Vaccine Preventable Disease Monitoring Report
Hepatitis B, 2015 and 2016

Report release date: July, 2017

Purpose:

The Saskatchewan Ministry of Health's Population Health Branch provides routine surveillance of notifiable diseases at the provincial and regional health authority (RHA), First Nations and Inuit Health Branch (FNIHB) 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 Chief and Deputy Chief Medical Health Officers. Hepatitis B is a Category II disease.

Report Features:

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Background

Hepatitis B is a virus that infects the liver. It can cause permanent scarring and damage to the liver (cirrhosis), liver cancer and death. The hepatitis B virus is found in the body fluids of infected persons. The major risk factors associated with transmission include sexual contact, sharing of drug use equipment, household contact with an infected case, and perinatal transmission. Less than 10% of children and 30%-50% of adults with acute hepatitis B infection will have jaundice and the disease is often milder in children.

It usually takes two to three months before the insidious onset of clinical illness. The incubation period can be as short at two weeks to as long as six to nine months. The case fatality rate is 1%, but is higher in those over 40 years of age.

The Public Health Agency of Canada estimates less than 1% of Canada's population are infected with either acute or chronic hepatitis B virus. In 2012, the reported rate of acute hepatitis B infection in Canada was 0.6 cases per 100,000 people living in Canada.

The risk of chronic infection varies inversely with age. For example, 90% of infants infected at birth will develop chronic infection; while 20%-50% of children infected between ages one to five; and 1%-10% of individuals infected as older children and adults will develop chronic hepatitis B infection.

Approximately 15%-25% of those with chronic hepatitis B die prematurely of either cirrhosis or liver cancer.

Immunization

The Saskatchewan Routine Immunization Schedule for hepatitis B vaccine includes Grade 6 students; anyone born since January 1, 1984; and those at risk of hepatitis B exposure or infection, including infants born to positive mothers, children whose families emigrated from regions of intermediate or high prevalence, and those with select medical conditions or lifestyle behaviours. Hepatitis B immunization is a two- or three -dose series, depending on client age at presentation or vaccine formulation availability.

Hepatitis B vaccine is 95% to 100% effective in preventing disease in individuals who complete an appropriate immunization series. In endemic regions (e.g., the Far East, the Middle East, Africa, South America, Eastern Europe and Central Asia), the duration of vaccine induced protection has been shown to be long lasting.

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 the case definition in the Saskatchewan Communicable Disease Control Manual.

Notifiable diseases may be undetected, therefore underreported, due to a number of factors including lack of contact with the health care system or inability of laboratory tests to identify the organism. 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 and allow comparability of surveillance data. This definition should not be misconstrued for a clinical diagnosis.

Currently molecular epidemiology genotyping is not routinely performed for hepatitis B at the Saskatchewan Disease Control Laboratory.

EPIDEMIOLOGY AND VACCINE COVERAGE SUMMARIES

Hepatitis B in Saskatchewan: 2015

- Six cases of lab-confirmed hepatitis B were reported. Three cases self-reported injecting illicit drugs and two self-reported high risk sexual activity. Cases may report more than one high-risk behaviour. Three of the six cases were co-infected with hepatitis C. Two cases in 2015 reported heterosexual relations with a person from a country endemic for hepatitis B.
- Three of the six cases were males aged 50-70 years. All three females were of a child bearing age (aged 30-45 years).
- All but one case lived in the Saskatoon Health Region.
- There were no reported deaths from hepatitis B.

Hepatitis B in Saskatchewan: 2011 to 2015

- Thirty-eight (38) cases of hepatitis B ranging in age from late teens to over 80 years were reported. The median age of cases was 39 years. Twenty-six cases (68%) were males.
- Sixty-six percent (66%) of the cases lived in Saskatoon Health Region (25 cases); 11% lived in Regina Qu'Appelle Health Region (4 cases).
- Forty-five percent (45%) were co-infected with hepatitis C (17 cases). Five cases were co-infected with HIV.
- Other self-reported high risk behaviours for exposure to the virus included injecting illicit drugs (47% of cases reported this), high risk sexual activity (63%), and tattooing and body piercing (24%). Cases who had recently lived in countries endemic for hepatitis B comprised 18% of cases and 13% reported living in a household with a hepatitis B case or carrier.
- There were no deaths from hepatitis B though six cases were hospitalized.
- Two cases had received hepatitis B vaccine. One case had not reached full protection prior to exposure in an overseas country. The other case had an immunocompromising co-infection which may have compromised a full response to the vaccine.

Hepatitis B Coverage in Saskatchewan: 2012 to 2016

- From 2012 to 2016, provincial immunization coverage rates declined for 13- and 15-year-old adolescents.
- From 2013 to 2016, the coverage rate declined for 17-year-old teens (the 2012 rate is unreliable and should not be compared with later years).

