Minikohk Kaachiitaaw-ontwaa Awaahshishak Waaninaankaawi Tipenchikewinink

Childhood Vaccination Coverage in the Sioux Lookout Area First Nations

Sioux Lookout First Nations Health Authority

September 2022

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Data Sources

Data presented in this report are derived from the vaccinations database within Mustimuhw Information Solutions (MIS), which is housed at the Sioux Lookout First Nations Health Authority.

Ownership

The data in this report is owned collectively by the First Nations in the Sioux Lookout area with SLFNHA acting as their data steward.

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For Further Inquiry

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Message From

Janet Gordon

Chief Operating Officer

There has been a longstanding lack of recognition and support of a public health system in our communities. This report demonstrates the lack of investment from governments into public health and prevention efforts and clearly shows the inequities in health services in our communities.

There has also been a lack of recognition of the role community-based workers can play in helping to coordinate and support vaccinations at the community level. These gaps have an impact on people's wellness and are putting kids – and the whole community – at risk. We need to support community involvement in health care services at the community level to a greater degree. Even though community workers would not be able to give the vaccine, they could provide health promotion and education and act as a community navigator to help community members understand the importance of vaccines, provide reminders, and book appointments to help them stay up to date.

During the COVID-19 pandemic, a dedicated person was essential to the success of Operation Remote Immunity. These positions need to be funded for more than 3-months at a time. With COVID-19 still ongoing, and this report highlighting the need for significant improvement in routine vaccination, we need long-term ongoing funding. Community-based workers with a focus on vaccine preventable diseases need to be part of a comprehensive immunization program and integrated into a dedicated public health system.

Message From

Dr. Lloyd Douglas

Public Health Physician

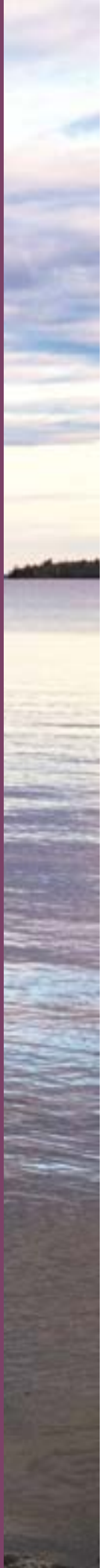
Immunization is a most essential service, a pillar and an indicator of a strong public health system. However, several health system barriers continue to negatively impact the timely vaccination of many individuals in the Sioux Lookout area First Nations. These communities are at an increased risk when compared to non-First Nation communities for experiencing large vaccine-preventable diseases outbreaks. This would be a tragedy as we reflect on what the First Nations in this area have gone through and are going through regarding COVID-19.

In today's world, no one should not be afforded the right to the protection that vaccines offer because of inequities in the health and public health system, but this is happening to the First Nations people of in this region. This report sheds light on how the First Peoples of this land continue to receive second class treatment. The children and youth in the Sioux Lookout area First Nations continue to be left behind.

Now is the time to close the immunity gaps in remote First Nation communities and develop strong community-based immunization programs. We must continue to build our community health workers knowledge and practice to support the delivery of catch-up vaccination. We must adapt our communication and community engagement strategy to identify and reach missed individuals. We must improve community recording and reporting practices. We must continuously implement catch-up vaccination as a component of routine immunization and as an integrated part of the healthcare system. All of the above require sustained and appropriate funding, health human resources, community-based data systems, and First Nations governance.

My hope is that this report will motivate all parties to collaborate and support Sioux Lookout area First Nations in mitigating potential vaccine preventable disease outbreaks. The time to act is now!

Contents



Acronyms/Abbreviations

ACW	Approaches to Community Wellbeing
cEMR	Community Electronic Medical Record
cNICS	The Childhood National Vaccination Coverage Survey
DTaP	Diphtheria-Tetanus-Pertussis vaccine
DTwP	Diphtheria and tetanus toxoids vaccine
FNIHIS	First Nations and Inuit Health Information System
HB	Hepatitis B vaccine
Hib	Haemophilus Influenzae vaccine
HPV	Human Papillomavirus vaccine
IPV	Inactivated Polio vaccine
ISC	Indigenous Services Canada
Men-C-C	Meningococcal Conjugate C vaccine
Men-C-ACYW	Meningococcal Conjugate Group A, C, Y, W vaccine
MIS	Mustimuhw Information Solutions
MMR	Measles, Mumps and Rubella vaccine
MMRV	Measles, Mumps, Rubella, and Varicella vaccine
NIS	National Immunization Strategy
Pneu-C-13	Pneumococcal Conjugate 13 vaccine
Rot-1/Rot-5	Rotavirus vaccine
SLFNHA	Sioux Lookout First Nations Health Authority
Td	Tetanus-Diphtheria vaccine
Tdap	Tetanus-Diphtheria-pertussis vaccine
Var	Varicella (Chickenpox) vaccine
VPD	Vaccine Preventable Disease

Background

The Sioux Lookout First Nations Health Authority (SLFNHA) is a regional First Nations governed organization that works towards improved health outcomes for First Nations in the Sioux Lookout area. Approaches to Community Wellbeing (ACW) is the public health department at SLFNHA, which supports 31 communities in preventing illnesses, promoting health, and building capacity in public health. The vision of ACW is to ensure the Anishinabe people of this land are on a journey to good health, by living healthy lifestyles rooted in our cultural knowledge.

Since 2012, access to statistics on the health status of the communities served by SLFNHA has been recognized as a priority by the Sioux Lookout area Chiefs-in-Assembly. SLFNHA was mandated through resolution 12-07: Health Monitoring Surveillance to monitor the health status of the communities and produce health status reports. This work is largely undertaken by the Roots for Community Wellbeing program of ACW, and has resulted in reports on child health, adult health, and diabetes. SLFNHA also participates in a broader data partnership, called Mamow Ahyamowen. A mortality analysis for the SLFNHA region was produced through this initiative. This report aims to add to these resources to increase the understanding of the health status of the First Nations communities by providing information on vaccine coverage.

Vaccination coverage refers to the number of people in a community that are appropriately vaccinated against a vaccine preventable disease (VPD) at a point in time. Vaccination (also known as immunization) is an important foundation of healthy communities as they help prevent and control vaccine preventable diseases, reduce impact of disease, and save lives. Achieving and maintaining high vaccination coverage is essential for the effective prevention and control of VPDs. "Vaccination is widely recognized as one of the greatest public health achievements of the twentieth century. Vaccinations save lives, prevent the spread of diseases, and reduce health care costs."[1]

Vaccinations are mainly administered in communities at the nursing stations. Historically, vaccinations provided in communities were entered into the First Nations and Inuit Health Information System (FNIHIS) under Indigenous Services Canada (ISC). Since

the 1990s, SLFNHA has been supporting this work for communities and inputting all vaccination records from communities into FNIHIS. Over time, that system became outdated, making it difficult to assess vaccination coverage rates in communities or the region. In 2018, the SLFNHA Chiefs-in-Assembly passed resolution 18-13 Changes to Vaccination Record Keeping. The resolution formally mandated SLFNHA to maintain a system (known as an immunization repository) on behalf of the communities to be collectively owned and governed by First Nations. The resolution further directed SLFNHA to transfer the historical records from FNIHIS into a new system called Mustimuhw Information Solutions (MIS), a community Electronic Medical Record (cEMR) developed by the Cowichan Tribe. In addition, the resolution mandated SLFNHA to continue working with the province to get direct access to the provincial vaccination repository. This will ensure there are complete vaccination records for community members when they live in other towns and cities within Ontario. SLFNHA has nearly completed the historical transfer from FNIHIS into MIS, and now has vaccination records in a system that is easier to use and can produce useful reports for communities. Conversations are still ongoing around access to records from the provincial system.

> In 1950, a nursing station was built at the old Lansdowne House settlement. My late mother-in-law used to say that was the beginning of when her children started getting [vaccinated].
>
> *-Anonymous, Community Member*

Setting the Context

In 2017, vaccine preventable diseases data collected from Indigenous Services Canada's Alberta, Saskatchewan, Manitoba, Ontario, Quebec, and Atlantic regional offices for First Nations on reserve showed that vaccination efforts are working. Between 2011-2016, there were no new reported cases of measles, rubella, tetanus, diphtheria, and polio. There was also only a low number of reported cases of mumps, haemophilus influenza type b (Hib), and invasive meningococcal disease.[2] Within that same time period, 81-84% of two year old children were fully vaccinated against measles, mumps, and rubella, and 68-73% of two year old children were fully vaccinated against diphtheria, tetanus, pertussis, polio and Hib. However, this still falls short of national targets.[3] Within the communities served by the Sioux Lookout First Nations Health Authority, these rates are even lower.

Vaccinations are provided at nursing stations in the First Nations communities served by SLFNHA. The nursing stations may be operated by ISC, a Tribal Council, or by the community themselves. Nursing stations are responsible for delivering public health, primary care, and responding to acute care needs. Vaccinations are undertaken by physicians, nurses, and supported by community health workers as part of the First Nations Inuit Health Vaccine Preventable Diseases – Immunization Program. The program includes service delivery, public health education and awareness, capacity development, and surveillance data collection and evaluation.

A recent audit of Access to Health Services for Remote First Nations Communities in Ontario conducted between April 2013 and December 2014 concluded that "Health Canada did not have reasonable assurance that eligible First Nations individuals living in remote communities in Manitoba and Ontario had access to clinical and client care services" and had not met their objective of ensuring access was equitable to provincial residents in similar geographical locations.[4] The

> …Our region is suffering from a lack of nursing services, so we haven't had a public health nurse for a couple of years. It's hard to increase the rate of immunizations without it.
>
> *-Patricia Keesickquayash, Mishkeegogamang Ojibway Nation*

resources available to provide health services in community do not match the needs within the communities SLFNHA serves. The evident lack of health human resources in communities and persistent staffing shortages diminishes the priority of public health prevention efforts such as vaccinations.

It is important to recognize the longstanding impacts of colonization, residential schools, systemic racism, and oppressive, paternalistic policy legacies on First Nations communities. In the presence of these injustices and cultural and social disruptions, First Nations communities face greater barriers to managing infectious diseases, including vaccine preventable diseases, due to inadequate health care, limited access to resources and lack of trust in public health.

