VACCINE PREVENTABLE DISEASE SURVEILLANCE
Measles, 2014

May, 2015

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 (FNIHB) and Northern Inter-Tribal Health Authority (NITHA) levels.

This report presents the most recent data for reportable communicable diseases and vaccine coverage rates as collected by the Integrated Public Health Information System (iPHIS). Immunization coverage information is collected by the Saskatchewan Immunization Management System (SIMS) and Panorama. Limitations associated with these systems have been described elsewhere.

Under the *Saskatchewan Public Health Act, 1994* and the accompanying Disease Control Regulations, local Medical Health Officers (MHOs) must report Category I Communicable Diseases, as well as any communicable disease outbreaks to the Chief/Deputy Chief Medical Health Officer. Measles 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

Measles is an acute, highly communicable disease with early symptoms of fever, cough, runny nose, mild eye inflammation and diarrhea that lasts two to four days (range one to seven days). Koplik's spots (small, red spots with bluish-white spots in the centre) may occur opposite to the second molar teeth. A few days later, a characteristic red blotchy rash appears beginning behind the ear and on the face, gradually spreading down to the trunk and then the extremities. (see image, page 4)

The time from exposure to early symptoms such as fever (incubation period) averages 10-12 days. The time from exposure to start of the rash is about 14 days (seven to 18 days).

Measles virus is a member of the family paramyxovirus, genus *Morbillivirus.*

Measles was declared eliminated in Canada in 1998. In 2002, the World Health Organization (WHO) declared measles eliminated from the Americas (North America, Central America and South America). Measles virus is still circulating in the rest of the world.

Measles continues to be imported into Canada by infected people travelling to Canada or by susceptible people exposed when travelling to areas where measles cases are still common or experiencing measles out-breaks. This can lead to spread in Canada, particularly in those who are unvaccinated or under vaccinated.

Immunization

The Saskatchewan Routine Immunization Schedule for Infants, Children and Adolescents recommends two doses of measles containing vaccine as part of the routine childhood vaccination schedule.

The first dose is recommended at one year (12 months) and a second dose at 18 months of age.

Approximately 95% of people will be protected against measles after one dose of vaccine. After two doses, protection increases to 99%.

Immunization coverage rates measure the numbers of individuals who have received the appropriate doses by a specific date/age and are a reliable indicator of the preventative measures to control the spread of disease.

A very high level (92% -95%) of immunity in the population is required to interrupt/stop measles transmission.

Surveillance

Under the Saskatchewan *Public Health Act, 1994*, Saskatchewan health care providers are required to report cases of measles to the local Medical Health Officer (MHO) who then reports the case to the Chief/Deputy Chief Medical Health Officer using the case definition in the Saskatchewan Communicable Disease 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 may fluctuate dramatically over time. In these cases, 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.

Measles molecular epidemiology (genotyping) may be used to establish whether connections exist between concurrent measles cases or outbreaks and/or to indicate possible sources of importations.

EPIDEMIOLOGY SUMMARY

Measles in Saskatchewan: 2014

- 16 cases of measles (including two clusters of related cases) were reported from Regina Qu'Appelle, Prairie North and Sun Country Health Regions.
- Dates of rash onset ranged from January to April.
- The median* age of cases was 12 years.
- No cases were reported hospitalized.
- All 10 cases aged less than 20 years were unvaccinated, four of those being too young for the vaccination.
- Of the six cases 20 years and older, four had at least one dose and two had unknown vaccination status.

Measles in Saskatchewan: 2011 to 2014

- 25 cases of measles were reported province-wide from Five Hills, Prairie North, Prince Albert Parkland, Regina Qu'Appelle, Saskatoon, and Sun Country Health Regions.
- The median* age was 19 years.
- One case was reported to be hospitalized, 16 had unknown hospitalization status.
- Of the 13 cases aged less than 20 years, all were unvaccinated, with five cases being too young for the vaccination.
- Of the 12 cases aged 20 years and older, six were unimmunized, three had one and three had two doses of vaccine.
- Transmission is believed to have occurred in the province in at least 13 instances either by household contact, social contact or contact with a case with international travel history.
- Among the three cases who acquired measles internationally, travel was reported to Europe or the Philippines during the incubation period.
- Genotyping was available for 12 of the cases. Of those, three were B3, five were D8 and four were D9. Genotyping is an important tool for outbreak investigation.

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

Measles case counts by year

	2015*	2014	2013	2012	2011	Total
Saskatchewan	0	16	1	2	6	25
Canada	191	127	83	9	752	1162

* preliminary counts to date, April 2015

Measles case characteristics, 2011- 2014

Characteristics of measles cases - Saskatchewan 2011 - 2014		Cases	Percent of Cases
Total		25	100
Sex	Male	12	48
	Female	13	52
Age	less than 1 yr	4	16
	1 - 4 yrs	3	12
	5 - 19 yrs	6	24
	20 - 49 yrs	12	48
	50 yrs and over	0	0
Hospitalized	Yes	1	4
	No	8	32
	Unknown	16	64
Immunization status for measles vaccine	2 doses	3	12
	1 dose	4	16
	0 doses	13	52
	Too young	5	20
	Unknown	0	0
Source	International	3	12
	Phillipines 2		
	Europe 1		
	Canada	0	0
	Saskatchewan	22	88
Provincial source (n=22)	Domestic Travel	0	0
	Epidemiologically-linked to travel case	10	45
	Epidemiologically-linked to case with unknown source	5	23
	No identified source	7	32
Genotype*	B3	3	12
	D8	5	20
	D9	4	16
	unknown	13	52

*Laboratory analyses can identify different genotypes of measles which may help identify whether the virus was imported or possibly related to other cases.

Measles vaccine coverage rates for Saskatchewan by year

Age	Doses	2014	2013	2012
13 months	1	59.3%	55.2%	55.2%
18 months	1	84.4%	83.2%	83.9%
19 months	2	45.9%	43.8%	44.6%
	1	88.4%	89.1%	88.4%
24 months	2	75.9%	75.9%	74.9%
	1	93.6%	93.0%	93.1%
5 years	2	88.3%	87.4%	86.7%
7 years	2	91.1%	91.6%	91.5%
13 years (Grade 6)	2	94.9%	95.1%	95.5%
15 years (Grade 8)	2	96.0%	96.5%	96.6%
17 years	2	96.5%	96.5%	87.3%*

*Immunization records in SIMS may be incomplete for children born prior to 1996, therefore, the immunization coverage for 17-year-olds may not reflect the actual provincial rate.

EPIDEMIOLOGY SUMMARY

Measles Vaccine Coverage by Regional Health Authorities

Measles vaccine coverage rates, 2014

Health Region, by Peer Group	Vaccine coverage (% immunized), by age and dose										
	13 months	18 months	19 months	24 months		5 years		7 years	13 years (Grade 6)	15 years (Grade 8)	17 years
	1 dose	1 dose	2 doses	1 dose	2 doses	1 dose	2 doses	2 doses	2 doses	2 doses	2 doses
Saskatchewan	**59.3**	**84.4**	**45.9**	**88.4**	**75.9**	**93.6**	**88.3**	**91.1**	**94.9**	**96.0**	**96.5**
Peer Group A											
Regina Qu'Appelle	59.9	83.8	49.4	87.1	74.8	93.4	87.5	92.6	95.7	95.9	96.3
Saskatoon	62.8	86.0	49.8	90.0	78.7	93.9	88.4	91.1	94.4	95.9	96.8
Peer Group D											
Cypress	59.2	84.7	51.5	90.5	81.2	95.6	92.7	92.8	96.3	97.7	98.4
Five Hills	62.9	87.2	48.7	89.2	78.1	94.3	88.9	91.4	96.1	97.0	97.5
Heartland	65.2	89.5	50.1	92.2	82.9	94.4	90.3	92.5	96.2	97.7	98.5
Kelsey Trail	49.0	82.9	36.8	87.8	71.7	92.2	86.9	90.3	95.2	96.1	95.8
Sun Country	68.6	87.5	54.9	91.9	82.8	95.7	91.1	95.0	98.8	97.9	98.1
Sunrise	58.4	82.9	41.9	87.4	74.4	92.8	89.8	88.7	95.3	98.0	96.7
Peer Group F											
Athabasca	80.0	97.6	58.1	95.7	87.0	100.0	98.9	95.4	94.2	96.3	98.3
Keewatin Yatthe	47.3	87.8	23.8	92.7	66.7	99.4	95.7	97.9	99.2	98.6	97.8
Mamawetan Churchill River	55.3	88.0	24.3	92.6	74.4	97.5	94.7	95.3	96.0	88.8	93.0
Peer Group H											
Prince Albert Parkland	42.4	77.2	30.2	84.2	66.7	90.8	85.0	86.8	91.2	94.1	94.0
Prairie North	53.2	79.7	33.6	82.9	67.1	90.6	84.0	85.2	92.0	94.8	94.6

* Registered in SIMS as of January 15, 2015

Measles vaccine coverage rates, 2013

Health Region, by Peer Group	Vaccine coverage (% immunized), by age and dose										
	13 months	18 months	19 months	24 months		5 years		7 years	13 years (Grade 6)	15 years (Grade 8)	17 years
	1 dose	1 dose	2 doses	1 dose	2 doses	1 dose	2 doses	2 doses	2 doses	2 doses	2 doses
Saskatchewan	**55.2**	**83.2**	**43.8**	**89.1**	**75.9**	**93.0**	**87.4**	**91.6**	**95.1**	**96.5**	**96.5**
Peer Group A											
Regina Qu'Appelle	56.0	83.0	50.2	88.6	77.2	92.7	86.7	92.2	95.3	96.6	96.7
Saskatoon	57.5	84.5	45.6	90.4	79.1	93.5	87.3	92.7	95.0	97.0	97.0
Peer Group D											
Cypress	55.8	84.4	41.4	90.6	75.7	95.6	92.3	91.9	97.2	96.6	98.0
Five Hills	59.2	85.3	44.0	91.0	76.7	93.9	88.7	90.6	95.8	97.8	98.3
Heartland	63.4	89.6	45.5	92.1	80.0	94.7	91.7	92.3	96.3	96.7	98.1
Kelsey Trail	49.2	81.7	34.9	86.6	69.9	90.0	87.3	89.6	94.1	95.3	96.2
Sun Country	70.0	89.6	61.1	92.6	84.6	95.7	92.2	97.1	98.5	98.7	98.6
Sunrise	52.4	81.4	34.3	87.5	71.7	93.5	87.7	92.6	96.0	96.6	97.2
Peer Group F											
Athabasca	65.2	95.5	32.6	100.0	92.5	96.6	93.1	94.6	96.6	94.6	95.8
Keewatin Yatthe	52.2	87.3	25.9	95.3	80.0	94.9	92.3	91.8	96.4	100.0	97.2
Mamawetan Churchill River	49.2	84.2	29.3	94.4	69.2	94.3	88.5	84.9	91.4	90.5	89.5
Peer Group H											
Prince Albert Parkland	39.5	75.3	29.6	84.4	62.0	91.5	85.4	88.1	93.3	94.1	93.8
Prairie North	45.6	75.8	30.1	82.7	65.6	89.7	81.4	85.6	92.2	95.9	94.1

