

Vaccine Preventable Disease Monitoring Report

Haemophilus influenzae type b, 2015 and 2016

Report release date: June 2017

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. *Haemophilus influenzae* type b 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

Haemophilus influenzae type b (Hib) disease is a serious disease caused by bacteria. It is responsible for a wide range of localized and invasive infections. It usually affects children under five years old. It can also affect adults with certain medical conditions.

Illnesses often caused by Hib include meningitis, epiglottitis, pneumonia, and bacteremia. Symptoms include fever, drowsiness, stiff neck, rapid or difficult breathing, sore throat, excessive irritability, or symptoms at the site of infection. Most cases are in children two months to four years of age. Before Hib vaccine, Hib disease was the leading cause of bacterial meningitis among children under five years old. Hib vaccines were first available in Saskatchewan in 1988.

Hib is spread person to person from direct contact or droplet contact of oral or nasal secretions. People can harbor the bacteria and not develop illness (asymptomatic carriage). These individuals can transmit the bacteria to others, who may become ill.

Adult cases are rare and illness usually occurs in those who also have a deficient immune system. A seasonal pattern of infection, peaking in September to December and March to May, has been observed for meningitis.

Immunization

The Saskatchewan Routine Childhood Immunization Schedule recommends a three dose primary series of Hib-containing vaccine at two, four and six months of age and a booster dose at 18 months of age. At 15 months of age or older, a single dose of a Hib-containing vaccine is required for a previously unimmunized or incompletely immunized child up to and including 59 months of age. Although not routinely required for healthy children after 59 months of age (i.e., fifth birthday), Hib-containing vaccine is recommended for older children with congenital immunodeficiency, malignant hematologic disorders, HIV, anatomic or functional asplenia, and all transplant and cochlear implant recipients.

More than 95% of infants develop protective antibody concentration upon completion of the primary series and booster dose. However, the efficacy of Hib-containing vaccine is unknown for persons with congenital or acquired immunodeficiency. The clinical efficiency of Hib vaccination has been estimated at 95-100%. Good vaccination coverage is required because a significant component of protection of children is associated with community immunity. Protection upon completion of age-appropriate immunization is long lasting, but the duration of immunity is not known.

Surveillance

Under *The Public Health Act, 1994*, Saskatchewan health care providers are required to report cases of notifiable communicable diseases 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.

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.

EPIDEMIOLOGY AND VACCINE COVERAGE SUMMARIES

Haemophilus influenzae type b (Hib) in Saskatchewan: 2015

- There were no cases of lab-confirmed Hib reported in 2015.

Table 1: Hib case counts by year

	2016*	2015	2014	2013	2012	2011	Total
Saskatchewan	1	0	1	1	0	1	4
Canada	N/A	N/A	26	34	24	32	116

*preliminary counts to date, April 2017

N/A = not available

Haemophilus influenzae type b (Hib) in Saskatchewan: 2011-2015

- Three cases of Hib ranging in age from eight months to over 60 years were reported.
- One of the two pediatric cases had one dose of Hib vaccine prior to his illness. The other pediatric case was not immunized.
- Both pediatric cases were hospitalized.
- None of the cases are known to have died.

Table 2: Hib case characteristics, 2011-2015

Characteristics of Hib cases – Saskatchewan 2011 - 2015		Cases	Percent of Cases
Total		3	100
Sex	Male	3	100
	Female	0	0
Age	Less than 1 year	1	33
	1 - 4 years	1	33
	5 - 19 years	0	0
	20 - 49 years	0	0
	50 years and over	1	33
Hospitalized	Yes	2	67
	No	1	33
	Unknown	0	0
Immunization status for Hib vaccine	2 doses	0	0
	1 dose	1	33
	0 dose	1	33
	Too young	0	0
	Unknown	1	33
Source	International	0	0
	Canada	3	100
	Saskatchewan	3	100
	Domestic Travel	0	0
Provincial source	Epidemiologically-linked to travel case	0	0
	Epidemiologically-linked to case with unknown source	0	0
	No identified source	3	100
	Unknown	0	0
Genotype	Unknown	0	0

Haemophilus influenzae type b (Hib) in Saskatchewan: 2012 to 2016

- From 2012 to 2016, provincial immunization coverage rates improved for all the age-dose categories.