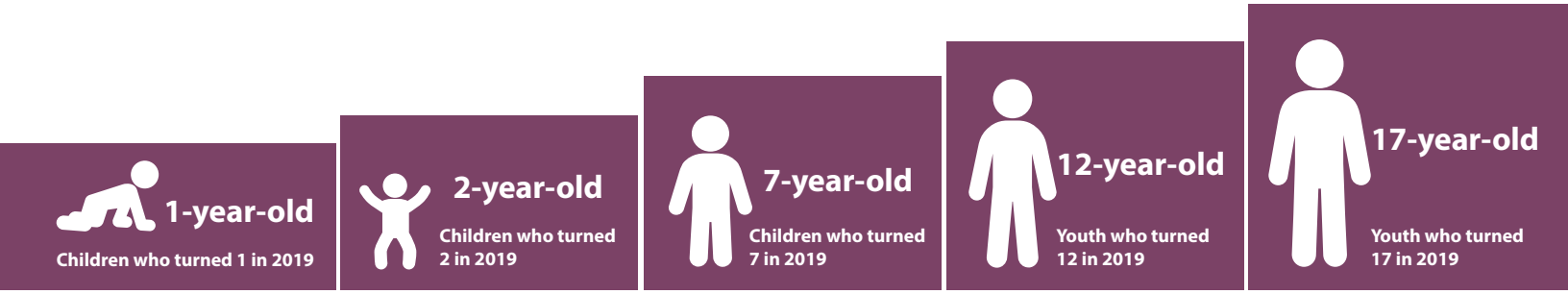
> People in all the communities I have been think vaccines are beneficial. They know they can prevent these diseases by getting immunized. I did not encounter anyone that was resistant to the vaccines. The challenges I encountered in one community was it was very spread out, people living out on the land with no phones. The people had difficulty getting to the clinic as they had no transportation. There were times the nurses would go to these places and do the flu vaccines and others if needed. They would take the vaccines in a cooler to keep them in the right temperature. In some communities, the nurses would go to the school at the beginning of the school year to do school age vaccines for the older grades. We did flu shot campaign at the northern store and go home visiting to the elder's homes.
>
> *– Daisy Sugarhead, First Nation nurse*

Creating this Report

This report is created for Sioux Lookout area First Nations. It is the first vaccination coverage report for the region. It can be used for planning purposes, funding applications, and advocacy. It intends to inform community leadership, community members, health workers, and health planners of vaccination coverage in the region. More details on how the report was created can be found in a Technical Report, which can be accessed at your request.

How We Defined Age Groups

In this report, five age groups of children and youth are included. The age groups were identified using the calendar year of birth. For instance, children who had their 12th birthday between January 1 and December 31, 2019, are classified under the 12-years-old age group. Using this method ensures children have reached the minimum age for certain vaccinations to calculate accurate coverage of each vaccine.



The Ontario Agency for Health Protection and Promotion (also known as Public Health Ontario), annually reports on vaccination coverage of school pupils aged 7-, 12-, and 17-years old. This report uses a similar approach to make it as consistent as possible with the provincial level report. This also helps to see where Sioux Lookout area First Nations are doing well against other students in the province, and where improvement is needed to increase vaccination uptake. The criteria for assessing vaccination coverage were based on the Publicly Funded Vaccination Schedules for Ontario, January 2021. The 1- and 2-years old age groups were included in this report to assess vaccination coverage in younger years. It also helps to identify any gaps in vaccination schedules earlier, since there is a higher risk of complications of VPDs in younger age groups. Furthermore, the 2nd birthday is a recognized benchmark to monitor progress towards meeting vaccination coverage goals.[5]

This report presents the information in two ways:

- By age group and the vaccination coverage rate for each vaccination required at that age. This is helpful to look at age groups and their vaccination status.
- By vaccination type and coverage at each age group. This allows comparison of coverage at all ages at once. This gives a better picture of possible chances of VPD outbreaks in communities. It also allows comparisons of children "dropping off" the schedule and to pinpoint when this is happening to help plan for improvements.

This report provides an overview of national goals.[6] Additionally, provincial comparators and goal coverage rates by vaccination and by age group have been provided where available to allow for meaningful comparisons. However, Public Health Ontario presents these data only for school age children, and not pre-school children (the 1- and 2-year-old age groups). Another source of comparison data is The Childhood National Vaccination Coverage Survey (cNICS).[7] This is a survey that collects information from parents across Canada for children ages two and older. It should be noted that these data may not identify First Nations comparators or rates.

Routine Childhood Vaccinations Included in this Report

Some vaccine preventable diseases (VPDs) could lead to disability or death. When children and youth get vaccinated (immunized), they are protected from VPDs. The VPDs discussed in this report include: diphtheria, tetanus, pertussis, poliomyelitis (polio), haemophilus influenzae, invasive pneumococcal disease, invasive meningococcal disease, rotavirus, measles, mumps, rubella, varicella (chickenpox), hepatitis b, and human papillomavirus.

To protect against VPDs, there are many vaccinations for children and youth to receive. Some of the vaccinations prevent against one disease, while others are made to protect against multiple diseases. Each vaccination has a schedule of how many doses are required and at what ages. This schedule is updated from time to time as new evidence emerges.

Limitations of the data sources

- Data for this report included individual vaccination records from 30 First Nations communities within the Sioux Lookout region. One First Nation was excluded because of insufficient data that could not be analyzed.
- The staff at the nursing stations fill out the consent and vaccination form for each client and fax them to the Immunization Repository at SLFNHA. SLFNHA staff enter the data into MIS. As a result, some data may be delayed being entered, missing, or there could be errors with data entry.
- Vaccinations administered off-reserve in cities and towns are not reflected in this report. SLFNHA's Immunization Repository is not integrated with the provincial vaccination record keeping system. As a result of this lack of data, the coverage rates presented in this report could be underestimated.
- Discrepancies are found in diphtheria, tetanus, and pertussis data for ages 1 and 2 years, despite these vaccines typically being combined into one. This limitation might be due to the quality of data.
- The standards listed in the Publicly Funded Vaccination Schedules for Ontario, January 2021, were used for this analysis. The limitation of this approach is that older age groups might not be 'up-to-date' after the introduction of updated routine vaccination schedules. As a result, the analysis might have underestimated the age-appropriate vaccination rates for older age groups.

How we Analyzed the Data

To analyze the data, 'up-to-date' vaccinations or vaccinations at specific ages were considered. An 'up-to-date' vaccination means that children and youth have received all recommended doses of a vaccine, or vaccines they are eligible to receive within an age group.

Up-to-date vaccination coverage for each vaccine at specific ages are presented as percentages in this report. Percentages are calculated by dividing the number of children and youth who received up-to-date vaccination by the total number of children and youth who were eligible for the vaccination, and then multiplying by100 percent. This tells us how many children and youth in a group of 100 received a specific up-to-date vaccination at a certain point of time.

$$\text{Up-to-date vaccination coverage (\%)} = \frac{\text{\# of children and youth up-to-date for their vaccination born in a certain year}}{\text{\# of children and youth born in a certain year}} \times 100\%$$

To conduct these calculations, both the denominator (# of children and youth born in a certain year) and the numerator (# of children and youth up-to-date for their vaccination born in a certain year) needed to be calculated. Appendix 1 shows population estimates by age group for the denominator.

To be considered as part of the numerator, children and youth must have met all criteria outlined within the Publicly Funded Vaccination Schedules for Ontario, January 2021. For diphtheria, tetanus, pertussis, polio, and haemophilus influenzae type b, the vaccination schedules for the 7-, 12-, and 17-years old age groups were based upon the Technical Annex Vaccination Coverage Report for School Pupils in Ontario: 2018–19 School Year, for ease of comparison.[8] Internal memorandums from ISC were considered for the Measles, Mumps, and Rubella (MMR), Measles, Mumps, Rubella, and Varicella (MMRV) and Varicella (Var) vaccinations to accurately reflect policy changes over the years.

In this report, confidence intervals for the proportion estimates are not included. The reason is that the calculation is based on the data recorded for the entire population, rather than a sample of the population.

Beyond the Numbers

The information in this report presents a western numerical way of measuring an indicator for health. By focusing on numbers, it misses the stories of the people being assessed. It does not capture the experience of individuals getting immunized or illness community members experience. Efforts have been made to listen to the perspectives of community members and include their experiences and views in the report. This report shows differences between the vaccination coverage in the First Nations communities and provincial rates and/or national goals. However, it does not tell the story of, or address, the health inequities that are behind these differences. Hence, though this report was principally developed based on quantitative data, some quotes from community members were added in different sections to ensure the voice of communities are reflected and a better understanding of vaccination status is provided.

> I believe vaccinations are important for the well-being of the community... It ensures we are taking an extra step for our own safety, as well as the safety of the community. I feel the perspective of vaccinations in my community is not all that great. It is talked about when needed but would be nice if we were informed once in awhile and not because they have to tell us. It isn't really discussed around the community unless these is some sort of health program.
>
> *- Kayla Beardy, Muskrat Dam First Nation*

Using this Report

The results in this report underscore the importance of improving outreach and education on vaccinations, removing barriers and improving health services. This report can be used to:

- **Understand** - understand the current uptake of vaccinations and assess risks for outbreaks. Engage community members to understand their awareness, knowledge, and hesitancies around vaccination.
- **Plan** – use the information in this report to plan prevention efforts. This report can help identify diseases that the region is vulnerable against for which education programs can be developed and preparations can be done for outbreaks. It can also help identify what age groups need to be targeted in program efforts.
- **Evaluate** – the numbers in this report can serve as a baseline measure of where the region is at today. SLFNHA will produce updated reports in the future to measure progress in vaccination coverage, which can be used to evaluate programming and initiatives.
- **Advocate** – the numbers in this report can be used to strengthen funding reports or as a tool to advocate for improved services, increased funding, and access to complete vaccination records.

Vaccine Preventable Diseases

Tetanus (Lockjaw)

Tetanus (also known as lockjaw) is an infection spread by a bacterium. The bacterium lives in dirt, soil, and dust, but can also be found in human and animal feces. The infection affects the nerves that control body muscles. They become stiff and painful and make swallowing and breathing difficult. Without proper hospital treatment, tetanus can be fatal.[9]

Diphtheria

Diphtheria is a serious bacterial infection of the nose, throat, and skin. It causes sore throat, fever, and chills. It can be complicated by breathing problems, heart failure, and nerve damage. It is most often passed to others through coughing and sneezing.[9]

Pertussis (Whooping cough)

Pertussis (also known as whooping cough) is an acute infection of the respiratory tract caused by the pertussis bacteria. Children and youth who get this disease have spells of violent coughing. This cough can cause them to vomit or stop breathing for a short period of time. The cough can last for weeks and makes it hard for a child to eat, drink, or even breathe. Pertussis can also cause brain damage, seizures, and death. These problems happen most often in babies. Pertussis spreads very easily from an infected person to others through coughing or sneezing.[9]

Protection against tetanus, diphtheria, and pertussis requires 3 different vaccinations: 4 doses of DTaP-IPV-Hib, 1 dose of DTaP- IPV, and 1 dose of DTaP for a total of 6 doses by age 17 .[9]

Haemophilus influenza type b (Hib)

The most common haemophilus influenza is haemophilus influenza type b (Hib). People spread haemophilus influenza to others through respiratory droplets. Hib was the most common cause of bacterial meningitis in children two months to five years of age. Meningitis is a serious infection of the fluid and lining that cover the brain and spinal cord. Meningitis can cause brain damage, learning and developmental problems, deafness, and blindness. The Hib germ also causes a serious infection of the throat near the voice box, and can also cause infection of the lungs (pneumonia) and bone and joint infections.[9]

Protection against Hib requires 4 doses of DTaP-IPV-Hib by age 7.[9]

My baby had whooping cough at the age of 17 months. She was coughing non-stop. Her eyes were bloodshot from her coughing excessively. [It was] Scary.

