

Vaccine Preventable Disease Monitoring Report Meningococcal, 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 and former regional health authorities (RHAs), Athabasca Health Authority (AHA), 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 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. Invasive meningococcal disease 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 April 1, 2019)

Background

Invasive meningococcal disease (IMD) is caused by the *N. meningitidis* bacteria. IMD usually results in meningitis (50%), bacteremia (35%-40%), or both. There are several strains of *N. meningitidis*, but those most common include A, B, C, W-135 and Y. The meningococcal serogroup C immunization program has virtually eliminated cases of meningococcal serogroup C. Saskatchewan continues to see rare cases of meningococcal serogroup B and other serogroups. A universal meningococcal serogroup B immunization program is currently not recommended by the National Advisory Committee on Immunization (NACI).

Universal immunization programs target infants and adolescents who are at greatest risk. Individuals with certain risk factors such as immune-compromising conditions are eligible to receive additional doses of meningococcal vaccines. The bacterium is spread through direct contact with respiratory secretions. The incubation period is usually within three to four days of exposure but can be as long as 10 days. *N. meningitidis* has the potential to cause epidemics with serious complications.

Every case of IMD results in intensive public health follow-up to treat and vaccinate individual contacts that are at high risk of infection. Timely implementation of these efforts can avert further cases.

Overall, approximately 10%-15% will not survive infection with IMD; this number is higher in adolescents. Of the survivors, 11-19% may suffer hearing loss, neurologic disability or limb amputations. Additional subtle neurological deficits such as behavioral problems, school performance or attention deficit disorder may also be experienced by survivors.

Immunization

The Saskatchewan Routine Childhood Immunization Schedule currently recommends a meningococcal conjugate C vaccine at 12 months and a meningococcal conjugate ACYW-135 vaccine at Grade 6.

In October 2004, meningococcal conjugate C was added to the routine immunization schedule in Saskatchewan as a two-dose series at 12 months and Grade 6. However, children born between January 1, 1993 and December 31, 1999 received a single dose of meningococcal conjugate C at Grade 6 only.

With the addition of meningococcal conjugate ACYW-135 to the immunization schedule in September 2011 for Grade 6 students, all children born since October 1, 2000 received meningococcal conjugate C vaccine as the first dose and meningococcal conjugate ACYW-135 at Grade 6.

Surveillance

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

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

IMD occurs infrequently but seldom goes undetected since the severity of symptoms brings cases into contact with the health care system. IMD case rates, based on small numbers of cases, fluctuate over time. Year to year comparisons should be interpreted with caution.

Whole genomic sequencing of many *N. meningitidis* strains has been performed but no standard cataloguing of sequences associated with the vaccine strains is available.

EPIDEMIOLOGY AND VACCINE COVERAGE SUMMARY

Meningococcal serogroups A, C, W135 and Y in Saskatchewan: 2018

- Three cases of lab-confirmed invasive meningococcal were reported, two type W135 and one type Y.
- All three cases were hospitalized but there were no deaths.
- All the cases were seniors with underlying morbidities.

Meningococcal serogroups A, C, W135 and Y in Saskatchewan: 2014 to 2018

- Eight cases of lab-confirmed cases of invasive meningococcal were reported during this time period.
- Serotypes comprised two cases of type C and three cases each of type W135 and type Y.
- All were adults ranging in age from 19 to 81 years except one infant who was ineligible for the vaccine.
- All eight cases were hospitalized but there were no deaths.

Meningococcal Coverage in Saskatchewan: 2014 to 2018

- All provincial immunization coverage rates improved or remained stable for all age-dose categories from 2014 to 2018.

Table 1: Meningococcal serogroups A, C, W135 and Y case counts by year

	2018	2017	2016	2015	2014	Total
Saskatchewan	3	3	1	0	1	8
Canada*	N/A	N/A	N/A	N/A	N/A	N/A

*Public Health Agency of Canada (PHAC) publishes total counts for all meningococcal serotypes combined — no stratification is available by individual serogroup.
N/A = not available

Table 2: Meningococcal case characteristics of serogroups A, C, W135 and Y cases – Saskatchewan 2014 - 2018

		Cases	Percent of Cases
Total		8	100
Sex	Male	4	50
	Female	4	50
Age	Less than 1 year	1	13
	1 - 4 years	0	0
	5 - 19 years	1	13
	20 - 49 years	2	25
	50 years and over	4	50
Hospitalized	Yes	8	100
	No	0	0
	Unknown	0	0
Immunization status for meningococcal vaccine	Up to date	0	0
	No	0	0
	Too young	1	13
	Unknown	7	88
Source	International	0	0
	Canada	0	0
	Saskatchewan	8	100
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	8	100

Table 3: Meningococcal cases by serogroup and age, 2014 – 2018

Serogroup	Age group					Total
	< 1	1 - 4	5 - 19	20 - 49	50 +	
A	0	0	0	0	0	0
C	1	0	0	1	0	2
W135	0	0	0	1	2	3
Y	0	0	1	0	2	3
Total	1	0	1	2	4	8

