

Vaccine Preventable Disease Monitoring Report Hepatitis B, 2014

Report release date: August, 2016

Purpose:

The Saskatchewan Ministry of Health's Population Health Branch provides routine surveillance of notifiable diseases at the provincial and regional health authorities (RHAs), 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. Hepatitis B is a Category II disease.

Report Features:

Background
Epidemiological Summary
Surveillance Case Definition
Case Counts by Year
Case Characteristics
Vaccine Coverage by RHA

Prepared by:

Population Health Branch,
Saskatchewan Ministry of Health.

Contact:

Val Mann, PhD
Chief Population Health
Epidemiologist,
Population Health Branch,
Saskatchewan Ministry of Health
email: cdc@health.gov.sk.ca

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.

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

Surveillance

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

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.

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 at least 15 years. Age at vaccination appeared to be the most important determinant of protection rates, which is also influenced by the schedule used, the dosage and the health of the individual. A 95% response rate has been reported for children less than two years of age, while the best response rate is observed in children between five and 15 years with 99% protection rates.

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: 2014

- Nine cases of lab-confirmed hepatitis B were reported. Over one-third of cases self-reported injecting illicit drugs and a third self-reported high risk sexual activity. Cases may report more than one high-risk behaviour. Five of the nine cases were co-infected with hepatitis C.
- Seven of the nine cases were males aged 30-60 years. Both females were over 35 years of age. Seven of nine cases lived in Saskatoon Health Region.
- There were no reported deaths from hepatitis B. No cases in 2014 reported travelling outside of Canada.

Hepatitis B in Saskatchewan: 2011 to 2014

- Thirty-seven cases of hepatitis B ranging in age from late teens to over 75 years were reported. The median* age of cases was 38 years. Twenty-six (70%) were males.
- Over two-thirds of the cases (70%) lived in the regional health authorities of Saskatoon (57% of cases) and Regina Qu'Appelle (13%). Over 40% (16 cases) were co-infected with hepatitis C. Three cases were co-infected with HIV. Self-reported high risk behaviours for exposure to the virus included injecting illicit drugs (18%), high risk sexual activity (18%), and tattooing and body piercing (11%).
- 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.

*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: Hepatitis B (acute) case counts by year

	2015*	2014	2013	2012	2011	Total
Saskatchewan	10	9	7	9	12	47
Canada	N/A	N/A	178	183	209	570

*preliminary counts as of April, 2016

N/A = Not Available

Table 2: Hepatitis B case characteristics, 2011-2014

Characteristics of hepatitis B cases – Saskatchewan 2011 - 2014		Cases	Percent of Cases
Total		37	100
Sex	Male	26	70
	Female	11	30
	Unknown	0	0
Age	Less than 1 year	0	0
	1 - 4 years	0	0
	5 - 19 years	3	8
	20 – 49 years	26	70
	50 years and over	8	22
Hospitalized	Yes	6	16
	No	31	84
	Unknown	0	0
Immunization status for hepatitis B vaccine	Up to date	2	5
	No	4	11
	Unknown	31	84
Source	International	1	3
	Canada	0	0
	Saskatchewan	0	0
	Unknown	36	97
Provincial source n = 36	Domestic Travel	0	0
	Epidemiologically-linked to travel case	0	0
	Epidemiologically-linked to case with unknown source	0	0
	No identified source	36	100
Genotype	Unknown	37	100

Table 3: Hepatitis B vaccine coverage for Saskatchewan by year

Age	Doses	2014	2013	2012
13 years	1	88.3%	88.9%	89.6%
	2	81.9%	82.9%	85.0%
	3	N/A	N/A	70.9%
15 years	1	91.8%	92.2%	92.3%
	2	88.7%	89.1%	89.5%
	3	71.6%	N/A	N/A
17 years	1	92.3%	92.5%	83.9%
	2	89.7%	90.4%	81.8%

*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

VACCINE COVERAGE SUMMARIES

Table 4: Hepatitis B Vaccine Coverage by Health Region, 2014 (selected age & dose)

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	3 doses	1 dose	2 doses
Saskatchewan	88.3	81.9	91.8	88.7	71.6	92.3	89.7
Peer Group A							
Regina Qu'Appelle	90.2	83.9	92.9	89.2	74.2	93.2	90.9
Saskatoon	88.9	82.4	92.6	89.7	74.5	93.4	90.6
Peer Group D							
Cypress	92.0	88.0	94.1	92.6	77.7	96.3	95.4
Five Hills	89.5	84.2	94.7	93.5	81.9	96.4	94.3
Heartland	92.2	88.0	94.7	93.6	78.9	95.8	94.5
Kelsey Trail	87.4	83.4	92.3	90.1	70.3	90.9	89.1
Sun Country	94.5	91.0	96.2	95.5	80.5	96.5	95.3
Sunrise	89.7	84.6	94.1	91.0	69.1	92.8	91.2
Peer Group F							
Athabasca Health Authority	75.0	67.3	98.1	90.7	44.4	94.9	88.1
Keewatin Yatthé	87.6	72.7	79.1	76.3	43.9	92.5	84.3
Mamawetan Churchill River	80.4	59.6	85.3	73.3	41.9	80.2	72.8
Peer Group H							
Prince Albert Parkland	79.6	71.5	86.4	82.0	59.8	85.4	81.7
Prairie North	81.9	74.2	84.9	81.9	60.7	85.9	82.1

