

Vaccine Preventable Disease Monitoring Report Pneumococcal, 2017 and 2018

Release Date: November 2019

PREPARED BY POPULATION HEALTH BRANCH, SASKATCHEWAN MINISTRY OF HEALTH

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<p><u>Purpose:</u></p> <p>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.</p> <p>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.</p> <p>Under <i>The Public Health Act, 1994</i> 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. Invasive pneumococcal is a Category I disease.</p> <p><u>Report Features:</u></p> <p>Background Epidemiological Summary Surveillance Case Definition Case Counts by Year Case Characteristics Vaccine Coverage by AHA and former RHA</p> <p><u>Data Source:</u></p> <p>Panorama (as of July 1, 2019)</p>	<div> <div> <h2>Background</h2> <p><i>Streptococcus pneumoniae</i> (pneumococcal disease) is a bacterial disease that has over 90 different serotypes. Most pneumococcal infections are mild and cause common diseases of the respiratory tract such as ear infections, sinus infections and pneumonia. It is also able to cause a more serious, invasive form of disease that can affect the brain, heart and bloodstream. These can result in long-term problems such as brain damage or hearing loss.</p> <p>The bacteria are very common and many people carry them in their nose and throat without getting sick. However, certain people are at higher risk for illness: infants and the elderly, people with chronic medical conditions such as HIV, diabetes, heart or lung disease, and people with weakened immune systems because of illness or medications. When these at-risk</p> </div> <div> <p>people are in settings that have increased risk of transmission (spread) such as daycares, prisons, homeless shelters and overcrowded living conditions, there is a greater chance of illness.</p> <p>Some infections can also cause death, most commonly in infants and the elderly (one in five with infection of the brain, one in fifteen with infection of the blood stream and one in twenty with invasive pneumonia affecting the lining of the heart or lungs).</p> <p>A small proportion of the 90 serotypes are vaccine-preventable. Immunization programs in Saskatchewan are targeted to protect individuals at greatest risk of infection.</p> </div> </div> <div> <h2>Immunization</h2> <p>A seven-strain pneumococcal conjugate vaccine was added to the public program in September 2002 as a four-dose series for high risk children younger than 24 months. High risk children 24 to 59 months of age became eligible in October 2003.</p> <p>In April 2005, the eligibility for the four-dose series was expanded to include all children at two months of age who were born since April 1, 2005. This formulation was replaced by a 13-strain vaccine as a four-dose series in 2010.</p> <p>In April 2012, the current three-dose series was introduced. It is offered at two, four and 12 months of age for healthy children. High risk children receive an additional dose at six months of age. In April 2013,</p> </div> <div> <p>high risk children five to 17 years of age became eligible to receive one dose if they did not receive this formulation previously.</p> <p>Although this report contains no coverage information on anyone born before 2009, it is worth noting that one dose of pneumococcal polysaccharide vaccine (containing 23 strains of <i>S. pneumoniae</i>) is offered to persons 65 years and older. Those two years and older who have select medical conditions are also eligible for this one vaccine dose. Some of these individuals may receive a booster dose five years later.</p> </div>
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Surveillance

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

Standard case definitions allow comparability of surveillance data. These definitions should not be misinterpreted as a clinical diagnosis. Invasiveness for surveillance purposes does not include infections of the pleural cavity or the middle ear.

Some genomic sequencing of the pneumococcal strain has been published in the International Nucleotide Sequence Database Collaboration.

EPIDEMIOLOGY AND VACCINE COVERAGE SUMMARY

Invasive Pneumococcal Disease in Saskatchewan: 2018

- Of the 124 cases of invasive pneumococcal disease in 2018, 39 cases (31%) had documentation that their immunizations were up-to-date for their age and eligibility.
- Sixty-five of the 68 cases between 20 and 64 years were eligible for immunization but only 15 had been immunized and 71% of the 65 eligible cases had a serotype contained in the P-23 vaccine.
- There were 48 cases among people 65 years and older and there was one infant case.
- Thirty-four cases (27%) were hospitalized and of these, 13 were aged 65 years and older.
- Seven of the 15 cases who died were over 65 years of age. The majority had underlying medical conditions which diminished an effective immune response, even if immunized.

Invasive Pneumococcal Disease in Saskatchewan: 2014 to 2018

- The 644 cases of invasive pneumococcal disease ranged in age from newborn to 98 years. The median*age was 55 years.
- Twenty-one cases had two or more episodes of invasive pneumococcal disease in this five-year period.
- Just under half of the cases (49%) lived in the former regional health authorities of Regina Qu'Appelle and Saskatoon.
- Eight-three percent (534 cases) were reported hospitalized, the majority having underlying medical conditions exacerbated by the infection.
- Forty-eight percent of those known to have died as a result of their infection were over 65 years of age (42 of 88 deaths). Other cases who succumbed to the infection had co-morbidities or high risk lifestyles.
- One hundred sixty-six cases (26%) had documentation in their epidemiological record that immunization against invasive pneumococcal disease was up to date. Thirty-nine of 52 cases (75%) under 10 years of age had documentation of an up-to-date immunization status in their epidemiological record.