- *Anonymous, Community Member*

Polio

Polio, or poliomyelitis, is a disabling and life-threatening disease caused by the poliovirus. People can get infected from drinking water or eating food with the polio germ in it. It can also be spread from person to person. This disease can cause nerve damage and paralyze a person for life. It can paralyze muscles used for breathing, talking, eating, and walking. It can also cause death.[9]

Protection against polio requires 4 doses of DTaP-IPV-Hib and 1 dose of DTaP-IPV by age 7.[9]

All I know is what I've been told by my parents and others who saw me. I don't even remember what age I was when I contracted polio. I always say one-year-old, but I'm just guessing from what my mom and dad were telling me. I could've been two. It was a very early age, around there, after I was born. I was one of the lucky ones that survived the disease.

There were some people up north who contracted polio and died. At that time, in 1947, we were very much isolated from the rest of Canada. There was hardly any contact with the outside world, other than Hudson Bay company. My parents and our people were pretty much living on our own up north and there were no established communities at that time, we were all living in our traditional territory at the time.

I don't know how I contracted that disease. It was spreading in the world at that time, but we were so isolated I don't know how I contracted it. The only thing I can think of was there was a mine close by where people used to work. There was a mine doctor who came and lived in the mine. He was the one that looked after me. They had a makeshift building they used as a hospital, and that's where I was treated. From the pieces of the story that I hear, it sounds like he put some intravenous stuff into my vein and I still have marks there. That was before that was widely used. And so with the vaccine, that was available at that time, I was able to overcome that disease. The rest of the time I was pretty much immobilized because the disease affected my right leg and it is pretty much useless, there is no muscle in there. There is a little bit of muscle on my left leg because it was starting to get affected but it got cured before it got worse. The rest of my body…my arms, my lungs and respiratory system were not affected.

A lot of people experienced respiratory symptoms and couldn't breathe, so I was lucky it only affected my legs. But from there on, it was just a matter of recovery. Because of my leg, I wasn't able to walk until I was about 10 years old. There are stories about me playing with other kids and they used to carry me around wherever they went and whatever games they were playing so I was able to play. From there on, once I started walking, I was okay. I never really felt at any time or all the way through my life that I was different, I always felt that I was normal. It didn't cause me any trauma when I found out I wasn't walking normal. It didn't affect me in any way.

Some people find it traumatizing, but I didn't have any of those feelings. I was lucky to be able to handle that and act normal. I'm thankful that the vaccine came along when it did because that's when I needed it, and sure enough it saved my life.

- Ennis Fiddler, Sandy Lake First Nation

Invasive pneumococcal disease (IPD)

IPD is an infection caused by a type of bacteria called streptococcus pneumoniae (or pneumococcus). This type of bacteria can cause pneumonia (lung infection), bacteraemia (infection of the blood), meningitis (infection of the lining of the brain and spinal cord), or ear infections (otitis media). Pneumonia, bacteraemia, and meningitis can sometimes cause death or long-lasting complications such as deafness, especially in people with a high-risk medical condition.[9]

Protection against IPD requires 3 doses of pneumococcal conjugate (Pneu-C-13) before 2 years old.[9]

> Vaccines, I feel, are definitely a necessity. I make sure my babies are kept up-to-date on all. Some I feel aren't educated enough about them, so they come to their own conclusions. But they need to be educated properly so they don't miss out on these life saving vaccines.
>
> - *Anonymous, Community Member*

Rotavirus

Rotavirus is a common infection that causes vomiting and diarrhea in infants and children. Rotavirus is very contagious, spreading easily from children who are already infected to other infants, children, and sometimes adults. Most children are infected with rotavirus at least once by five years of age. Serious but rare symptoms commonly seen in children under two years of age include severe diarrhea, leading to hospitalization. Rotavirus infection is a major cause of visits to health care providers and hospital stays for infants and children under five years of age in Ontario. Deaths in Ontario due to rotavirus are rare.[9]

Protection against rotavirus requires 3 doses of Rot-5 or 2 doses of Rot-1 before 1 year old. The vaccine is taken orally.[9]

Meningococcal disease

Meningococcal disease is caused by bacteria known as neisseria meningitidis (commonly known as meningococcus). Meningococcal disease is a very serious infection. It occurs in people who have either met a person with meningococcal diseases or who is carrying the bacteria. Meningococcal disease occurs in two main forms. Meningococcal septicaemia, also called meningococcemia, occurs when the bacteria infect the bloodstream and cause blood poisoning. Meningococcal meningitis occurs when the bacteria infect the outer lining around the brain and spinal cord.[9]

Protection against meningococcal meningitis requires 1 dose of Men-C-C vaccination at 12 to 23 months of age and 1 dose of Men-C-ACYW in Grade 7.[9]

Measles

Measles is a highly contagious infectious disease caused by the measles virus. Measles can be a serious infection. It causes high fever, cough, rash, runny nose, and watery eyes. Measles lasts for one to two weeks. Ear infections or pneumonia (lung infection) can happen in 1 in 10 children with measles. Measles can also be complicated by encephalitis, an infection of the brain, in about 1 out of every 1,000 children with measles. Measles spreads from person to person very easily and quickly. People can get measles from an infected person coughing or sneezing around them or simply talking to them.[9]

Mumps

Mumps is a contagious disease that is caused by mumps virus. It typically starts with a few days of fever, headache, muscle aches, tiredness, and loss of appetite. Then most people will have swelling of their salivary glands. This is what causes the puffy cheeks and a tender, swollen jaw. It spreads through direct contact with saliva or respiratory droplets from the mouth, nose, or throat. Mumps can occasionally cause complications, especially in adults, including inflammation of the ovaries (oophoritis) and/or breast tissue (mastitis), inflammation in the pancreas (pancreatitis), inflammation of the brain (encephalitis), inflammation of the tissue covering the brain and spinal cord (meningitis), deafness, and inflammation of the testicles (orchitis) that may lead to a decrease in testicular size (testicular atrophy).[9]

Rubella
(German measles)

Rubella is usually a mild illness in children; up to half of the infections with rubella occur without a rash. Rubella may cause fever, sore throat, swollen glands in the neck, and a rash on the face and neck. Temporary aches and pains and swelling of the joints are common in adolescents and adults, especially females, with rubella infection. Rubella can be followed by chronic arthritis (inflamed joints). It can also cause temporary blood clotting problems and encephalitis. Rubella is very dangerous in people who are pregnant. If an individual gets rubella in the early part of a pregnancy, it is very likely that their baby will develop congenital rubella syndrome and be severely disabled or die. Rubella spreads by contact with an infected person through coughing, sneezing, or talking. It can also be spread by contact with the saliva of infected people.[9]

Protection against measles, mumps, and rubella (MMR) requires 1 dose of MMR vaccination at 12 months of age and a second dose at 4-6 years of age with the Measles, Mumps, Rubella, and Varicella (MMRV) vaccination.[9]

> We had a mumps outbreak a few years ago. We got public health support during the outbreak and extra funding to run clinics and provide rides. The community didn't panic. We didn't advertise it too much, we just told them to come to a vaccine clinic. It was in the summer and by the fall we didn't have any new cases.
>
> - *Joan Rae, Sandy Lake First Nation*

Varicella (Chickenpox)

Chickenpox is a highly contagious disease caused by the varicella-zoster virus (VZV). It can cause an itchy, blister-like rash. The rash appears first on the chest, back, and face, and then spreads over the entire body. Chickenpox can be serious, especially in babies, adolescents, adults, pregnant individuals, and people that have a lowered ability to fight germs and sickness (weakened immune system). Serious complications from chicken-pox include bacterial infections of the skin and soft tissues in children, infection of the lungs (pneumonia), infection or swelling of the brain (encephalitis, cerebellar ataxia), bleeding problems (hemorrhagic complications), bloodstream infections, and dehydration.[9]

Protection against chickenpox requires 1 dose of the Varicella vaccine at 12 through 15 months old and 1 dose at 4-6 years of age with the Measles, Mumps, Rubella, and Varicella (MMRV) vaccine.[9]

Hepatitis B

Hepatitis B is caused by hepatitis B virus that affects the liver and can cause permanent damage. It's the biggest cause of liver cancer worldwide. People with the disease often become tired, feverish, lose their appetite, and sometimes get yellow skin and eyes (called jaundice). However, some people can get the virus and not have any symptoms. That means they can infect someone else without knowing. Hepatitis B is transmitted through direct contact with infected blood or certain bodily fluids. The virus is most commonly transmitted from an infected pregnant person to their baby during child-birth, due to the blood exchange that happens during delivery. It is also transmitted through unsterile medical or dental equipment, unprotected intimate contact, or unsterile needles, or by sharing personal items such as razors, toothbrushes, nail clippers, body jewelry, etc.[9]

The Hepatitis B vaccine is provided in 3 doses. The 1st dose is recommended in Grade 7 and the 2nd dose is recommended between 4 to 6 months after the 1st dose. For children who have not received their 2nd dose prior to their 16th birthday, a 3-dose series is recommended.[9]

> Traditional practices and immunizations can work well by using each where it is needed. In skin diseases, certain pastes made from traditional medicines helps the wound directly, while a vaccine would work from internally.
>
> - *Anonymous, Fort Severn First Nation*

Human Papillomavirus (HPV)

HPV is a very common virus that is spread during sexual activity through skin-to-skin contact with an infected person. HPV can lead to different kinds of cancer. There are many different types of HPV. Some types of HPV can cause cervical, vulvar, vaginal, penile, and anal cancer. Other types can lead to skin lesions such as genital warts. Fortunately, infections from most common cancer-causing types of HPV can be prevented with the HPV vaccine.[9]

The HPV vaccine is recommended for all preteens at age 11 or 12 years (or can start at age 9 years), or everyone through age 26 years, if not vaccinated already. The HPV vaccination is given either as a 2 or 3-dose series, in the intervals of 6 months or 12 months. Those unable to begin or complete the HPV vaccination series in Grade 7 are eligible to catch-up missed doses until the end of Grade 12.[9]

> Immunization programs can be improved by actually having more hands-on education on it as well as more education towards different immunization that is being offered.
>
> - *Michael Loon, Slate Falls First Nation*

Regional Vaccination Coverage by Age

This section details the results of the analysis of vaccination coverage by age. Appendix 2 provides a summary of vaccination coverage rates, grouped by age group.

