

# First Nations Health Protection Report 2010

**Saskatchewan Region** 



# Canada

Health Canada is a federal department responsible for helping the people of Canada maintain and improve their health. We assess the safety of drugs and many consumer products, help improve the safety of food, and provide information to Canadians to help them make healthy decisions. We provide health services to First Nations people and Inuit communities. We work with the provinces to ensure our health care system serves the needs of Canadians.

Published by authority of the Minister of Health.

First Nations Health Protection Report 2010 - First Nations and Inuit Health Branch, Saskatchewan Region

© Her Majesty the Queen in Right of Canada, represented by the Minister of Health, 2013. This publication may be reproduced without permission provided the source is fully acknowledged. Cat.: H33-1/16-2010E-PDF

# Message from the Regional Medical Health Officer

#### Greetings,

We are very pleased to share the Regional First Nations Health Protection Report 2010 with our First Nations stakeholders. The report outlines accomplishments made in the mandatory program areas, as well as availability of services, and provides reflection on key challenges on-reserve.

This report is intended primarily for key decision makers, health directors and health professionals working on-reserve in Saskatchewan First Nations communities. The vision is to provide information on the mandatory programs, including Immunization, Tuberculosis, HIV, Environmental Health, Pandemic Emergency Planning, as well as other reportable communicable diseases on-reserve. The report also emphasizes the importance of increasing education and awareness in the communities around immunization, and to help improve overall immunization coverage rates. These basic elements will contribute to improving the health and safety of future generations.

Health protection is a key public health function that exists in Saskatchewan on First Nations reserves. Public health staff on-reserve includes: community health nurses, health directors, nurse managers, medical health officers, water quality monitors and environmental health officers, health services managers, local doctors, and many other health care providers who play a direct role in the provision of these services. Strong working relationships and regular communication occur between First Nations and Inuit Health Branch (FNIHB) and the regional health authorities, Saskatchewan Ministry of Health and First Nations stakeholders, contributing to the overall goal of improving the health of First Nations people.

According to the recent data seen in this report, sexually transmitted infections, hepatitis C, MRSA, tuberculosis, HIV, water quality, and animal bites are priority health issues. Current surveillance data are critical for program planning, evaluation of impact and also can assist with decision making at the community level. We would like to congratulate stakeholders who have diligently contributed efforts to improving the health status for on-reserve First Nations people. In addition to their hard work, multiple factors contribute to improving overall health outcomes, such as income, housing, education, employment and access to services. Emphasis needs not only to be placed on efforts to control and prevent commonly seen illnesses, but also to focus on reducing overall health risks to First Nations people.

Data and general information utilized in this report have been obtained from FNIHB regional programs, Northern Inter-Tribal Health Authority, Tuberculosis Information System, Integrated Public Health Information System and from Saskatchewan Ministry of Health. We would like to acknowledge some limitations with data quality in portions of the report as adequate information was not available. References are provided in the report where the data were either not available or incomplete.

I would encourage you to share this report with your staff and community members. As you are aware, this is the second report of its kind and we value your input and comments in order to enhance future Health Protection reports.

Sincerely,

#### Dr. Ibrahim Khan

Regional Medical Health Officer First Nations and Inuit Health Branch Saskatchewan Region Health Canada

If you have any questions, please contact Health Surveillance and Assessment Unit at (306) 780-3499.

We would like to acknowledge the contributions of many of our colleagues and community members who helped us put this report together. The First Nations Health Protection Report 2010 is the result of the efforts of our First Nations stakeholders, provincial stakeholders, and FNIHB Saskatchewan. This report is surveillance data driven, and much time and effort have gone into collecting, formatting and analyzing the data used in its preparation.

We would also like to recognise the contributions of our partners at Northern Inter -Tribal Health Authority (NITHA), Saskatchewan Ministry of Health, First Nations and Inuit Health Branch-Alberta Region (FNIHB-AB), Federation of Saskatchewan Indian Nations (FSIN), and TB Prevention and Control Program.

We also extend acknowledgements to all those who shared their valuable comments, ideas and time in making this report. We strongly believe the wide variety of input received has enriched the quality of this report.

# **Table of Contents**

Message from the Medical Health Officer	1
Acknowledgments	3
Executive Summary	6
Introduction	9

Section 1: Population Demographics	
1.1 National and Provincial Populations	11
1.2 South Central and NITHA Populations	
1.3 Age and Gender Distribution	

Section 3: Immunization and Vaccine-Preventable Diseases	56
3.1 Childhood Immunization Coverage Rates	57
Immunization Rates for One-Year-Old Children	
Immunization Rates for Two-Year-Old Children	60
Immunization Rates for Six-Year-Old Children	64
Childhood Immunization Coverage by Community	66
3.2 Adult Immunization	68
3.3 Vaccine-preventable disease	69
Pertussis	70
Section 4: Animal Exposures	72
Section 5: Environmental Public Health	78
5.1 Drinking Water	79
5.2 Wastewater	84
5.3 Housing	86
5.4 Solid Waste Disposal	86
5.5 Food Safety	86
Section 6: Pandemic Influenza Planning	87
Section 7: Infection Prevention and Control	91
Appendices	92
Appendix A - List of Figures and Tables	92
Appendix B – Abbreviations	96
Appendix C – Data Sources, Methods and Limitations	97
Appendix D - Reporting and Follow-up Timelines	
References	104

This is the second Health Protection report produced by Health Canada, First Nations and Inuit Health Branch, Saskatchewan Region (FNIHB-SK). It is designed to provide Health Directors, decision-makers in First Nations communities and health professionals with information for program planning and community action, in the areas of communicable disease control and environmental health. The first report covered data from 2003 to 2007. This report, where possible, covers data from 2004 to 2010.

The report contains information about trends in notifiable communicable diseases, immunization and vaccine-preventable diseases, animal exposures, environmental health, pandemic influenza planning, and infection prevention and control for First Nations living on-reserve in Saskatchewan. It does not include data for off-reserve First Nations people or other Aboriginal groups. First Nations data are compared, where possible, to the overall Saskatchewan population, and First Nations in other Canadian jurisdictions.

It is the intention of FNIHB-SK to produce similar reports on a regular basis to assist communities with planning and evaluating their health protection activities. It is anticipated that lessons learned both in the development of the report and as a result of its use by stakeholders, will increase both the scope and quality of information that is available for future reports.

### **Communicable Diseases**

Sexually transmitted infections (STI) were the most commonly reported notifiable diseases from 2004 to 2010. Chlamydia infections accounted for half of all notifiable disease reports in the Saskatchewan First Nations on-reserve population during this time period, with incidence rates approximately four times those of the overall Saskatchewan population. Chlamydia incidence rates in the Northern Inter-Tribal Health Authority (NITHA) communities were higher than in First Nations communities in South Central Saskatchewan, but the incidence rates in South Central have been steadily increasing over the seven year period. Gonorrhea incidence rates, although considerably lower than chlamydia incidence rates, were more than five times those of the overall Saskatchewan population. Gonorrhea and chlamydia are concerning because of their potential for serious health effects in both infected adults, and young infants because of transmission from mother to infant.

Between 2004 and 2010 the incidence rate of hepatitis C virus (HCV) varied widely from year to year, although on average it was 137 per 100,000 population; approximately twice the rate of the overall Saskatchewan population. HCV incidence rates for South Central communities were higher than incidence rates for NITHA communities.

The incidence rate of new human immunodeficiency virus (HIV) infection has increased steadily between 2004 and 2011 (This report includes data from 2011 to better display current trends). In 2011, the incidence rate of HIV was 70 per 100,000 for First Nations living on-reserve, compared to 17 per 100,000 for the overall Saskatchewan population.

From 2004 to 2010 the incidence rate of methicillin-resistant Staphylococcus aureus (MRSA) averaged 893 per 100,000. This rate includes both invasive and colonized cases, as no distinction is made between the two types of MRSA in Saskatchewan Ministry of Health's surveillance system. Incidence rates in the NITHA communities were higher than for South Central communities. Over half (59%) of all cases were in children and youth under the age of 25 years.

Tuberculosis (TB) is an ongoing concern for First Nations in Saskatchewan. This report reviewed data for the ten year period from 2000 to 2010. During this period of time, NITHA had an average incidence rate of 113 per 100,000 while South Central averaged a rate of 20 per 100,000.

# **Animal Exposures**

Animal exposures (i.e. bites) pose a health and safety concern in First Nations communities. In the seven years from 2004 to 2010, over 1,200 incidents were reported. Biting incidents most often involved children and youth with 49% of all victims being under the age of 20 years. Investigation of these incidents, including locating and monitoring the animals involved, can be very time consuming for community health nurses and reduces time available to focus on other public health priorities in the communities.

# **Immunization and Vaccine-Preventable Diseases**

The report presents data on childhood immunization coverage for the seven years from 2004 to 2010. Overall coverage rates for Saskatchewan First Nations ranged from 66% to 89% for one and two-year-old children, and from 78% to 96% for six-year-old children, depending on the vaccine.

The First Nations and Inuit Health Branch Targeted Immunization Strategy (FNIHB-TIS) was developed in partnership with the First Nations people and integrated with the Canadian National Immunization Strategy (CNI) to address the needs of First Nations children living on-reserve. This strategy aims to increase the rate of immunization of children less than six years of age living on-reserve across Canada to 95% and to reduce the incidence of complications of vaccine-preventable diseases.<sup>35</sup>

NITHA childhood immunization coverage for most vaccines was higher than that for the South Central communities. NITHA also had a higher percentage of communities with high (over 90%) coverage and fewer communities with very low (less than 50%) coverage, as compared to South Central.

Hepatitis A vaccine was introduced for children living on-reserve in the 1990s in response to the high rates of hepatitis A reported in several communities. From 2004 to 2010, there were no cases of hepatitis A reported in Saskatchewan First Nations living on-reserve. However, the occurrence of cases of other vaccine-preventable diseases (such as pertussis and invasive Pneumococcal disease) from 2004 to 2010 indicates there is still work to be done to improve protection.

#### **Environmental Public Health**

Drinking water quality is an ongoing concern for First Nations communities in Saskatchewan. From 2007 to 2010, there were 92 boil water advisories, lasting an average of 34 days. Most of the advisories were due to a loss of pressure in the water system followed by low chlorine residuals/plant operation issues. There were two boil water advisories issued over the four years because of poor bacteriological quality.

### Pandemic Influenza Planning

Substantial work has occurred at the regional and First Nations community level across the province to plan for pandemic influenza. In 2008, 70% of South Central communities surveyed had plans that were three-quarters or more complete. Communities were encouraged to develop succession planning strategies. FNIHB-SK completed its most recent revision of their regional pandemic plan in 2010.

#### **Infection Prevention and Control**

Infection prevention and control (IPC) practices and standards in Saskatchewan vary by jurisdiction. Saskatchewan Ministry of Health, regional health authorities, NITHA and FNIHB-SK started regular meetings to take a look at the overall IPC situation in the province and began providing support in capacity development and training, best practice resource sharing and applying consistent standards in all programs in First Nations communities. The overall move is to strengthen the notion of IPC key elements while providing critical services to patients and clients, and to make it part of the overall patient safety initiatives.

# Introduction

This Health Protection Report is the second of its kind produced by Health Canada, First Nations and Inuit Health Branch, Saskatchewan (FNIHB-SK). It is designed to provide Health Directors, decisionmakers in First Nations communities and health professionals with information for program planning and community action, in the areas of communicable disease control and environmental health.

The report contains information about trends in communicable diseases, immunization, pandemic influenza planning and environmental health for First Nations on-reserve. It does not include data for off-reserve First Nations people or other aboriginal groups. First Nations data are compared, where possible, to the overall Saskatchewan population. It is the intention of FNIHB-SK to produce similar reports on a regular basis to assist communities with planning and evaluating their health protection activities.