Table 1: Hepatitis B (acute) case counts by year

	2016*	2015	2014	2013	2012	2011	Total
Saskatchewan	3	6	9	6	6	11	41
Canada	N/A	N/A	N/A	178	183	209	570

*preliminary counts as of December, 2016

N/A = not available

Table 2: Hepatitis B case characteristics, 2011-2015

Characteristics of hepatitis B cases – Saskatchewan 2011 - 2015		Cases	Percent of Cases
Total		38	100
Sex	Male	26	68
	Female	12	32
	Unknown	0	0
Age	Less than 1 year	0	0
	1 - 4 years	0	0
	5 - 19 years	1	3
	20 – 49 years	26	68
	50 years and over	11	29
Hospitalized	Yes	6	16
	No	32	84
	Unknown	0	0
Immunization status for hepatitis B vaccine	Up to date	2	5
	No	4	11
	Unknown	32	84
Source	International	1	3
	Canada	0	0
	Saskatchewan	0	0
	Unknown	37	97
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	38	100

Table 3: Hepatitis B vaccine coverage for Saskatchewan, 2012-2016

Age	Doses	2016	2015	2014	2013	2012
13 years	1	87.4%	87.6%	88.3%	88.9%	89.6%
	2	80.1%	80.7%	81.9%	82.9%	85.0%
	3	N/A	N/A	N/A	N/A	70.9%
15 years	1	91.2%	90.5%	91.8%	92.2%	92.3%
	2	87.0%	86.7%	88.7%	89.1%	89.5%
	3	N/A	N/A	71.6%	N/A	N/A
17 years	1	91.5%	91.8%	92.3%	92.5%	83.9%^
	2	88.5%	88.9%	89.7%	90.4%	81.8%^
	3	70.6%	N/A	N/A	N/A	N/A

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

N/A = not applicable because the three-dose series was used only in 2010-11, which primarily affected the 1999 birth cohort who were 13 in 2012, 15 in 2014, and 17 in 2016.

VACCINE COVERAGE SUMMARIES

Table 4: Hepatitis B Vaccine Coverage by Health Region, 2016

Health Region, by Peer Group	Vaccine coverage (% immunized), by age and dose						
	13 years		15 years		17 years*		
	1 dose	2 doses	1 dose	2 doses	1 dose	2 doses	3 doses
Saskatchewan	**87.4**	**80.1**	**91.2**	**87.0**	**91.5**	**88.5**	**70.6**
Peer Group A							
Regina Qu'Appelle	88.7	80.4	92.7	88.5	92.5	88.9	73.0
Saskatoon	88.3	81.0	92.7	87.9	92.3	89.2	73.4
Peer Group D							
Cypress	89.4	85.4	91.8	89.8	91.8	90.4	71.8
Five Hills	88.9	84.0	90.3	87.6	94.1	92.7	79.8
Heartland	91.1	85.9	92.8	91.7	94.9	93.8	77.7
Kelsey Trail	87.4	84.0	91.0	88.1	92.7	91.2	70.6
Sun Country	90.6	86.2	94.9	92.4	94.9	93.5	76.9
Sunrise	89.8	85.6	93.3	91.3	94.0	92.3	71.1
Peer Group F							
Athabasca Health Authority	93.6	80.9	96.0	96.0	100.0	98.0	41.2
Keewatin Yatthé	65.5	49.7	85.3	80.0	74.4	71.2	42.9
Mamawetan Churchill River	71.2	56.3	77.2	58.8	80.3	68.3	40.8
Peer Group H							
Prairie North	81.8	73.4	85.4	81.4	85.4	82.2	60.5
Prince Albert Parkland	82.7	73.5	84.6	78.8	87.8	84.0	60.7

Table 5: Hepatitis B Vaccine Coverage by Health Region, 2015

Health Region, by Peer Group	Vaccine coverage (% immunized), by age and dose					
	13 years		15 years		17 years	
	1 dose	2 doses	1 dose	2 doses	1 dose	2 doses
Saskatchewan	**87.6**	**80.7**	**90.5**	**86.7**	**91.8**	**88.9**
Peer Group A						
Regina Qu'Appelle	88.7	81.8	91.4	87.0	93.2	89.9
Saskatoon	89.1	81.5	92.0	88.6	92.3	89.2
Peer Group D						
Cypress	88.7	86.1	93.1	91.7	93.4	92.1
Five Hills	88.8	83.0	91.2	87.4	92.9	91.1
Heartland	90.8	85.8	92.5	90.8	90.9	90.0
Kelsey Trail	89.2	85.0	90.3	88.4	93.0	91.6
Sun Country	91.8	88.2	93.2	91.2	93.3	92.4
Sunrise	88.7	85.0	92.3	86.6	93.4	91.2
Peer Group F						
Athabasca Health Authority	91.8	79.6	100.0	98.1	97.0	97.0
Keewatin Yatthé	74.5	48.9	77.4	71.2	87.6	80.0
Mamawetan Churchill River	77.4	62.1	78.0	64.9	81.5	71.1
Peer Group H						
Prairie North	81.6	74.5	84.2	80.0	88.2	84.7
Prince Albert Parkland	80.6	71.6	86.4	83.0	88.3	84.6