* Registered in SIMS as of January 15, 2014

Measles vaccine coverage rates, 2012

Health Region, by Peer Group	Vaccine coverage (% immunized), by age and dose										
	13 months	18 months	19 months	24 months		5 years		7 years	13 years (Grade 6)	15 years (Grade 8)	17 years
	1 dose	1 dose	2 doses	1 dose	2 doses	1 dose	2 doses	2 doses	2 doses	2 doses	2 doses
Saskatchewan	**55.2**	**83.9**	**44.6**	**88.4**	**74.9**	**93.1**	**86.7**	**91.5**	**95.5**	**96.6**	**** 87.3**
Peer Group A											
Regina Qu'Appelle	58.1	84.0	53.4	88.3	77.4	92.8	85.5	93.0	96.0	96.6	** 55.7
Saskatoon	57.3	84.3	44.8	88.5	75.3	94.1	87.4	91.8	95.2	97.1	95.8
Peer Group D											
Cypress	51.4	86.4	43.4	91.4	77.0	93.3	87.9	93.8	96.7	98.9	97.6
Five Hills	53.6	86.9	41.4	90.0	74.3	94.2	89.0	92.0	97.0	97.8	97.5
Heartland	54.5	88.4	47.5	90.5	80.8	94.1	90.2	95.0	96.8	98.7	97.4
Kelsey Trail	52.0	85.3	40.1	88.8	73.9	88.9	84.6	90.5	96.2	95.5	95.4
Sun Country	64.3	92.1	56.9	94.7	86.7	96.9	92.5	95.3	97.9	97.8	95.2
Sunrise	54.0	81.9	41.5	90.2	75.1	93.2	87.5	91.5	97.2	97.0	95.6
Peer Group F											
Athabasca	67.5	92.0	49.1	94.4	83.3	94.1	92.6	94.2	90.4	96.6	83.1
Keewatin Yatthe	48.2	88.2	21.4	90.9	76.6	98.1	96.1	96.1	98.6	97.8	94.4
Mamawetan Churchill River	43.8	83.2	32.6	87.5	67.0	89.2	84.5	78.2	82.9	90.5	80.8
Peer Group H											
Prince Albert Parkland	41.7	77.2	27.6	83.3	64.3	90.4	84.1	88.9	93.8	94.2	93.8
Prairie North	50.5	76.3	33.3	83.3	65.8	90.0	81.2	84.2	93.9	94.7	94.8

* Registered in SIMS as of January 15, 2013

Three years of coverage data in 11 age categories are provided by RHA. Yellow highlight indicates RHAs below the provincial coverage rate.

As measles vaccine is recommended at 12 and 18 months, data for 13 and 19 months are shown.

At a provincial level, coverage at 13 months has improved by over 4% from 2012 to 2014.

Other rates remained steady or showed modest improvements for ages up to and including 5 years.

For 13 months (2014), six RHAs exceeded the provincial average; seven were below. For 19 months seven RHAs exceeded the provincial average; six were below.

There is significant growth in coverage from the 19 to the 24 month age groups - an increase of 65.4% (two doses).

Across all 11 age categories, two RHAs were below the provincial rate in all 11 categories and one was below in nine age categories.

Three RHAs were at or above the provincial rate in all age categories and two had minor deficiencies in one age category.

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

**Immunization records in SIMS may be incomplete for children born prior to 1996, therefore, the immunization coverage for 17-year-olds may not reflect the actual provincial or RHA rates.

SURVEILLANCE CASE DEFINITION: Saskatchewan CD Manual

Respiratory and Direct Contact

Measles

Date Reviewed: May, 2014

Section: 2-90
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Notification Timeline:
From Lab/Practitioner to Public Health: Within 48 hours.
From Public Health to Ministry of Health: Within 72 hours.
Public Health Follow-up Timeline: Immediate.

Information
Case Definition (Public Health Agency of Canada, 2013)

Confirmed Case	Laboratory confirmation of infection in the absence of recent immunization* with measles-containing vaccine: • isolation of measles virus from an appropriate clinical specimen **OR** • detection of measles virus RNA† **OR** • seroconversion or a significant (e.g., fourfold or greater) rise in measles IgG titre by any standard serologic assay between acute and convalescent sera **OR** • positive serologic test for measles IgM antibody using a recommended assay‡ in a person who is either epidemiologically linked to a laboratory-confirmed case or has recently travelled to an area of known measles activity. **OR** Clinical illness in a person with an epidemiologic link to a laboratory-confirmed case.
Probable Case	Clinical illness • in the absence of appropriate laboratory tests **OR** • in the absence of an epidemiologic link to a laboratory-confirmed case **OR** • in a person who has recently travelled to an area of known measles activity.
Clinical Case	Clinical illness is characterized by all of the following features: • fever of 38.3° C or greater; • cough, coryza or conjunctivitis; • generalized maculopapular rash for at least 3 days.

* The most frequent reaction to measles-mumps-rubella (MMR) immunization is malaise and fever (with or without rash) occurring 6-23 days after immunization. However, this should be determined for each case, as these reactions and the timeframe can vary (Pubic Health Agency of Canada, 2012).
† Confirmation of genotype is required in recently vaccinated individuals (within the past 45 days) to determine if illness is related to wild virus or vaccine-related.
‡ IgM serology has the potential for false-positive findings. If the clinical presentation is inconsistent with a diagnosis of measles or in the absence of recent travel/exposure history, IgM results must be confirmed by the other listed confirmatory methods.
Most acute measles cases develop IgM after 3 days post rash onset. Therefore, a suspected measles case in which serum collected ≤ 3 days after rash onset initially tests IgM negative should have a second serum specimen collected > 3 days after onset for retesting for IgM. Further strain characterization is indicated for epidemiologic, public health and control purposes.

DATA NOTES

Case Data Source: Saskatchewan Integrated Public Health Information System (iPHIS), a provincially mandated integrated client-centered case management information system that supports public health surveillance. Confirmed cases must meet the provincial surveillance case definition.

Measles molecular epidemiology is a tool for tracking measles virus importations, establishing whether connections exist between concurrent measles cases or outbreaks, and demonstrating the absence of sustained measles transmission. Genotyping is performed by the National Medical Laboratory (NML).

Peer groups were created by Statistics Canada and consist of health regions with similar socio-economic characteristics so that important differences may be detected by comparing within a peer group. The thirteen health regions in Saskatchewan fall into four (identified by letters A , D, F and H) of the ten peer groups (A-J) across Canada.

Vaccine Coverage Data Source: Saskatchewan Immunization Management System (SIMS), 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 statistics for the entire provincial population. For further methodology information, please refer to http://www.saskatchewan.ca/live/health-and-healthy-living/public-health-advisories/public-health-monitoring-and-surveillance#saskatchewan-population-health-assessment-and-surveillance-reports

The measles vaccine is currently administered as measles, mumps, rubella and varicella (MMRV) or measles, mumps and rubella (MMR) vaccine. Immunization coverage is based on those who turned 13, 18, 19 and 24 months, and 5, 7, 13, 15 and 17 years by December 31 in 2012, 2013 and 2014. For example, the rate for 7 year olds in 2014 is based on births and immunization records up to December 2014.

Vaccine Preventable Disease Monitoring Report
Mumps, 2014

Report release date: October, 2015

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). Immunization coverage information is collected by the Saskatchewan Immunization Management System (SIMS) and Panorama. Limitations associated with these systems have been described elsewhere.

Under the *Saskatchewan Public Health Act, 1994* and the accompanying Disease Control Regulations, local Medical Health Officers (MHOs) must report Category I Communicable Diseases, as well as any communicable disease outbreaks to the Chief/Deputy Chief Medical Health Officer. Mumps is a Category I disease.

Report Features:

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Background

Mumps is an acute, viral communicable disease characterized by fever, swelling and tenderness of one or more salivary glands lasting more than two days. The parotid gland is usually affected hence the term parotitis (see image, page 4). Up to 30% of infected cases can be asymptomatic. Orchitis (inflammation of the testes) may occur in as many as 20-30% of postpubertal males. Meningitis or encephalitis occurrs in about 10% of cases. During the first trimester of pregnancy, mumps is associated with an increased rate of spontaneous abortion.

The time from exposure to early symptoms such as fever (incubation period) ranges from 14 to 25 days.

The mumps virus can be identified up to seven days before the onset of symptoms and for as long as 9-14 days after the onset of the illness. The period of maximum infectiousness is between two days before to four days after the onset of parotitis.

Mumps virus is a member of the family *Paramyxoviridae*, genus *Rubulavirus.*

Although mumps is not common in Canada, travelers outside of North America have a higher risk of exposure to mumps.

Mumps outbreaks still occur, especially in crowded institutions such as educational facilities.

Immunization

The Saskatchewan Routine Childhood Immunization Schedule recommends two doses of mumps containing vaccine for infants, children and adolescents. The doses are scheduled at 12 and 18 months of age. Mumps containing vaccine is also offered to school-age children (Grade 6, 8 and 12) who have not received two doses, and to susceptible adults born in 1970 or later.

Vaccination is the best way to prevent mumps. An immunity level of 75% to 86% is required to stop/ interrupt mumps transmission. One dose of vaccine is not sufficient to prevent mumps.

Immunization coverage that measures the proportion of individuals vaccinated with recommended doses is a reliable indicator of the preventative measures to control the spread of disease.

The effectiveness of mumps containing vaccine has been estimated at 62% to 91% for one dose and 76% to 95% for two doses.

Surveillance

Under the Saskatchewan *Public Health Act, 1994*, Saskatchewan health care providers are required to report cases of mumps to the local Medical Health Officer (MHO). The MHO then reports cases to the Chief/Deputy Chief Medical Health Officer 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 comparability of surveillance data. The definitions are not intended to be used for clinical or laboratory diagnosis or management of cases.