1-Year-Old Age Group

For children to be considered up-to-date by age 1, they must have received:

- 3 doses of Diphtheria, Tetanus, Pertussis, Polio, and Haemophilus Influenza Type B (DTaP-IPV-Hib) vaccine
- 2 doses of Pneumococcal Conjugate 13 (Pneu-C-13) vaccine
- 2 doses of Rotavirus (Rot-1) vaccine

There is no national goal for this age group.

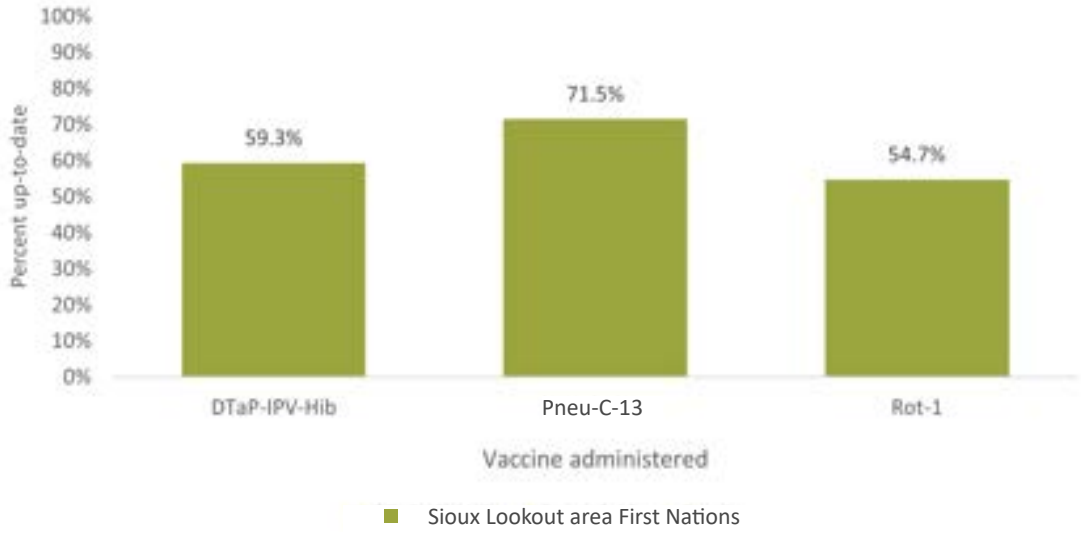


Figure 1. Percentage of Sioux Lookout area First Nations 1-year-olds up-to-date by type of vaccine

Key Findings

- The number of second and third doses of DTaP-IPV-Hib administered were lower than first dose.
- The number of second doses Pneu-C-13 administered was lower than first dose.
- The rotavirus vaccine can be administered with 2 doses (known as Rot-1) or with 3 doses (Rot-5) to be considered up-to-date. Within the communities that SLFNHA serves, most children and youth were on the 2 doses schedules. The number of second doses administered was lower than first dose.

> [My] parents had whopping cough when they were small and almost died. The Northern Store manager managed to get some medicine for them and saved their lives.
>
> - *Pauline Miles, Fort Severn First Nation*

2-Year-Old Age Group

For children to be considered up-to-date by age 2, they must have received:

- 4 doses of Diphtheria, Tetanus, Pertussis, Polio, and Haemophilus Influenza Type B (DTaP-IPV-Hib) vaccine
- 3 doses of Pneumococcal Conjugate 13 (Pneu-C-13) vaccine
- 1 dose of Meningococcal Conjugate C (Men-C-C) vaccine
- 1 dose of Measles, Mumps and Rubella (MMR) vaccine
- 1 dose of Varicella (Var) vaccine

The Canadian national goal for these vaccines within this age group is 95%.[7, 10]

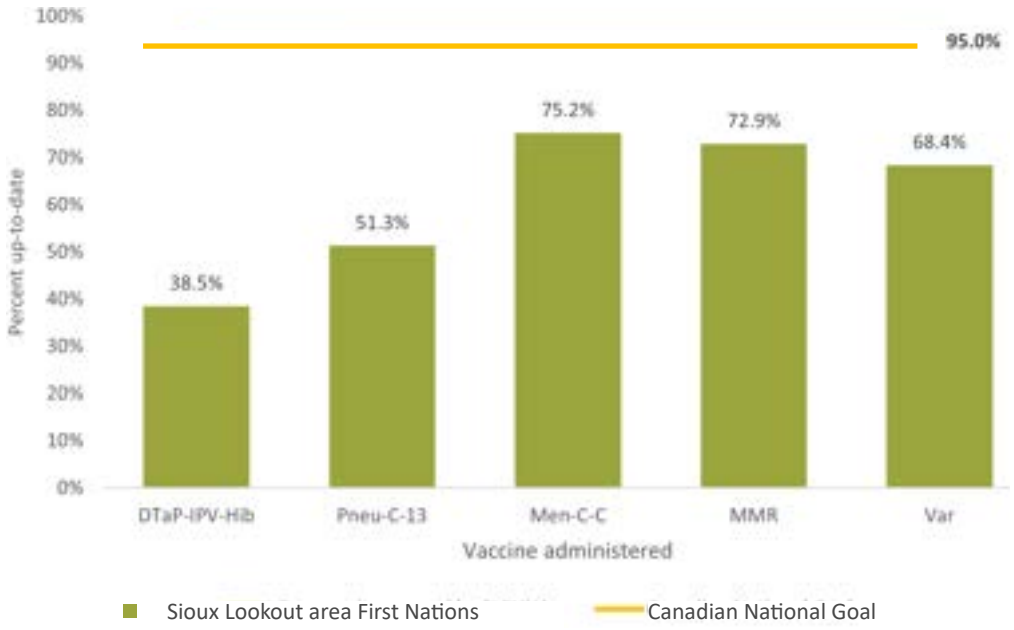


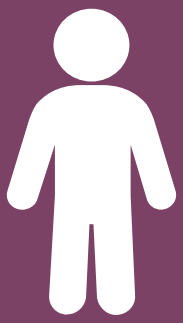
Figure 2. Percentage of Sioux Lookout area First Nations 2-year-olds up-to-date by type of vaccine

> I believe quite a lot of people in my reserve don't really know what diseases these are except for chickenpox…As a child I had chickenpox. I recall my mother applying calamine cream over the spots.
>
> - *AH, Webequie First Nation*

Key Findings

- The regional rate for Sioux Lookout area First Nations up-to-date for DTaP-IPV-Hib of 38.5% is much lower than the range 68-73% reported among First Nations children.[3] The number of DTaP-IPV-Hib doses administered continued to drop after the first dose. That is, second doses given were lower than the number of first doses, third doses given were lower than second doses, and fourth doses given were lower than the number of third doses.
- 51.3% of 2-year-old children received all 3 recommended doses of pneumococcal conjugate 13 vaccine. The number of second and third doses administered were lower than first dose. As a comparison, the Canadian national vaccination rate for pneumococcal conjugate 13 is 79%.[7, 10]
- The Sioux Lookout area First Nations regional rate of 72.9% up-to-date for measles, mumps, and rubella vaccine is lower than the range of 81-84% reported among First Nations children in the Childhood National Coverage Survey.[3]

7-Year-Old Age Group



For children to be considered up-to-date by age 7, they must have received:

- 5 doses of Tetanus, Diphtheria, Pertussis, and Polio vaccine[i]
- 4 doses of Haemophilus Influenza Type B (Hib) vaccine
- 1 dose of Meningococcal Conjugate C (Men-C-C) vaccine
- 3 doses Pneumococcal Conjugate 13 (Pneu-C-13) vaccine
- 2 doses of Measles, Mumps, Rubella (MMR) vaccine
- 2 doses of Varicella (Var) vaccine

The Canadian national goal for vaccines within this age group is 95%.[7, 10]

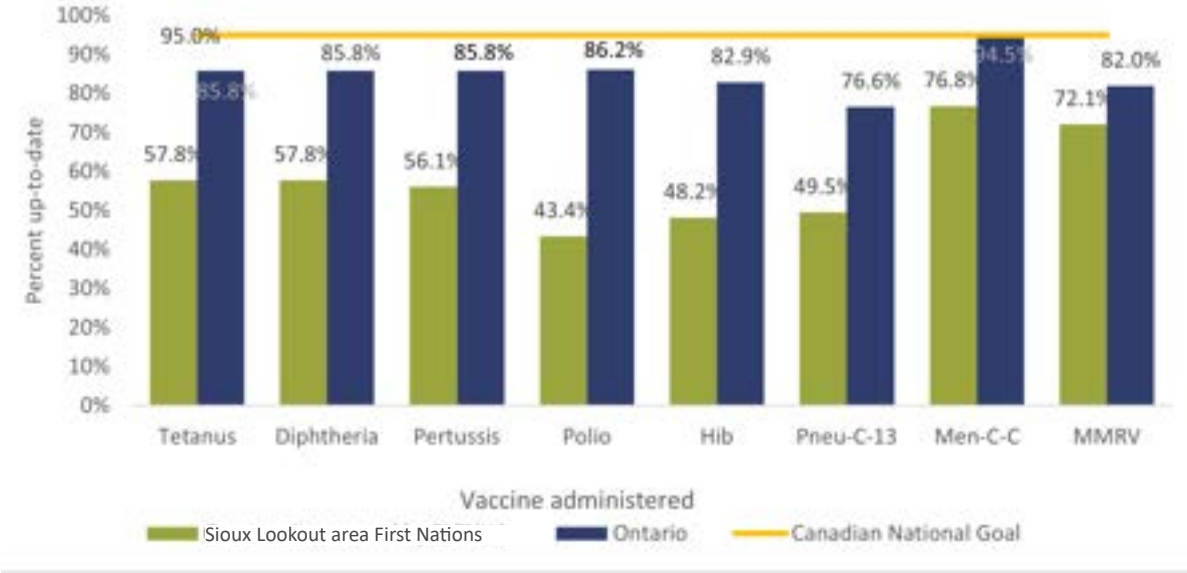


Figure 3. Percentage of Sioux Lookout area First Nations 7-year-olds up-to-date by type of vaccine

[i] Various forms of vaccines are used such as DTaP, DTaP-Hib, DTaP-IPV, DTaP-IPV-HB, DTaP-IPV-Hib, DTaP-IPV-Hib-HB, DTP, DTwP, DTwP-IPV, DTwP-IPV-Hib, Td, Tdap, and Tdap-IPV.
As mentioned in the 'Limitations' section, while tetanus, diphtheria, pertussis, and polio vaccine are typically combined into one vaccine, the data retrieved contained data on each individual vaccine and was analyzed as such. These discrepancies may be due to data quality issues.

