	88.7%	89.1%	88.6%
20 months	3	60.9%	60.4%	60.2%	59.0%	59.6%
	4	89.9%	89.3%	89.6%	90.2%	89.1%
24 months	3	76.8%	74.4%	75.5%	76.1%	75.3%
	4	87.7%	85.0%	87.3%	86.8%	86.5%
5 years	4	84.7%	83.8%	85.5%	86.6%	85.8%
7 years	Up-to-date	90.6%	90.3%	90.5%	90.6%	90.7%
13 years	Up-to-date	92.7%	91.6%	90.9%	91.6%	91.4%
15 years	Up-to-date	91.3%	91.6%	91.1%	91.0%	82.6%^

^Immunization records may be incomplete for children born prior to 1996; therefore, the 2012 coverage rate for 17-year-old adolescents may not reflect the actual provincial rate.

VACCINE COVERAGE SUMMARIES

Table 4: Polio Vaccine Coverage by Health Region, 2016

Health Region, by Peer Group	Vaccine 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
Saskatchewan	85.0	76.9	78.8	85.6	89.0	60.9	89.9	76.8	87.7	84.7	90.6	92.7	91.3
Peer Group A													
Regina Qu'Appelle	87.1	78.6	79.9	85.4	87.4	58.4	88.9	75.1	86.4	85.2	91.6	94.3	91.7
Saskatoon	83.9	76.1	77.8	85.9	90.9	63.2	91.3	80.6	87.7	84.5	90.8	93.4	91.7
Peer Group D													
Cypress	87.1	80.6	82.6	88.6	93.0	71.2	94.9	87.6	92.7	89.4	91.9	94.2	93.7
Five Hills	89.1	80.0	83.2	89.2	90.5	63.6	90.2	77.2	87.3	83.5	93.2	94.5	94.2
Heartland	88.6	79.7	83.0	91.0	93.7	68.6	93.5	82.6	93.4	89.4	93.3	92.1	92.9
Kelsey Trail	86.2	77.5	82.7	88.9	90.4	66.4	90.9	76.7	87.9	88.1	91.3	92.5	90.4
Sun Country	90.3	89.6	92.0	93.8	94.4	78.3	94.5	88.8	94.4	91.2	95.0	96.7	96.2
Sunrise	87.6	82.5	83.3	86.1	88.9	60.4	90.1	73.9	89.3	86.4	91.7	94.7	91.5
Peer Group F													
Athabasca Health Authority	90.2	65.9	70.3	88.2	94.4	55.6	94.3	82.9	96.9	98.9	89.4	88.0	98.0
Keewatin Yatthé	66.7	55.0	56.4	70.5	79.5	35.5	82.0	54.7	83.1	81.5	88.3	86.7	85.3
Mamawetan Churchill River	74.6	63.3	61.9	77.9	86.8	42.9	89.2	66.2	85.5	77.4	81.3	85.1	76.8
Peer Group H													
Prairie North	83.1	74.7	76.1	80.7	85.1	52.0	86.4	69.0	83.5	80.3	84.4	87.6	89.3
Prince Albert Parkland	76.2	64.1	66.0	78.2	82.0	48.3	82.9	61.0	85.5	77.8	87.3	86.6	87.9

Table 5: Polio Vaccine Coverage by Health Region, 2015

Health Region, by Peer Group	Vaccine 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
Saskatchewan	85.0	76.0	77.3	84.9	88.5	60.4	89.3	74.4	85.0	83.8	90.3	91.6	91.6
Peer Group A													
Regina Qu'Appelle	85.8	77.1	78.1	84.5	88.5	63.9	88.8	74.7	83.6	84.6	91.3	92.3	91.9
Saskatoon	84.9	77.7	78.4	85.9	88.8	61.0	89.8	76.4	83.5	83.7	90.5	92.5	92.8
Peer Group D													
Cypress	85.1	74.1	80.7	90.5	91.7	71.0	92.6	80.1	90.5	89.2	92.6	94.2	91.9
Five Hills	88.6	79.5	78.9	85.6	90.3	54.6	90.8	73.2	86.4	85.4	93.3	92.9	95.5
Heartland	86.8	80.4	84.3	91.5	91.7	66.0	92.2	80.7	92.1	91.0	91.5	92.7	92.4
Kelsey Trail	85.1	77.1	80.9	88.5	90.8	55.7	89.8	71.4	91.8	84.1	92.4	89.8	89.1
Sun Country	93.2	88.6	90.0	92.7	94.5	74.2	94.9	85.3	94.4	87.7	95.5	93.8	93.8
Sunrise	82.4	74.5	78.3	85.5	90.9	63.7	89.5	74.5	85.9	84.3	90.1	93.7	91.5
Peer Group F													
Athabasca Health Authority	82.4	59.0	66.7	88.6	100.0	69.7	100.0	85.3	91.5	89.5	93.9	92.5	93.9
Keewatin Yatthé	65.3	46.6	47.6	68.9	75.6	39.3	82.8	58.9	83.0	80.2	85.8	82.9	85.5
Mamawetan Churchill River	80.4	58.1	63.2	81.0	84.2	43.3	87.6	65.5	83.9	78.5	85.9	81.7	82.7
Peer Group H													
Prairie North	84.2	69.6	70.9	80.5	84.7	52.8	87.3	69.6	80.8	76.5	84.6	87.0	89.3
Prince Albert Parkland	78.5	63.6	64.2	73.7	81.2	43.3	83.2	60.6	84.1	79.5	85.5	90.0	87.5