The majority of this second report has used data that were available as of December 31<sup>st</sup>, 2010. The number of years covered in the different report sections varies based on the availability of data of sufficient quality. It is anticipated that lessons learned both in the development of the report and as a result of its use by stakeholders will increase both the scope and quality of information that is available for future reports.

Health services to First Nations people living on-reserve in Saskatchewan are provided in a variety of ways by FNIHB-SK, Northern Inter-Tribal Health Authority (NITHA), tribal councils, regional health authorities and individual bands. This complex administrative arrangement poses a unique challenge in the coordination of health services delivery to First Nations people.

FNIHB-SK supports the delivery of community-based health promotion and health protection services on First Nations reserves in Saskatchewan. In non-transferred First Nations communities in South and Central Saskatchewan, FNIHB-SK is a direct service provider of public health services. Transferred communities (those that have accepted responsibility for the delivery of public health services and have received funding to do so) may hire their own health professionals or enter into agreements with provincial or regional health authorities for the provision of these services. FNIHB-SK provides consultation and support to transferred communities, as requested.

FNIHB-SK provides services through a regional and community-based structure in South and Central Saskatchewan. The regional office in Regina provides region-wide services and support, while the North Service Centre (covering Central Saskatchewan) and the South Service Centre (covering Southern Saskatchewan) provide services in their respective geographic areas.

In Northern Saskatchewan, NITHA and its member partners (Prince Albert Grand Council, Meadow Lake Tribal Council, Peter Ballantyne Cree Nation and Lac La Ronge Indian Band) are responsible for public health and primary care services on-reserves within their jurisdiction. NITHA provides public health oversight, professional support, advice and guidance to its partners, enabling them to better meet the health needs of their communities. This is directed by the partners and accomplished through research, data collection, proposal development, sound two-way communication, information sharing, policy review, training and standards development. FNIHB-SK and NITHA work collaboratively in areas of common interest.

## **1.1 National and Provincial Populations**

Saskatchewan has one of the largest percentages of Registered First Nations population in Canada at 13% of the overall provincial population (Figure 1.1). Statistics Canada reported Saskatchewan's population to be 1,033,381 (2011 Census), while Aboriginal Affairs and Northern Development Canada (AANDC) reported Saskatchewan's Registered First Nations population to be 134,021 (on and off-reserve) as of December 31, 2010.



Sources: Statistics Canada, 2011 Census. AANDC Registered Indian Population by Region, December 31, 2010.

Statistics Canada estimates that the Registered First Nations population in Canada will grow by 45%, from about 633,600 in 2001 to 920,100 in 2026. During this same time period the on-reserve and urban populations are expected to increase by 64% and 33% respectively (Figure 1.2). The Registered First Nations population is expected to experience a higher growth rate than the overall Canadian rates.



Source: AANDC, Aboriginal Demography Population, Household and Family Projections, 2001 to 2026

Fertility, mortality and migration patterns differ significantly between regions, resulting in large variations in the projected growth of First Nations populations between provinces. Significant growth is expected in all regions from 2001 to 2026, particularly the prairie region (Figure 1.3).



Source: AANDC, Aboriginal Demography Population, Household and Family Projections, 2001 to 2026

Population numbers provided by AANDC indicate that in 2010 there were 66,707 registered First Nations people living on-reserve in Saskatchewan. This represents almost exactly one half (49.8%) of the total number of registered First Nations people in the province and 6% of the overall Saskatchewan population (Figure 1.4). The proportion of registered First Nations people living on-reserve has remained consistent from 2004 to 2010.



Sources: Statistics Canada, Saskatchewan Population at July 1, 2010. AANDC Registered Indian Population by Region, December 31, 2010

# **1.2 South Central and NITHA Populations**

From 2004 to 2010 the on-reserve population in the South Central and NITHA regions increased by 12.9% (from 59,072 in 2004 to 66,707 in 2010). In 2010 the on-reserve population included 31,530 (47.3%) people living in communities served by NITHA and 35,177 (52.7%) people living in South and Central communities (Figure 1.5). The distribution of on-reserve population between NITHA and South Central communities has remained consistent from 2004 to 2010.





### **1.3 Age and Gender Distribution**

The Saskatchewan First Nations on-reserve population is younger in comparison to the overall Saskatchewan population (Figure 1.6). This may influence the impact of disease in First Nations individuals living on-reserve, as certain infectious diseases are more prevalent in specific age groups.



Sources: Statistics Canada, Saskatchewan Population, by Age Group at July 1, 2010. AANDC Registered Indian Population by Region and Age Group, December 31, 2010



Males and females are distributed equally at every age group for the Saskatchewan Registered First Nations population (Figure 1.7).

Source: AANDC Registered Indian Population by Region, Age Groups and Sex, December 31, 2010

## Introduction

The prevention and control of communicable diseases is one of the key roles of Public Health in Saskatchewan. A collaborative approach is necessary to protect Saskatchewan's population from the risks associated with communicable diseases, as these pathogens do not recognize boundaries or jurisdictions.<sup>1</sup>

*The Public Health Act, 1994* and its regulations are the statutory basis for the reporting, investigation and control of communicable diseases in Saskatchewan. The Act and Regulations outline the roles and responsibilities of individuals and agencies as they relate to communicable disease control. Saskatchewan Ministry of Health identifies 75 communicable diseases that must be reported to public health officials and Saskatchewan Ministry of Health.<sup>2</sup> Under the Act, health care providers (physicians and nurses), school personnel, and managers of eating establishments and laboratories are required to report cases of these diseases and outbreaks to the designated Medical Health Officers. South Central communities and NITHA communities are responsible, under the Act, for overseeing communicable disease reporting for First Nations individuals living on-reserve in their respective areas.

When a communicable disease is reported in an individual living on-reserve, community-based health staff contact the affected person, perform contact tracing for specific diseases and arrange for treatment and follow-up measures to prevent further spread of disease. Reportable diseases are monitored to understand trends in their occurrence, plan individual and population interventions to reduce disease, and to evaluate the impact of control strategies such as immunization and educational campaigns.

Health service delivery for First Nations differs between the NITHA and South Central communities of Saskatchewan. NITHA has 13 First Nations communities equipped with nursing stations that provide basic diagnostic, treatment and primary care services. In contrast, most communities in South Central Saskatchewan only provide public health services on-reserve and people must go off-reserve for diagnosis and treatment. This difference in the delivery of health services can potentially affect rates of reportable diseases.

First Nations people living on-reserve in Saskatchewan account for a disproportionate amount of infectious disease in the province. Poverty, inadequate housing, lack of education, unemployment, child abuse, and family violence are all determinants of health that influence an individual's risk of acquiring many infectious diseases. Therefore, reducing the incidence rates of infectious disease in Saskatchewan First Nations populations requires a holistic and coordinated approach that focuses on improving these determinants of health.

## 2.1 Sexually Transmitted Infections

Sexually transmitted infections (STIs) have the highest incidence of all communicable diseases in Saskatchewan, both in the overall population as well as in the First Nations population living on-reserve. Chlamydia was the most frequently reported STI (79%), followed by gonorrhea (20%) and syphilis (1%) (Figure 2.1.1).



Sources: Health Canada FNIHB-SK and NITHA

The incidence rates of STIs for each disease and for each year examined were consistently higher for First Nations on-reserve populations compared to the overall province. Early diagnosis and treatment, partner notification, and routine screening for STIs in pregnant women are all effective measures at preventing and controlling the spread of STIs.<sup>1</sup>

#### Chlamydia

Chlamydia is the most commonly diagnosed and reported STI in Canada.<sup>9</sup> Chlamydia can be transmitted through sexual contact with an infected individual or can be spread from infected mothers to their newborns. The majority of individuals with chlamydia have no symptoms, creating challenges for the early detection and diagnosis. Untreated, chlamydia can potentially be infectious for years and can lead to pelvic inflammatory disorder in females. Chlamydia infection also increases the risk of acquiring HIV.<sup>3</sup> Co-infection of chlamydia with gonorrhea is common.<sup>4</sup>

According to the Public Health Agency of Canada (PHAC), reported cases of chlamydia infection steadily increased over time in Canada in both sexes. PHAC reported that in Canada between 1999 and 2008, rates in males increased by 107% from 81 to 168 per 100,000 population, and rates in females increased by 69% from 193 to 327 per 100,000.<sup>16</sup> Saskatchewan has one of the highest rates of chlamydia and gonorrhea in Canada.<sup>16</sup> In 2010 the overall Saskatchewan incidence rate of chlamydia was 484 per 100,000. In contrast, South Central had an incidence rate three times higher (1475 per 100,000) and NITHA had an incidence rate almost five times higher (2328 per 100,000). It is important to note that the smaller population in the South Central and NITHA communities makes the rates more sensitive to changes in reported cases.



Sources: Health Canada FNIHB-SK; NITHA; AANDC Registered Indian Population by Region and Age Group, December 31, 2010; Overall SK rates from Centre for Communicable Diseases and Infection Control (overall rates include South Central and NITHA populations), Public Health Agency of Canada (verified as of November 2011)

The majority of cases (70% in 2010) of chlamydia in Saskatchewan on-reserve First Nations (South Central and NITHA) occur in females (888 out of 1253) (Figure 2.1.3). These percentages reflect those of the overall Saskatchewan population in which 65% (3298 out of 5061) of chlamydia cases were females in 2010. The higher number of reported cases of chlamydia in females may be due to more frequent testing during routine health visits for prenatal care or contraception.



Sources: Health Canada FNIHB-SK and NITHA

The 15 to 24-year-old age group has the highest number of reported cases of chlamydia for on-reserve First Nations from 2004 to 2010 (5,200 out 7,300 – or 72%) (Figure 2.1.4). This age trend is similar in the overall Canadian population.<sup>16</sup>



Sources: Health Canada FNIHB-SK and NITHA

#### Gonorrhea

Gonorrhea is the second most commonly reported STI in Canada.<sup>9</sup> Like chlamydia, gonorrhea is a STI that can be spread through sexual contact with an infected individual or from an infected mother to her newborn. Although symptoms of gonorrhea are common in men, the majority of women are asymptomatic. However, the high incidence of reported cases among females can be explained by routine STI screening in health facilities or sexual clinics. Untreated gonorrhea infection in females may result in complications like pelvic inflammatory disease which can cause tubal infertility, chronic pelvic pain, ectopic pregnancy, or complications in newborns. Co-infection of gonorrhea with chlamydia is common. In 2010, 51% of gonorrhea cases reported in Saskatchewan on-reserve First Nations were co-infected with chlamydia (56 out of 109). Gonorrhea infections increase the risk of an individual acquiring HIV. Gonorrhea can be treated with antibiotics; however drug resistance to certain antibiotics has been increasing, which is a public health concern.<sup>4</sup>

The overall Saskatchewan incidence rate of gonorrhea in 2010 was 73 per 100,000. Similar to the findings for chlamydia, there is a disproportionate burden of gonorrhea in First Nations on-reserve populations compared to overall Saskatchewan. In 2010 South Central had an incidence rate of gonorrhea that was over four times higher than the overall Saskatchewan population (315 per 100,000) and NITHA had an incidence rate that was nine times higher (637 per 100,000).