*The median age divides a population into two equal groups; that is, half the people are younger than this age and half are older.

Pneumococcal Coverage in Saskatchewan: 2014 to 2018

- Provincial immunization coverage rates either improved or remained stable for all age-dose/up-to-date categories from 2014 to 2018.

Table 1: Invasive pneumococcal case counts by year

	2018*	2017	2016	2015	2014	Total
Saskatchewan	124	130	143	135	112	644
Canada	N/A	3,477	3,290	3,212	3,177	13,156

*Preliminary data
N/A = not available

Table 2: Invasive pneumococcal case characteristics, 2014-2018

	Cases	Percent of Cases
Total	644	100
Sex		
Male	346	54
Female	298	46
Age		
Less than 1 year	16	2
1 - 4 years	17	3
5 - 19 years	38	6
20 – 49 years	180	28
50 years and over	393	61
Hospitalized		
Yes	534	83
No	110	17
Unknown	0	0
Immunization status for pneumococcal vaccine		
Up to date	166	26
No	234	36
Unknown	249	38
Source		
International	N/A	N/A
Canada	N/A	N/A
Saskatchewan	N/A	N/A
Provincial source		
Domestic Travel	N/A	N/A
Epidemiologically-linked to travel case	N/A	N/A
Epidemiologically-linked to case with unknown source	N/A	N/A
No identified source	N/A	N/A
Genotype	644	100

Note: rounded percentages may not total 100%
N/A = not available

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

Age	Doses	2018	2017	2016 ^a	2015 ^a	2014 ^b
3 months	1	86.8%	85.9%	84.7%	84.2%	84.0%
5 months	1	92.3%	91.8%	92.2%	90.8%	91.7%
	2	78.1%	77.3%	76.6%	75.0%	73.5%
8 months	1	93.8%	93.7%	93.8%	92.8%	93.5%
	2	89.1%	88.8%	88.3%	87.0%	87.7%
13 months	Up-to-date	65%	61.6%	59.2%	60.1%	59.2%
20 months	Up-to-date	86.6%	85.3%	84.1%	82.9%	83.8%
24 months	Up-to-date	88.6%	86.9%	86.5%	85.3%	85.7%
59 months	Up-to-date	91.8%	89%	92.3%	89.5%	92.5%

^a Vaccine Preventable Disease Monitoring Report: Pneumococcal, 2015 and 2016
(Data source: Panorama January 12, 2017)

^b Vaccine Preventable Disease Monitoring Report: Pneumococcal, 2014
(Data source: SIMS January 16, 2015)

EPIDEMIOLOGY AND VACCINE COVERAGE SUMMARY

Table 4: Pneumococcal 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		13 months	20 months	24 months
	1 dose	1 dose	2 doses	1 dose	2 doses	up-to-date	up-to-date	up-to-date
Saskatchewan	86.8	92.3	78.1	93.8	89.1	65	86.6	88.6
Saskatchewan Health Authority	86.8	92.3	78.1	93.8	89.1	65	86.6	88.6
Peer Group A								
Regina Qu'Appelle	91.5	94.5	79.9	94.8	90.9	68.7	85.8	87
Saskatoon	83.2	91.6	77.3	93.3	88.5	59.4	87.1	89
Peer Group D								
Cypress	83.2	90.4	76.5	93.5	89.6	70.7	91.1	92.8
Five Hills	88.6	91.9	80.6	92.4	89.7	72.9	88.1	90
Heartland	89.7	92.8	83.9	92	90	69.1	90.2	91.2
Kelsey Trail	93.7	97.2	82.1	97.8	94.1	82.3	94.8	94.1
Sun Country	94.2	96	91.4	96.5	95.8	84	93.1	94.2
Sunrise	86.9	90.8	80.1	92.5	88.7	68.2	85.7	90.1
Peer Group F								
Athabasca Health Authority	85.3	100	71.4	100	100	75	86.7	94.3
Keewatin Yatthé	78.2	88.5	64.3	93.5	81.2	52.7	80.9	87.1
Mamawetan Churchill River	80.1	91	63.4	96.8	87.8	64.7	91.4	92.7
Peer Group H								
Prairie North	86	89.7	73.5	93.2	86.8	61.4	80.8	84.8
Prince Albert Parkland	81.6	88.4	68	91.2	81.1	51.9	80.5	84.8

