

# Vaccine Preventable Disease Monitoring Report Pneumococcal, 2014

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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. Invasive pneumococcal 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**

*Streptococcus pneumoniae* (pneumococcal disease) is a bacterial disease that has over 90 different serotypes. It causes common diseases of the respiratory tract such as ear infections, sinus infections and pneumonia. It is also able to cause invasive disease that affects the brain, heart and bloodstream, which are more serious.

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 people are in settings that have increased risk of transmission (spread) such as daycare settings, prisons, homeless shelters and overcrowded living conditions, there is a greater chance of illness.

## **Immunization**

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.

In April 2005, the eligibility for the four-dose series was expanded to include all children at 2 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.

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, high risk children five to 17 years of age became eligible to

## **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 a standard case definition in the Saskatchewan Communicable Disease Control Manual.

Most pneumococcal infections are mild. However some can result in long-term problems, such as brain damage or hearing loss. Some 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).

Immunization programs in Saskatchewan are targeted to protect individuals at greatest risk of infection. A small proportion of the 90 serotypes are vaccine-preventable. The serotypes most commonly causing illness have shifted over time and the effectiveness of antibiotics has also decreased, making prevention more important.

receive one dose if they did not receive this formulation previously.

Although this report contains no coverage information on anyone born before 2007, it is worth noting that one dose of pneumococcal polysaccharide vaccine (containing 23 strains of *S. pneumoniae*) is offered to persons 65 years and older. Those 2 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. The long-term effectiveness of this vaccine is inferior compared to pneumococcal conjugate vaccine.

Standard case definitions allow comparability of surveillance data. These definitions should not be misinterpreted as a clinical diagnosis.

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

# EPIDEMIOLOGY AND VACCINE COVERAGE SUMMARIES

## Invasive Pneumococcal Disease in Saskatchewan: 2014

- Of the 111 cases of invasive pneumococcal disease in 2014, 64 (57%) cases had strains covered by the pneumococcal 23 vaccine. Only 12 cases had documentation that their immunizations were up to date for their age and eligibility.
- The highest number of cases was among people 65 years and older (38/111). Fourteen cases were under 20 years of age.
- Ninety-two cases (83%) were hospitalized; eight cases had two admissions in 2014.
- Eight of the eleven people who died were over 65 years of age.

## Invasive Pneumococcal Disease in Saskatchewan: 2011 to 2014

- Four hundred and ninety-six cases of invasive pneumococcal disease ranging in age from newborn to 94 years were reported. The median\* age of cases was 52 years.
- Fifteen cases had two or more episodes of invasive pneumococcal disease in this four year period.
- Over half of the cases (56%) lived in the regional health authorities of Regina-Qu'Appelle and Saskatoon.
- Forty percent (201 cases) were reported hospitalized. Many had underlying medical conditions exacerbated by the infection.
- Sixty percent of those known to have died as a result of their infection were over 65 years of age (34/57 cases).
- Forty-six cases had documentation that their immunization for invasive pneumococcal disease was up to date. Eleven immunized cases were under 10 years of age.

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

**Table 1: Invasive pneumococcal case counts by year**

	2015	2014	2013	2012	2011	Total
Saskatchewan	133	111	124	128	133	629
Canada	N/A	3178	3172	3407	3281	13038

N/A = not available

**Table 2: Invasive pneumococcal case characteristics, 2011-2014**

Characteristics of pneumococcal cases – Saskatchewan 2011 - 2014		Cases	Percent of Cases
Total		496	100
Sex	Male	263	53
	Female	233	47
Age	Less than 1 year	20	4
	1 - 4 years	27	5
	5 - 19 years	33	7
	20 - 49	152	31
	50 years and over	264	53
Hospitalized	Yes	201	40
	No	295	60
	Unknown	0	0
Immunization status for pneumococcal vaccine	Up to date	46	9
	No	51	10
	Unknown	399	81
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	Unknown	N/A	N/A

**Table 3: Pneumococcal vaccine coverage for Saskatchewan by year**

Age	Doses	2014	2013	2012
3 months	1	84.0%	83.1%	82.8%
5 months	1	91.7%	91.0%	91.4%
	2	73.5%	73.4%	71.9%
8 months	1	93.5%	93.3%	93.5%
	2	87.7%	87.4%	87.1%
13 months	Up-to-date	59.2%	56.0%	76.4%
20 months	Up-to-date	83.8%	84.8%	86.8%
24 months	Up-to-date	85.7%	88.4%	88.1%
59 months	Up-to-date	92.5%	92.2%	91.8%