The variability in the number of mumps cases from one year to the next and in different geographical regions is usually because of outbreaks of the disease in communities.

EPIDEMIOLOGY SUMMARY

Mumps in Saskatchewan: 2014

- No cases of lab-confirmed mumps were reported.
- No cases were reported hospitalized.

Mumps case counts by year

	2015*	2014	2013	2012	2011	Total
Saskatchewan	1	0	2	0	0	3
Canada	N/A	N/A	94	49	274	417

*preliminary counts to date, April 2015

Mumps in Saskatchewan: 2011 to 2014

- Two cases of mumps were reported from Regina Qu'Appelle and Prairie North Health Regions.
- Dates of onset were in March and September.
- The median* age of cases was 32 years.
- No cases were reported hospitalized for mumps illnesses.
- One case had one primary dose of mumps-containing vaccine. The vaccination status of the other case is unknown.
- One of the cases of mumps was acquired in the Philippines, the other in Saskatchewan.
- Genotyping was not available for either of the cases.
- One case is known to have wild virus type disease and was not a contact of an immunized person. Details regarding the second case are unknown.

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

Mumps case characteristics, 2011-2014

Characteristics of mumps cases – Saskatchewan 2011 - 2014		Cases	Percent of Cases
Total		2	100
Sex	Male	0	0
	Female	2	100
Age	Less than 1 yr	0	0
	1 - 4 yrs	0	0
	5 - 19 yrs	0	0
	20 - 49	2	100
	50 yrs and over	0	0
Hospitalized	Yes	0	0
	No	2	100
	Unknown	0	0
Immunization for mumps vaccine	2 doses	0	0
	1 dose	1	50
	0 dose	0	0
	Too young	0	0
	Unknown	1	50
Source	International	1	50
	Canada	0	0
	Saskatchewan	1	50
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	1	50
Genotype*	Unknown	2	100

*Laboratory analyses can identify different genotypes of mumps which may help identify whether the virus was imported or possibly related to other cases.

Mumps vaccine coverage for Saskatchewan by year

Age	Doses	2014	2013	2012
13 months	1	59.0%	55.0%	54.9%
18 months	1	84.2%	83.0%	83.6%
19 months	2	45.6%	43.6%	44.3%
24 months	1	88.4%	89.0%	88.2%
	2	75.6%	75.7%	74.6%
5 years	1	93.3%	92.7%	92.7%
	2	87.9%	87.9%	86.2%
7 years	2	90.7%	91.2%	91.1%
13 years (Grade 6)	2	94.5%	94.6%	52.3%
15 years (Grade 8)	2	91.8%	89.8%	88.2%
17 years	2	89.5%	88.7%	*78.8%

*Immunization records in SIMS may be incomplete for children born prior to 1996; therefore, the coverage for 17-year-olds may not reflect the actual provincial rate.

EPIDEMIOLOGY SUMMARY

Mumps Vaccine Coverage by Health Region

Mumps vaccine coverage, 2014

Health Region, by Peer Group	Vaccine coverage (% immunized), by age and dose										
	13 months	18 months	19 months	24 months		5 years		7 years	13 years (Grade 6)	15 years (Grade 8)	17 years
	1 dose	1 dose	2 doses	1 dose	2 doses	1 dose	2 doses	2 doses	2 doses	2 doses	2 doses
Saskatchewan	**59.0**	**84.2**	**45.6**	**88.4**	**75.6**	**93.3**	**87.9**	**90.7**	**94.5**	**91.8**	**89.5**
Peer Group A											
Regina Qu'Appelle	59.5	83.5	49.1	86.9	74.5	93.1	87.0	92.3	95.3	92.4	90.8
Saskatoon	62.6	85.7	49.5	89.9	78.4	93.7	87.9	90.5	93.9	92.4	91.3
Peer Group D											
Cypress	59.2	84.7	51.5	90.5	81.0	95.6	92.3	92.6	96.3	94.1	95.1
Five Hills	62.8	87.2	48.4	89.2	78.0	93.7	88.9	91.1	96.0	95.3	93.0
Heartland	65.0	89.5	50.1	92.2	82.9	94.4	90.3	92.5	96.0	94.5	94.6
Kelsey Trail	48.5	82.9	36.2	87.8	71.1	92.0	86.3	89.9	95.0	92.5	88.6
Sun Country	68.2	87.5	54.8	91.9	82.5	95.2	91.1	94.9	98.5	95.9	94.0
Sunrise	58.3	82.9	41.7	87.4	74.3	92.5	89.5	88.3	95.3	93.3	89.3
Peer Group F											
Athabasca	80.0	97.6	58.1	95.7	87.0	100.0	98.9	95.4	94.2	83.3	86.4
Keewatin Yatthe	47.3	87.8	23.8	92.7	66.7	99.4	95.7	97.9	99.2	79.1	73.1
Mamawetan Churchill River	55.3	88.0	24.3	92.6	74.4	97.5	94.7	94.9	96.0	77.1	71.6
Peer Group H											
Prince Albert Parkland	42.4	77.2	30.2	84.2	66.6	90.8	84.9	86.6	90.7	89.3	82.0
Prairie North	53.0	79.6	33.5	82.7	67.1	90.6	83.7	84.5	91.6	87.4	81.8

Registered in SIMS as of January 15, 2015

Mumps vaccine coverage, 2013

Health Region, by Peer Group	Vaccine coverage (% immunized), by age and dose										
	13 months	18 months	19 months	24 months		5 years		7 years	13 years (Grade 6)	15 years (Grade 8)	17 years
	1 dose	1 dose	2 doses	1 dose	2 doses	1 dose	2 doses	2 doses	2 doses	2 doses	2 doses
Saskatchewan	**55.0**	**83.0**	**43.6**	**89.0**	**75.7**	**92.7**	**87.0**	**91.2**	**94.6**	**89.8**	**88.7**
Peer Group A											
Regina Qu'Appelle	55.7	82.8	49.8	88.5	76.9	92.2	86.3	91.9	94.9	91.1	90.4
Saskatoon	57.3	84.3	45.4	90.3	78.8	93.0	86.5	92.2	94.3	91.2	90.4
Peer Group D											
Cypress	55.8	84.4	41.2	90.6	75.5	95.6	92.3	91.5	96.6	93.2	92.5
Five Hills	59.1	85.3	44.0	91.0	76.7	93.7	88.7	90.3	95.3	92.6	93.3
Heartland	63.2	89.6	45.1	92.1	80.0	94.5	91.5	92.3	96.1	92.3	94.9
Kelsey Trail	49.2	81.7	34.9	86.4	69.9	89.6	87.3	89.0	93.7	87.6	87.8
Sun Country	70.0	89.6	61.1	92.6	84.7	95.7	91.9	96.8	98.1	94.7	95.2
Sunrise	52.2	81.3	34.1	87.3	71.7	93.5	87.5	92.0	95.7	89.2	90.3
Peer Group F											
Athabasca	65.2	95.5	32.6	100.0	92.5	96.6	93.1	94.6	96.6	81.1	87.5
Keewatin Yatthe	52.2	87.3	25.9	95.3	80.0	94.9	92.3	91.8	94.6	80.0	73.2
Mamawetan Churchill River	49.2	84.2	29.3	94.4	69.2	94.3	88.5	84.9	91.4	73.8	63.3
Peer Group H											
Prince Albert Parkland	39.4	75.3	29.5	84.4	61.8	91.5	85.3	88.0	93.0	84.8	79.5
Prairie North	45.5	75.8	29.9	82.7	65.3	89.5	81.2	85.2	91.7	84.0	79.2

Registered in SIMS as of January 15, 2014

Mumps vaccine coverage, 2012

Health Region, by Peer Group	Vaccine coverage (% immunized), by age and dose										
	13 months	18 months	19 months	24 months		5 years		7 years	13 years (Grade 6)	15 years (Grade 8)	17 years
	1 dose	1 dose	2 doses	1 dose	2 doses	1 dose	2 doses	2 doses	2 doses	2 doses	2 doses
Saskatchewan	**54.9**	**83.6**	**44.3**	**88.2**	**74.6**	**92.7**	**86.2**	**91.1**	**52.3**	**88.2**	**** 78.8**
Peer Group A											
Regina Qu'Appelle	57.6	83.7	53.0	88.1	77.0	92.2	84.7	92.5	56.2	90.0	** 49.1
Saskatoon	56.8	83.9	44.2	88.1	74.8	93.8	86.8	91.2	50.0	90.7	87.9
Peer Group D											
Cypress	51.0	86.4	43.2	91.4	77.0	93.3	87.9	93.8	47.5	94.4	93.3
Five Hills	53.3	86.6	41.4	90.0	74.1	93.7	88.5	91.6	50.5	92.4	92.7
Heartland	54.5	88.4	47.5	90.5	80.8	93.3	90.0	94.8	42.2	94.0	92.4
Kelsey Trail	52.0	84.9	39.7	88.6	73.5	88.9	84.4	90.5	53.1	88.3	85.8
Sun Country	64.3	92.1	57.1	94.7	86.5	96.5	91.9	95.3	45.3	91.7	91.0
Sunrise	54.0	81.7	41.3	90.2	74.6	92.9	87.5	91.1	51.9	89.6	89.1
Peer Group F											
Athabasca	67.5	92.0	49.1	94.4	83.3	94.1	92.6	94.2	59.6	69.0	74.6
Keewatin Yatthe	48.2	88.2	21.4	90.9	76.6	98.1	96.1	96.1	55.7	57.4	61.3
Mamawetan Churchill River	43.8	83.2	32.6	87.5	67.0	88.7	84.0	78.2	52.6	63.3	60.8
Peer Group H											
Prince Albert Parkland	41.5	77.0	27.4	83.3	64.2	90.4	83.8	88.6	59.4	80.8	79.5
Prairie North	50.4	76.3	33.3	83.2	65.8	89.7	81.0	83.9	53.7	79.2	81.1

Registered in SIMS as of January 15, 2013

Three years of coverage data in 11 age/dose categories are provided by RHAs which are clustered by peer group. Yellow highlighting indicates RHAs below the provincial coverage rate.

As mumps vaccine is recommended at 12 and 18 months, data for 13 and 19 months are shown.

At a provincial level, coverage at 13 months has improved by 7% from 2012 to 2014.

Other rates remained steady or showed modest improvements for ages up to and including 5 years.

For 13 months (2014), seven health regions exceeded the provincial average (59%); six were below. For 19 months, seven RHAs exceeded the provincial average (46%); six were below.

There is a significant improvement in coverage from the 19 to the 24 month age groups in 2014 – an increase of 66% (two doses).