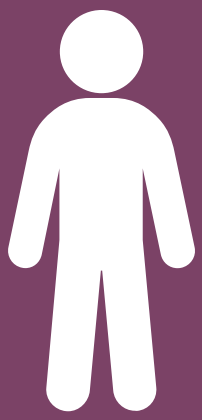
> I have both positive and negative experiences with vaccinations. The last two years have been hard to get my toddler up to date. I can't say there is that much programming or drop-in clinics available, so they are lacking in that area.
>
> - *Anonymous, North Caribou Lake First Nation*

Key Findings

- Only 48.2% of 7-year-old children received all recommended 4 doses of haemophilus influenza type B vaccine. The number of doses administered continued to decrease as children progressed through the vaccination series, contributing to low coverage rates.
- While the dose of Men-C-C is due at age 12 to 13 months, it is assessed by the province at age 7, so we have also included it here and 76.8% of 7 year-old children were up to date.
- Only 49.5% of 7-year-old children received the recommended doses (either a 2- or 3- dose vaccination series) of pneumococcal conjugate 13 vaccine. The number of second and third doses administered in this age group were much lower than the number of first doses.

> When you educate the nurses, you [can] also educate either the Healthy Baby Healthy Children [worker] or a community worker who could work hand-in-hand with the nurse… having them trained as a specialist to support nurses as well…would definitely help to get children on time.
>
> - *Kathy MacLeod, Paawidigong First Nations Forum*

12-Year-Old Age Group



For children to be considered up-to-date by age 12, they must have received:

- 5 doses of Tetanus, Diphtheria, Pertussis, and Polio vaccine
- 4 doses of Haemophilus Influenza Type B (Hib) vaccine
- 1 dose of Meningococcal Conjugate A, C, Y, and W (Men-C-ACYW) vaccine
- 2 doses of Measles, Mumps, Rubella (MMR) vaccine
- 2 doses of Varicella (Var) vaccine
- 3 doses of Hepatitis B (HB) vaccine
- 2 doses of Human Papillomavirus (HPV) vaccine.

There is no national goal for this age group

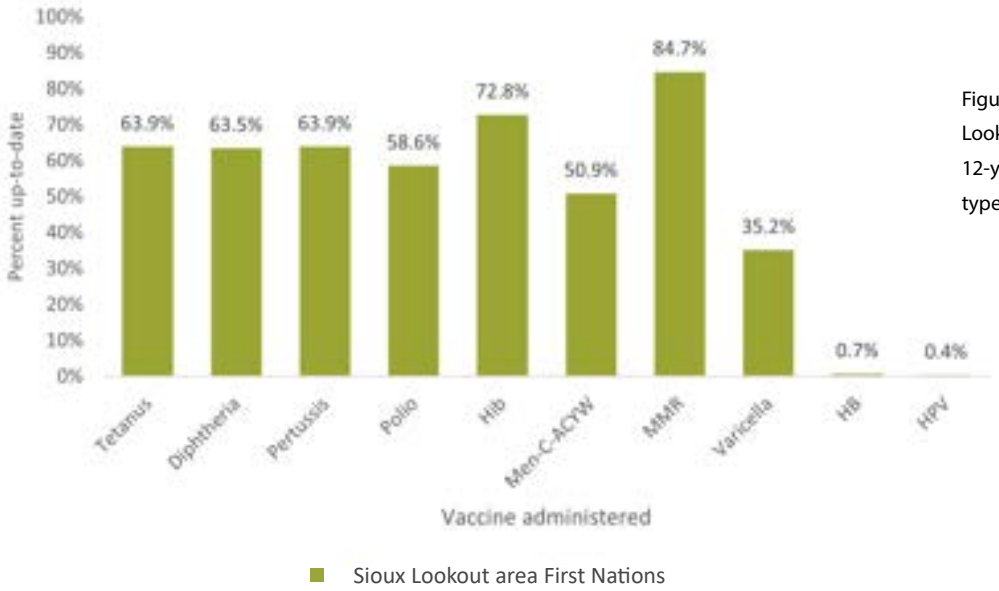


Figure 4. Percentage of Sioux Lookout area First Nations 12-year-olds up-to-date by type of vaccine

> People tend to not trust vaccines because it's the government that is testing on us and people are very hesitant to take the vaccine. But I believe that the science is far better now than it was 50 years ago. Immunizations have always helped fight diseases and will continue to do so. History has proven that.
>
> - *Anonymous, Community Member*

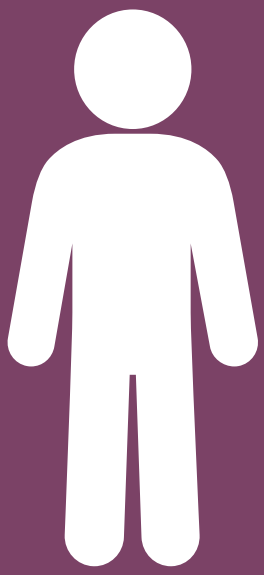
Key Findings

- Only 72.8% of 12-year-old youth received the 4 recommended doses of haemophilus influenza type B vaccine. The number of doses given to 12-year-old youth decreased as the dose number in the vaccination series increased (i.e., dose 2 coverage is lower than dose 1, dose 3 coverage is lower than dose 2, and dose 4 coverage is lower than dose 3).
- Only 50.9% of 12-year-old children (grade 7) received the recommended 1 dose of Men-C-ACYW vaccine. However, this may be because it is given in grade 7, and depending on birthdates and timing of the vaccine campaign students may not be offered it until they are 13.
- Only 35.2% of 12-year-old youth received the 2 recommended doses of varicella vaccine whereas the national vaccination rate for varicella was 83% (in 2017).[3] The number of second doses administered was lower than first dose.
- There are 2 dose and 3 dose schedules available for hepatitis B. Only 0.7% of 12-year-old youth received the recommended doses (2 or 3 valid doses) of hepatitis B vaccine. A significant challenge for this age group appears to be the first dose coverage of hepatitis B.
- Only 0.4% of 12-year-old youth received the 2 recommended doses of Human Papillomavirus vaccine. The largest challenge appears to be receiving the first dose of HPV vaccine in this age group. Since the HPV vaccine may be given to youth while they are outside of their communities attending school, the data set available may be incomplete and may not represent the full coverage of this vaccine.

My thoughts on immunizations to share are mainly to be open to it. It's good that we've come this far in medicine to experience this help. I hope that people take their health seriously and help themselves keep up with their immunizations so that they can prevent getting themselves sick or even others.

- *Nigel Morris, Muskrat Dam First Nation*

17-Year-Old Age Group



For children to be considered up-to-date by age 17, they must have received:

- 6 doses of Tetanus, Diphtheria, and Pertussis vaccine
- 5 doses of Polio vaccine
- 4 doses of Haemophilus Influenza Type B (Hib) vaccine
- 3 doses Pneumococcal Conjugate 13 (Pneu-C-13) vaccine
- 2 doses of Measles, Mumps, Rubella (MMR) vaccine
- 2 doses of Varicella (Var) vaccine
- 3 doses of Hepatitis B (HB) vaccine
- 2 or 3 doses of Human Papillomavirus (HPV) vaccine.

The Canadian national goal for DTaP and MMR vaccines within this age group is 90%.[7, 10] There are no national goals for Var and Hib for this age group.

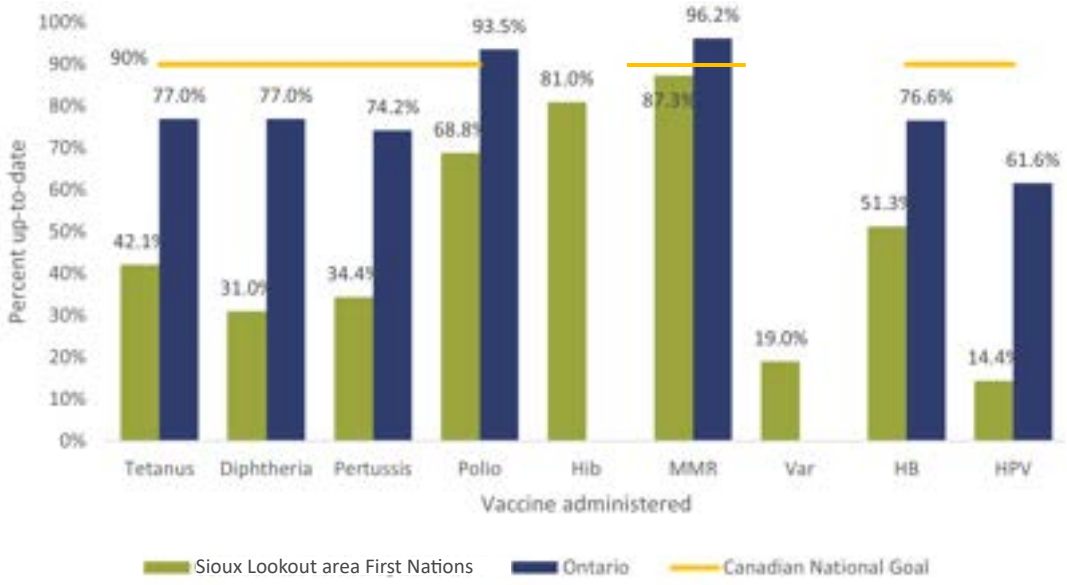


Figure 5. Percentage of Sioux Lookout area First Nations 17-year-olds up-to-date by type of vaccine

My brother had mumps. He hid in his room until he was resolved because he was scared and didn't have any information about it yet.

- *Anonymous, Sandy Lake First Nation*

Key Findings

- At this age, coverage for hepatitis B vaccine has increased substantially compared to the 12-year-olds with 51.3% of 17-year-old youth having received the 2 or 3 recommended doses of hepatitis B vaccine.
- Only 19.0% of 17-year-old youth received the 2 recommended doses of varicella (Var) vaccine.
- For the human papillomavirus vaccine, a 2 or 3 dose schedule is required. Only 15.1% of 17-year-old youth received 1 dose, and 14.4% received either a 2-dose or a 3-dose series. Uptake of the HPV vaccination is generally lower than the other vaccinations. However, the low coverage rate may be due in part to lack of access to provincial data when youth go to high school out of the community and may receive the HPV vaccinations there.

Regional Vaccine Coverage by Type of Vaccines

This section presents vaccination coverage rates by vaccination type for communities served by SLFNHA This view allows for meaningful comparisons of where the greatest challenges are in keeping children and youth up-to-date, and where further connection and partnerships will help to increase coverage on time for best protection of children and youth in communities. Where available, Ontario up-to-date vaccination coverage rates and Canadian national goals are provided for comparisons and targets. There is no provincial data for ages 1, 2 or 12, so only the data from the Sioux Lookout area First Nations is presented.

Diphtheria, Tetanus, Pertussis, Polio, and Haemophilus influenza Type B (DTaP-IPV-Hib) Vaccine

Up-to-date rates of the DTaP-IPV-Hib vaccine were lower in the 2-year-old age group than in the 1-year-old age group. However, rates in both age groups fall short of the national goal.

