

Manitoba Health, Seniors and Active Living

Annual Report of

Immunization Surveillance

METHODS

Epidemiology and Surveillance

To meet the health needs of individuals, families and their communities by leading a sustainable, publicly administered health system that promotes well-being and provides the right care, in the right place, at the right time.

— Manitoba Health, Seniors and Active Living

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Epidemiology and Surveillance

Information Management & Analytics

Manitoba Health, Seniors, and Active Living

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Abbreviations

CDC	Communicable Disease Control
DPIN	Drug Programs Information Network
E&S	Epidemiology and Surveillance
MHSAL	Manitoba Health, Seniors and Active Living
MIMS	Manitoba Immunization Monitoring System
PHIMS	Public Health Information Management System
PHIN	Personal Health Identification Number
RHA	Regional Health Authority

Vaccines with Containing Antigens

DTaP-IPV	Diphtheria, Tetanus, Pertussis, and Polio
DTaP-IPV-Hib	Diphtheria, Tetanus, Pertussis, Polio, and Haemophilus influenzae Type B (Hib)
HB	Hepatitis B
HPV	Human Papillomavirus
Men-C-C	Meningococcal Conjugate C
MMR	Measles, Mumps, and Rubella
MMRV	Measles, Mumps, Rubella, and Varicella
Pneu-C-13	Pneumococcal Conjugate Vaccine 13 valent
Pneu-P-23	Pneumococcal Polysaccharide Vaccine 23 valent
Rota-1	Rotavirus
Td	Tetanus and Diphtheria
Tdap	Tetanus, Diphtheria, and Pertussis
Tdap-IPV	Tetanus, Diphtheria, Pertussis, Polio

Summary

Immunization is one of the most effective and cost-efficient health interventions of modern times. Manitoba Health, Seniors and Active Living (MHSAL) protects children and adults in Manitoba from many diseases by recommending and providing routine immunizations. Immunizations administered are recorded in the Public Health Information Management System (PHIMS). This electronic record plays a key role in ensuring that residents in Manitoba receive all recommended immunizations.

Using PHIMS, MHSAL also monitors the immunization status in the population, identifies specific groups at higher risk, and assesses vaccine delivery throughout Manitoba. Annual reporting provides an overview of immunization surveillance in each reporting year to inform priority setting, policy development, and program planning and evaluation.

The immunization status, measured by immunization coverage rate, is the percentage of a population that have received the required number of doses for a specific antigen as of December 31 in the reporting year per the routine immunization schedule. This assessment considers all immunizations received since birth for each individual. In contrast, assessment of vaccine delivery by providers considers all vaccine doses administered from January 1 to December 31 in the reporting year.

An annual report of immunization surveillance produced by the Epidemiology and Surveillance Unit (E&S) at MHSAL has been publicly available since 2002. Over the years, the format of this report has been evolving due to changes in technology and needs of readers. A new format will take effect from the 2015 annual report and onward. Essentially, the new reporting structure has three components:

1. Summary tables that are provided in four downloadable excel files (read and print restricted) presenting the immunization coverage rates (on December 31 of the reporting year) by antigen and the number of immunizations delivered by providers over the calendar year in Manitoba and five regions:
 - Immunization coverage in children at age 1, 2, 7, 13, and 17 years
 - Immunization coverage in children by continuous/non-continuous status at age 1, 2, 7, 13, and 17 years
 - Immunization coverage in adults (18 years of age and older) and seniors (65 years of age and older)
 - Immunizations by provider in infants and preschool-age children (0–6 years of age), school-age children (7–17 years of age), adults and seniors
2. The document of methods that explains the terms and data sources to help readers understand results presented in summary tables. This document will be updated only if needed for future reports.
3. Appendix: Immunization schedules for the reporting year that are provided in a downloadable excel file.