Across all 11 categories and for all three years, except 13 and 17 years in 2012, two RHAs were below the provincial rate.

Only one RHA (Sun Country) was at or above the provincial rate in all age/dose categories for all three years.

Coverage rates for health regions in Peer Group F and H should be interpreted with caution (see Data Notes).

**Immunization records in SIMS may be incomplete for children born prior to 1996; therefore, the immunization coverage for 17-year-olds may not reflect the actual provincial or RHA rates.

SURVEILLANCE CASE DEFINITION: Saskatchewan CDC Manual

Respiratory and Direct Contact Mumps	
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 illness[1] and laboratory confirmation of infection in the absence of recent immunization with mumps-containing vaccine: • isolation of mumps virus from an appropriate clinical specimen **OR** • detection of mumps virus RNA **OR** • seroconversion or a significant rise (e.g., fourfold or greater) in mumps IgG titre by any standard serologic assay between acute and convalescent sera **OR** • positive serologic test for mumps IgM antibody in a person who is either epidemiologically linked to a laboratory-confirmed case or has recently travelled to an area of known mumps activity. **OR** Clinical illness[1] in a person with an epidemiologic link to a laboratory-confirmed case.
Probable Case	Clinical illness[1] • in the absence of appropriate laboratory tests **OR** • in the absence of an epidemiologic link to a laboratory-confirmed case.

Photo Courtesy of Centers for Disease Control/ Patricia Smith; Barbara Rice

[1] Clinical illness is characterized by acute onset of unilateral or bilateral tender, self-limited swelling of the parotid or other salivary gland, lasting > 2 days, and without other apparent cause.

To confirm diagnosis of the mumps, the following must be taken into consideration:

- lab information;
- clinical presentation;
- case history.

DATA NOTES

Case Data Source: Saskatchewan Integrated Public Health Information System (iPHIS), a provincially mandated integrated client-centered case management information system that supports public health surveillance. Confirmed cases must meet the provincial surveillance case definition.

Mumps molecular epidemiology is a tool for tracking mumps virus importations, establishing whether connections exist between concurrent mumps cases or outbreaks, and demonstrating the absence of sustained mumps transmission. Genotyping is performed by the National Medical Laboratory (NML).

Peer groups were created by Statistics Canada. A peer group consists of health regions with similar socio-economic characteristics so that important differences may be detected by comparing within a peer group. The thirteen health regions in Saskatchewan fall into four (identified by letters A , D, F and H) of the ten peer groups (A to J) across Canada.

Vaccine Coverage Data Source: 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/regional population. For further methodology information, please refer to http://www.saskatchewan.ca/residents/health/public-health-advisories/public-health-monitoring-and-surveillance#saskatchewan-population-health-assessment-and-surveillance-reports.

Mumps vaccine is currently administered as measles-mumps-rubella-varicella (MMRV) or measles-mumps-rubella (MMR) vaccine. Immunization coverage is based on those who turned 13, 18, 19 and 24 months, and 5, 7, 13, 15 and 17 years by December 31 in 2012, 2013 and 2014. For example, the immunization coverage for 7 year olds in 2014 is based on clients who were born in 2007 and their immunization records up to December 31, 2014.

Vaccine Preventable Disease Monitoring Report
Rubella, 2014

Report release date: October, 2015

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). Immunization coverage information is collected by the Saskatchewan Immunization Management System (SIMS) and Panorama. Limitations associated with these systems have been described elsewhere.

Under the *Saskatchewan Public Health Act, 1994* and the accompanying Disease Control Regulations, local Medical Health Officers (MHOs) must report Category I Communicable Diseases, as well as any communicable disease outbreaks to the Chief/Deputy Chief Medical Health Officer. Rubella is a Category I disease.

Report Features:

Background

Epidemiological Summary

Surveillance Case Definition

Case Counts by Year

Case Characteristics

Vaccine Coverage by RHA

Prepared by:

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Background

Rubella, also called German measles or three-day measles, is a contagious viral infection characterized by a distinctive red rash. It is not the same as measles (rubeola) – it is caused by a different virus and is not as infectious or severe.

Symptoms are generally mild and occur 2-3 weeks after exposure, last 2-3 days and may include: mild fever (up to 38.9°); headache, stuffy nose, inflamed, red eyes; enlarged lymph nodes at base of skull, back of neck and behind the ears; a fine pink rash that begins on the face, spreads to the trunk and then arms and legs, disappearing in same sequence; and aching joints, particularly in young women.

Women contemplating pregnancy should ensure their immunizations are up to date. The virus can cause fetal death or serious birth defects, especially in the first trimester. Rubella during pregnancy is the most common cause of congenital deafness.

Rubella virus is a member of the family *Togaviridae*, genus *Rubivirus.*

Rubella was declared eliminated in Canada in 2005. In 2015, the World Health Organization (WHO) declared rubella eliminated from the Americas (North America, Central America and South America). Rubella virus is still circulating in the rest of the world.

Rubella continues to be imported into Canada by infected people travelling to Canada or by susceptible people exposed when travelling to areas where rubella cases are still common or experiencing rubella out-breaks. This can lead to spread in Canada, particularly in those who are unvaccinated or under vaccinated.

Immunization

The Saskatchewan Routine Childhood Immunization Schedule recommends two doses of rubella containing vaccine for infants, children and adolescents. The first dose is recommended at 12 months of age and a second dose at 18 months.

Rubella is highly communicable and occurs throughout the world. An immunity threshold of 83% to 85% is required to interrupt/stop rubella transmission. Of those immunized against rubella, over 97% develop immunity after one dose of the vaccine.

Immunization coverage is a reliable indicator of the preventative measures to control the spread of disease. It measures the proportion of individuals immunized with the recommended doses.

Surveillance

Under the Saskatchewan *Public Health Act, 1994*, Saskatchewan health care providers are required to report cases of rubella to the local Medical Health Officer. The MHO then reports cases to the Chief/Deputy Chief Medical Health Officer using the case definition in the Saskatchewan Communicable Disease 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 may fluctuate dramatically over time. In these cases, 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 patients.

Rubella molecular epidemiology (genotyping) may be used to establish whether connections exist between concurrent rubella cases or outbreaks and/or to indicate possible sources of importations from outside Canada.

Government of Saskatchewan

EPIDEMIOLOGY SUMMARY

Rubella in Saskatchewan: 2014

- No cases of lab-confirmed rubella were reported.
- No cases were reported hospitalized.

Rubella case counts by year

	2015*	2014	2013	2012	2011	Total
Saskatchewan	0	0	0	0	0	0
Canada	N/A	N/A	2	2	2	6

*preliminary counts to date, April 2015

Rubella in Saskatchewan: 2011 to 2014

- No cases of lab-confirmed rubella were reported.
- No cases were reported hospitalized.

Rubella case characteristics, 2011-2014

Characteristics of rubella cases – Saskatchewan 2011 - 2014		Cases	Percent of Cases
Total		0	0
Sex	Male	0	0
	Female	0	0
Age	Less than 1 yr	0	0
	1 - 4 yrs	0	0
	5 - 19 yrs	0	0
	20 - 49	0	0
	50 yrs and over	0	0
Hospitalized	Yes	0	0
	No	0	0
	Unknown	0	0
Immunization for rubella vaccine	2 doses	0	0
	1 dose	0	0
	0 dose	0	0
	Too young	0	0
	Unknown	0	0
Source	International	0	0
	Canada	0	0
	Saskatchewan	0	0
Provincial source (n=0)	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	0	0

*Laboratory analyses can identify different genotypes of rubella which may help identify whether the virus was imported or possibly related to other cases.

Rubella vaccine coverage for Saskatchewan by year

Age	Doses	2014	2013	2012
13 months	1	59.1%	55.0%	54.9%
18 months	1	84.3%	83.1%	83.6%
19 months	1	85.7%	84.7%	85.3%
	2	45.7%	43.6%	44.3%
24 months	1	88.4%	89.0%	88.2%
	2	75.6%	75.7%	74.7%
5 years	1	93.4%	92.8%	92.7%
	2	88.0%	87.0%	86.2%
7 years	1	94.3%	94.6%	94.6%
	2	90.7%	91.2%	91.1%
13 years (Grade 6)	1	96.1%	96.4%	96.9%
	2	94.6%	94.7%	95.0%
15 years (Grade 8)	1	97.4%	97.7%	97.7%
	2	95.7%	96.2%	96.3%
17 years	1	97.6%	97.7%	*88.8%
	2	96.2%	96.3%	*87.1%

*Immunization records in SIMS may be incomplete for children born prior to 1996; therefore, the coverage for 17-year-olds may not reflect the actual provincial rate.

EPIDEMIOLOGY SUMMARY

Rubella Vaccine Coverage by Health Region

Rubella vaccine coverage, 2014

Health Region, by Peer Group	Vaccine coverage (% immunized), by age and dose										
	13 months	18 months	19 months	24 months		5 years		7 years	13 years (Grade 6)	15 years (Grade 8)	17 years
	1 dose	1 dose	2 doses	1 dose	2 doses	1 dose	2 doses	2 doses	2 doses	2 doses	2 doses
Saskatchewan	**59.1**	**84.3**	**45.7**	**88.4**	**75.6**	**93.4**	**88.0**	**90.7**	**94.6**	**95.7**	**96.2**
Peer Group A											
Regina Qu'Appelle	59.6	83.5	49.1	86.9	74.5	93.1	87.0	92.2	95.3	95.5	96.1
Saskatoon	62.7	85.8	49.5	89.9	78.4	93.7	88.0	90.5	93.9	95.6	96.4
Peer Group D											
Cypress	59.2	84.7	51.5	90.5	81.0	95.6	92.5	92.6	96.3	97.5	98.4
Five Hills	62.8	87.2	48.4	89.2	78.0	93.7	88.9	91.1	96.0	97.0	97.5
Heartland	65.0	89.5	50.1	92.2	82.9	94.4	90.3	92.5	96.0	97.5	98.5
Kelsey Trail	48.5	82.9	36.4	87.8	71.3	92.0	86.3	89.9	95.0	95.9	95.8
Sun Country	68.3	87.5	54.8	91.9	82.5	95.2	91.1	95.0	98.5	97.4	97.9
Sunrise	58.3	82.9	41.7	87.4	74.3	92.7	89.8	88.4	95.3	97.8	96.6
Peer Group F											
Athabasca	80.0	97.6	58.1	95.7	87.0	100.0	98.9	95.4	94.2	96.3	98.3
Keewatin Yatthe	47.3	87.8	23.8	92.7	66.7	99.4	95.7	97.9	99.2	98.6	97.8
Mamawetan Churchill River	55.3	88.0	24.3	92.6	74.4	97.5	94.7	95.3	96.0	88.8	93.0
Peer Group H											
Prince Albert Parkland	42.4	77.2	30.2	84.2	66.7	90.8	84.9	86.7	90.9	94.1	93.9
Prairie North	53.0	79.6	33.5	82.7	67.1	90.6	83.8	84.6	91.7	94.1	94.3