Table 5: Pneumococcal 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		13 months	20 months	24 months
	1 dose	1 dose	2 doses	1 dose	2 doses	up-to-date	up-to-date	up-to-date
Saskatchewan	85.9	91.8	77.3	93.7	88.8	61.6	85.3	86.9
Saskatchewan Health Authority	85.9	91.8	77.3	93.7	88.8	61.6	85.3	86.9
Peer Group A								
Regina Qu'Appelle	87	92.5	78.2	93.5	88.5	57	83.5	84.8
Saskatoon	84.7	91.2	76.6	93.9	89.1	61.5	84.6	86.7
Peer Group D								
Cypress	88	93.4	79	93.8	89.9	65.8	90.2	90.7
Five Hills	87.8	91.5	82.1	93.5	90.5	67.8	88.5	91.5
Heartland	84.7	91.5	79.1	93.6	90.8	68.4	90.5	91.4
Kelsey Trail	91.1	95.4	85.1	96.6	95.1	73.7	94	95.2
Sun Country	93.8	94.9	89.7	95	93.7	79.1	93.8	94
Sunrise	84.7	89.6	79.5	92.1	89.5	70.5	87.5	87.1
Peer Group F								
Athabasca Health Authority	92	95.5	86.4	100	96.7	57.1	90.2	91.7
Keewatin Yatthé	76.7	91.8	56.6	96.9	85.8	53.6	82.9	82.5
Mamawetan Churchill River	82.9	92.3	69.1	94.9	86.3	55	87.2	87.1
Peer Group H								
Prairie North	84.8	91.7	74	92.2	85.6	58.1	81.7	83.7
Prince Albert Parkland	82.4	89.1	67.5	92.8	83.2	53.8	80.8	84.5

- Two years of coverage data in nine 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.
- Pneumococcal vaccine is recommended for healthy children at two and four months, with a booster at 12 months. If the primary series is delayed or interrupted, the series is adjusted to bring the child up-to-date for protection. Data for three, five, eight, 13, 20, 24 and 59 months are shown with 13, 20, 24 and 59 months reported as up-to-date.
- Up-to-date at 13 months:
 - children who received three doses at two, four and 12 months AND
 - children who received two doses with at least 28 days between each dose and a third dose at 12-13 months, if it is at least eight weeks after the second dose AND
 - children who received two or three doses before 12 months of age and one more (i.e., third or fourth) dose at 12-13 months, if it is at least eight weeks after the penultimate dose AND
 - children who received one dose before 12 months of age and a second dose at 12-13 months of age, if at least eight weeks after the first dose AND
 - children who received their first dose at 12-13 months of age.
- Up-to-date at 20 months:
 - a) to c) for 12 months AND
 - children who received one dose before 12 months of age and two more doses by 20 months of age, if there is an interval of at least eight weeks between each dose AND
 - children who received two doses eight weeks apart between 12 and 20 months of age AND
 - children who received two or three doses before 12 months of age and one more (i.e., third or fourth) dose between 13 and 20 months of age.
- Up-to-date at 24 months:
 - a) to d) for 20 months AND
 - children who received two doses eight weeks apart between 20 months plus a day and 24 months of age AND
 - children who received one dose before 12 months of age and two more doses between 20 months plus a day and 24 months of age, if there is an interval of at least 8 weeks between each dose AND
 - children who receive two or three doses before 12 months of age and one more (i.e., third or fourth) dose between 20 months plus a day and 24 months of age AND
 - children who received a single dose at 24 months.
- Up-to-date at 59 months:
 - a) to e) for 24 months AND
 - children who received a single dose between 24 months plus a day and 59 months.
- At the provincial level, coverage at all age-dose/up-to-date categories either improved or remained stable from 2017 to 2018.
- In 2018, the up-to-date coverage rate was higher among the 20-month age-group compared to the 13-month age-group: 86.6% vs. 65%.
- In 2018, two former RHAs were at or above the provincial rates in all nine age-dose categories and one was at or above all but one age-dose category.
- In 2018, one former RHA was below the provincial rates in all nine age-dose categories and two were below in all but one age-dose category.

SURVEILLANCE CASE DEFINITION: SASKATCHEWAN CDC MANUAL

Respiratory and Direct Contact Pneumococcal Disease – invasive

Notification Timeline:

From Lab/Practitioner to Public Health: Within 48 hours.

From Public Health to Saskatchewan Health: Within 2 weeks.

Public Health Follow-up Timeline: Initiate within 72 hrs.

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

Confirmed Case

Clinical evidence of invasive disease¹ with laboratory confirmation of infection:

- isolation of *Streptococcus pneumoniae* from a normally sterile site (excluding the middle ear and pleural cavity)
OR
- demonstration of *S. pneumoniae* DNA from a normally sterile site (excluding the middle ear and pleural cavity).

Probable Case

Clinical evidence of invasive disease¹ with no other apparent cause and with nonconfirmatory laboratory evidence:

- demonstration of *S. pneumoniae* antigen from a normally sterile site (excluding the middle ear and pleural cavity).

¹Clinical illness associated with invasive disease manifests itself mainly as pneumonia with bacteremia, bacteremia without a known site of infection, and meningitis. Pneumonia without bacteremia is not notifiable.

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.

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.

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 pneumococcal conjugate vaccine contains antigens from 13 serotypes of *S. pneumoniae* and the pneumococcal polysaccharide vaccine contains antigens from 23 serotypes of the bacterium. Immunization coverage is based on those who turned three, five, eight, 13, 20, 24 and 59 months by December 31 in 2017 and 2018. For example, the immunization coverage for 24-month-old children in 2018 is based on clients who were born in 2016 and their immunization records by their second birthdays.