Terms

Antigens and Vaccines

An antigen is a substance that the body may recognize as foreign and may trigger immune responses. In response to antigens introduced into the body, antibodies are produced to protect the body from disease. A vaccine is a preparation of dead or inactivated organisms, purified products, or live attenuated or weakened organisms that contain one or more antigens. Vaccines are administered to produce or artificially increase immunity to particular diseases depending on the antigens contained. There are three types of vaccine preparations:

1. vaccines containing only one antigen against one disease (e.g. hepatitis B vaccine)
2. vaccines containing antigens against more than one serogroup or serotype of the same disease (e.g. Men-C-C, Pneu-C-13, Pneu-P-23)
3. vaccines containing more than one antigen against multiple vaccine preventable diseases (e.g. the combined MMRV vaccine)

The immunization coverage rates are analyzed by antigen instead of vaccine because vaccines may include more than one antigen and the antigen composition in vaccines may change over time. All administered doses of vaccines that contained the same antigen are included in the calculation of immunization coverage rate and are counted equally. For example, the coverage rate of rotavirus reflects receiving vaccine products of both Rota-1 and Rota-5.

Additionally, the coverage rates for antigens contained in the same vaccine may be different because the numbers of doses required to be considered “complete for age from birth” for those antigens are different. For example, to be considered “complete for age from birth” at age seven, children need to receive two doses of measles, mumps and varicella, but only one dose of rubella; all four antigens are contained in the MMRV vaccine (the first dose recommended at 12 months of age and the second at four to six years).

Regional Health Authority (RHA)

In Manitoba, in accordance with the provisions of *The Regional Health Authorities Act*, health services to residents are delivered in five geographic regions corresponding to the Regional Health Authorities:

- Winnipeg RHA
- Southern Health-Santé Sud
- Interlake-Eastern RHA
- Prairie Mountain Health
- Northern Health Region

In immunization surveillance, residents are assigned geographically to a region based on the postal code of their address maintained in the Manitoba Health Registry.

Age in Years

Age for each individual was calculated by the number of years from the birth date to December 31 of the reporting year. In this annual report, we analyze the immunization coverage rate in children at the age of 1, 2, 7, 13, and 17 years. We also analyze the coverage status in adults (18 years of age and older) and in seniors (65 years of age and older).

Complete for Age

Complete for age measures if an individual has received all recommended doses for an antigen at a specific age. All doses administered up to and including December 31 of the reporting year are included. For children, this measurement analyzes all doses received from birth. Children missing one or more doses before a specific age are not considered “complete for age from birth” for that antigen.

The number of required doses for each antigen to complete at a specific age was based on Manitoba’s Routine Immunization Schedules in the reporting year and also in previous years. The routine immunization schedules for the reporting year and the number of doses required to complete for each age in the reporting year are provided in Appendix.

For the antigens of tetanus, diphtheria, and pertussis, an additional indicator of “one dose since age 10” is included at age 17. Conventionally, six doses of these antigens are required to be considered complete for age from birth at age 17. Among them, one dose is routinely administered as a booster dose in the school-based program at grade 8 or 9. Doses for these antigens missed in early childhood may not impact current immunization status as long as three doses have been received for a primary series. This additional indicator may better reflect how many adolescents received their adolescent booster dose, despite missing one or two early childhood doses.

Immunization Coverage Rate

The immunization coverage rate in children is the percentage of all children at a specific age who are complete for age from birth for a specific antigen. The population for the analysis is based on the Manitoba Health Registry. The registry file is linked to immunization data in PHIMS to determine coverage rate in population. For example, to calculate coverage at age two for diphtheria, the *numerator* is the number of children who have received four doses of the antigen of diphtheria by December 31. The *denominator* is the number of all children who have turned two years of age between January 1 and December 31.

Two immunization coverage rates in adults are assessed in the annual reporting: 1) the percentage of adults receiving one dose of tetanus in the last 10 years among those who are aged 18 years and older; 2) the percentage of seniors receiving at least one dose of Pneumococcal Polysaccharide (Pneu-P-23) among those who are aged 65 years and older.

Continuous vs. Non-Continuous Residents

Residents are considered Manitoba residents if they register with MHSAL to receive insured health care benefits. Continuous residents are those who have been continuously registered with MHSAL since two months of age or younger.