Registered in SIMS as of January 15, 2015

Rubella vaccine coverage, 2013

Health Region, by Peer Group	Vaccine coverage (% immunized), by age and dose										
	13 months	18 months	19 months	24 months		5 years		7 years	13 years (Grade 6)	15 years (Grade 8)	7 years
	1 dose	1 dose	2 doses	1 dose	2 doses	1 dose	2 doses	2 doses	2 doses	2 doses	2 doses
Saskatchewan	**55.0**	**83.1**	**43.6**	**89.0**	**75.7**	**92.8**	**87.0**	**91.2**	**94.7**	**96.2**	**96.3**
Peer Group A											
Regina Qu'Appelle	55.7	82.8	49.8	88.5	76.9	92.2	86.3	91.9	94.9	96.1	96.4
Saskatoon	57.3	84.3	45.4	90.3	78.9	93.1	86.6	92.3	94.5	96.6	96.7
Peer Group D											
Cypress	55.8	84.4	41.2	90.6	75.5	95.6	92.3	91.5	96.6	96.4	97.8
Five Hills	59.1	85.3	43.9	91.0	76.7	93.7	88.7	90.3	95.3	97.8	98.1
Heartland	63.2	89.6	45.1	92.1	80.0	94.5	91.5	92.3	96.3	96.7	98.0
Kelsey Trail	49.2	81.7	34.9	86.4	69.9	89.6	87.3	89.4	93.7	94.9	96.0
Sun Country	70.0	89.6	61.1	92.6	84.7	95.7	91.9	96.8	98.1	98.4	98.5
Sunrise	52.2	81.3	34.1	87.3	71.7	93.5	87.7	92.1	95.9	96.6	97.0
Peer Group F											
Athabasca	65.2	95.5	32.6	100.0	92.5	96.6	93.1	94.6	96.6	94.6	95.8
Keewatin Yatthe	52.2	87.3	25.9	95.3	80.0	94.9	92.3	91.8	96.4	100.0	97.2
Mamawetan Churchill River	49.2	84.2	29.3	94.4	69.2	94.3	88.5	84.9	91.4	90.5	89.5
Peer Group H											
Prince Albert Parkland	39.4	75.3	29.5	84.4	61.8	91.5	85.3	87.9	93.3	94.1	93.9
Prairie North	45.5	75.8	29.9	82.7	65.3	89.5	81.2	85.2	92.0	95.6	93.9

Registered in SIMS as of January 15, 2014

Rubella vaccine coverage, 2012

Health Region, by Peer Group	Vaccine coverage (% immunized), by age and dose										
	13 months	18 months	19 months	24 months		5 years		7 years	13 years (Grade 6)	15 years (Grade 8)	7 years
	1 dose	1 dose	2 doses	1 dose	2 doses	1 dose	2 doses	2 doses	2 doses	2 doses	2 doses
Saskatchewan	**54.9**	**83.6**	**44.3**	**88.2**	**74.7**	**92.7**	**86.2**	**91.1**	**95.0**	**96.3**	*** 87.1**
Peer Group A											
Regina Qu'Appelle	57.6	83.7	53.0	88.2	77.1	92.2	84.8	92.5	95.6	96.3	* 55.6
Saskatoon	56.9	83.9	44.2	88.1	74.9	93.8	86.8	91.2	94.4	96.6	95.4
Peer Group D											
Cypress	51.0	86.4	43.2	91.4	77.0	93.3	87.9	93.8	96.0	98.7	97.4
Five Hills	53.3	86.6	41.4	90.0	74.1	94.0	88.7	91.6	96.8	97.8	97.5
Heartland	54.5	88.4	47.5	90.5	80.8	93.3	90.0	94.8	96.8	98.9	97.4
Kelsey Trail	52.0	84.9	39.7	88.6	73.5	88.9	84.4	90.5	95.7	95.3	95.0
Sun Country	64.3	92.1	57.1	94.7	86.5	96.5	92.1	95.3	97.4	97.6	95.1
Sunrise	54.0	81.9	41.5	90.2	75.1	92.9	87.5	91.3	96.7	96.7	95.2
Peer Group F											
Athabasca	67.5	92.0	49.1	94.4	83.3	94.1	92.6	94.2	90.4	96.6	83.1
Keewatin Yatthe	48.2	88.2	21.4	90.9	76.6	98.1	96.1	96.1	98.6	97.8	94.4
Mamawetan Churchill River	43.8	83.2	32.6	87.5	67.0	89.2	84.0	78.2	82.9	90.5	80.8
Peer Group H											
Prince Albert Parkland	41.5	77.0	27.4	83.3	64.2	90.4	83.8	88.6	93.5	94.0	93.8
Prairie North	50.4	76.3	33.3	83.2	65.8	89.7	81.0	83.9	93.4	94.4	94.5

Registered in SIMS as of January 15, 2013

Three years of coverage data in 11 age/dose categories are provided by RHAs which are clustered by peer group. Yellow highlighting indicates RHAs below the provincial coverage rate.

As rubella vaccine is recommended at 12 and 18 months, data for 13 and 19 months are shown.

At a provincial level, coverage at 13 months has improved by 8% from 2012 to 2014.

Other rates remained steady or have shown modest improvements for ages up to and including 5 years.

For 13 months (2014), seven RHAs exceeded the provincial average (59.1%); six were below. For 19 months (two doses), seven RHAs exceeded the provincial average (45.7%); six were below.

There is a significant increase in coverage from the 19 to the 24 month age groups in 2014 - an increase of 65% (two doses).

Across all 11 categories, two RHAs were below the provincial rate in all 11 categories.

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

**Immunization records in SIMS may be incomplete for children born prior to 1996; therefore, the immunization coverage for 17-year-olds may not reflect the actual provincial or regional rates.

SURVEILLANCE CASE DEFINITION: Saskatchewan CDC Manual

Respiratory and Direct Contact
Rubella

Notification Timeline:

From Lab/Practitioner to Public Health: Within 48 hours (or immediate if an outbreak is suspected).

From Public Health to Ministry of Health: Within 72 hours (or immediate if an outbreak is suspected).

Public Health Follow-up Timeline: Initiate within 24-48 hrs.

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

Confirmed Case	Laboratory confirmation of infection in the absence of recent immunization with rubella containing vaccine: • isolation of rubella virus from an appropriate clinical specimen **OR** • detection of rubella virus RNA **OR** • seroconversion or a significant (e.g., fourfold or greater) rise in rubella IgG titre by any standard serologic assay between acute and convalescent sera **OR** • positive serologic test for rubella IgM antibody using a recommended assay in a person with an epidemiologic link to a laboratory-confirmed case or who has recently travelled to an area of known rubella activity. **OR** Clinical illness[1] in a person with an epidemiologic link to a laboratory-confirmed case.
Probable Case	Clinical illness[1] • in the absence of appropriate laboratory tests **OR** • in the absence of an epidemiologic link to a laboratory-confirmed case **OR** • in a person who has recently travelled to an area of known rubella activity.

Photo Courtesy of Centers for Disease Control

[1]Clinical illness is characterized by fever and rash, and at least one of the following:

- arthralgia/arthritis;
- lymphadenopathy;
- conjunctivitis.

DATA NOTES

Case Data Source: Saskatchewan Integrated Public Health Information System (iPHIS), a provincially mandated integrated client-centered case management information system that supports public health surveillance. Confirmed cases must meet the provincial surveillance case definition.

Rubella molecular epidemiology is a tool for tracking rubella virus importations, establishing whether connections exist between concurrent rubella cases or outbreaks, and demonstrating the absence of sustained rubella transmission. Genotyping is performed by the National Medical Laboratory (NML).

Peer groups were created by Statistics Canada. A peer group consists of health regions with similar socio-economic characteristics so that important differences may be detected by comparing within a peer group. The thirteen health regions in Saskatchewan fall into four (identified by letters A , D, F and H) of the ten peer groups (A to J) across Canada.

Vaccine Coverage Data Source: 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/regional population. For further methodology information, please refer to http://www.saskatchewan.ca/residents/health/public-health-advisories/public-health-monitoring-and-surveillance#saskatchewan-population-health-assessment-and-surveillance-reports.

Rubella vaccine is currently administered as measles-mumps-rubella-varicella (MMRV) or measles-mumps-rubella (MMR) vaccine. Immunization coverage is based on those who turned 13, 18, 19 and 24 months, and 5, 7, 13, 15 and 17 years by December 31 in 2012, 2013 and 2014. For example, the immunization coverage for 7 year olds in 2014 is based on clients who were born in 2007 and their immunization records up to December 31, 2014.

Vaccine Preventable Disease Monitoring Report
Pertussis, 2014

Report release date: November, 2015

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 and vaccine coverage rates as collected by the Integrated Public Health Information System (iPHIS). Immunization coverage information is collected by the Saskatchewan Immunization Management System (SIMS) and Panorama. Limitations associated with these systems have been described elsewhere.

Under the *Saskatchewan Public Health Act, 1994* and the accompanying Disease Control Regulations, local Medical Health Officers (MHOs) must report Category I Communicable Diseases, as well as any communicable disease outbreaks to the Chief/Deputy Chief Medical Health Officer. Pertussis is a Category I disease.

Report Features:

Prepared by:

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Background

Pertussis (whooping cough) is a highly contagious bacterial disease that begins with mild respiratory symptoms, cough and sometimes fever, and can progress to severe coughing attacks characterized by a "whoop sound" when a breath is taken.

One to three deaths related to pertussis occur each year in Canada, particularly in infants who are too young to be immunized, or in unimmunized or partially immunized children. Deaths were not required to be reported prior to 2014, although it was common practice to do so.

The time from exposure to early symptoms such as cough (the incubation period) averages nine to 10 days.

Pertussis is caused by the bacteria *Bordetella pertussis.*

The bacteria is easily spread by droplets from the nose or mouth or through direct contact with the respiratory secretions of an infected person.

Pertussis becomes more active on a cyclical basis with increased cases being reported every two to five years. The variability in the number of pertussis cases from one year to the next and in different geographical regions is often because of outbreaks. Saskatchewan last experienced a peak year in 2010 with 234 cases.