Sources: Health Canada FNIHB-SK; NITHA; AANDC Registered Indian Population by Region and Age Group, December 31, 2010; and Overall SK rates from Centre for Communicable Diseases and Infection Control (overall rates include South Central and NITHA populations), Public Health Agency of Canada (verified as of November 2011)

The number of cases of gonorrhea is higher in females in both the Saskatchewan First Nations onreserve population (South Central and NITHA) and the overall Saskatchewan population. In 2010, 59% (186 out of 314) of the on-reserve First Nations gonorrhea cases were diagnosed in females (Figure 2.1.6); the overall Saskatchewan population shared the same proportion of female cases (446 out of 759). This differs from national trends where 56% of gonorrhea cases were diagnosed in males (6385 out of 11397).<sup>17</sup>



Sources: Health Canada FNIHB-SK and NITHA

The percentage breakdown of gonorrhea by age group is almost identical to that of chlamydia. The 15 to 24 year old age group has the highest number of cases of gonorrhea for on-reserve First Nations, representing 72% of all the on-reserve cases from 2004 to 2010 (Figure 2.1.7). This age trend is consistent with that of Saskatchewan and Canada.<sup>9</sup>



Sources: Health Canada FNIHB-SK and NITHA

#### **Syphilis**

Syphilis is a STI that can either be symptomatic or latent. Latent syphilis occurs when an individual is infected with syphilis but does not have any symptoms. One third of untreated syphilis cases progress to tertiary syphilis, in which the bacteria invades the brain, nerves, eyes, heart, blood vessels, liver, bones, or joints. Syphilis infection increases an individual's risk of acquiring HIV. Syphilis can effectively be treated with antibiotics.<sup>5</sup>

From 2004 to 2010, there were 28 syphilis cases reported in First Nations living on-reserve (NITHA and South Central combined); 15 of the cases were reported in 2010. Females represented 75% (21 out of 28) of the reported syphilis cases. This trend differs from that of overall Saskatchewan and Canada where there is a higher rate of syphilis in males than in females.<sup>16,17</sup>

## 2.2 Bloodborne Pathogens

#### Human Immunodeficiency Virus (HIV)

HIV is an infection of the immune system that results in a chronic illness and makes individuals more susceptible to other infections and cancers. Acquired Immunodeficiency Syndrome (AIDS) may develop once an individual is no longer able to fight the HIV infection. HIV can be acquired when the virus is introduced into the bloodstream through unprotected sexual intercourse, shared needles or equipment for injecting drugs, or from a mother to a newborn during pregnancy, delivery, or breastfeeding.

It is estimated that 71,300 Canadians were living with HIV in 2011, 25% of whom were unaware of their HIV infection.<sup>6</sup>

In 2009, Saskatchewan had the highest rate of HIV in Canada at almost three times the national rate (23.6 per 100,000 compared to 8.6 per 100,000).<sup>7</sup> In response to this situation, Saskatchewan Ministry of Health, through the HIV Strategy Task Group, released *Saskatchewan's HIV Strategy 2010-2014* to further investigate and manage this increase in HIV. The goals of this strategy are to:

- reduce the number of new infections;
- improve the quality of life for HIV infected individuals; and
- reduce risk factors for acquisition of HIV infection.<sup>8</sup>

In 2009, 79% of Saskatchewan HIV cases were reported in individuals of Aboriginal ethnicity and 77% of HIV cases were identified as using injection drugs.<sup>8</sup> Injection drug use in Aboriginal individuals account for the majority of new HIV diagnoses in Saskatchewan.<sup>8</sup> In Saskatchewan there is a high rate of co-infection of HIV with hepatitis C virus (HCV); 70% of those diagnosed with HIV in Saskatchewan in 2010 were co-infected with HCV.<sup>8</sup> In 2011, 44% of the new cases of HIV reported in FNIHB-SK's South Central communities were co-infected with HCV.

#### **HIV Incidence**

From 2004 to 2011 there were 133 lab confirmed cases of HIV reported in on-reserve First Nations in Saskatchewan (South Central and NITHA). This number has increased from 11 cases in 2008 to 48 cases in 2011; a 336% increase in three years (Figure 2.2.1).



Sources: Health Canada FNIHB-SK and NITHA

In 2008, the incidence rates of HIV were similar in South Central, NITHA and overall Saskatchewan (15, 20 and 17 per 100,000 respectively). From 2009 to 2011, HIV rates more than doubled in South Central and NITHA communities. In 2011, NITHA reached a rate of 43 cases per 100,000, while South Central reached a rate of 95 per 100,000 (see Figure 2.2.2). FNIHB-SK responded to this situation by developing an approach aligned with *Saskatchewan's HIV Strategy*. In 2011, HIV testing increased in some First Nations communities and resulted in more cases being reported. The overall provincial rate of HIV increased from 2004 to 2009, and has since stabilized.



Sources: Health Canada FNIHB-SK; NITHA; Saskatchewan Ministry of Health, Population Health Branch (overall rates include South Central and NITHA populations); AANDC Registered Indian Population by Region and Age Group, December 31, 2010.

Overall, from 2004 to 2011, male cases have accounted for 53% of HIV cases in the First Nations onreserve population compared to 47% females. In 2011, 28 male cases and 20 female cases were reported in Saskatchewan on-reserve First Nations (Figure 2.2.3).



Sources: Health Canada FNIHB-SK and NITHA

The age distribution of HIV cases in males differs from that of females in the First Nations on-reserve populations. In 2011, more females fell within the 15 to 24 age group than males, while males had the majority of cases in the 25 to 34 age group (Figure 2.2.4). This age distribution is similar to that of the overall province.<sup>18</sup>



Sources: Health Canada FNIHB-SK and NITHA

#### **Hepatitis C Virus**

The hepatitis C virus (HCV) is a bloodborne pathogen that can be spread through exposure to blood or bodily fluids infected with HCV, or from a mother to a newborn child. It is estimated that 70% to 80% of HCV transmission is due to sharing needles and other drug equipment for injection drug use.<sup>12</sup> Approximately 70% to 80% of individuals infected with HCV are asymptomatic and do not show signs of infection.<sup>10</sup> As a result, an estimated 21% of individuals infected with HCV do not know they are positive and remain undiagnosed.<sup>11</sup> Even without symptoms, these individuals are still infectious and may be spreading the virus without knowing it. It is estimated that 20% to 30% of individuals who are HCV positive will recover without treatment, while the remaining 70% to 80% of untreated cases will progress to the chronic state and may eventually develop liver damage or liver cancer.<sup>10,12</sup>

There were a total of 603 HCV cases reported in South Central and NITHA communities from 2004 to 2010. There was a slight trend upward in the number of HCV cases from 60 in 2004 to a peak of 110 in 2009. In 2010, 97 HCV cases were reported, a 12% decrease from 2009 (Figure 2.2.5). The number of new cases does not necessarily reflect newly-acquired infections; since many HCV cases do not produce symptoms until many years after the initial infection, many cases diagnosed in a particular year may have acquired their infection in a previous year.<sup>14</sup>



Sources: Health Canada FNIHB-SK and NITHA

HCV rates among First Nations individuals living on-reserve in Saskatchewan annually averaged 137 per 100,000 from 2004 to 2010. Rates were higher for First Nations on-reserve in South Central communities (188 per 100,000 in 2010) compared to NITHA communities (98 per 100,000 in 2010) in all years from 2004 to 2010. The overall rate of HCV in Saskatchewan in 2010 was 56 per 100,000 (Figure 2.2.6).



Sources: Health Canada FNIHB-SK; NITHA; AANDC Registered Indian Population by Region and Age Group, December 31, 2010; and Overall SK rates from Centre for Communicable Diseases and Infection Control (overall rates include South Central and NITHA populations), Public Health Agency of Canada (verified as of November 2011).

From 2004 to 2010, there were more new cases of HCV reported in female First Nations living onreserve than their male counterparts (326 and 277 respectively) (Figure 2.2.7). This demographic differs from cases among the overall Saskatchewan population and from national demographics in which HCV is more common in males.<sup>11</sup>



Sources: Health Canada FNIHB-SK and NITHA

The number of cases of HCV was highest among the 15 to 24 and 25 to 34 age groups, which are consistent with provincial and national demographics.<sup>11</sup> Females tend to be younger, with 75% of HCV cases under the age of 35 years. Males are evenly distributed between age groups. There were no reported cases of HCV in those less than 15 year of age (Figure 2.2.8).



Sources: Health Canada FNIHB-SK and NITHA
# 2.3 Methicillin-Resistant Staphylococcus Aureus (MRSA)

Staphylococcus *aureus* (Staph) is a type of bacteria that is commonly found on the skin and in the noses of healthy people. Some of these bacteria can be easily treated, but those resistant to the antibiotic methicillin are referred to as methicillin-resistant *Staphylococcus aureus* (MRSA). MRSA is spread through skin to skin contact. Those with weakened immune systems and chronic diseases tend to be more susceptible to acquiring MRSA. There is a high rate of MRSA transmission in acute care settings and a higher risk of serious infections. It is estimated that between 20% and 30% of the Canadian population are carriers of Staph bacteria but are not ill. Although an individual may carry MRSA and not develop an illness, they can transmit the bacteria to others who may eventually become ill.<sup>15</sup>

There are two classifications of MRSA: hospital-acquired and community-acquired. The bacteria and the transmission are the same; the classification simply refers to the location where MRSA was acquired. Community-acquired MRSA tends to be more prevalent in groups of people that live in crowded settings, or those who routinely share contaminated items.<sup>15</sup>

From 2004 to 2010, 3926 MRSA cases (annual average rate of 889 per 100,000) were diagnosed in First Nations people living on-reserve in Saskatchewan. (see Figure 2.3.1).



All MRSA data includes both invasive and colonized cases, as no distinction is available in Saskatchewan Ministry of Health's surveillance system.

From 2004 to 2010, NITHA has consistently had the highest rate of MRSA, compared to South Central, but the rates have been converging. From 2004 to 2005, the rate of MRSA in NITHA almost doubled from 767 to 1522 (per 100,000). The rate of MRSA in NITHA has subsequently steadily decreased from the peak rate in 2006 to 1063 per 100,000 in 2010. MRSA has been steadily increasing in South Central communities from a rate in 2004 of 151 per 100,000, to a high of 765 per 100,000 in 2010 (Figure 2.3.2).



Sources: Health Canada FNIHB-SK, NITHA, and AANDC Registered Indian Population by Region and Age Group, December 31, 2010

The high rate of MRSA diagnosed in the 0 to 4 year old population is concerning, as this population may be at an increased risk of developing serious infections. MRSA is distributed relatively equally between males and females in all age groups (Figure 2.3.3).



Sources: Health Canada FNIHB-SK and NITHA

# 2.4 Tuberculosis (TB)

### Introduction

Tuberculosis (TB) is a preventable, contagious disease that can be treated and cured with medication. *Mycobacterium tuberculosis* is the bacterium that causes TB. It is an important airborne infectious disease even in developed countries with extensive control programs.<sup>49</sup> Persons with active TB usually feel sick and may have symptoms such as coughing, fever, and weight loss. They may spread TB bacteria to others. Persons with latent TB infection (LTBI) are infected with TB bacteria, but do not have TB disease. They do not feel sick, do not have any symptoms, and cannot spread TB infection to others.<sup>56</sup>

TB remains an ongoing concern for First Nations across Canada. The persistence of tuberculosis in First Nations populations is the result of a complex set of factors. From a public health perspective, these include high-risk sub-populations such as people with HIV-TB co-infection, diabetes, mental health issues, or people who live in high incidence communities and areas with a high prevalence of LTBI.<sup>50</sup> There are many factors that contribute to the increased risk for TB in First Nations. Reducing TB requires attention to all these factors:

- <u>Environmental factors</u>: Overcrowded houses, poor ventilation and second hand smoke are known to increase the spread of TB.<sup>44,45</sup> First Nations people on-reserve have, on average, more people per house. In addition, less than half of homes are smoke-free.<sup>46</sup>
- <u>Personal factors</u>: Poor nutrition, alcohol and drug abuse, diabetes, kidney disease and HIV increase the risk of disease in people who are infected.<sup>47</sup>
- <u>Community factors</u>: Distance from diagnosis and treatment facilities and challenges in providing stable nursing coverage for early detection and case management.