# VACCINE COVERAGE SUMMARIES

**Table 4: Pneumococcal Vaccine Coverage by Health Region, 2014**

Health Region, by Peer Group	Vaccine coverage (% immunized), by age and doses or up-to-date									
	3 months		5 months		8 months		13 months	20 months	24 months	59 months
	1 dose	1 dose	2 doses	1 dose	2 doses	up-to-date	up-to-date	up-to-date	up-to-date	
<b>Saskatchewan</b>	<b>84.0</b>	<b>91.7</b>	<b>73.5</b>	<b>93.5</b>	<b>87.7</b>	<b>59.2</b>	<b>83.8</b>	<b>85.7</b>	<b>92.5</b>	
<b>Peer Group A</b>										
Regina Qu'Appelle	86.0	92.7	74.4	93.8	88.3	59.4	82.9	84.5	91.7	
Saskatoon	84.6	91.4	76.2	93.3	87.9	62.7	85.4	87.0	93.2	
<b>Peer Group D</b>										
Cypress	88.4	94.5	75.7	95.4	90.8	59.2	85.8	89.0	95.9	
Five Hills	87.1	93.4	78.9	94.4	91.6	61.6	85.2	87.2	93.5	
Heartland	86.0	90.3	74.3	93.1	88.9	64.1	88.3	90.4	93.6	
Kelsey Trail	84.6	92.4	69.8	94.9	89.8	50.1	81.1	84.9	90.4	
Sun Country	90.5	94.4	88.0	94.9	93.3	68.5	87.2	90.2	93.9	
Sunrise	82.4	92.1	72.4	93.6	89.4	57.9	84.3	85.0	91.5	
<b>Peer Group F</b>										
Athabasca Health Authority	82.8	100.0	59.4	100.0	100.0	80.0	95.5	95.7	98.9	
Keewatin Yatthé	70.2	90.7	51.4	95.7	77.3	47.3	88.2	89.1	98.8	
Mamawetan Churchill River	71.8	94.5	55.1	97.4	88.0	55.3	85.9	90.2	96.9	
<b>Peer Group H</b>										
Prince Albert Parkland	72.9	85.9	59.2	90.4	79.9	44.1	77.0	80.2	89.7	
Prairie North	79.2	88.9	66.5	90.9	83.1	54.4	79.1	79.9	90.6	

**Table 5: Pneumococcal Vaccine Coverage by Health Region, 2013**

Health Region, by Peer Group	Vaccine coverage (% immunized), by age and doses or up-to-date									
	3 months		5 months		8 months		13 months	20 months	24 months	59 months
	1 dose	1 dose	2 doses	1 dose	2 doses	up-to-date	up-to-date	up-to-date	up-to-date	
<b>Saskatchewan</b>	<b>83.1</b>	<b>91.0</b>	<b>73.4</b>	<b>93.3</b>	<b>87.4</b>	<b>56.0</b>	<b>84.8</b>	<b>88.4</b>	<b>92.2</b>	
<b>Peer Group A</b>										
Regina Qu'Appelle	84.2	90.9	75.5	92.6	87.8	56.4	84.7	88.0	91.7	
Saskatoon	83.8	91.1	75.9	93.9	88.2	58.0	85.1	89.2	92.0	
<b>Peer Group D</b>										
Cypress	81.6	91.2	70.3	93.3	89.0	57.3	87.8	90.6	95.7	
Five Hills	86.6	92.9	78.0	94.4	90.1	60.0	87.0	89.7	93.3	
Heartland	84.5	92.7	76.1	94.0	90.6	63.5	89.4	92.1	93.4	
Kelsey Trail	82.6	91.2	72.9	93.6	88.0	52.9	85.6	87.7	89.4	
Sun Country	88.9	93.4	83.2	94.5	92.2	70.1	92.2	92.9	95.0	
Sunrise	82.6	90.9	73.5	92.3	88.9	53.7	83.6	87.7	93.2	
<b>Peer Group F</b>										
Athabasca Health Authority	84.0	100.0	74.2	97.2	97.2	69.6	97.7	100.0	98.4	
Keewatin Yatthé	72.5	90.2	59.8	97.2	84.3	54.0	85.7	93.5	95.0	
Mamawetan Churchill River	77.3	92.2	53.7	94.2	83.0	51.4	85.7	90.3	96.6	
<b>Peer Group H</b>										
Prince Albert Parkland	77.4	88.9	58.5	91.9	79.7	40.6	77.8	83.7	90.9	
Prairie North	78.9	89.3	66.4	91.8	82.9	47.3	78.5	82.9	89.7	