Immunization

Acellular pertussis vaccine is only available in combination vaccines. The Saskatchewan Routine Childhood Immunization Schedule recommends a four dose primary series of pertussis vaccine at 2, 4, 6 and 18 months of age, one booster at 4 to 6 years of age and a second booster in Grade 8. Adults are eligible to receive one lifetime pertussis vaccine dose.

Transmission is less likely in or to people who are vaccinated. Adolescents and adults who have not received a booster are at risk of infection and are often the source of infection for infants. Infants too young for vaccination are at the greatest risk for serious pertussis complications and deaths.

The efficacy of acellular pertussis vaccine following the primary series is estimated to be about 85%, and approximately 90% following booster immunization.

Surveillance

Under the Saskatchewan *Public Health Act, 1994*, Saskatchewan health care providers are required to report cases of pertussis to the local Medical Health Officer (MHO) who then reports the case to the Chief/ Deputy Chief Medical Health Officer 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 to allow comparability of surveillance data. The definitions are not intended to be used for clinical or laboratory diagnosis or management of cases.

Currently molecular epidemiology genotyping is not available for pertussis.

EPIDEMIOLOGY SUMMARY

Pertussis in Saskatchewan: 2014

- Forty-seven (47) cases of lab-confirmed pertussis were reported.
- Two community outbreaks where children were under-immunized accounted for 12 (25%) of cases.
- Five of 10 infant cases were too young to be adequately protected by immunization and two cases among infants were hospitalized.
- There were no deaths from pertussis.

Pertussis in Saskatchewan: 2011 to 2014

One hundred forty-eight cases of pertussis ranging in age from three weeks to 79 years were reported. The median* age of cases was 17 years.

Almost half of the cases (47%) lived in the regional health authorities of Regina-Qu'Appelle and Saskatoon. Just over one quarter (26%) lived in First Nations health authorities.

Thirty cases were hospitalized, 19 were infants.

One case of pertussis under the age of one year is known to have died.

Seven of 37 infant cases were too young to begin their primary immunization series for pertussis and another fourteen had begun their series but were too young to complete it at the time of infection. Five had completed their series but still became infected. Another 11 infants who were old enough to complete their series had either not started or were at various points in completing their series.

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

Special Note: The Cycle of Pertussis
In 2004 there were 393 confirmed cases; and 232 cases in 2005. 2010 saw 234 confirmed cases and two infant deaths, followed by three years where case numbers dropped.

Pertussis case counts by year

	2015*	2014	2013	2012	2011	Total
Saskatchewan	94	47	19	34	48	242
Canada	N/A	N/A	1275	4540	697	6512

*preliminary counts to date, October 2015

Pertussis case characteristics, 2011-2014

Characteristics of pertussis cases – Saskatchewan 2011 - 2014		Cases	Percent of Cases
Total		148	100
Sex	Male	70	47
	Female	78	53
Age	Less than 1 yr	37	25
	1 - 4 yrs	22	15
	5 - 19 yrs	46	31
	20 - 49	30	20
	50 yrs and over	13	9
Hospitalized	Yes	30	20
	No	0	0
	Unknown	118	80
Immunization for pertussis vaccine*	3 doses	5	3
	2 doses	6	4
	1 dose	11	7
	0 dose	7	5
	Too young	8	5
	Unknown	111	76
Source	International	0	0
	Canada	0	0
	Saskatchewan	148	100
Genotype	Not applicable	N/A	N/A

*Immunization status is monitored for infant cases only.

Pertussis vaccine coverage for Saskatchewan by year

Primary Series: Infants and toddlers up to 2 years of age				
Age	Doses	2014	2013	2012
3 months	1	84.1%	83.3%	82.8%
5 months	1	91.9%	91.3%	91.8%
	2	73.7%	73.7%	72.0%
8 months	1	93.7%	93.6%	94.0%
	2	88.1%	87.8%	87.6%
	3	76.4%	75.7%	74.5%
12 months	3	84.7%	84.4%	84.7%
20 months	3	88.8%	89.1%	88.8%
	4	60.1%	58.7%	59.3%
24 months	3	89.8%	90.4%	89.3%
	4	75.7%	76.3%	75.4%

Boosters: Children 4 to 17 years of age				
Age	Doses	2014	2013	2012
4 years	3	91.8%	92.3%	91.8%
	4	84.8%	84.8%	84.0%
7 years	4	90.5%	91.1%	91.0%
	5	77.8%	78.3%	77.6%
13 years (Grade 6)	4	92.7%	93.1%	93.6%
	5	80.2%	80.7%	82.4%
15 years (Grade 8)	4	94.9%	95.3%	95.3%
	5	89.5%	89.8%	89.8%
	6	72.2%	72.9%	73.1%
17 years	5	89.7%	89.9%	81.1%*
	6	74.3%	75.0%	67.3%*

*Immunization records in SIMS may be incomplete for children born prior to 1996; therefore, the coverage for 17-year-olds may not reflect the actual provincial rate.

EPIDEMIOLOGY SUMMARY

Pertussis Vaccine Coverage by Health Region: 2014

Primary Series: Infants & Toddlers up to 2 years of age

Health Region, by Peer Group	Vaccine coverage (% immunized), by age and dose																
	3 months	5 months		8 months			12 months			20 months				24 months			
	1 dose	1 dose	2 doses	1 dose	2 doses	3 doses	1 dose	2 doses	3 doses	1 dose	2 doses	3 doses	4 doses	1 dose	2 doses	3 doses	4 doses
Saskatchewan	**84.1**	**91.9**	**73.7**	**93.7**	**88.1**	**76.4**	**94.6**	**90.7**	**84.7**	**95.3**	**92.5**	**88.8**	**60.1**	**95.4**	**92.8**	**89.8**	**75.7**
Peer Group A																	
Regina Qu'Appelle	86.2	93.0	74.6	94.2	88.8	78.0	94.7	90.9	85.3	94.9	91.8	88.7	62.6	95.0	91.9	89.2	75.0
Saskatoon	84.7	91.7	76.2	93.6	88.4	77.2	94.6	91.2	85.2	95.8	93.1	89.8	63.0	96.0	93.3	90.1	78.3
Peer Group D																	
Cypress	88.2	94.3	76.1	95.8	90.6	79.2	95.4	92.7	88.4	95.6	94.0	89.8	65.9	96.1	94.8	92.4	80.8
Five Hills	87.1	93.4	78.9	94.6	91.7	81.8	94.5	91.9	89.0	95.6	93.6	91.0	62.2	94.9	93.9	91.4	79.9
Heartland	86.2	91.0	74.9	93.3	89.3	83.1	94.2	92.7	88.7	96.1	95.1	92.6	63.7	96.7	95.7	94.1	82.4
Kelsey Trail	85.2	92.9	70.4	95.4	90.5	74.0	94.3	90.7	84.3	94.6	91.5	87.5	49.9	95.6	93.5	91.8	73.0
Sun Country	90.7	94.8	88.4	95.3	93.8	90.0	96.1	94.2	92.3	95.8	94.5	91.8	68.8	96.5	95.7	94.2	83.7
Sunrise	82.6	92.4	72.0	93.8	89.6	78.4	93.7	91.5	86.8	93.6	92.3	88.9	61.0	93.0	91.7	88.9	73.8
Peer Group F																	
Athabasca	82.8	100.0	65.6	100.0	100.0	84.2	100.0	100.0	97.8	100.0	97.7	97.7	77.3	100.0	95.7	95.7	91.3
Keewatin Yatthé	69.5	89.3	51.4	95.7	77.3	51.1	96.8	88.6	74.1	98.3	96.6	90.4	39.3	98.8	96.4	92.1	64.8
Mamawetan Churchill River	71.8	94.5	54.3	97.0	87.6	59.2	97.7	91.3	80.0	98.9	95.7	90.2	44.2	98.2	96.5	93.3	70.9
Peer Group H																	
Prince Albert Parkland	73.2	86.1	59.4	90.3	79.9	63.2	92.6	84.5	75.1	94.1	89.5	81.3	45.0	94.3	90.6	84.5	64.8
Prairie North	79.1	89.1	66.7	91.0	83.3	69.1	93.7	88.1	78.8	93.8	90.1	85.5	52.0	92.9	88.8	85.2	66.8

Boosters: Children 4 to 17 years of age

Health Region, by Peer Group	Vaccine coverage (% immunized), by age and dose														
	4 years		7 years			13 years (Grade 6)			15 years (Grade 8)			17 years		
	3 doses	4 doses	3 doses	4 doses	5 doses	3 doses	4 doses	5 doses	4 doses	5 doses	6 doses	4 doses	5 doses	6 doses
Saskatchewan	**91.8**	**84.8**	**94.3**	**90.5**	**77.8**	**95.8**	**92.7**	**80.2**	**94.9**	**89.5**	**72.2**	**95.1**	**89.7**	**74.3**
Peer Group A														
Regina Qu'Appelle	90.9	83.3	95.2	91.7	77.1	96.4	92.6	77.0	94.1	87.4	70.2	94.8	87.7	71.6
Saskatoon	92.1	84.6	94.5	90.5	77.3	94.7	91.9	78.9	94.8	89.6	72.0	95.2	90.0	74.1
Peer Group D														
Cypress	94.9	89.1	95.8	93.2	82.8	97.7	95.5	87.0	97.1	95.0	80.1	97.3	94.7	85.2
Five Hills	92.2	86.3	95.0	91.7	82.9	97.4	95.6	84.9	96.3	93.3	82.2	97.5	93.3	81.4
Heartland	93.2	89.5	95.3	92.7	83.1	97.6	95.4	89.4	98.1	94.9	84.9	97.6	95.4	87.8
Kelsey Trail	92.9	88.0	93.3	90.3	80.0	97.2	94.4	86.0	95.7	90.1	76.3	94.4	90.6	77.9
Sun Country	97.2	94.1	98.4	95.6	85.6	99.1	97.2	90.8	98.3	95.2	85.2	97.1	94.5	86.1
Sunrise	92.2	87.1	93.0	90.3	82.3	96.7	94.6	86.2	97.2	93.8	77.1	96.3	91.4	77.2
Peer Group F														
Athabasca	92.7	90.9	96.9	96.9	81.5	90.4	90.4	76.9	100.0	98.1	68.5	96.6	91.5	83.1
Keewatin Yatthé	96.6	91.9	100.0	97.9	88.9	100.0	99.2	93.4	99.3	95.0	60.4	99.3	91.0	66.4
Mamawetan Churchill River	97.5	88.2	98.2	93.1	82.5	98.0	96.4	82.4	88.4	83.7	52.7	92.6	87.7	54.7
Peer Group H														
Prince Albert Parkland	87.5	80.2	90.2	85.1	70.9	92.1	88.5	73.6	93.1	85.0	65.6	91.5	84.8	66.9
Prairie North	87.8	78.5	89.9	83.5	68.7	94.5	89.5	75.4	92.7	85.5	61.2	93.5	86.6	66.0

Coverage data in 31 age/dose categories are provided. RHAs are clustered by peer group. **[Yellow highlight indicates RHAs <u>below</u> the provincial average rate.]**

The four-dose primary series of pertussis containing vaccine is recommended at 2, 4, 6 and 18 months. Data for 3, 5, 8 and 20 months are shown. Similarly, data for 7 and 15 years are shown as booster doses are recommended at 4 to 6 years of age and in Grade 8.