Table 4: Meningococcal vaccine coverage for Saskatchewan by year, 2014-2018

Age	Doses	2018	2017	2016 ^a	2015 ^a	2014 ^b
13 months	1	64.6%	61.2%	58.8%	60%	59%
20 months	1	88.1%	86.7%	86.1%	84.7%	86.1%
24 months	1	90%	88.2%	88.3%	87%	87.8%
5 years	1	92.3%	89.7%	92.5%	89.6%	92.4%
7 years	1	93%	92.2%	92.9%	91.4%	93.1%
13 years	1	95.3%	94.6%	93.6%	92.8%	93.7%
	2	81.9%	81.4%	80.1%	78.6%	79.2%
15 years	1	95.2%	94.6%	94.8%	90.9%	91.2%
	2	81.7%	80.7%	80.1%	27.4% [^]	N/A
17 years	1	94.6%	91.1%	90.9%	90.4%	91.3%
	2	79.9%	27.6% [^]	N/A	N/A	N/A

^aVaccine Preventable Disease Monitoring Report: Meningococcal serogroup C, 2015 and 2016 (Data source: Panorama January 12, 2017)

^bVaccine Preventable Disease Monitoring Report: Meningococcal serogroup C, 2014 (Data source: SIMS January 16, 2015)

[^]The two-dose coverage rate for 15-year-old teens in 2015 and 17-year-old teens in 2017 was quite low because only those born during the last three months of 2000 would have been eligible for two doses.

N/A = not applicable because this birth cohort was eligible for only one dose in Grade 6.

EPIDEMIOLOGY AND VACCINE COVERAGE SUMMARY

Table 5: Meningococcal conjugate vaccine coverage (serogroup C first dose all ages and serogroups A, C, W135 and Y second dose for 13 to 17 years) by Athabasca Health Authority and former RHA, 2018

Jurisdiction (with former health region by Peer Group)	Immunization coverage (% immunized), by age and dose															
	13 months		20 months		24 months		5 years		7 years		13 years		15 years		17 years	
	1 dose	1 dose	1 dose	1 dose	1 dose	1 dose	1 dose	1 dose	2 doses	1 dose	2 doses	1 dose	2 doses	1 dose	2 doses	
Saskatchewan	64.6	88.1	90	92.3	93	95.3	81.9	95.2	81.7	94.6	79.9					
Saskatchewan Health Authority	64.6	88.1	90	92.3	93	95.3	81.9	95.2	81.7	94.6	79.9					
Peer Group A																
Regina Qu'Appelle	68.1	87.3	88.3	92.1	93.8	95.7	82.2	95.6	81.5	94.6	81.6					
Saskatoon	58.8	88.7	90.6	90.1	91.6	94.6	80.7	95.3	81.3	94.9	79.6					
Peer Group D																
Cypress	71.3	90.9	91.6	94.5	94.3	96.5	85.9	95.9	86.1	95.3	84.5					
Five Hills	72.8	90.1	91.6	93.4	93.6	94.7	81.6	95.2	84	94.9	80.9					
Heartland	69.6	91	92.2	94.3	95.6	97	85.7	97.2	85.4	96.4	85.3					
Kelsey Trail	80.2	95.1	95.3	96.7	95.7	95.5	85.1	96.8	82.5	95.5	79.4					
Sun Country	84.6	94.3	94.8	96.1	95.8	97.1	85.4	96	85.8	96.9	85.6					
Sunrise	68	85.7	90.4	92.9	94.6	96	83.7	94.5	81.2	96.4	79.8					
Peer Group F																
Athabasca Health Authority	75	90.3	94.4	97.1	100	100	91.7	95.8	89.6	100	80.4					
Keewatin Yatthé	52.3	84.7	88.5	93.8	92.4	90	62.7	93.6	75	96	77.9					
Mamawetan Churchill River	65.5	93.1	96.9	100	96.9	95.6	77	93.2	73.2	93.8	71					
Peer Group H																
Prairie North	61.9	82.8	86.8	93.1	90.8	93.7	77.5	91.4	74.5	90.2	70.5					
Prince Albert Parkland	50.6	83.3	87.6	94	92.1	96.3	85.5	94.6	84.9	92.6	77.1					

Table 6: Meningococcal conjugate vaccine coverage (serogroup C first dose all ages and serogroups A, C, W135 and Y second dose for 13 to 17 years) by Athabasca Health Authority and former RHA, 2017