- Two years of coverage data are provided by RHA. A yellow highlighted cell means the RHA's coverage rate is below the provincial coverage rate.
- Hepatitis B vaccine is recommended at Grade 6 and is usually provided as a two-dose series. In the 2010-11 school year, a two-dose product was not available and a three-dose* pediatric product was used instead.
- This means most children born in 1999 (i.e., children most likely to be in Grade 6 in 2010-11) would have received a three-dose series. To account for this exception, the adjacent tables report one, two and three dose coverage rates for *17-year-old teens in 2016 (i.e., children born in 1999). Please note, this does not mean all children in Grade 6 during 2010-11 were born in 1999 or that all children born in 1999 were in Grade 6 during 2010-11.
- For all other ages and years, one and two-dose coverage rates are reported.
- At a provincial level, coverage slightly improved for 15-year-old adolescents for one and two doses from 2015 to 2016, but slightly decreased among 13- and 17-year-old adolescents for one and two-doses.
- In 2016, six RHAs reported coverage rates equal to or above the provincial average for all age-dose categories and three RHAs were at or above the provincial average in all but one age-dose categories.
- In 2016, four RHAs were below the provincial coverage in all age-dose categories.

SURVEILLANCE CASE DEFINITION: Saskatchewan CDC Manual

Blood and Body Fluid Pathogens

Hepatitis B

Notification Timeline:
From Lab/Practitioner to Public Health: Within 72 hours.
From Public Health to Ministry of Health: Within 2 weeks.
Public Health Follow-up Timeline: Within 24-48 hours.

Case Definition (adopted from Public Health Agency of Canada, 2009)

Acute Hepatitis B Confirmed Case	Hepatitis B surface antigen (HBsAg) and immunoglobulin M antibody to hepatitis B core antigen (anti-HBcIgM) positive in the context of a compatible clinical history or probable exposure **OR** clearance of HBsAg in a person who was documented to be HBsAg positive within the last six months in the context of a compatible clinical history or probable exposure.
Acute Hepatitis B Probable case	Acute clinical illness in a person who is epidemiologically linked to a confirmed case.
Chronic Hepatitis B Confirmed Case	HbsAg positive for more than 6 months **OR** detection of HBsAg in the documented absence of anti-HBc-IgM **OR** detection of hepatitis B virus (HBV) DNA for more than 6 months.
Unspecified Hepatitis B Confirmed Case	Does not fit the criteria for either of the above **AND** HBsAg positive **OR** detection of HBV DNA.

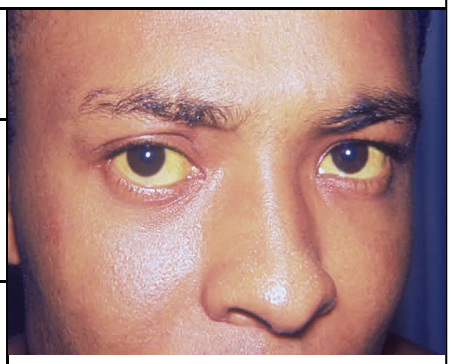

Photo Courtesy of Centers for Disease Control

Laboratory Note: Occult HBV infection is characterized by a positive HBV DNA and presence of anti-HBc alone, or anti-HBc and anti-HBs in the absence of HBsAg. Further isolate characterization is indicated.

DATA NOTES

Case Data Source: The Saskatchewan Integrated Public Health Information System (iPHIS) is an information system that supports public health surveillance. Confirmed cases must meet the provincial surveillance case definition.

Genotyping is a tool for detecting and differentiating characteristics of hepatitis B. Mapping the genotypes worldwide is a useful tool for establishing imported infections or infections acquired while travelling abroad. Genotyping is performed by the National Medical Laboratory (NML) but not routinely monitored among cases occurring in Saskatchewan.

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.

Hepatitis B-containing vaccines may be administered in combination with hepatitis A or individually as hepatitis B. Immunization coverage is based on those who turned 13, 15 & 17 years by December 31 in 2015 and 2016. For example, the immunization coverage for 13-year old children in 2016 is based on clients who were born in 2003 and the immunization doses they received by their thirteenth birthdays.