At a provincial level, the coverage for three doses at 8 months was 76.4% and the coverage has improved narrowly by 3% since 2012 (see 2012 and 2013 charts). Some infants received vaccinations late:

- about 6% of infants received their first dose after 4 months of age;
- about 7% of infants received their second dose after 6 months of age.

For 8 month olds (three doses), eight health regions exceeded the provincial average; five were below. Similar coverage performance with respect to health regions is observed for 20 month olds (four doses).

There is significant growth (26%) in coverage for four doses in the 20 to the 24 months age group.

In 2014, about 78% of children were immunized with five doses by 7 years of age, consistent with the previous two years. For 7 year olds with fewer than five doses, some children are, however, considered up to date by age (Saskatchewan Immunization Manual).

- About 3% of children received a third dose after age 4 and were up to date by age 7 because another dose scheduled at Grade 8 is required to protect them.
- About 9% of children received a fourth dose after age 4 and did not require the fifth dose scheduled for 4 to 6 years.

Six-dose coverage in 15 years olds was 72.2 percent. Note: not all children of this age require six doses. About 10% received a fourth dose after age 4. Therefore, the fifth dose scheduled for 4 to 6 years is not required for them (Saskatchewan Immunization Manual).

Only two RHAs (Cypress and Sun Country) were above the provincial average in all 31 age/dose categories; two (Prince Albert Parkland and Prairie North) were below in all categories.

Coverage rates for health regions in Peer Group F and H should be interpreted with caution (see Data Notes).

EPIDEMIOLOGY SUMMARY

Pertussis Vaccine Coverage by Health Region: 2013

Primary Series: Infants & Toddlers up to 2 years of age

Health Region, by Peer Group	Vaccine coverage (% immunized), by age and dose																
	3 months	5 months		8 months			12 months			20 months				24 months			
	1 dose	1 dose	2 doses	1 dose	2 doses	3 doses	1 dose	2 doses	3 doses	1 dose	2 doses	3 doses	4 doses	1 dose	2 doses	3 doses	4 doses
Saskatchewan	**83.3**	**91.3**	**73.7**	**93.6**	**87.8**	**75.7**	**94.4**	**90.4**	**84.4**	**95.5**	**92.8**	**89.1**	**58.7**	**95.8**	**93.6**	**90.4**	**76.3**
Peer Group A																	
Regina Qu'Appelle	84.4	91.5	76.1	93.2	88.3	78.2	94.0	90.0	85.3	95.8	92.7	89.2	64.1	96.1	93.5	89.9	76.9
Saskatoon	84.1	91.3	76.1	94.0	88.5	77.2	94.8	90.8	84.8	95.4	92.8	89.3	59.3	96.1	93.9	91.0	79.4
Peer Group D																	
Cypress	81.4	91.2	71.1	93.6	89.5	74.1	95.2	92.4	86.7	95.9	94.2	91.9	57.4	95.8	94.0	91.8	76.1
Five Hills	86.6	93.4	77.9	94.8	90.3	81.7	95.3	93.4	88.7	95.4	93.8	91.2	57.8	96.3	94.4	92.1	78.4
Heartland	84.7	92.9	75.9	94.4	91.0	80.7	96.3	94.7	91.4	96.2	95.4	93.6	66.0	95.7	94.8	93.2	81.0
Kelsey Trail	83.8	91.9	73.4	94.4	88.7	77.9	95.7	92.4	87.7	95.5	93.3	90.6	55.9	94.7	92.7	90.9	72.8
Sun Country	89.7	93.8	84.1	95.1	92.9	86.5	95.9	94.7	91.7	97.0	95.8	94.6	76.2	96.6	95.5	94.3	85.7
Sunrise	82.4	90.8	73.7	92.3	89.1	78.5	91.8	89.3	84.6	93.5	91.2	88.0	52.3	94.3	92.5	90.1	71.4
Peer Group F																	
Athabasca	84.6	100.0	71.9	97.3	97.3	81.1	100.0	97.8	97.8	100.0	100.0	100.0	75.0	100.0	100.0	100.0	92.5
Keewatin Yatthé	72.0	89.7	60.3	96.6	83.8	59.8	98.2	92.1	80.5	95.5	92.2	85.7	47.4	97.1	94.1	92.4	77.1
Mamawetan Churchill River	79.1	92.2	54.8	93.9	82.1	55.5	96.2	89.7	77.8	97.7	94.5	88.5	42.2	98.1	96.7	92.1	69.2
Peer Group H																	
Prince Albert Parkland	77.3	88.9	58.9	92.1	79.8	58.0	93.7	85.2	72.6	94.4	91.1	83.4	43.8	95.1	91.6	85.9	64.0
Prairie North	78.8	89.1	66.3	91.9	83.2	68.4	91.9	86.0	78.6	94.4	90.3	84.4	46.5	94.7	90.9	86.3	65.7

Boosters: Children 4 to 17 years of age

Health Region, by Peer Group	Vaccine coverage (% immunized), by age and dose														
	4 years		7 years			13 years (Grade 6)			15 years (Grade 8)			17 years		
	3 doses	4 doses	3 doses	4 doses	5 doses	3 doses	4 doses	5 doses	4 doses	5 doses	6 doses	4 doses	5 doses	6 doses
Saskatchewan	**92.3**	**84.8**	**94.4**	**91.1**	**78.3**	**96.0**	**93.1**	**80.7**	**95.3**	**89.8**	**72.9**	**95.1**	**89.9**	**75.0**
Peer Group A														
Regina Qu'Appelle	91.8	84.4	94.4	91.3	77.9	96.0	92.2	77.4	95.1	88.4	70.4	94.3	88.0	72.5
Saskatoon	92.6	84.0	94.9	92.2	78.4	95.7	92.9	79.6	95.4	90.4	74.2	95.1	90.6	76.3
Peer Group D														
Cypress	94.6	88.9	95.3	91.9	82.7	97.4	95.2	86.6	95.8	92.2	79.0	97.2	93.4	82.0
Five Hills	94.9	89.3	95.7	91.5	81.3	96.8	95.2	86.2	96.9	92.5	77.6	96.9	92.5	80.8
Heartland	93.8	90.1	95.8	94.0	86.3	97.3	95.7	89.6	96.3	93.6	83.9	97.5	95.4	86.5
Kelsey Trail	92.3	85.1	93.8	89.9	78.4	94.6	91.3	81.5	94.9	90.8	77.2	95.8	91.4	77.0
Sun Country	94.9	90.9	97.9	96.2	91.3	98.8	97.8	92.0	97.8	94.6	84.5	97.2	94.9	87.8
Sunrise	93.0	87.7	95.4	92.3	80.6	98.1	95.2	84.0	95.8	92.7	76.5	95.2	91.9	77.2
Peer Group F														
Athabasca	100.0	96.7	96.4	94.6	71.4	98.3	98.3	89.8	94.6	91.9	62.2	95.8	95.8	79.2
Keewatin Yatthé	95.6	89.4	94.2	90.1	80.7	95.5	94.6	89.3	100.0	90.0	61.5	97.9	92.3	66.9
Mamawetan Churchill River	94.0	81.9	92.5	86.9	71.8	93.3	91.4	78.6	88.6	80.5	57.1	91.0	79.5	52.9
Peer Group H														
Prince Albert Parkland	87.8	79.5	91.4	86.5	72.1	94.7	91.6	76.9	93.2	87.2	67.4	93.1	85.7	65.9
Prairie North	89.0	79.5	90.9	85.2	68.1	94.5	91.0	76.6	95.1	86.6	62.9	93.7	86.9	66.9

Coverage data in 31 age/dose categories are provided. RHAs are clustered by peer group. **[Yellow highlight indicates RHAs <u>below</u> the provincial average rate.]**

The four-dose primary series of pertussis containing vaccine is recommended at 2, 4, 6 and 18 months. Data for 3, 5, 8 and 20 months are shown. Similarly, data for 7 and 15 years are shown as booster doses are recommended at 4 to 6 years of age and in Grade 8.

At a provincial level, the coverage for three doses at 8 months was 75.7% and the coverage has improved slightly by about 2% compared to the previous year (see 2012 chart). Some infants received vaccinations late:

- about 6% of infants received their first dose after 4 months of age;
- about 7% of infants received their second dose after 6 months of age.

For 8 month olds (three doses), eight health regions exceeded the provincial average; five were below. For 20 month olds (four doses), five health regions were above the provincial average and eight were below.

There is significant growth (30%) in coverage for four doses in the 20 to the 24 months age group.

In 2013, 78.3% of children were immunized with five doses by 7 years of age, consistent with the previous year. For 7 year olds with fewer than five doses, some children are, however, considered up to date by age (Saskatchewan Immunization Manual).

- More than 3% of children received a third dose age 4 and were up to date by age 7 because another dose scheduled at Grade 8 is required to protect them.
- About 10% of children received a fourth dose after age 4 and did not require the fifth dose scheduled for 4 to 6 years.

Six-dose coverage in 15 years olds was 72.9 percent. Note: not all children of this age require six doses. More than 10% received a fourth dose after age 4. Therefore, the fifth dose scheduled for 4 to 6 years is not required for them (Saskatchewan Immunization Manual).

Only Sun Country Health Region was above the provincial average in all 31 age/dose categories; two (Prince Albert Parkland and Prairie North) were below in all categories.

Coverage rates for health regions in Peer Group F and H should be interpreted with caution (see Data Notes).