Jurisdiction (with former health region by Peer Group)	Immunization coverage (% immunized), by age and dose															
	13 months		20 months		24 months		5 years		7 years		13 years		15 years		17 years	
	1 dose	1 dose	1 dose	1 dose	1 dose	1 dose	1 dose	2 doses	1 dose	2 doses	1 dose	2 doses	1 dose	2 doses*	1 dose	2 doses*
Saskatchewan	61.2	86.7	88.2	89.7	92.2	94.6	81.4	94.6	80.7	91.1	27.6					
Saskatchewan Health Authority	61.2	86.7	88.2	89.7	92.2	94.6	81.3	94.6	80.7	91	27.6					
Peer Group A																
Regina Qu'Appelle	56.8	84.2	85.6	89.2	91.9	94	80	94.7	81.2	90.9	24.6					
Saskatoon	60.9	86.4	88.2	87.8	91	94.3	81	94.8	80.3	91.6	29.4					
Peer Group D																
Cypress	64.1	90	91	93.7	92.9	95.4	85.4	94	83.6	93	29					
Five Hills	68.3	89.6	91.8	90.1	93.5	94.9	81.4	96	83.2	92.1	25.9					
Heartland	68.1	90.6	92.4	94.2	95.1	96	86.2	96.5	87.1	93.9	34.5					
Kelsey Trail	74.7	94.5	95.5	94.5	95.8	97.2	86	95.8	82.9	92.6	24.2					
Sun Country	79	93.4	93.9	93.5	95.8	95.6	86.1	95.9	86.2	93.4	25.1					
Sunrise	70.5	88.8	88.2	89.8	92.4	93.9	82.9	94.2	76.1	91.5	25.4					
Peer Group F																
Athabasca Health Authority	55.6	90.2	94.6	96.7	91.7	100	96.1	100	91.3	98.1	28.3					
Keewatin Yatthé	51	85.7	85.1	94.8	90.6	94.4	63.5	90.6	79	80.1	29.8					
Mamawetan Churchill River	56	93.9	94.1	98.1	97.2	96.3	73.3	96.3	72.6	81.8	21.5					
Peer Group H																
Prairie North	57.7	84.5	85.8	89.1	90.7	93.7	78.7	92.3	72.3	87.3	32.5					
Prince Albert Parkland	52.5	83.7	88.2	91.8	92.3	95.1	82.7	93.1	82.3	90.3	27.7					

*This is the first birth cohort eligible to receive two doses of vaccine. Not surprisingly the two-dose coverage rate in 2017 was quite low because only those born in the last three months of 2000 would have been eligible. In 2018 when a full cohort (i.e., born in 2001) would have been eligible for two doses, the two-dose coverage rate for 17-year-old teens was much higher at 79.9%.

- Two years of coverage data are provided by Athabasca Health Authority (AHA) and former regional health authority (RHA). A yellow highlighted cell means the coverage rate is below the provincial coverage rate.
- At the provincial level, immunization coverage improved from 2017 to 2018 for all age-dose categories.
- In 2018, the one-dose coverage rate was higher among the 20-month-old age group compared to the 13-month-old age group: 88.1% vs. 64.6%. It was even higher for the five-year-old age group at 92.3%.
- In 2018, the AHA and three former RHAs reported coverage rates equal or above the provincial average for all age-dose categories and one former RHA was at or above the provincial average in all but one age-dose category.
- In 2018, one former RHA was below the provincial coverage in all but one age-dose category and one former RHA was below the provincial coverage in all but two age-dose categories.

SURVEILLANCE CASE DEFINITION: SASKATCHEWAN CDC MANUAL

Respiratory and Direct Contact Meningococcal Disease



Photo Courtesy of Centers for Disease Control/Mr. Gust

¹Clinical illness associated with invasive meningococcal disease usually manifests itself as meningitis and/or septicaemia, although other manifestations may be observed (e.g., orbital cellulitis, septic arthritis). Invasive disease may progress rapidly to petechiae or purpura fulminans, shock and death.

²Each jurisdiction will have a validation process for the NAT that they have in place.

Notification Timeline:

From Lab/Practitioner to Public Health: Immediate.
From Public Health to Saskatchewan Health: Within 72 hours.
Public Health Follow-up Timeline: Initiate within 24-48 hrs.

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

Confirmed Case	Clinical evidence ¹ of invasive disease with laboratory confirmation of infection: isolation of <i>Neisseria meningitidis</i> from a normally sterile site (blood, CSF, joint, pleural or pericardial fluid) OR demonstration of <i>N. meningitidis</i> DNA by an appropriately validated nucleic acid test (NAT) ² from a normally sterile site.
Probable Case	Clinical evidence ¹ of invasive disease with purpura fulminans or petechiae, with no other apparent cause and with non-confirmatory laboratory evidence: • detection of <i>N. meningitidis</i> antigen in the CSF.

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 Statistic 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. Peer groups used in this report are based on Statistics Canada's 2011 peer groupings and should not be compared to the 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.

Most FNIHB-SK and NITHA communities, with the exception of those in AHA, are not currently using Panorama. Therefore, immunization data for most 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 April 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 meningococcal containing vaccines can be administered as a single serogroup vaccine specifically against serogroup C or as a combination serogroup vaccine against serogroups A, C, W135 and Y. 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 24-month-old children in 2018 is based on clients who were born in 2016 and the immunization doses they received by their second birthdays.