Table 5: Hepatitis B Vaccine Coverage by Health Region, 2013 (selected age & dose)

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	88.9	82.9	92.2	89.1	92.5	90.4
Peer Group A						
Regina Qu'Appelle	90.4	84.7	94.1	90.8	93.8	91.9
Saskatoon	90.5	85.4	92.7	89.5	93.5	91.4
Peer Group D						
Cypress	93.4	90.2	94.7	93.5	94.7	93.6
Five Hills	90.8	86.0	93.8	91.6	95.6	93.6
Heartland	91.0	87.6	92.3	90.8	95.6	95.1
Kelsey Trail	85.4	81.3	90.6	88.0	92.1	90.8
Sun Country	94.0	89.1	95.7	94.7	96.8	96.2
Sunrise	91.6	83.8	94.5	91.5	93.7	91.6
Peer Group F						
Athabasca Health Authority	89.8	64.4	97.3	91.9	91.7	91.7
Keewatin Yatthé	83.9	67.0	90.8	83.2	92.4	78.6
Mamawetan Churchill River	73.7	54.5	79.5	71.9	72.9	66.2
Peer Group H						
Prince Albert Parkland	82.4	74.1	86.6	81.8	85.9	83.1
Prairie North	80.4	73.9	87.8	84.3	86.7	84.1

Table 6: Hepatitis B Vaccine Coverage by Health Region, 2012 (selected age & dose)

Health Region, by Peer Group	Vaccine coverage (% immunized) by age and dose						
	13 years*			15 years		17 years**	
	1 dose	2 doses	3 doses	1 dose	2 doses	1 dose	2 doses
Saskatchewan	89.6	85.0	70.9	92.3	89.5	83.9	81.8
Peer Group A							
Regina Qu'Appelle	90.8	87.0	74.3	93.2	90.8	52.8	51.3
Saskatoon	91.0	86.8	73.5	93.6	90.7	92.5	90.5
Peer Group D							
Cypress	93.3	89.8	77.9	96.5	95.6	94.8	94.0
Five Hills	92.7	90.2	80.1	96.5	94.2	96.3	94.6
Heartland	94.9	91.3	79.0	96.1	94.4	94.6	94.0
Kelsey Trail	90.4	86.3	71.6	91.1	88.9	91.9	90.6
Sun Country	95.0	92.2	78.6	95.9	94.3	94.0	92.8
Sunrise	91.6	87.3	69.7	93.7	91.0	93.4	91.3
Peer Group F							
Athabasca Health Authority	80.8	61.5	44.2	93.1	86.2	83.1	81.4
Keewatin Yatthé	68.6	55.7	38.6	89.0	83.8	87.3	71.1
Mamawetan Churchill River	70.6	55.7	37.3	74.7	67.9	75.4	67.9
Peer Group H							
Prince Albert Parkland	82.9	75.3	57.3	85.2	81.7	86.9	84.0
Prairie North	82.6	77.4	59.4	85.7	81.5	88.9	86.3

Three 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 *13-year-old teens in 2012 and *15-year-old teens in 2014 (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. But this is the best estimation possible of who would have received the three-dose series using data from the SIMS database because SIMS did not capture product formulation.

For all other ages and years, one and two-dose coverage rates are reported.

At a provincial level, coverage improved by 9.7% from 2012 to 2014 for 17-year-old adolescents with two doses but decreased among 13- and 15-year-old adolescents (by 3.6% and 0.9% respectively at two doses).

In 2014, six RHAs reported coverage rates equal to or above the provincial average for all age-dose categories compared to 2012 when five RHAs did so.

Coverage rates for health regions in Peer Groups F and H should be interpreted with caution.

**Immunization records may be incomplete for children born prior to 1996. Therefore, the immunization coverage for 17-year-old adolescents may not reflect actual provincial or RHA rates.

SURVEILLANCE CASE DEFINITION: Saskatchewan CDC Manual

Blood and Body Fluid Pathogens Hepatitis B



Photo Courtesy of Centers for Disease Control

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.

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).

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.

Hepatitis B-containing vaccines may be administered in combination as hepatitis A & hepatitis B or individually as hepatitis B. Immunization coverage is based on those who turned 13, 15 & 17 years by December 31 in 2012, 2013 and 2014. For example, the immunization coverage for 13-year old children in 2014 is based on clients who were born in 2001 and their immunization records up to December 31, 2014.