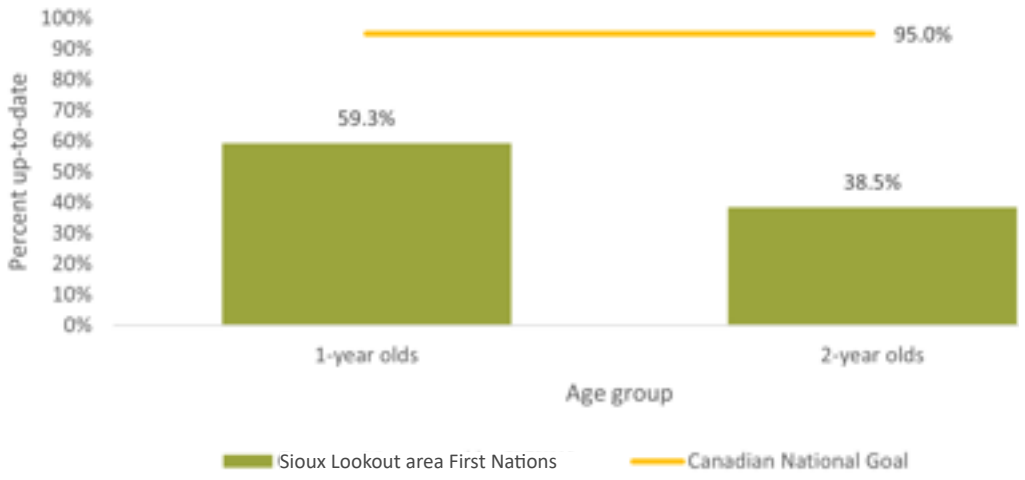


Figure 6. DTaP-IPV-Hib vaccine coverage for Sioux Lookout area First Nations 1- and 2-year olds

Tetanus Vaccine

Coverage rates for tetanus vaccine in communities for ages 7 and 17 were lower in comparison to the provincial coverage rate. The Canadian national goal changes from 95% at age 7, to 90% at age 17 [9]

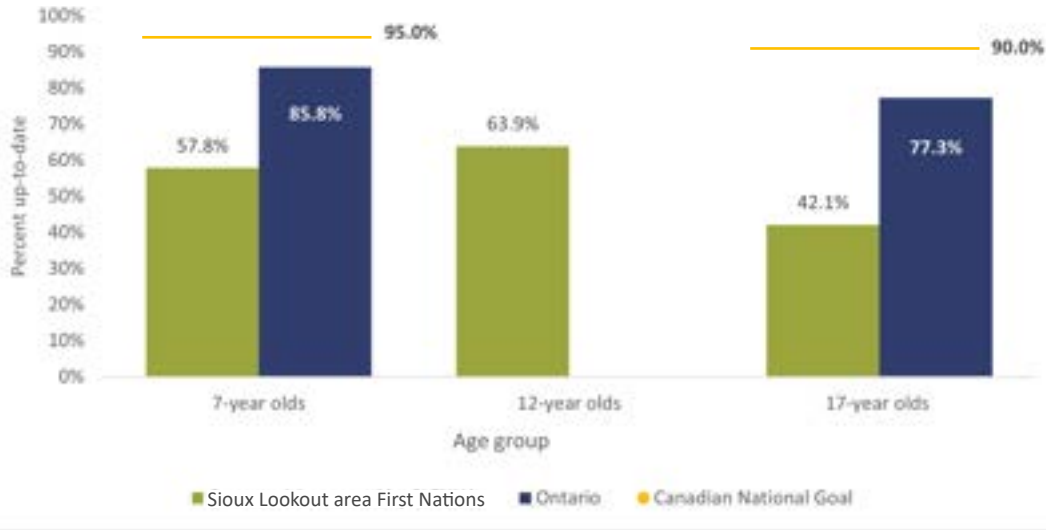


Figure 7. Tetanus vaccine coverage for Sioux Lookout area First Nations 7-, 12-, and 17-year olds

Diphtheria Vaccine

For the diphtheria vaccine, the up-to-date rates increased between the 7-year-olds and the 12-year-olds age groups. However, the rate decreased significantly between the 12-year-olds and 17-year-olds (Figure 8). The Canadian national goal changes between age 7 and 17 from 95% to 90% respectively.

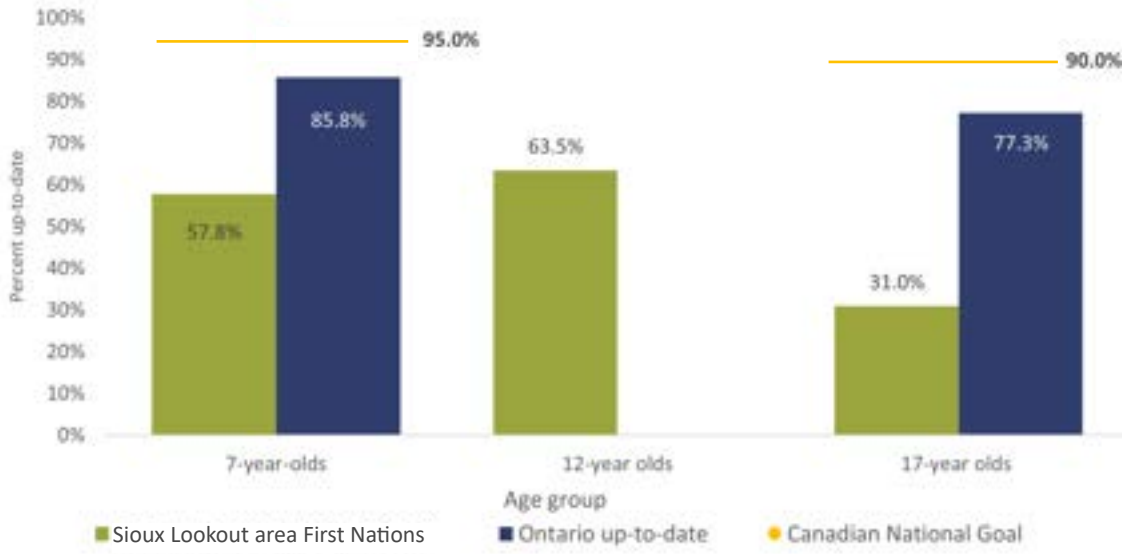


Figure 8. Diphtheria vaccine coverage for Sioux Lookout area First Nations 7-, 12-, and 17-year old

Pertussis Vaccine

Similar to the tetanus vaccine, up-to-date rates for the pertussis vaccine for youth aged 12 were the highest. Coverage rates for ages 7 and 17 were lower in comparison to provincial comparators.

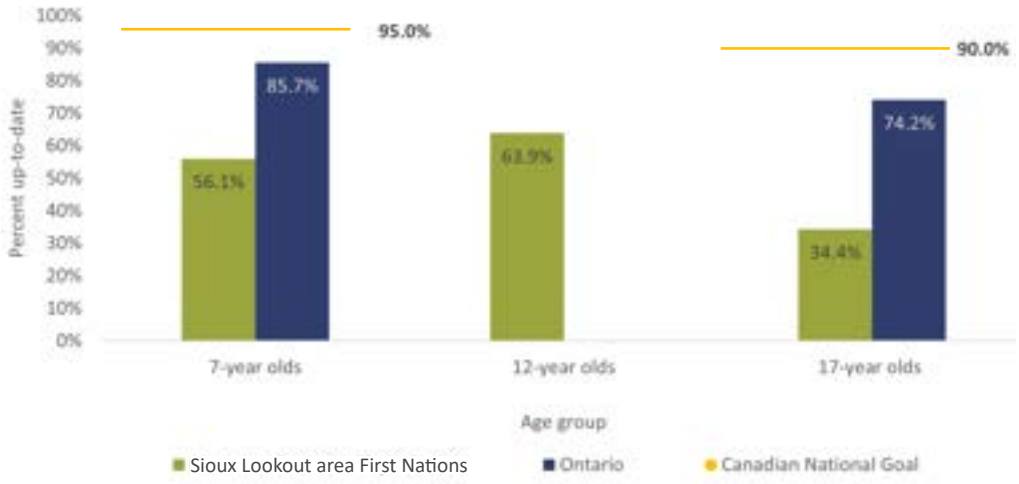


Figure 9. Pertussis vaccination coverage for Sioux Lookout area First Nations 7-, 12- and 17-year olds

Polio Vaccine

Up-to-date rates for the polio vaccine increased as children and youth get older. Some contributing factors may be the fact that the number of doses required to be up-to-date was the same for ages 7 and 17. However, coverage rates in communities lag behind provincial comparators (Figure 10).

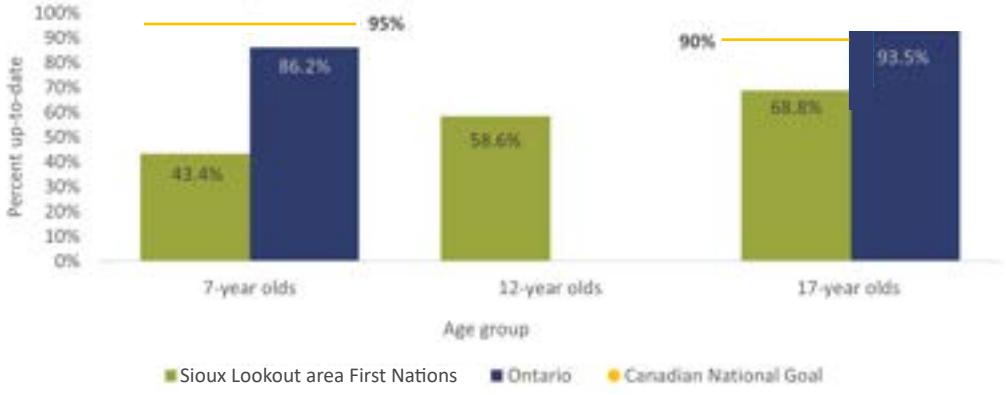


Figure 10. Polio vaccine coverage for Sioux Lookout area First Nations 7-, 12- and 17-year olds

Haemophilus influenza type B (Hib) Vaccine

Up-to-date rates for haemophilus influenza type b vaccine increased as children and youth got older, as evidenced by the older age groups having higher coverage rates. This could possibly be due to the fact that the number of vaccines were the same for ages 7 and 17 to be considered up-to-date (Figure 11). Additionally, the schedule is flexible regarding the number of doses required to be up-to-date (this varies between 1 to 4 doses, depending when the first valid dose was given), which may contribute to higher coverage rates.