On the contrary, non-continuous residents include those, for example, who may were born in Manitoba, but moved out for a period of time and then returned or who moved to Manitoba at an age older than two months.

Providers of Immunizations

Vaccines in Manitoba are administered by different types of providers. There may be requirements in the types of vaccines or the age groups that different providers are authorized to vaccinate. In the annual report, doses administered by different types of providers between January 1 and December 31 in the reporting year are analyzed by vaccine.

The provider type is determined by the organization a provider belongs to when administering vaccines. However, providers are not assigned to specific geographic regions as the location of service may not be captured. In this analysis, the number of doses administered by RHA is based on residents' RHAs when receiving vaccines.

In this annual report, there are six groups of providers:

- Physicians and nurse practitioners (from the Manitoba Claims Processing System)
- Public health nurses
- Pharmacists
- Medical clinics (Primary care providers that administer vaccines but could not submit through the Claims Processing System. Such immunizations are directly entered in PHIMS.)
- Other providers (e.g. occupational health, long term care programs, other RHA providers)
- Unknown providers due to incomplete or incorrect data entries

The results are presented by four groups based on the age of an individual when receiving the immunization:

1. infants and preschool-age children (0–6 years of age)
2. school-age children (7–17 years of age)
3. adults (18 years of age and older)
4. seniors (65 years of age and older)

Data Sources

Public Health Information Management System (PHIMS)

The provincial immunization registry contained in [PHIMS](#) is the data source for immunization records. Data are extracted six months after the end of the reporting year to include delayed entries of immunizations into PHIMS.

PHIMS uses the Panorama application that was developed in collaboration with public health professionals and partner organizations across Canada. The Immunization Management module in PHIMS was implemented in Manitoba in 2015. Immunizations prior to 2015, children's immunizations from 1988 and adults' from 2000, were captured in the previous immunization registry, the Manitoba Immunization Management System (MIMS). All the immunization records in MIMS have been imported into PHIMS. This electronic registry plays a key role in ensuring that Manitoba residents receive all recommended immunizations.

All immunizations administered to Manitoba residents are captured in PHIMS in three ways:

- Publicly funded immunizations administered by fee-for-service physicians or nurse practitioners are imported into PHIMS from the Manitoba Claims Processing System;
- Immunizations administered by certified pharmacists are imported into PHIMS from the Drug Program Information Network (DPIN); and
- Immunizations provided by all other health care providers including public health nurses were entered directly into PHIMS by providers or data entry staff.

The immunizations captured in PHIMS are generally considered comprehensive. There may be missed immunizations due to several reasons:

- Those administered in facilities without access to PHIMS, the Manitoba Claims Processing System or DPIN may not be captured if records are not provided for data entry.
- Immunizations administered by providers outside of Manitoba may not be captured.
- Immunizations administered to non-Manitoba residents may not be captured.

Only valid doses of vaccines are included in the annual reporting. PHIMS contains a "Forecaster" decision support tool that validates recorded immunizations and recommends when future immunizations should be administered. Doses are marked as "invalid" when doses break an immunization rule and may not be protective as a result. Doses are determined as invalid if they are administered to residents that should not have received the product based on their age and dose history, or an interaction rule with another vaccine is broken. For example, doses administered to residents that have not reach a minimum age or doses that the time in between does not meet the minimum interval are considered invalid.

Manitoba Health Registry

MHSAL provides universal health insurance to all Manitoba residents, which covers laboratory, hospital, and ambulatory services. For administrative purposes, MHSAL maintains a registry of all residents who have ever registered with MHSAL to receive health services since 1970. This database can be linked with PHIMS using a unique personal health identification number (PHIN).

The registry maintains a record of demographic information for each resident including birth date, death date, gender, and address including postal codes. In addition, the start and end dates of health insurance coverage as well as reasons for initiation and termination of coverage for each resident are also contained in this dataset.

For this annual report, data up till six months after the end of the reporting year are extracted from the health registry. This data source not only provides necessary information for immunized residents including age, geographical area, and continuous vs. non-continuous status, but also provides a means to define populations for calculation of immunization coverage rates.