Health Canada's *Strategy Against Tuberculosis for First Nations On-reserve* was released in March 2012 with the following goal: to significantly reduce the incidence and burden of TB in First Nations on-reserve. This document, which is a reference for daily work, is designed to be used in conjunction with the *Canadian Tuberculosis Standards*, the *Guidance for Tuberculosis Prevention and Control Programs in Canada*, and also aligns with the *Global Plan to Stop TB*.<sup>54</sup>

The strategy is divided along three themes:

- 1. Preventing, Diagnosing and Managing TB;
- 2. Targeting Populations at Greatest Risk for TB; and
- 3. Developing and Maintaining Partnerships.

#### **TB in overall Saskatchewan**

In Saskatchewan, the provincial program is led by TB Prevention and Control Program and shares responsibility with Saskatchewan Ministry of Health, FNIHB-SK, NITHA and other First Nations partners. The data source used for the TB profile is Tuberculosis Information System (TBIS).

In 2010, according to the Saskatchewan TB Profile Report<sup>53</sup>, from January 1st to December 31, 2010, 80 cases have been reported with active TB disease in the overall Saskatchewan population; 52% were male and 48% female. Seventy-two of these cases were new and eight were re-treated cases (recurrence of active disease after a period of treatment and presumed cure for a minimum of six months after treatment is completed). This gives a new overall case rate for Saskatchewan of 6.8 per 100,000. Of those 80 active reported cases, six died after diagnosis, with TB being an important contributing factor for three of the individuals.

#### TB in Saskatchewan First Nations on-reserve

The tuberculosis incidence rates remain higher in First Nations communities than the overall Saskatchewan population. In 2010, there were 36 reported cases of active TB among First Nations living on-reserve, a rate of 53.6 per 100,000. This incidence rate is nearly eight times the average case rate of the overall Saskatchewan population. These cases represent 45% (36 out of 80) of overall cases reported in the province, with 33 cases (92%) in the NITHA region and three cases reported in South Central. Nineteen of these cases were female (53%) and 17 (47%) male. In 2010, TB cases occurred in various age groups with the highest incidence in the 15 to 24 age group (Figure 2.4.1).



Source: TB Control Saskatchewan

From 2001 to 2010 there were 391 active TB cases reported in Saskatchewan First Nations living onreserve; averaging 39 cases per year over the 10 year period. There was a peak in the number of reported TB cases in 2005 (Figure 2.4.2).



Source: TB Control Saskatchewan

Although the NITHA region has a slightly smaller population count than South Central areas, NITHA reported 83% of the TB cases from 2001 to 2010. This difference is shown very clearly in Figure 2.4.3 where the incidence rate of TB in NITHA has been on average six times higher than that in South Central.



Sources: TB Control Saskatchewan (overall rates include South Central and NITHA populations), AANDC Registered Indian Population by Region and Age Group, December 31, 2010

A major concern is the number of preschool cases or pediatric active TB cases diagnosed in Northern Saskatchewan. Among First Nations on-reserve communities from 2001 to 2010, the highest numbers of active TB cases are in the 0 to 4 age group, followed by the 15 to 24 age group. Over 60% of the active TB cases occurred in people under age 25 (Figure 2.4.4). When active TB and LTBI are seen in young age groups it means that there are active transmissions in that community.



Source: TB Control Saskatchewan

The incidence rates of active TB cases in First Nations on-reserve remain higher than their counterparts off-reserve over the last 17 years (Figure 2.4.5). However, there is a significant downward trend in rates over the last 15 years.



Sources: TB Control Saskatchewan, AANDC Registered Indian Population by Region and Age Group, December 31, 2010

Figure 2.4.6 indicates a general decrease in active TB incidence rates within the 0 to 4 age group among First Nations on-reserve from 2001 to 2010. In the 15 to 24 age group, however, there seems to be an increase in tuberculosis incidence rates.



Sources: TB Control Saskatchewan, AANDC Registered Indian Population by Region and Age Group, December 31, 2010

#### **Treatment Completion**

The completion of a course of adequate treatment is important both for the person affected and for the prevention of spread of the disease to others. The Canadian Tuberculosis Standards 6<sup>th</sup> Edition states that, "The ideal anti-TB drug regimen and drug delivery system for any patient will result, at a minimum, in an achievement of at least a 90% cure (negative sputum culture at the end of treatment) or treatment completion (treatment completed but no sputum culture at the end of treatment) rate within 12 months of starting treatment for patients who did not die or transfer out during treatment."<sup>47</sup>

According to FNIHB-SK's previous Health Protection Report (1997-2006), the outcome of tuberculosis cases in First Nations on-reserve showed that 92% of NITHA cases and 88% of South Central cases completed treatment. This was higher than the overall Canadian completion of 76%.<sup>47</sup> Treatment completion declined for First Nations living on-reserve from 90% in 2006 to 73% in 2010, which works out to an average annual decrease of four percent. From 2001 to 2010, TB either caused or was a factor in the deaths of 10 First Nations people living on-reserve in Saskatchewan. The mean age of deceased cases was 59 years (range 37 to 81 years).

#### **BCG Vaccination and TB Screening**

Historically, BCG has been recognized as a vaccine that helps protect babies and young children from the most severe forms of TB. It has been offered to First Nations in Canada for over 50 years. In recent years, due to declining TB rates and concerns about reactions to the vaccine, recommendations regarding BCG have changed. In 2004, the National Advisory Committee on Immunization did not recommend routine use, but suggested that the vaccine can be used in First Nations communities with high rates of TB.<sup>48</sup>

Screening for TB is an essential part of the FNIHB-SK TB program. The approach for TB skin testing is reviewed periodically, based on the epidemiology of TB in each area. In order to accurately assess the effectiveness of the TB screening program, the percentage of eligible children screened (the coverage rate) is needed. However, the only information available at the time of this report was the total number of children screened (no details were available on the total number of children eligible for testing).

### **Tuberculosis Control Program**

The FNIHB-SK TB program is based on four pillars:

- 1. Case finding and management;
- 2. Contact tracing and treatment for latent infection;
- 3. Enhanced surveillance and screening; and
- **4.** Health education and support.

The First Nations Tuberculosis Advisory Committee (FN-TB Advisory Committee) is composed of multidisciplinary and multi-agency representation from FNIHB-SK, provincial and First Nations health authorities and agencies, and functions under the direction of the FNIHB-SK Regional Medical Health Officer. It identifies issues of concern related to the management of TB infection in Saskatchewan First Nations living on-reserve, and recommends TB control strategies to reduce the incidence of the disease and infection in First Nations communities in Saskatchewan .

The FNIHB-SK TB program works collaboratively with TB Control Saskatchewan and partners. TB Control Saskatchewan's program is based on the internationally-recognized principle of enhanced directly observed therapy (DOT). The high treatment completion rate reflects the dedication and support of TB nurses, community health nurses (CHN) and TB program workers. FNIHB-SK funds TB program workers to work in collaboration with CHNs to ensure that all doses of medication are received and observed to be swallowed. The flexible client centered DOT program, which adapts to client routines, employment, and individual circumstances, uses treatment supports and incentives when necessary. DOT has been associated with a significantly improved outcome for both the individual and the program.<sup>53</sup> DOT is the Canadian standard for TB treatment to prevent the development of drug resistance and the relapse of TB.<sup>53</sup>

The FNIHB-SK TB program also participates on an Interprovincial TB Committee which provides an avenue for collaborative exchange of program information, ideas and best practices among the provincial TB partners. This committee promotes quality and continuity of care for TB clients who cross jurisdictional boundaries. The committee shares and discusses issues, challenges and strategies for success. Membership includes the following representation: FNIHB regions of Alberta, Saskatchewan and Manitoba; and their respective provincial and First Nations partnerships.

### **2.5 Enteric Diseases**

Enteric diseases are bacterial, parasitic or viral infections that affect the intestines, causing symptoms ranging from nausea and diarrhea to serious chronic conditions and death.<sup>21</sup> The majority of enteric diseases are mild; however, some cases are severe and result in hospitalization. Since many enteric diseases cause mild symptoms, only approximately 12 to 24% of people with enteric diseases seek medical care in Canada.<sup>21</sup> As a result, enteric diseases are under-reported in Canada. In one study in Ontario, it was found that only about 1 in 313 cases of enteric diseases were reported to the province.<sup>21</sup>

Enteric diseases enter the body through the mouth and intestinal tract and are usually spread through contaminated food and water or by contact with vomit or feces.<sup>22</sup> Environmental conditions such as crowded housing and limited clean water supply can affect hygiene practices and contribute to the risk of enteric disease.<sup>23</sup>

Between 2004 and 2010, there were 327 cases (rate of 74 per 100,000) of enteric diseases reported in Saskatchewan First Nations on-reserve; 155 cases in NITHA and 172 cases in South Central. Out of the total 327 cases, 167 cases were reported in females and 160 cases in males. (The numbers of enteric diseases reported in the overall Saskatchewan population were unavailable for comparison.)

Figure 2.5.1 shows the number of cases for all enteric diseases reported in Saskatchewan First Nations on-reserve from 2004 to 2010. The three most commonly reported enteric diseases were aeromonas, campylobacter and salmonella, accounting for 70% of all enteric diseases reported from 2004 to 2010. No cases of shigella and E. coli were reported from 2004 to 2010.



Looking at age-specific incidence rates for 2004 to 2010, the highest incidence rates of enteric diseases were found in children aged four and under, with high rates also seen in adults 65 years and older (Figure 2.5.2).



Sources: Health Canada FNIHB-SK and NITHA

## 2.6 Other Notifiable Diseases

#### **Invasive Group A Streptococcal Disease**

Group A streptococcal disease (GAS) is a bacterial disease caused by group A streptococcus. GAS infections are typically mild illnesses such as strep throat; however, sometimes the bacteria can be disseminated into the lungs, blood or layers of tissue that surround muscle. When this occurs, it is called invasive group A streptococcal (iGAS) disease and can cause serious symptoms, including death.<sup>24</sup>

From 2004 to 2010 there were 110 cases of iGAS reported in Saskatchewan First Nations on-reserve. Reported cases of iGAS in Saskatchewan First Nations living on-reserve peaked in 2008 with 27 cases reported (Figure 2.6.1). The seven year annual average of iGAS from 2004 to 2010 was roughly 16 cases per year (incidence rate of 25 per 100,000). There was no significant difference in incidence between males and females.



Looking at age-specific incidence rates from 2004 to 2010 for Saskatchewan First Nations living onreserve, the highest incidence of iGAS is found in adults aged 65 and older. Higher rates are also seen in children aged four and under and adults aged 55 to 64 (Figure 2.6.2). This higher rate in seniors is likely because the risk of infection is higher for people who have chronic illnesses, which is more often seen with increased age.



Incidence rates of iGAS in the NITHA region have remained steady from 2004 to 2010, averaging an annual rate of 25 per 100,000. South Central saw an increase in the rate of iGAS reported in 2008, increasing from a rate 18 per 100,000 in 2007 to 53 per 100,000, then decreasing to 26 per 100,000 in 2010 (Figure 2.6.3).



Sources: Health Canada FNIHB-SK, NITHA, and AANDC Registered Indian Population by Region and Age Group, December 31, 2010

#### West Nile Virus

West Nile virus (WNV) is a zoonotic virus that can be transmitted to humans via certain species of mosquitoes. Those certain species of mosquitoes become infected after biting an infected bird. Most people who are infected with WNV do not have any symptoms or may only experience mild flu-like illness. However, in some cases the virus can result in serious neurological illness, which can cause long-term complications and even death. The risk of WNV varies from year to year, depending on a number of environmental factors such as weather, standing water, mosquito population, and bird migration.<sup>26</sup> There is no cure or vaccine for WNV, so awareness and prevention strategies are essential in order to protect the population.