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

Age	Doses	2016	2015	2014	2013	2012
3 months	1	84.9%	84.9%	84.1%	83.4%	83.0%
5 months	2	76.9%	75.8%	73.7%	73.8%	72.2%
8 months	3	78.7%	77.1%	76.2%	75.6%	74.4%
12 months	Up-to-date	86.0%	85.2%	85.0%	84.7%	84.8%
20 months	Up-to-date	62.2%	61.4%	61.1%	60.2%	60.6%
24 months	Up-to-date	78.2%	75.4%	76.5%	77.3%	76.3%
59 months	Up-to-date	86.3%	83.7%	86.4%	85.6%	84.6%

VACCINE COVERAGE SUMMARIES

Table 4: Hib Vaccine Coverage by Health Region, 2016

Health Region, by Peer Group	Vaccine coverage (% immunized), by age and dose						
	3 months 1 dose	5 months 2 doses	8 months 3 doses	12 months up-to-date	20 months up-to-date	24 months up-to-date	59 months up-to-date
Saskatchewan	84.9	76.9	78.7	86.0	62.2	78.2	86.3
Peer Group A							
Regina Qu'Appelle	86.9	78.4	79.7	85.6	59.7	76.4	84.8
Saskatoon	83.8	76.0	77.7	86.4	64.5	82.1	87.0
Peer Group D							
Cypress	87.1	80.4	82.6	89.2	73.1	88.6	91.1
Five Hills	89.1	80.0	83.0	89.2	64.5	78.9	86.8
Heartland	88.6	79.9	82.8	91.2	69.8	83.5	91.0
Kelsey Trail	86.2	77.5	82.7	89.8	68.0	77.6	87.5
Sun Country	90.2	89.4	92.0	93.7	78.7	89.3	93.2
Sunrise	87.6	82.5	83.2	86.3	61.4	76.0	88.6
Peer Group F							
Athabasca Health Authority	90.2	65.9	70.3	91.2	55.6	82.9	96.3
Keewatin Yatthé	66.7	55.0	56.4	71.2	39.2	59.0	87.0
Mamawetan Churchill River	74.6	63.3	61.9	77.9	44.0	66.7	80.1
Peer Group H							
Prairie North	83.1	74.6	76.1	81.1	53.6	71.0	79.8
Prince Albert Parkland	76.2	64.1	66.0	79.0	49.8	62.5	83.3

Table 5: Hib Vaccine Coverage by Health Region, 2015

Health Region, by Peer Group	Vaccine coverage (% immunized), by age and dose						
	3 months 1 dose	5 months 2 doses	8 months 3 doses	12 months up-to-date	20 months up-to-date	24 months up-to-date	59 months up-to-date
Saskatchewan	84.9	75.8	77.1	85.2	61.4	75.4	83.7
Peer Group A							
Regina Qu'Appelle	85.6	76.8	77.9	84.8	64.6	75.4	82.2
Saskatoon	84.8	77.5	78.0	86.1	62.1	77.5	81.9
Peer Group D							
Cypress	85.1	74.1	81.0	90.5	71.6	81.0	87.5
Five Hills	88.4	79.5	78.9	85.8	55.4	74.1	87.1
Heartland	86.8	80.6	84.5	91.7	66.9	80.7	93.0
Kelsey Trail	85.1	77.1	80.9	88.5	57.6	73.3	90.4
Sun Country	93.0	88.1	89.5	92.4	74.3	85.3	93.9
Sunrise	82.2	74.5	77.9	86.1	65.4	75.7	87.5
Peer Group F							
Athabasca Health Authority	82.4	59.0	66.7	88.6	69.7	85.3	87.5
Keewatin Yatthé	65.3	46.6	47.6	69.6	40.5	61.1	82.6
Mamawetan Churchill River	80.4	58.1	63.2	81.5	45.6	68.9	79.6
Peer Group H							
Prairie North	84.1	69.6	70.9	81.1	54.2	71.1	79.6
Prince Albert Parkland	78.5	63.6	64.2	74.3	44.4	62.2	82.2