- Two years of coverage data in thirteen age-dose/up-to-date categories are provided by RHA. Yellow highlight indicates RHAs 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:
 - a) children who received the four-dose primary series and one booster and
 - b) 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.
- At the provincial level, up-to-date coverage from 2015 to 2016 slightly declined at 17 years from 91.6% to 91.3%.
- Other rates showed modest improvements or no change for ages up to and including 15 years.
- In 2016, the four-dose coverage rate was higher among the 24-month age group compared to the 20-month age group: 76.8% vs. 60.9%. It was even higher among the five-year age group at 87.7%.
- In 2016, four RHAs were below the provincial coverage rate in all thirteen age-dose/up-to-date categories.
- In 2016, two RHAs were above the provincial rate in all thirteen age-dose/up-to-date categories, one was above in all but one category, and one was above the provincial average in eleven categories.

SURVEILLANCE CASE DEFINITION: Saskatchewan

Polio

Notification Timeline:

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.

Case Definition (adopted from Public Health Agency of Canada, 2008)

Confirmed Case

Clinical illness¹ with laboratory confirmation of infection:

- isolation of polio virus (vaccine or wild-type) from an appropriate clinical specimen

OR

- detection of polio virus RNA

OR

Clinical illness¹ in a person who is epidemiologically linked to a laboratory-confirmed case.

Confirmed cases of poliomyelitis can be further subdivided into the following two categories:

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.

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.

Probable Case

Clinical illness¹ 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:

- significant rise (e.g., fourfold or greater) in polio IgG titre by any standard serologic assay between acute and convalescent sera

OR

- positive serologic test for polio IgM antibody in the absence of recent immunization with polio virus-containing vaccine

Suspect Case

- Clinical illness¹ and no laboratory confirmation of infection (no polio virus detection or serologic evidence), including negative test results and inadequate or no investigation



Photo Courtesy of Centers for Disease Control

¹ 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: The Saskatchewan Integrated Public Health Information System (iPHIS) is a provincially mandated integrated client-centered case management information system that supports public health surveillance. Confirmed cases must meet the provincial surveillance case definition.

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 Statistic Canada, each identified by a letter (A to J). A peer group consists of health regions with similar socio-economic characteristics which facilitates comparisons within a peer group. The twelve health regions and one health authority in Saskatchewan fall into four groups identified by letters A, D, F and H.

Vaccine Coverage Data Source: The Saskatchewan Immunization Management System (SIMS) was a client-based registry recording vaccines delivered by public health services. It did not include vaccines delivered by First Nations (FN) communities that did not use SIMS.

Panorama is a comprehensive, integrated public health information system. Of the five modules in the system, two have been implemented: vaccine inventory and immunization. When fully functional, it will help

public health professionals work together to effectively manage vaccine inventories, immunizations, investigations, outbreaks and family health. It does not include vaccines delivered by FN communities that do not use Panorama.

SIMS was implemented province-wide in 2001 and was replaced by Panorama's immunization module on January 27, 2015. To learn more, please visit: www.ehealthsask.ca/services/panorama/Pages/default.aspx.

This report includes only those children with Saskatchewan health coverage and registered in Panorama under a health region jurisdiction as of January 12, 2017. This means this report does not include coverage statistics for the entire provincial or regional populations.

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 2015 and 2016. For example, the immunization coverage for seven-year-old children in 2016 is based on clients who were born in 2009 and the immunization doses they received by their seventh birthdays.