**Table 6: Pneumococcal Vaccine Coverage by Health Region, 2012**

Health Region, by Peer Group	Vaccine coverage (% immunized), by age and doses or up-to-date									
	3 months		5 months		8 months		13 months	20 months	24 months	59 months
	1 dose	1 dose	2 doses	1 dose	2 doses	up-to-date	up-to-date	up-to-date	up-to-date	
<b>Saskatchewan</b>	<b>82.8</b>	<b>91.4</b>	<b>71.9</b>	<b>93.5</b>	<b>87.1</b>	<b>76.4</b>	<b>86.8</b>	<b>88.1</b>	<b>91.8</b>	
<b>Peer Group A</b>										
Regina Qu'Appelle	84.1	91.6	74.3	93.5	87.7	77.6	87.4	88.7	91.1	
Saskatoon	83.2	91.0	72.9	93.5	87.0	76.5	85.8	87.5	92.4	
<b>Peer Group D</b>										
Cypress	83.7	92.7	70.4	93.7	88.8	73.9	90.1	91.9	92.5	
Five Hills	83.1	92.8	75.4	93.7	89.9	80.8	90.5	91.8	94.3	
Heartland	84.0	93.3	75.4	95.3	91.4	80.4	91.8	90.7	93.5	
Kelsey Trail	85.3	93.3	74.6	93.9	88.9	75.9	90.0	89.3	89.5	
Sun Country	90.8	95.5	86.6	96.2	94.1	84.5	93.8	94.2	95.7	
Sunrise	79.9	90.1	69.6	92.0	87.8	78.3	87.9	89.5	92.2	
<b>Peer Group F</b>										
Athabasca Health	90.3	100.0	65.6	100.0	97.2	87.5	90.9	90.7	93.9	
Keewatin Yatthé	72.7	84.0	47.9	90.1	75.7	71.2	90.8	90.9	97.3	
Mamawetan Churchill River	68.6	86.0	48.4	94.0	80.0	67.9	81.3	86.5	89.9	
<b>Peer Group H</b>										
Prince Albert Parkland	77.2	90.1	57.4	92.4	81.9	68.1	80.3	81.7	89.1	
Prairie North	79.1	89.6	67.5	91.8	82.1	71.5	82.2	83.6	88.9	

Three years of coverage data in nine age-dose/up-to-date categories are provided by RHA. A yellow highlighted cell means the RHAs coverage rate is below the provincial coverage rate.

Pneumococcal vaccine is recommended for healthy children at 2 and 4 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 3, 5, 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:

- a) children who received three doses at 2, 4 and 12 months AND
- b) 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
- c) 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
- d) children who received one dose before 12 months of age and a second dose at 12-13 months of age, if at least 8 weeks after the first dose AND
- e) 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
- d) 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 8 weeks between each dose AND
- e) children who received two doses eight weeks apart between 12 and 20 months of age AND
- f) children who receive 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 f) for 20 months AND
- g) children who received two doses eight weeks apart between 20 months plus a day and 24 months of age AND
- h) 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
- i) 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
- j) children who received a single dose at 24 months.

Up-to-date at 59 months:

- a) to j) for 24 months AND
- k) children who received a single dose between 24 months plus a day and 59 months.

# 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)

<b>Confirmed Case</b>	<p>Clinical evidence of invasive disease<sup>1</sup> with laboratory confirmation of infection:</p> <ul style="list-style-type: none"> <li>isolation of <i>Streptococcus pneumoniae</i> from a normally sterile site (excluding the middle ear and pleural cavity)</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>demonstration of <i>S. pneumoniae</i> DNA from a normally sterile site (excluding the middle ear and pleural cavity)</li> </ul>
<b>Probable Case</b>	<p>Clinical evidence of invasive disease<sup>1</sup> with no other apparent cause and with nonconfirmatory laboratory evidence:</p> <ul style="list-style-type: none"> <li>demonstration of <i>S. pneumoniae</i> antigen from a normally sterile site (excluding the middle ear and pleural cavity)</li> </ul>

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

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 thirteen health regions in Saskatchewan fall into four groups identified by letters A, D, F and H.

Vaccine Coverage Data Source: The Saskatchewan Immunization Management System (SIMS) is a client-based registry recording vaccines delivered by regional public health services. It does not include vaccines delivered out of province or by First Nations communities that declined to use SIMS. Immunization data from Keewatin Yatthé and Mamawetan Churchill River health regions and historical data from Athabasca Health Authority are incomplete. As a result, this report does not provide immunization coverage for the entire provincial or regional populations.

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 2012, 2013 and 2014. For example, the immunization coverage for 24-month-old children in 2014 is based on clients who were born in 2012 and their immunization records up to December 31, 2014.