The only year that WNV has been reported in First Nations on-reserve between 2003 and 2010 was in 2007 (21 cases). Saskatchewan as a whole experienced a high number of WNV cases in 2007 (n=1,456), but has seen very few cases from 2008 to 2010; 17 in 2008, one in 2009, and two in 2010.<sup>27</sup>

#### H1N1 Pandemic Influenza

In April of 2009, a new strain of influenza virus was identified in Mexico and soon began spreading across the world.<sup>28</sup> In June 2009, the World Health Organization (WHO) declared that the influenza virus had become a pandemic, known as H1N1 Pandemic Influenza (pH1N1).<sup>29</sup> The pandemic was not declared over by the WHO until August 10, 2010.<sup>30</sup>

Saskatchewan experienced two waves of pH1N1 activity. The first lasted from May to July 2009; the second began in September and ended in December 2009.<sup>31,32</sup> First Nations communities in Saskatchewan saw a similar progression of the disease, with the first case reported in June and the last in the middle of December.

In total, 343 cases of pH1N1 were reported in First Nations on-reserve individuals from June to December 2009, with the majority of cases reported in the second wave (Figure 2.6.4). There was no significant difference in cases reported between South Central and NITHA in the first wave of pH1N1 (48 and 38 cases respectively). However, South Central reported a higher number of pH1N1 cases in the second wave as compared to NITHA (152 and 105 respectively).



Just over half of the cases reported (53%) were seen in children less than 15 years of age (Figure 2.6.5). Unlike seasonal influenza viruses, there were almost no cases reported in seniors 65 years and older. Overall there were more cases reported in females (55%) than males (45%), particularly in the 15 to 24 age group and 35 to 44 age group.



# Introduction

Immunization is one of the most effective and cost-beneficial public health interventions.<sup>55</sup> In order for immunizations to be successful, high levels of vaccine uptake among target populations is important. These target populations vary according to vaccine and may include young children, elderly, and immune-compromised individuals. High immunization coverage rates protect not only the individual vaccinated, but also provide herd immunity to the community. Herd immunity is the protection of unvaccinated individuals from a particular disease when a large portion of a community is immunized against the disease, as this reduces the transmission of infection within the community. Herd immunity is important for protecting young infants who are not yet able to be immunized and for individuals who cannot be immunized, due to allergies or immunocompromising conditions.<sup>33</sup>

In 2003, the First Nations and Inuit Health Branch Targeted Immunization Strategy (FNIHB-TIS) was developed to address the needs of First Nations children living on-reserve. This strategy aimed to increase the rate of immunization of children less than six years of age living on-reserve across Canada to 95%, and to reduce the incidence of complications of vaccine-preventable diseases.<sup>35</sup> The TIS was developed in partnership with the First Nations people and is integrated with the Canadian National Immunization Strategy (CNI). The objectives are to:

- Improve coverage rates for routine vaccines;
- Implement newly recommended vaccines;
- Improve data collection;
- Improve people's understanding of immunization and the diseases it prevents; and
- Build capacity at the community level.

This initiative has included additional resources for increased surveillance, raising community awareness, professional education, equipment and introduction of new vaccines.

Note: First Nations children living on-reserve are offered the same provincially funded vaccines as children living off-reserve.

# 3.1 Childhood Immunization Coverage Rates

Data for on-reserve First Nation children in Saskatchewan is collected manually by community health nurses for each community. It is reported to FNIHB-SK on an annual basis. This information is collected for children at one, two and six years of age.

In this section, immunization coverage rates for First Nations children living on-reserve are reported for the period from 2004 to 2010. Immunization coverage rates are defined as the percentage of children in the population of interest, at a specific point in time, that have received the recommended number of doses at a specific age.

There is an important limitation to note when calculating coverage rates for First Nations children onreserve in Saskatchewan. Some First Nations children may receive their vaccinations off-reserve through a Regional Health Authority (RHA). FNIHB-SK and NITHA do not have access to the Saskatchewan Immunization Management System (SIMS), where RHAs record their immunization data. As a result, a child could be up-to-date with their immunizations, but if the child was immunized off-reserve this may not be entered in community immunization records. The exact extent to which this affects the coverage rates is unknown, but is addressed in the following section.

#### **Immunization Rates for One-Year-Old Children**

From 2004 to 2010, children under one year of age were recommended to receive vaccines at two, four, and six months of age for: diphtheria, tetanus, pertussis, inactivated polio virus (IPV), haemophilus influenzae type B (Hib) and pneumococcal conjugate (Pneumo). Diphtheria, tetanus, pertussis, and polio are all given in one vaccine, called Diphtheria-Tetanus-Acellular Pertussis-Polio Absorbed Vaccine (DTap-IPV), so their results are shown together below. While the Hib vaccine is typically given in the same combination vaccine as DTaP-IPV, if a child starts the series late then the total number of doses of Hib required decreases. Therefore, Hib results are shown separately below.

One-year-old immunization coverage rates in South Central fluctuated slightly from 2004 to 2010 averaging above 74%, while NITHA immunization coverage rates averaged around 82% (Figure 3.1.1). NITHA rates were higher than South Central rates for all seven years analyzed.



Coverage rates for DTaP-IPV, Hib and Pneumo have all remained stable from 2004 to 2010 (Figure 3.1.2). The slightly higher coverage rates for Hib compared with DTaP-IPV may be explained by the fact that only two doses of Hib are required to be considered up-to-date when a child presents after seven months of age, whereas three doses of DTaP-IPV are required regardless of age of presentation.



Sources: Health Canada FNIHB-SK and NITHA

\*Pneumo immunization data not available prior to 2006. Pneumococcal conjugate 13-valent replaced Pneumococcal conjugate 7-valent in May 2010.

#### Immunization Rates for Two-Year-Old Children

Children two years of age should have received the recommended doses for 12 and 18 month immunizations: diphtheria, tetanus, pertussis, polio (DTaP-IPV); haemophilus influenza type B (Hib); measles, mumps, and rubella (MMR); pneumococcal conjugate (Pneumo); meningococcal; varicella and hepatitis A. Because the majority of recommended doses are given during the first two years of life, the two-year-old immunization rate is often used as the standard for childhood immunization analysis.

Two year old immunization coverage rates in South Central have remained consistent at about 70% since 2004, with only slight variations from year-to-year (Figure 3.1.3). Immunization coverage rates in NITHA fluctuated between 2004 and 2006, but have remained at roughly 80% since 2007. As with the one-year-old coverage rates, NITHA rates are higher than South Central rates for all seven years analyzed.



The two year old coverage rates for DTaP-IPV have remained consistent from 2004 to 2010, while the Hib coverage rates have decreased from 88% in 2004 to 73% in 2010 (Figure 3.1.4). MMR coverage rates decreased slightly in 2005 but have remained relatively stable since (Figure 3.1.4).



Sources: Health Canada FNIHB-SK and NITHA

As mentioned at the top of this section, there are challenges in calculating accurate immunization coverage rates for First Nations children in Saskatchewan. First Nations children may receive immunization in their community or off-reserve in a RHA facility. First Nations communities and RHAs use different information systems to record immunization, meaning doses given in one system may not be recorded in the other system and a child may be recorded as not up-to-date.

Figure 3.1.5 shows the percentage of two-year-olds in Saskatchewan First Nations communities up-todate with their DTaP-IPV immunization, combined with those who are recorded as being short only one dose. It is possible that those who are only one dose short have actually received another dose at a RHA facility and are in fact up-to-date. The combined coverage rates and partial coverage rates for DTaP-IPV are only slightly below the FNIHB-TIS.



First Nations children living on-reserve are eligible to receive two doses of hepatitis A by their second birthday. Coverage rates for two-year olds for hepatitis A has remained between 68% and 72% since 2004 (Figure 3.1.6).

Uptake for new vaccines is often low, but it soon increases as awareness and confidence in the new vaccines increase. For example, pneumococcal had a mere 6% in its first year of availability (Figure 3.1.6). Pneumococcal coverage rates in two-year-old children have increased from 66% in 2007 to almost 73% in 2010.

Meningococcal and varicella coverage rates have increased since 2006, remaining over 80% for the past five years (Figure 3.1.6). Part of the reason that varicella rates remain high is likely because children who have a history of varicella are included in the rates as up-to-date, as they will be immune to the disease. This means that fewer vaccinations are required to achieve a high coverage rate, depending on how many children have a history of varicella. Meningococcal rates and varicella rates are also likely higher than rates for other antigens because only one dose is required for children to be up-to-date, where vaccines like hepatitis A require two doses.



Sources: Health Canada FNIHB-SK and NITHA

\*Pneumo immunization introduced mid-year 2006. \*\*Meningococcal immunization introduced mid-year 2005. \*\*\*Varicella data unavailable prior to 2006.

### Immunization Rates for Six-Year-Old Children

Overall six-year-old coverage rates for South Central and NITHA have fluctuated slightly between 2004 and 2010, with the seven year average coverage rates above 88% and 90% respectively (Figure 3.1.7).



The only additional vaccination that children receive between four and six years of age is a booster shot of DTaP-IPV. However, children that were not up-to-date with their immunizations at two years of age should ideally be caught up with all of their vaccinations by age six.

Hib vaccination coverage rates have decreased from 95% in 2004 to 80% in 2010 (Figure 3.1.8). MMR rates have stayed consistent at approximately 92% for the past seven years (Figure 3.1.8).

Hepatitis A coverage rates have remained around 88% over the seven years, with the exception of a decrease in 2005 (Figure 3.1.8). Meningococcal coverage rates have increased since its initial uptake in 2007 from 78% to 94% in 2010.



Sources: Health Canada FNIHB-SK and NITHA

\*Meningococcal data unavailable prior to 2007.

### **Childhood Immunization Coverage by Community**

Figure 3.1.9 shows the percentage of South Central communities by coverage rates in three categories: 90% or higher, 50% to 89%, and less than 50%. It is important to note that because many communities have a small population, coverage rates can be greatly affected if only a few children are not immunized.

The proportion of South Central communities achieving greater than 90% coverage dropped from 32% in 2009 to 24% in 2010 (Figure 3.1.9). This resulted in an increase in the proportion of communities in the other two categories (50% to 89% and less than 50%).



Source: Health Canada FNIHB-SK

NITHA communities in 2010 had double the proportion of communities achieving 90% or greater immunization coverage compared to South Central communities (Figure 3.1.10). Only two NITHA communities had less than 50% coverage in 2010.



Sources: Health Canada FNIHB-SK and NITHA

Looking at the seven year averages for South Central and NITHA from 2004 to 2010 (Figure 3.1.9 and 3.1.10), both areas have few communities with coverage rates below 50%. South Central First Nations have a higher percentage of communities in the 50% to 89% coverage rate category, whereas NITHA communities have a higher percentage of communities in the 90% or higher coverage rate category.

## **3.2 Adult Immunization**

There are some publicly-funded immunizations that are offered to adults. A tetanus and diphtheria (Td) booster is recommended every 10 years for adults. Saskatchewan currently offers a one-time only dose of Tetanus-Diphtheria-Acellular Pertussis Vaccine (TdaP) to every adult in place of one dose of Td, when the adult is due for a booster. There has been a change in the eligibility criteria for the MMR vaccine, making this vaccine now more accessible to adults born after 1970 (individuals born before 1970 are considered immune to measles, mumps, and rubella). As a publicly-funded vaccine, the influenza vaccine is also now available to anyone who asks on an annual basis. The influenza vaccine continues to be strongly recommended for all high risk groups, such as those aged 65 and older or those who are immune-compromised. There are other publicly-funded adult immunizations such as the pneumococcal polysaccharide 23 vaccine (Pneu-P-23).