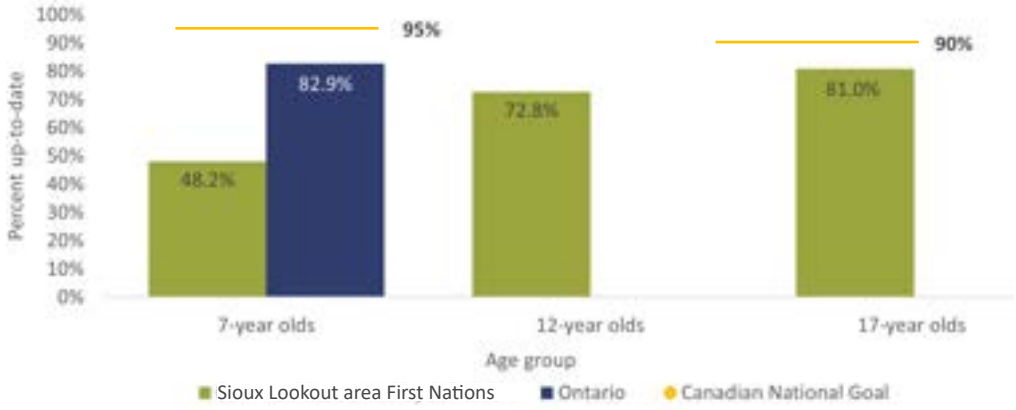


Figure 11. Haemophilus Influenza type B (Hib) vaccine coverage for Sioux Lookout area First Nations 7-, 12-, and 17-year olds

> Up-to-date rates for haemophilus influenza type b vaccine was higher in older age groups.

Pneumococcal Conjugate 13 (Pneu-C-13)

It was observed that up-to-date rates for pneumoccal conjugate 13 decreased as children increase in age. The number of second doses administered were lower than first dose, with over 10% of doses given considered invalid because they did not align with the vaccination schedule criteria (Figure 12). There is no provincial data for the pneumococcal conjugate 13 vaccine. However, the Canadian national goal is indicated.

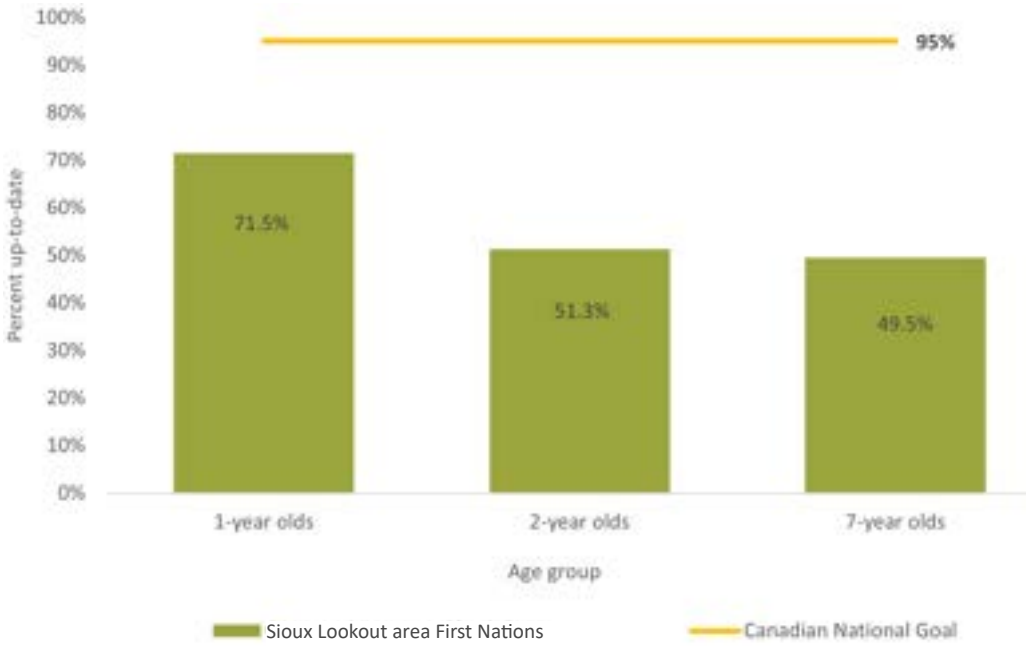


Figure 12. Pneumococcal Conjugate 13 vaccine coverage for Sioux Lookout area First Nations 1-, 2- and 7-year olds

Rotavirus Vaccine

Just over half of the 1-year-old age group were fully up-to-date on their Rotavirus vaccine, which is considerably behind the national goal of 95% coverage.

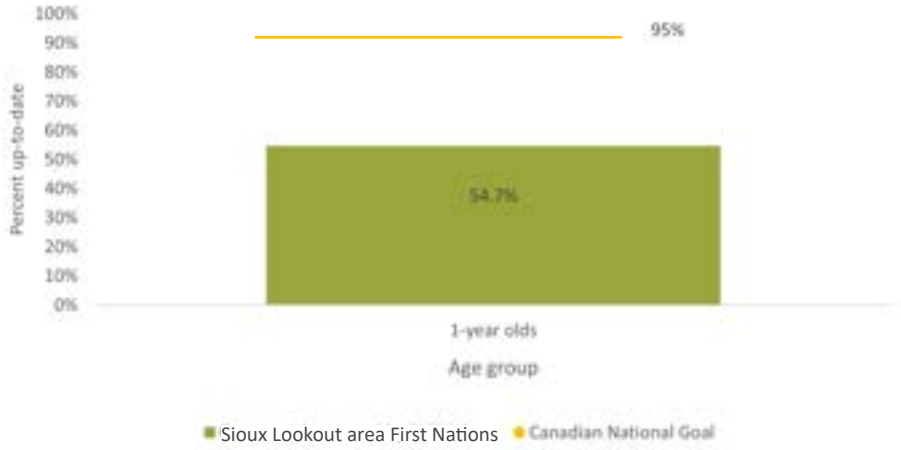


Figure 13. Rotavirus vaccine coverage for Sioux Lookout area First Nations 1-year-olds

Meningococcal Conjugate C (Men-C-C) and Meningococcal Conjugate C-ACYW (Men-C-ACYW) Vaccines

The up-to-date coverage rates of Men-C-C for the 2-years-old and 7-years-old age group were similar. This could possibly be due to the fact that only 1 dose is required to be up-to-date for each age group. The coverage rates of these groups, however, are lower than the Canadian national goal, and there are no provincial comparators. Similarly, the coverage rate of Men-C-ACYW is low for 12-year olds (Figure 14).

The coverage rates of these vaccines are lower than the Canadian national goal, and there are no provincial comparators.

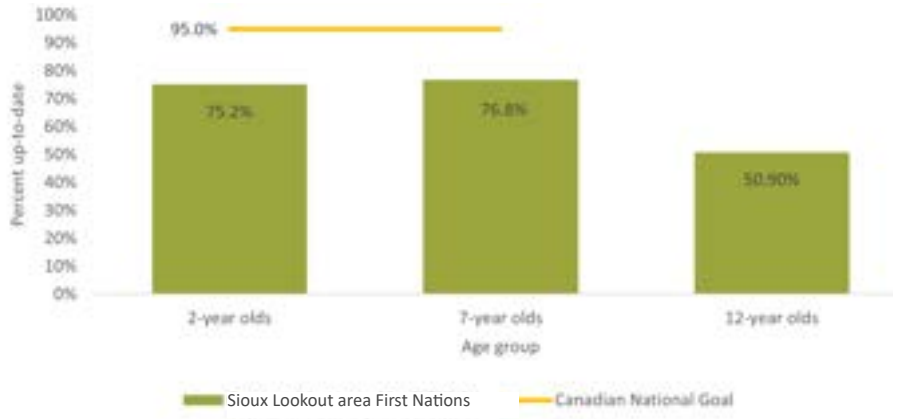


Figure 14. Meningococcal Conjugate C vaccine coverage for 2- and 7-year olds, and Meningococcal Conjugate ACYW coverage for 12-year olds

Measles, Mumps, Rubella (MMR) Vaccine

The up-to-date rates for the Measles, Mumps, Rubella Vaccine slightly increased as age groups increased in age. Only one additional dose is required for children and youth aged 12 and 17 from the age 2 vaccine dose (Figure 15). As such, this schedule provides ample time for children and youth to receive their second dose to complete the schedule and be considered up-to-date. However, coverage rates are slightly below provincial comparator rates, but much closer to the provincial rate than other vaccinations. There was no provincial comparator for the 2-year-old age group.

Coverage rates of MMR vaccine are much closer to the provincial rates than any other vaccine.

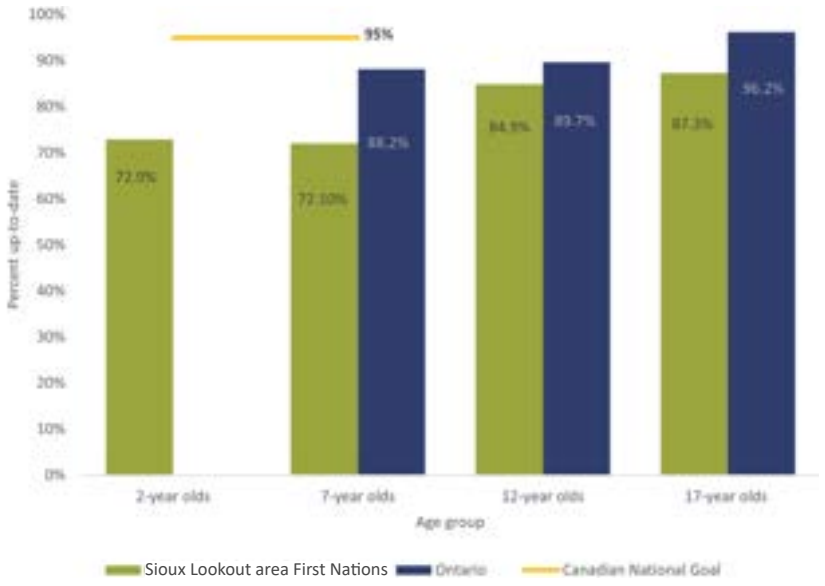


Figure 15. Measles, Mumps, Rubella vaccine coverage for Sioux Lookout area First Nations 2-, 12-, and 17-year olds

Varicella (Var) Vaccine

Compared to the Canadian national goals, the coverage rates of varicella in communities lag far behind (Figure 16). As the age group increased, the coverage rate decreased substantially.