Hib vaccine is recommended at two, four, and six months, with a booster dose at 18 months. 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, 24 and 59 months are shown with 12, 20, 24 and 59 months reported as up-to-date.

- Up-to-date at 12 months:**
- a) children who received three doses at two, four, and six months AND
 - b) children who received three doses with at least 28 days between each dose AND
 - c) children who received two doses four weeks apart between ages seven and 11 months AND
 - d) children who received their first dose at 12 months of age.

- Up-to-date at 20 months:**
- a) children who received four doses at two, four, six, and 18 months AND
 - b) children who received three doses with at least 28 days between each dose and a fourth dose at least 56 days after the third dose AND
 - c) children who received two doses four weeks apart between ages seven and 11 months and a third dose at least 56 days after the second dose AND
 - d) children who received one dose at 12-14 months and a second dose at least 56 days after the first AND
 - e) children who received one dose between 15-20 months.

- Up-to-date at 24 months:**
- a) to d) for 20 months AND
 - e) children who received one dose between 15-24 months.

- Up-to-date at 59 months:**
- a) to d) for 20 months AND
 - e) children who received one dose between 15-59 months.

- Two years of coverage data in seven age-dose/up-to-date categories are provided by RHA. Yellow highlight indicates RHAs below the provincial coverage rate.
- At the provincial level, coverage at all ages stayed the same or improved from 2015 to 2016.
- In 2016 the up-to-date coverage rate was higher among the 59-month age group compared to the 20-month age group: 86.3% vs. 62.2%.
- In 2016 three RHAs were below the provincial coverage rate in all seven age-dose categories and one was below in six categories.
- In 2016 four RHAs were at or above the provincial rate in all seven age-dose categories and one was at or above in six 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

Respiratory and Direct Contact *Haemophilus influenzae* type b



Photo Courtesy of Children's Immunization Project, St. Paul, Minnesota

Notification Timeline:

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

From Public Health to Ministry of 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 evidence¹ of invasive disease with laboratory confirmation of infection:
- isolation of *H. influenzae* (serotype b) (Hib) from a normally sterile site[^]
OR
 - isolation of *H. influenzae* (serotype b) from the epiglottis in a person with epiglottitis.

Probable Case

- Clinical evidence of invasive disease with laboratory evidence of infection:
- demonstration of *H. influenzae* type b antigen in cerebrospinal fluid
OR
 - demonstration of *H. influenzae* DNA in a normally sterile site
OR
 - buccal cellulitis or epiglottitis in a child < 5 years of age with no other causative organisms isolated.

¹Clinical illness associated with invasive disease due to *H. influenzae* includes meningitis, bacteraemia, epiglottitis, pneumonia, pericarditis, septic arthritis and empyema.

[^]Includes: blood, cerebrospinal, joint, pleural, pericardial, or peritoneal fluid.

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.

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 three-dose primary series and one-dose booster Hib-containing vaccine is administered as diphtheria, tetanus, acellular pertussis, inactivated polio & *Haemophilus influenzae* type b (DTaP-IPV-Hib). Immunization coverage is based on those who turned three, five, eight, 12, 20, 24 and 59 months by December 31 in 2015 and 2016. For example, the immunization coverage for 24-month-old children in 2016 is based on clients who were born in 2014 and the immunization doses they received by their second birthdays.