## 3.3 Vaccine-preventable disease

Vaccines provide an effective, long-lasting method of preventing infectious diseases. Despite the development of many infectious disease vaccines, there are still occurrences of these diseases that are preventable with adequate immunization. Figure 3.2.1 shows that there were 253 vaccine-preventable diseases reported in First Nations communities (includes all ages) in Saskatchewan between 2004 and 2010.



Sources: Health Canada FNIHB-SK and NITHA

There were no cases of hepatitis A reported between 2004 and 2010, demonstrating the success of the hepatitis A vaccine introduced in 1996. The two most frequently reported diseases between 2004 and 2010 were pertussis and invasive pneumococcal disease. The majority of invasive pneumococcal disease was reported in 2007 and 2010 (23 and 17 cases out of 66, respectively).

#### Pertussis

Pertussis (or "whooping cough") is a bacterial infection of the lungs and throat, which can cause severe complications such as: pneumonia, convulsions, brain damage or death. Young infants are particularly at risk, as pertussis vaccinations are not given until two, four and six months of age with boosters at 18 months, four years and 14 years.<sup>36</sup>

The rate of reported pertussis cases increased significantly in 2010, for both NITHA and South Central. This increase was not unique to on-reserve First Nations populations; Saskatchewan has seen a rise in pertussis cases as well.<sup>36</sup> Overall in 2010, pertussis cases made up 78% of all vaccine-preventable diseases reported in Saskatchewan First Nations living on-reserve.


Following the introduction of pertussis vaccination in the 1940s, there was a dramatic drop in the number of cases of pertussis in Canada. The incidence of pertussis remained low until the 1990s, where a gradual resurgence in the number of pertussis cases in Canada occurred, especially in the adolescent and adult populations. Decreasing immunity among these age groups is thought to be in part responsible for this trend.

Saskatchewan Ministry of Health's response to pertussis has been three-fold. There is continued emphasis on the DTaP-IPV-Hib series offered to infants and young children at their two, four, six, and 18 month routine public health visits, along with a DTaP booster being offered to the four year old population, and TdaP to adolescents in grade eight. In April 2011, a one-time only dose of TdaP in adults (18+ years old) was introduced to replace a routine does of Tetanus to help boost decreasing immunity in the adult population.<sup>37</sup> The Public Health Agency of Canada (PHAC) states that the "waning of vaccine-induced protection is a universal phenomenon affecting adolescents and adults worldwide. These persons constitute a major reservoir of the disease and are an important source of transmission to infants."<sup>38</sup> As a result, the third part of the response of Saskatchewan Ministry of Health has involved the cocooning of newborn infants by offering to both parents and select caregivers of newborn infants a publicly funded dose of TdaP – no matter when the previous dose of tetanus may have been received (cocooning surrounds and protects infants from disease until they have built up immunity through their own immunizations).

FNIHB-SK and NITHA implement these strategies as recommended by Saskatchewan Ministry of Health. Education is encouraged within communities in regards to all vaccine-preventable diseases, as well as other strategies to increase immunization coverage, such as offering incentives (blankets, bibs, etc.) and facilitating immunization clinic attendance. In communities that have experienced cases of pertussis, or a pertussis-related death, enhanced vaccination is offered along with education on the disease itself, and any other support that may be required by the community as a whole.

# Introduction

Animal exposures (i.e. bites or scratches) pose a serious risk to human health, not just because they can cause physical and psychological trauma, but because there is the possibility that they can transmit rabies to their victim. Rabies is an acute viral infection transmitted through saliva, via the bite, of an infected animal.<sup>40</sup> Once symptoms appear, rabies is almost always fatal.<sup>40</sup>

There are many vital pieces of information that need to be investigated and recorded after an animal exposure. A significant exposure is defined as any bite or contamination of wounds or mucous membranes with saliva, body fluids or tissue from a rabid or potentially rabid animal. All known exposures must be reported to the responsible Medical Health Officer (MHO), either FNIHB-SK or NITHA. The community health nurse (CHN) usually becomes aware of the exposure in one of two ways; either via the regional office or directly from the victim. If the CHN becomes aware of the exposure via the regional office, it is because the victim reported to the emergency room, their family physician or a nurse practitioner. No matter how the CHN is informed, proper follow-up must occur for both the victim and the animal, in consultation with the MHO. Proper follow-up includes first aid, animal inspection, immunization, referrals and education.

The animal owners need to be well educated on the importance of keeping their animal alive and under confined observation for at least 10 days. If the animal has rabies it will die within the 10 day observation period or show noticeable changes in behaviour. If the animal lives past 10 days and is healthy, it is considered not to have rabies and post exposure prophylaxis is not necessary for the victim.

Decisions to use post-exposure prophylaxis are made on a case by case basis and take into account the severity and location of the bite, the type and status of animal, and the circumstances of the incident, such as animal behaviour at the time of exposure. Examples of instances when post-exposure prophylaxis may be administered include:

- Animal is killed/dies and cannot be sent for testing;
- Animal cannot be found;
- Animal displays symptoms of rabies;
- Animal tests positive for rabies; and/or
- Animal is a bat.

There is no cure for rabies, but there are two products that can be given after an animal exposure in hopes of preventing rabies from developing; Rabies vaccine and Rabies Immunoglobulin (RIG). Rabies vaccine contains the inactive virus and induces an active immune response within seven to 10 days after it is given. RIG provides rapid protection that persists for only a short period of time (half-life is about 21 days). Rabies vaccine and RIG are used concurrently for optimal post-exposure prophylaxis and can only be given with an order from the MHO. Some disadvantages of the medication are that they are expensive, painful, require four or five series of injections, and must be given as soon as possible following an animal exposure. A total of 40 post-exposure prophylaxes were given to Saskatchewan South Central First Nations from 2004 to 2010.

Between 2004 and 2010 South Central and NITHA communities reported a combined total of 1352 animal exposures, averaging 193 animal exposures per year, ranging from a low of 172 exposures in 2005 to a high of 212 exposures in 2009 and 2010 (Figure 4.1).



Sources: Health Canada FNIHB-SK and NITHA

# **Animal Exposures by Gender**

Between 2004 and 2010 there were 1352 animal exposures reported among Saskatchewan First Nations people living on-reserve. Males experienced more animal exposures than females, at 620 and 483 bites respectively from 2004 to 2010 (gender not reported for 249 individuals) (Figure 4.2).



Sources: Health Canada FNIHB-SK and NITHA

\* NITHA unable to report genders for 2004 to 2006.

Animal exposures were reported more frequently in young children, with 28% of all animal exposures reported in children less than ten years of age (Figure 4.3). This emphasizes the need for education in young children about approaching animals in the community and how to behave around animals.



Sources: Health Canada FNIHB-SK and NITHA

# **Provoked and Unprovoked**

Animal exposures are categorized as either provoked or unprovoked in order to differentiate the risk of exposure and are used for educational and prevention purposes. Many victims may feel an animal exposure is unprovoked, when in fact it is provoked. Provoked attacks simply mean that there is a reasonable explanation for the attack. Provoked bites may occur in the following scenarios:

- Animal is hit, beaten or teased;
- Animal is stepped on or bumped;
- Victim is too close to baby animals or baby animals are taken from their mother;
- Victim interferes in an animal fight;
- Victim tries to touch or pet a frightened animal;
- Victim enters a yard guarded by a dog;
- Victim gets too close to an animal that is eating or takes food from an animal; and/or
- Victim walks past an unfamiliar animal.

An attack is considered unprovoked when the attack is for no explainable reason or the attack is from a known animal that does not have a history of being aggressive.

# **Types of Animals and Vaccinations**

Dogs accounted for almost all reported exposures in Saskatchewan First Nations from 2005 to 2010\* at 91%, followed by cats (6%) and wild animals (3%) (\*animal and vaccination data not available for South Central in 2004 and for NITHA from 2004 to 2006). Wild animals reported included: bats, mice, skunks, weasels, foxes, squirrels, gophers and rats. For the majority of animal exposures reported, 72%, it was not known whether the animal had been vaccinated. Looking specifically at cases where the vaccination status of the animal was known (375 out of 1346 exposures), nearly three quarters (72%) of animals were not vaccinated. Vaccination of dogs against rabies prevents transmission of this fatal infection, if a dog bite occurs.

# **Animal Exposures by Community**

Community information is collected for each animal exposure. For the period 2006 to 2010\*, animal exposures were reported in 72 communities (\*2004 and 2005 animal exposures by community data not available for NITHA). The number of exposures reported by each community ranged from 1 to 56, with the majority of communities reporting 10 to 19 exposures in the five year period. Sixteen (16) communities reported more than 20 bites from 2006 to 2010 (Figure 4.4).



Sources: Health Canada FNIHB-SK and NITHA

\*2004 and 2005 animal exposures by community data not available for NITHA.

# **Section 5: Environmental Public Health**

The health of First Nations communities depends in part on their physical environments. A healthy environment includes: access to safe drinking water, safe and properly maintained housing, and appropriate treatment and disposal of wastewater and solid waste.

The Environmental Public Health Program (EPHP) of FNIHB-SK works with First Nations communities to identify and prevent environmental public health risks that could negatively affect the health of the community. The EPHP does not have legislative authority, but provides advice and recommendations to Chief and Council regarding environmental health issues in the following program areas: drinking water quality; housing; wastewater; solid waste disposal; food safety; facilities inspections; communicable disease control; emergency preparedness and response; and environmental contaminants, research and risk assessment.<sup>40</sup>

Only 20% of the First Nations communities in Saskatchewan receive EPHP services from Health Canada. The remaining 80% of First Nation communities receive their services through First Nations run organizations that are funded by Health Canada through Transfer Agreements. This report will present data on both Health Canada and transferred services combined.

# **5.1 Drinking Water**

Access to and the quality of drinking water in First Nations communities across Canada is an ongoing concern. Data collected through the National Assessment of Water and Wastewater Systems in First Nations Communities for Saskatchewan First Nations in 2009 to 2010 found that of the 103 water systems included in the assessment, approximately three-quarters of the homes were piped (Figure 5.1.1).<sup>41</sup> In general, houses connected directly to the water systems have better and safer drinking water than houses connected to cisterns, individual or community wells. It is important to note that the assessment found that 43% of the water systems were deemed to be operating beyond their estimated capacities (referring to the flow rate proposed by the designer or manufacturer).<sup>41</sup>



Source: Aboriginal Affairs and Northern Development Canada

A risk assessment was completed for each water system according to the Aboriginal Affairs and Northern Development (AANDC) Risk Level Evaluation Guidelines, which determine an overall risk score by looking at the following categories: water source, design, operation and maintenance, reporting, and operators. Of the 103 water systems included in the assessment, 26% were determined to be high risk (Figure 5.1.2), which means the systems have major deficiencies that pose a high risk to the quality of the water. This could lead to health and safety or environmental concerns.<sup>41</sup>



Source: Aboriginal Affairs and Northern Development Canada

### **Drinking Water Safety Monitoring Program**

The EPHP, in partnership with First Nations governments, monitors the bacteriological and chemical quality of the drinking water in communities. Specifically, the monitoring program conducts:

- Weekly testing of the communities main water systems for bacteriological quality and chlorine residuals;
- Monthly bacteriological testing of the water quality in community wells (wells connected to at least three houses);
- Quarterly bacteriological testing of cisterns;
- Semi-annual bacteriological testing of individual wells (connected to one or two houses);
- Annual testing of chemical water quality in the main water systems and community wells; and
- Testing of the chemical water quality in individual wells every two years.