EPIDEMIOLOGY SUMMARY

Pertussis Vaccine Coverage by Health Region: 2012

Primary Series: Infants & Toddlers up to 2 years of age

Health Region, by Peer Group	Vaccine coverage (% immunized), by age and dose																
	3 months	5 months		8 months			12 months			20 months				24 months			
	1 dose	1 dose	2 doses	1 dose	2 doses	3 doses	1 dose	2 doses	3 doses	1 dose	2 doses	3 doses	4 doses	1 dose	2 doses	3 doses	4 doses
Saskatchewan	**82.8**	**91.8**	**72.0**	**94.0**	**87.6**	**74.5**	**95.1**	**91.2**	**84.7**	**95.6**	**92.7**	**88.8**	**59.3**	**95.4**	**92.7**	**89.3**	**75.4**
Peer Group A																	
Regina Qu'Appelle	84.1	92.2	74.4	94.5	88.6	76.6	95.4	90.9	84.7	95.8	92.6	88.7	66.3	95.6	92.7	89.5	77.3
Saskatoon	83.3	91.4	73.0	94.0	87.6	75.4	95.4	91.9	86.1	95.5	93.1	89.5	58.7	95.4	92.8	89.6	75.9
Peer Group D																	
Cypress	83.0	93.1	70.4	94.3	89.2	74.7	94.4	91.2	86.6	95.8	93.5	90.8	56.2	96.3	94.3	92.3	77.9
Five Hills	83.0	92.8	74.7	94.0	89.9	77.6	95.7	93.2	89.4	98.1	95.7	91.7	58.4	97.7	95.7	92.9	76.5
Heartland	84.2	94.1	76.2	95.9	92.1	81.7	96.7	95.2	90.4	96.3	95.0	92.7	65.2	95.5	94.0	91.9	80.8
Kelsey Trail	86.0	93.3	74.6	93.9	88.9	77.0	93.8	91.6	86.8	96.0	94.4	91.5	57.7	95.6	94.1	91.0	74.6
Sun Country	91.1	95.9	87.2	96.7	94.4	87.4	96.3	94.7	91.6	98.2	97.0	95.0	72.0	98.7	97.2	95.5	87.9
Sunrise	79.7	90.6	70.1	92.5	87.8	75.1	93.4	90.1	84.7	94.7	92.0	89.1	56.4	95.4	93.7	91.0	76.5
Peer Group F																	
Athabasca	90.3	100.0	65.6	100.0	97.2	63.9	100.0	100.0	97.4	96.4	94.5	94.5	74.5	96.3	94.4	94.4	83.3
Keewatin Yatthé	72.7	84.0	46.5	90.1	75.7	46.1	92.3	85.7	75.0	96.9	93.3	91.4	45.4	94.8	92.2	90.9	74.7
Mamawetan Churchill River	66.7	86.0	47.1	94.0	79.3	54.0	97.4	89.1	73.1	96.9	93.2	83.3	46.9	95.5	92.5	87.5	67.5
Peer Group H																	
Prince Albert Parkland	76.6	90.0	56.7	92.5	81.9	59.7	94.3	87.7	75.1	93.8	88.7	82.2	44.7	93.7	88.4	83.0	64.6
Prairie North	79.0	90.0	67.5	91.9	82.2	68.8	93.9	87.9	77.8	92.6	87.4	82.6	49.7	93.0	88.3	83.1	65.5

Boosters: Children 4 to 17 years of age

Health Region, by Peer Group	Vaccine coverage (% immunized), by age and dose														
	4 years		7 years			13 years (Grade 6)			15 years (Grade 8)			17 years**		
	3 doses	4 doses	3 doses	4 doses	5 doses	3 doses	4 doses	5 doses	4 doses	5 doses	6 doses	4 doses	5 doses	6 doses
Saskatchewan	**91.8**	**84.0**	**94.5**	**91.0**	**77.6**	**96.6**	**93.6**	**82.4**	**95.3**	**89.8**	**73.1**	**85.8**	**81.1**	**67.3**
Peer Group A														
Regina Qu'Appelle	91.5	82.7	95.3	92.1	76.4	96.8	92.4	79.1	95.1	88.0	71.1	53.8	49.5	39.1
Saskatoon	92.5	84.1	94.5	91.3	76.7	96.4	93.3	80.6	95.5	90.5	73.7	93.9	88.7	74.3
Peer Group D														
Cypress	94.3	88.1	96.3	93.2	83.5	98.0	96.9	88.6	97.8	94.8	84.4	96.0	93.1	84.3
Five Hills	94.0	86.5	96.2	92.5	84.0	97.7	95.4	88.8	97.6	93.5	81.9	96.2	93.0	79.6
Heartland	94.6	91.4	96.5	94.4	85.5	98.3	96.8	91.3	98.5	96.8	88.2	96.7	94.2	86.5
Kelsey Trail	90.9	85.2	94.1	90.5	78.4	97.2	94.9	86.4	94.0	90.4	76.4	94.0	91.6	78.7
Sun Country	95.4	91.2	98.6	96.4	90.5	98.5	97.3	91.5	97.3	95.0	84.8	95.2	93.3	83.8
Sunrise	93.3	87.7	95.0	92.5	80.3	97.0	95.9	88.8	96.7	90.8	75.9	94.4	89.5	74.7
Peer Group F														
Athabasca	96.6	86.4	97.1	94.2	85.5	98.1	98.1	92.3	96.6	93.1	69.0	83.1	79.7	69.5
Keewatin Yatthé	91.8	82.9	97.7	94.6	74.4	99.3	98.6	87.9	99.3	89.7	47.8	95.8	87.3	54.2
Mamawetan Churchill River	88.3	80.4	83.7	78.7	70.8	85.1	80.7	69.3	90.0	78.7	44.3	81.7	76.3	52.9
Peer Group H														
Prince Albert Parkland	88.9	81.2	91.6	87.2	75.5	95.8	92.2	79.4	91.7	84.1	63.7	91.5	83.7	65.0
Prairie North	86.1	77.0	90.9	83.7	66.8	95.2	92.0	79.3	93.2	86.7	64.2	93.5	87.5	68.1

Coverage data in 31 age/dose categories are provided. RHAs are clustered by peer group. **[Yellow highlight indicates RHAs below the provincial average rate.]**

The four-dose primary series of pertussis containing vaccine is recommended at 2, 4, 6 and 18 months. Data for 3, 5, 8 and 20 months are shown. Similarly, data for 7 and 15 years are shown as booster doses are recommended at 4 to 6 years of age and in Grade 8.

At a provincial level, the coverage for three doses at 8 months was 74.5 percent. Some infants received vaccinations late:

- about 6% of infants received their first dose after 4 months of age;
- about 7% of infants received their second dose after 6 months of age.

For 8 month olds (three doses), eight health regions exceeded the provincial average; five were below. For 20 month olds (four doses), four health regions were above the provincial average and nine were below.

There is significant growth (27%) in coverage for four doses in the 20 to the 24 months age group.

In 2012, 77.6% of children were immunized with five doses by 7 years of age. For 7 year olds with fewer than five doses, some children are, however, considered up to date by age (Saskatchewan Immunization Manual).

- About 3% of children received a third dose after age 4 and were up to date by age 7 because another dose scheduled at Grade 8 is required to protect them.
- About 10% of children received a fourth dose after age 4 and did not require the fifth dose scheduled for 4 to 6 years.

Six-dose coverage in 15 years olds was 73.1 percent. Note: not all children of this age require six doses. About 10% received a fourth dose after age 4. Therefore, the fifth dose scheduled for 4 to 6 years is not required for them (Saskatchewan Immunization Manual).

Only Sun Country and Heartland Health Region was above the provincial average in all 31 age/dose categories; two (Prince Albert Parkland and Prairie North) were below in all but a few categories for 17 years.

Coverage rates for health regions in Peer Group F and H should be interpreted with caution (see Data Notes).

**Immunization records in SIMS may be incomplete for children born prior to 1996, therefore, the immunization coverage for 17-year-olds may not reflect the actual provincial coverage.

SURVEILLANCE CASE DEFINITION: Saskatchewan CDC Manual

Respiratory and Direct Contact
Pertussis

Notification Timeline:
From Lab/Practitioner to Public Health: Immediate.
From Public Health to Ministry of Health: Within 2 weeks.
Public Health Follow-up Timeline: Immediate

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

Confirmed Case	Laboratory confirmation of infection:
	• isolation of Bordetella pertussis from an appropriate clinical specimen
	OR
	• detection of B. pertussis DNA from an appropriate clinical specimen **AND** one or more of the following:
	  • cough lasting 2 weeks or longer
	  • paroxysmal cough of any duration
	  • cough with inspiratory "whoop"
	  • cough ending in vomiting or gagging, or associated with apnea
	OR
	Epidemiologic link to a laboratory-confirmed case AND one or more of the following for which there is no other known cause:
	  • paroxysmal cough of any duration
	  • cough with inspiratory "whoop"
	  • cough ending in vomiting or gagging, or associated with apnea

Probable Case	Cough lasting 2 weeks or longer in the absence of appropriate laboratory tests and not epidemiologically linked to a laboratory-confirmed case **AND** one or more of the following, with no other known cause: • paroxysmal cough of any duration • cough with inspiratory "whoop" • cough ending in vomiting or gagging, or associated with apnea
Suspect Case	One or more of the following, with no other known cause: • paroxysmal cough of any duration • cough with inspiratory "whoop"

Photo Courtesy of Centers for Disease Control

DATA NOTES

Case Data Source: Saskatchewan Integrated Public Health Information System (iPHIS), a provincially mandated integrated client-centered case management information system that supports public health surveillance. Confirmed cases must meet the provincial surveillance case definition.

Peer groups were created by Statistics Canada. A peer group consists of health regions with similar socio-economic characteristics so that important differences may be detected by comparing within a peer group. The thirteen health regions in Saskatchewan fall into four (identified by letters A , D, F and H) of the ten peer groups (A to J) across Canada.

Vaccine Coverage Data Source: 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/regional population.

The four-dose primary series pertussis containing vaccine is administered as Diphtheria, Tetanus, acelluar Pertussis, inactivated Polio & Heamophilus influenza type B (DTaP-IPV-Hib). The first booster at 4 to 6 years of age is DTaP-IPV vaccine and the second and final booster at Grade 8 is Tetanus, Diphtheria & acelluar Pertussis (Tdap) vaccine. Immunization coverage is based on those who turned 3, 5, 8, 12, 20 and 24 months, and 4, 7, 13, 15 and 17 years by December 31 in 2012, 2013 and 2014. For example, the immunization coverage for 7 year olds in 2014 is based on clients who were born in 2007 and their immunization records up to December 31, 2014.