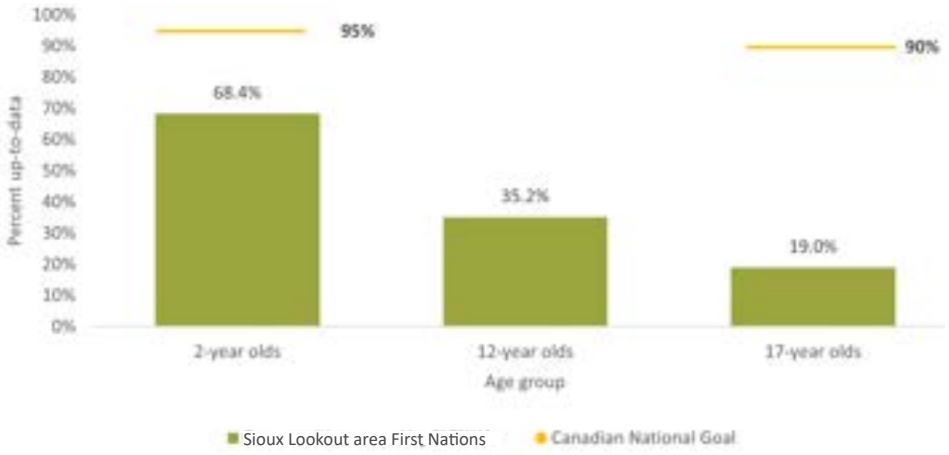


Figure 16. Varicella vaccine coverage for Sioux Lookout area First Nations 2-, 12-, and 17-year olds

Hepatitis B (HB) Vaccine

As youth get older, the up-to-date coverage rates for Hepatitis B increased. Overall, Sioux Lookout area First Nations coverage rates were still below the provincial rates and goal (Figure 17). In the 12-year-old age group, only 11 total second doses, and 3 total third doses were administered out of the 3-dose series for HB. Youth may simply need more time to get their second and third doses. Nonetheless, interventions may be required to boost overall coverage rates.

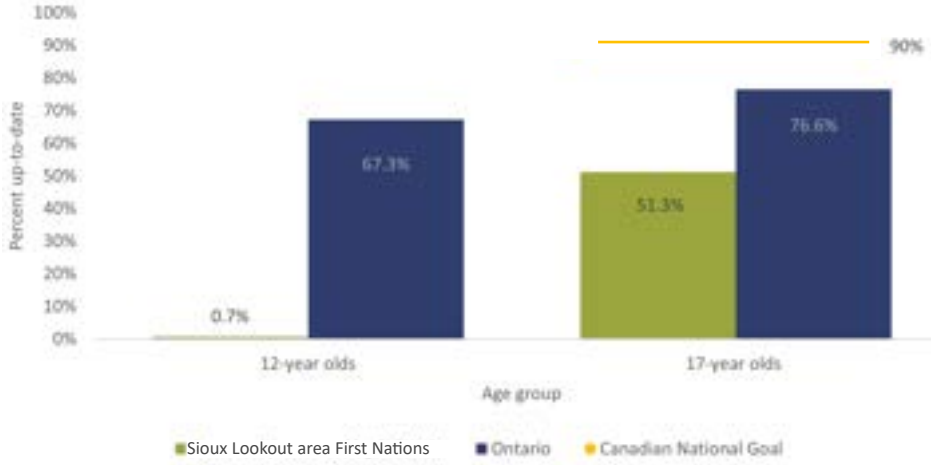


Figure 17. Hepatitis B vaccine coverage for Sioux Lookout area First Nations 12- and 17-year olds

Human Papillomavirus (HPV) Vaccine

As the age groups increased in age, the coverage rates also increased. However, the coverage rates of this vaccine are the lowest of all the vaccinations discussed in the report. In the 12- and 17- year old age groups, only 0.4% and 14.4% of youth received the vaccine, respectively, according to the vaccine schedule.

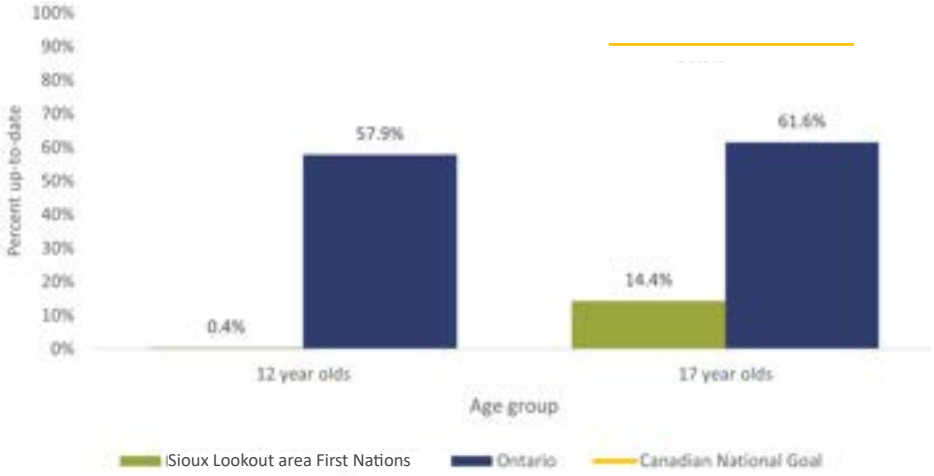


Figure 18. Human Papillomavirus vaccine coverage for Sioux Lookout area First Nations 2- and 7-year olds

Final Thoughts

> Reminders seems to be the big one, mothers are too busy to notice, and nurses may also be too busy to keep reminding families, playing phone tag with messages and miscommunication seems to happen more-so. Also, more record keeping. Most families move a lot and lose track of what's been done or needed.
>
> *- Leon Kamenawatamin, Bearskin Lake First Nation*

The findings within this report highlight that the vaccine coverage rate within the communities SLFNHA serves are lower than the provincial averages and national goals.

This report underscores the need for more focus to be placed on vaccination programming to ensure adequate resources are allocated to upstream interventions. A concerted, strategic, and coordinated approach is required across partners in the region to support this effort. There are many policy and program options that can be considered including, but not limited to:

Support Vaccine Confidence to address vaccine hesitancy, mistrust in the health care system, and build culturally safe care.

Ensure Community-led initiatives to build off the successes from Operation Remote Immunity and have dedicated personnel at the community level to spearhead vaccine education and clinic coordination.

Conduct Catch Up Programs as part of an overall regional immunization program and implement on a continuous timeframe to ensure children and youth with missing vaccinations are caught up.

Provide Education programs to community members that are user-friendly and culturally meaningful. This includes working with Elders and Knowledge Keepers.

Develop Standard Operating Procedures that are up to date and **conduct training** for health care workers, including frequent refreshers. National Advisory Committee on Immunization (NACI) developed the National Guidelines for Immunization Practices to define optimal practices that address the ongoing challenges of vaccination in Canada.

Strengthen Partnerships and Collaboration between communities, health partners, and education agencies to coordinate efforts.

Develop a Record System in communities that provides access to accurate and up-to-date records, including of vaccinations provided off reserve, for patient vaccination history/schedules.

Implement Reminder Systems to contact patients/families to remind them about required vaccinations, upcoming appointments, and general follow-up if appointments are missed.

Leverage National and Global Strategies such as the National Immunization Strategy (NIS)[12] and the World Health Organization's Immunization Agenda 2030[13] to provide further support to advocacy efforts.

Improve equity in the health care system overall, including with vaccination programming.

Achieving and maintaining high vaccination coverage is essential for the effective prevention and control of VPDs. Accurate and timely data on vaccination coverage is needed to evaluate vaccination programs and predict and prepare for outbreaks in communities. Collective efforts are required to speed up vaccination efforts to increase uptake, improve vaccination coverage, and address the current inequitable coverage of vaccine in Sioux Lookout area First Nations communities.

> My advice if anyone wants to improve the programming is [to] be more mindful and have a good heart and mindset going into our communities. Cause not everyone has the understanding of the person sharing the information. Be more open, show demonstrations.
>
> *- Melody Chikane, North Caribou Lake First Nation*

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Glossary

Age Group	A group of individuals born within the same year.
Coverage	The number of people who have received a particular vaccine.
Immunity	A person's ability to resist or fight an infection against disease.
Immunization	The process of receiving a vaccine to increase immunity or resistance to an infectious disease. This is also known as vaccination.
Immune system	The bodily process of protecting the body against foreign substances such as diseases.
Infectious diseases	Infectious diseases are caused by organisms such as viruses, bacteria, parasites, and fungi. It is possible for these organisms to spread diseases from one person to another.
Percentage	The proportion of a number out of 100.
Vaccination rate	The percentage of people who have received vaccines within the population. This is also known as the vaccination coverage rate.
Up-to-date	The number of children and youth who have received all recommended doses of a vaccine, or all vaccines they are eligible for within their age group.
Vaccine	A substance that stimulates the body's defenses against infection-causing viruses and bacteria. Most vaccines are given as an injection, but some can be given orally.
Vaccination	The process of administering a vaccine to induce immunity against a particular disease. This is also known as immunization.
Vaccine preventable disease (VPD)	Vaccine preventable diseases are diseases caused by viruses and bacteria that can be prevented with vaccines.

Appendices

Appendix 1. Population estimates by age group

Age group	1 year-old	2 year-old	7 year-old	12 year-old	17 year-old
# of children and youth born in a certain year	481	543	519	491	542

Appendix 2. Summary of vaccination coverage rates by age group in the SLFNHA region

Age group	Up-to-date vaccination	SLFNHA regional vaccination coverage
2018 age group (1st birthday)	3 doses of Dtap-IPV-Hib vaccine	59.3%
	2 doses of Pneu-C-13 vaccine	71.5%
	2 doses of Rot-1 vaccine	54.7%
2017 age group (2nd birthday)	4 doses of Dtap-IPV-Hib vaccine	38.5%
	3 doses of Pneu-C-13 vaccine	51.3%
	1 dose of Men-C-C vaccine	75.2%
	1 dose of MMR vaccine	72.9%
	1 dose of Var vaccine	68.4%
2012 age group (7th birthday)	5 doses of Tetanus vaccine	57.8%
	5 doses of Diphtheria vaccine	57.8%
	5 doses of Pertussis vaccine	56.1%
	5 doses of Polio vaccine	43.4%
	4 doses of Hib vaccine	48.2%
	3 doses of Pneu-C-13 vaccine	49.5%
	1 dose of Men-C-C vaccine	76.8%
	2 doses of MMR vaccine	72.1%
2007 age group (12th birthday)	5 doses of Tetanus vaccine	63.9%
	5 doses of Diphtheria vaccine	63.5%
	5 doses of Pertussis vaccine	63.9%
	5 doses of Polio vaccine	58.6%
	4 doses of Hib vaccine	72.9%
	3 doses of HB vaccine	0.7%
	1 dose of Men-C-ACYW vaccine	50.9%
	2 doses of MMR vaccine	84.7%
	2 doses of Var vaccine	35.2%
	At least 2 doses of HPV vaccine	0.4%
2002 age group (17th birthday)	6 doses of Tetanus vaccine	42.1%
	6 doses of Diphtheria vaccine	31.0%
	6 doses of Pertussis vaccine	34.4%
	5 doses of Polio vaccine	68.8%
	4 doses of Hib vaccine	81.0%
	3 doses of HB vaccine	51.3%
	2 doses of MRR vaccine	87.3%
	2 doses of Var vaccine	19.0%
	2 or 3 doses of HPV vaccine	14.4%