Bacteriological monitoring samples are collected and analysed by a Water Monitor who is employed by either the First Nations community or a Tribal Council. Chlorine residual testing is done by Water Monitors when they collect the weekly bacteriological analysis samples. Environmental Health Officers (EHOs) also test chlorine residuals when they visit the community. Chemical testing samples are collected by EHOs or Water Monitors and sent to accredited laboratories for analysis. The results of the water monitoring program are compared against the limits recommended in the Guidelines for Canadian Drinking Water Quality.<sup>42</sup>

#### **Drinking Water Advisories**

Environmental Health Officers have the responsibility to recommend to Chief and Council to issue a drinking water advisory if needed. This can be either a boil water advisory (all water should be boiled for drinking and other uses) or a do not drink advisory (should use bottled water for drinking and other uses). Chief and Council are then responsible for issuing the advisory in their communities and for taking action to address the problem.

Between 2007 and 2010, a total of 92 boil water advisories were issued in 43 Saskatchewan First Nations communities. There was over a 50% increase in the number of boil water advisories issued in 2010 compared with 2009 (Figure 5.1.3). Part of the reason for this is due to the increased awareness about, and reporting of, loss of pressure in the water system.

Of the 43 Saskatchewan First Nations communities with boil water advisories issued, 24 had more than one advisory during this time period, and three communities had five advisories issued. The duration of advisories ranged from one to 534 days, with an average of 34 days.<sup>1</sup>



Source: Health Canada FNIHB-SK

<sup>&</sup>lt;sup>1</sup> Twelve advisories did not have an end date listed.

The majority of boil water advisories issued from 2007 to 2010 were due to a loss of pressure in the water system, followed by low chlorine residuals/plant operation issues (Figure 5.1.4). There were two boil water advisories issued over the four years because of poor bacteriological quality.



Source: Health Canada FNIHB-SK

### **5.2 Wastewater**

Wastewater, or sewage, can spread disease and pollute surface and groundwater sources if not appropriately managed. EHOs conduct inspections of new and existing on-site sewage disposal systems and wastewater treatment plants when requested.

Data collected through the National Assessment of Water and Wastewater Systems in First Nations Communities for Saskatchewan First Nations in 2009 to 2010, found that of the 88 wastewater systems included in the assessment, half of the homes were piped (Figure 5.2.1).<sup>2</sup> Of these, 35% were deemed to be operating beyond their estimated capacities.<sup>41</sup>



Source: Aboriginal Affairs and Northern Development Canada

A risk assessment was completed for each wastewater system according to the AANDC Risk Level Evaluation Guidelines, which determines an overall risk score by looking at the following categories: effluent receiver, design, operation, reporting, and operators. Of the 88 wastewater systems included in the assessment, half of the systems were determined to be medium risk, which means there are deficiencies in the systems that pose a medium risk to human health (Figure 5.2.2).<sup>41</sup>



Source: Aboriginal Affairs and Northern Development Canada

### **5.3 Housing**

Environmental Health Officers in the EPHP perform public health inspections of on-reserve housing upon request. The inspections can include evaluating the following: indoor air quality, contaminants, pest control, water supply, solid and liquid waste disposal, general safety, structural defects, and overcrowding. Based upon the inspection, the EHO will submit recommendations to the Chief and Council.<sup>40</sup>

The primary issues seen in Saskatchewan First Nations housing on-reserve are: mould, overcrowding, unsafe conditions, infestations by mice or insects, and onsite sewage system problems.

Data available for 2009 to 2010 from AANDC's Housing and Infrastructure Assets Inventory found that out of 13,998 on-reserve homes in Saskatchewan First Nations communities, 13% are in need of major renovations and an additional 2.5% need to be replaced.

## 5.4 Solid Waste Disposal

Solid waste, or garbage, can pose health and safety risks if not managed properly. For example, solid waste can attract pests or can contaminate the air, soil and water if not disposed of properly. The EPHP works with First Nations communities, AANDC and Environment Canada to improve solid waste management practices in First Nations communities. This is done by providing environmental public health assessments of the solid waste disposal systems and by providing public education.<sup>40</sup>

Solid waste disposal systems vary considerably among First Nations communities, with some reserves having nothing more than a large pit as their solid waste disposal system. The EPHP, in conjunction with its partners, has been working to encourage all First Nations to move towards using transfer stations where the garbage is hauled to off-reserve regional landfills licensed by the province.

### 5.5 Food Safety

The EPHP works with First Nations communities to address public health issues related to traditional and conventional foods. Public health inspections are carried out on public food service facilities on-reserve and at community gatherings such as pow-wows.<sup>40</sup> Recommendations are made to Chief and Council on any issues that arise during inspections.

# Introduction

A pandemic is a worldwide epidemic. Although influenza (the 'flu') causes illness every year, a pandemic can occur when the flu virus changes to the point that most people do not have any immunity against it. Pandemics have occurred throughout history: there were four in the 20<sup>th</sup> century, the last one being in 2009-10. It is not known when the next pandemic will occur, but due to the potential impact on communities and the health care system (it is estimated that 15-35% of the whole population could become ill) it is important that First Nations and their health providers plan for a pandemic.

First Nations and Inuit Health Branch-Saskatchewan Region (FNIHB-SK) is directly responsible for South and Central First Nations on-reserve in Saskatchewan. The Northern Inter-Tribal Health Authority (NITHA) is directly responsible for the four Northern Inter-Tribal Councils. FNIHB-SK and NITHA have emergency coordinators who assist First Nations in the development of community-specific plans related to health emergencies.

FNIHB-SK and NITHA work closely with their federal and provincial partners including, but not limited to, Aboriginal Affairs and Northern Development Canada (AANDC), Public Safety Canada, Public Health Agency of Canada (PHAC) and Saskatchewan Ministry of Health. FNIHB-SK and NITHA play active roles in participating in opportunities that assist in well-coordinated planning and response to health emergencies for First Nations communities in Saskatchewan.

# **Pre-pandemic**

Pandemic planning began in 2006 when the FNIHB-SK pandemic team developed and distributed a pandemic planning template and assisted each South Central community to write their own plan. In 2007, the planning focus shifted to testing community plans and community members were trained to deal with a number of possible pandemic scenarios to which they might need to respond.

NITHA, during the same time, was and remains effective in supporting its communities with the completion and testing of their pandemic plans. A team of coordinators, along with a lead NITHA coordinator, assisted each of the four NITHA partners. NITHA also supported the elders in their communities to share their wisdom and provide guidance to assist the pandemic leads in working with communities. FNIHB-SK and NITHA have collaborated on the development of resources to support planning and increase knowledge and skills in the same areas of self-care and infection control.

In 2008, a survey was done to assess the progress made in pandemic planning in First Nations communities in South Central Saskatchewan (i.e. FNIHB-SK). Forty-eight out of 53 (91%) communities surveyed had a pandemic plan; 70% of those plans were three-quarters or more complete (Figure 6.1).



Source: Health Canada FNIHB-SK

The survey revealed that there was a lack of succession planning involved in the planning process and therefore communities were encouraged to ensure that plans are regularly updated and new community members orientated as membership changes. FNIHB-SK completed its most recent revision of their regional pandemic plan in 2010.

## Pandemic

In 2009, when the H1N1 pandemic (pH1N1) was declared, FNIHB-SK formed a regional pandemic response team. The team coordinated and supported the response by providing oversight and direction to South and Central First Nations communities. FNIHB-SK's role was regional in nature; the team directly communicated with national headquarters as well as addressed the volume of requests coming from various key regional partners including Saskatchewan Ministry of Health, PHAC, and First Nations communities and organizations.

As part of early detection, FNIHB-SK established surveillance in order to detect early on any increase in influenza activity in First Nations communities in order to facilitate a rapid response. The data collected was provided to the province and included in the overall picture for Saskatchewan. FNIHB-SK played a key role in communicating the needs of First Nations to the province with regard to priority vaccine administration in First Nations communities, and provided surge capacity where required. Staff monitored both vaccine uptake and Adverse Events Following Immunizations and promoted and disseminated public health measures. The regional office also adapted resources that were developed by PHAC and the province to ensure they were applicable to First Nations people.

FNIHB-SK participated on various committees, task groups, working groups and advisory groups at both the national and regional levels which facilitated improved coordination, communication and reporting between key partners. Information and updates were provided to stakeholders (including community members) through weekly teleconference calls chaired by FNIHB-SK.

NITHA provided oversight and direction for the pandemic response in their thirty-three communities in Northern Saskatchewan. NITHA also conducted surveillance for their communities and provided that data to FNIHB-SK, which was included in the data that was provided to the province. NITHA participated on various committees, task groups, working groups and advisory groups that facilitated improved coordination, communication and reporting between key partners.

The preparation, planning and exercises undertaken between 2006 and the start of the pandemic by the First Nations communities left them well prepared for pH1N1. The level of community preparedness was demonstrated in both their general response and capability to achieve high vaccine uptake numbers. Some communities have since successfully used their pandemic plans to respond to other events such as tornadoes, floods, and fires.

## **Post-pandemic**

FNIHB-SK and NITHA collaborate closely to support the development and/or updates and testing of community-specific plans and will continue to partnership closely regarding health emergency planning in FN communities. FNIHB-SK and NITHA are working towards developing a partnership that will result in province-wide consistency among First Nations communities. According to the World Health Organization (WHO), the pandemic plan should be flexible enough to respond to outbreaks of various intensities. Communication will be one of the most challenging tasks during an outbreak and it should be planned in advance.<sup>43</sup>

FNIHB-SK and NITHA are collaborating on the development of resources to support planning and increase knowledge and skills in the areas of self-care and infection control. FNIHB-SK and NITHA will work together to develop and introduce a revised pandemic template in order for communities to respond to a wide range of communicable diseases.

FNIHB-SK will continue to work with their core partners and facilitate collaboration where possible to maximize services provided to First Nations communities. FNIHB, PHAC, AANDC, and Saskatchewan Ministry of Health will continue to meet on a regular basis. Going forward this core group will focus on facilitating the completion of all-hazards, health, and business continuity plans in Saskatchewan First Nations communities.

The FNIHB-SK Regional Pandemic Influenza Plan will be updated to come into line with the move away from pandemic to communicable disease emergencies. Participation of FNIHB-SK regional staff in Incident Command Systems and Emergency Operation Centre training will lead to exercises that will identify strengths and challenges both in the plan and roles of regional staff.

FNIHB-SK will continue to work with communities in their planning and exercise needs and encourage succession planning. Collaboration and building stronger partnerships with federal, provincial and community stakeholders will remain a priority as it is crucial to maintain these relationships to ensure an effective and timely response during events.

Infection prevention and control (IPC) is a critical element in all FNIHB-SK programs. In 2008, a public health physician was contracted to review the infection control and prevention elements across FNIHB-SK's programs, and to clarify how IPC practices are implemented by various First Nations partners. As part of the review, interviews were held with community health/home care nurses, Regional Accreditation Canada staff, health and facilities staff, Medical Health Officers, dental professionals, and others who provide services to on-reserve First Nations population in Saskatchewan. The contractor provided a scan of IPC in Saskatchewan and helped collect the best practice IPC resources in the field. An IPC Steering Committee was established in the region that continues to oversee IPC in FNIHB-SK and First Nations and works closely with the Medical Health Officers and regional programs. NITHA and others partners are formally engaged.

IPC practices and standards in Saskatchewan vary by jurisdiction. Saskatchewan Ministry of Health, regional health authorities and FNIHB-SK began to meet regularly to review the IPC situation in the province and provide support in capacity development/training, best practice resource sharing, and applying consistent standards. The overall move is to strengthen the notion of IPC key elements while providing critical services to patients and to make it part of the overall patient safety initiatives. An IPC Coordinator position was created and staffed in the FNIHB-SK Region to help build formal linkages and a collaborative environment in IPC.

# Appendices

# Appendix A - List of Figures and Tables

Figure 1.1: Percentage of registered First Nations population in Canada by province, 2010
Figure 1.2: Projected registered First Nations population by place of residence, Canada, 2001 to 2026
Figure 1.3: Projected overall First Nations population growth by province, 2001 to 202613
Figure 1.4: Distribution of the registered First Nations population in Saskatchewan, 201014
Figure 1.5: Population of First Nations on-reserve in NITHA and South Central, 2004 to 201015
Figure 1.6: Age distribution of the Saskatchewan registered First Nations population living on- reserve compared to the total population of Saskatchewan, 2010
Figure 1.7: Age-gender distribution of the Saskatchewan registered First Nations population living on-reserve, 2010
Figure 2.1.1: Percentage of reported sexually transmitted infections, Saskatchewan First Nations on-reserve, 2010
Figure 2.1.2: Chlamydia incidence rates by area, 2004 to 201020
Figure 2.1.3: Number of chlamydia cases by gender, Saskatchewan First Nations on-reserve, 2004 to 2010
Figure 2.1.4: Number of chlamydia cases by age group and gender, Saskatchewan First Nations on-reserve, 2004 to 2010
Figure 2.1.5: Gonorrhea incidence rates by area, 2004 to 201023
Figure 2.1.6: Number of gonorrhea cases by gender, Saskatchewan First Nations on-reserve, 2004 to 2010
Figure 2.1.7: Number of gonorrhea cases by age group and gender, Saskatchewan First Nations on-reserve, 2004 to 201025
Figure 2.2.1: Number of new HIV cases, Saskatchewan First Nations on-reserve, 2004 to 201127
Figure 2.2.2: HIV incidence rates by area, 2004 to 2011

Figure 2.2.3: Number of new HIV cases by gender, Saskatchewan First Nations on-reserve,
2004 t0 2011
Figure 2.2.4: Number of new HIV cases by age group and gender, Saskatchewan First Nations      on-reserve, 2011      30
Figure 2.2.5: Number of hepatitis C cases, Saskatchewan First Nations on-reserve, 2004 to 2010
Figure 2.2.6: Hepatitis C incidence rates by area, 2004 to 201032
Figure 2.2.7: Number of hepatitis C cases by gender, Saskatchewan First Nations on-reserve, 2004 to 2010
Figure 2.2.8: Number of hepatitis C cases by age group and gender, Saskatchewan First Nations on-reserve, 2010
Figure 2.3.1: Number of MRSA cases, Saskatchewan First Nations on-reserve, 2004 to 201035
Figure 2.3.2: MRSA incidence rates by area, Saskatchewan First Nations on-reserve, 2004 to 2010
Figure 2.3.3: Number of MRSA cases by age group and gender, Saskatchewan First Nations on-reserve, 2010
Figure 2.4.1: Number of active TB cases by age group and gender, Saskatchewan First Nations on-reserve, 2010
Figure 2.4.2: Number of active TB cases, Saskatchewan First Nations on-reserve, 2001 to 201041
Figure 2.4.3: Active TB incidence rates by area, 2001 to 201042
Figure 2.4.4: Number of active TB cases by age group, Saskatchewan First Nations on-reserve, 2001 to 2010 combined
Figure 2.4.5: Active TB incidence rates, Saskatchewan First Nations on and off-reserve, 1994 to 201044
Figure 2.4.6: Active TB incidence rates by age group, Saskatchewan First Nations on-reserve, 2001 to 201045
Figure 2.5.1: Number of enteric diseases by type, Saskatchewan First Nations on-reserve, 2004 to 2010
Figure 2.5.2: Enteric diseases incidence rates by age group, Saskatchewan First Nations on-reserve, 2004 to 2010 combined

Figure 2.6.1: Number of invasive group A streptococcal cases, Saskatchewan First Nations on-reserve, 2004 to 2010
Figure 2.6.2: Invasive group A streptococcal incidence rates by age group, Saskatchewan First Nations on-reserve, 2004 to 2010 combined51
Figure 2.6.3: Invasive group A streptococcal incidence rates by area, Saskatchewan First Nations on-reserve, 2004 to 2010
Figure 2.6.4: Number of pH1N1 cases by week for Wave 1 and Wave 2, Saskatchewan First Nations on-reserve, 2009
Figure 2.6.5: Number of pH1N1 cases by age group and gender, Saskatchewan First Nations on-reserve, June to December 200955
Figure 3.1.1: Overall one-year-old coverage rates by area, Saskatchewan First Nations on-reserve, 2004 to 2010
Figure 3.1.2: One-year-old coverage rates for DTap-IPV, Hib and pneumococcal, Saskatchewan First Nations on-reserve, 2004 to 2010
Figure 3.1.3: Overall two-year-old coverage rates by area, Saskatchewan First Nations on-reserve, 2004 to 2010
Figure 3.1.4: Two-year-old coverage rates for DTap-IPV, Hib and MMR, Saskatchewan First Nations on-reserve, 2004 to 201061
Figure 3.1.5: Two-year-old coverage rates and partial coverage rates (short one dose) for DTap-IPV, Saskatchewan First Nations on-reserve, 2005 to 2010
Figure 3.1.6: Two-year-old coverage rates for hepatitis A, pneumococcal, meningococcal and varicella, Saskatchewan First Nations on-reserve 2004 to 2010
Figure 3.1.7: Overall six-year-old coverage rates by area, Saskatchewan First Nations on-reserve, 2004 to 2010
Figure 3.1.8: Six-year-old coverage rates for meningococcal, hepatitis A, Hib and MMR, Saskatchewan First Nations on-reserve, 2004 to 201065
Figure 3.1.9: Immunization coverage rates by community coverage levels, South Central, 2004 to 2010
Figure 3.1.10: Immunization coverage rates by community coverage levels, NITHA, 2004 to 2010

Figure 3.2.1: Number of cases of vaccine preventable disease, Saskatchewan First Nations on-reserve, 2004 to 20106	59
Figure 3.2.2: Pertussis incidence rates by area, Saskatchewan First Nations on-reserve, 2004 to 2010	70
Figure 4.1: Number of animal exposures by area, Saskatchewan First Nations on-reserve, 2004 to 2010	73
Figure 4.2: Number of animal exposures by gender, Saskatchewan First Nations on-reserve, 2004 to 2010	74
Figure 4.3: Percentage of animal exposures by age group, Saskatchewan First Nations on-reserve, 2004 to 2010	75
Figure 4.4: Percentage of animal exposures by bites per community, Saskatchewan First Nations on-reserve, 2006 to 2010	76
Figure 5.1.1: Percentage of homes by types of drinking water systems, Saskatchewan First Nations on-reserve, 2009 to 2010	79
Figure 5.1.2: Drinking water system risk assessment, Saskatchewan First Nations on-reserve, 2009 to 2010	30
Figure 5.1.3: Number of boil water advisories issued, Saskatchewan First Nations on-reserve, 2007 to 2010	82
Figure 5.1.4: Reason for boil water advisories, Saskatchewan First Nations On-reserve, 2007 to 2010	83
Figure 5.2.1: Percentage of homes by types of wastewater system, Saskatchewan First Nations on-reserve, 2009 to 2010	84
Figure 5.2.2: Wastewater system risk assessment, Saskatchewan First Nations on-reserve, 2009 to 2010	85
Figure 6.1: Completeness of community pandemic plans, South Central, 2008	38

# **Appendix B – Abbreviations**

AANDC	Aboriginal Affairs and Northern Development Canada
AIDS	acquired immunodeficiency syndrome
BBP	bloodborne pathogen
BCG	Bacille Calmette-Guerin Vaccine for tuberculosis
CHN	Community Health Nurse
CHR	Community Health Representative
CNI	Canadian National Immunization Strategy
DOT	directly observed therapy for tuberculosis
DTaP-IPV	Diphtheria-Tetanus-Acellular Pertussis-Polio Absorbed Vaccine
EHO	Environmental Health Officer
ЕРНР	Environmental Public Health Program
FNIHB-SK	Health Canada - First Nations and Inuit Health Branch, Saskatchewan Region
FNIHB-TIS	First Nations and Inuit Health Branch Targeted Immunization Strategy
FSIN	Federation of Saskatchewan Indian Nations
GAS	group A streptococcal disease
Hib	Haemophilus influenzae type B
HIV	human immunodeficiency virus
iGAS	invasive group A streptococcal
IPC	Infection Prevention and Control
iPHIS	Integrated Public Health Information System
IPV	Inactivated Polio Vaccine
МНО	Medical Health Officer
MMR	measles, mumps and rubella vaccine
MRSA	methicillin-resistant Staphylococcus aureus
NITHA	Northern Inter-Tribal Health Authority
pH1N1	H1N1 pandemic influenza
PHAC	Public Health Agency of Canada
RHA	Regional Health Authority
RIG	rabies immunoglobulin
SIMS	Saskatchewan Immunization Management System
STI	sexually transmitted infection
ТВ	tuberculosis
TBIS	Tuberculosis Information System
TdaP	Tetanus-Diphtheria-Acellular Pertussis Vaccine
WHO	World Health Organization
WNV	West Nile virus

# Appendix C – Data Sources, Methods and Limitations

## **Data Sources**

### **Communicable Diseases**

Communicable disease data for on-reserve South Central First Nations in Saskatchewan were obtained from Integrated Public Health Information System (iPHIS) maintained by Saskatchewan Ministry of Health. FNIHB-SK populates iPHIS with positive test results of on-reserve First Nations. Laboratory reports of both positive and negative test results are received from the Saskatchewan Disease Control Laboratory and other disease testing laboratories, supplemented by notifiable disease reporting forms completed by community-based health staff. Data for NITHA are based on aggregate reports provided by NITHA to FNIHB-SK.

For all notifiable diseases, except HIV and tuberculosis (TB), data are presented for the seven year period from 2004 to 2010; HIV reports from 2004 to 2011 and TB reports from 2001 to 2010.

Notifiable disease rates for the overall Saskatchewan population include all people residing in Saskatchewan, including First Nations on-reserve. Specific rates for non-First Nations people and for offreserve First Nations people were not available. Reported cases of HIV and HCV in the overall Saskatchewan population were provided by Population Health Branch of Saskatchewan Ministry of Health. Reported cases of sexually transmitted infections in Saskatchewan were obtained from the Public Health Agency of Canada (data were verified as of November 2011).

Tuberculosis case and screening data were compiled from information provided by TB Control Saskatchewan. Case data cover the 10 year period from 2001 to 2010.

Rates for First Nations and the overall Saskatchewan population are crude (unstandardized for age).

### **Immunization Coverage**

Each year Community Health Nurses (CHNs) review the immunization records of each one, two and six year old child in their communities, as of December 31<sup>st</sup>, to determine if the child is up-to-date for all recommended immunizations. Up-to-date status is assessed according to the immunization schedule for that particular year. CHNs report coverage rates by community to FNIHB-SK. NITHA provides statistical summaries to FNIHB-SK for communities in its jurisdiction.

### **Animal Exposures**

Summary data on animal bites were compiled from reports submitted by CHNs to FNIHB-SK and NITHA. Data, where available, were used from 2004 to 2010.

### **Environmental Public Health**

Information on water quality was obtained from the National Assessment of Water and Wastewater Systems in First Nations Communities for Saskatchewan in 2009 to 2010, and from Health Canada FNIHB-SK.

#### **Pandemic Planning**

Information on the status of community pandemic planning was obtained from a survey done by FNIHB-SK in 2008.

### **Infection Prevention and Control**

Information on infection prevention and control was provided by the FNIHB-SK Regional Medical Health Officer.

### Methods

### **Calculation of Incidence Rates**

In this report, infection and disease incidence rates are reported as crude rates. Age-standardized disease rates were not used for this report because age-specific disease rates for the overall Saskatchewan population were not available to FNIHB-SK.

The crude incidence rate was calculated by dividing the total number of new cases of the disease per year by the total population of that specific year, expressed as the number of cases or events per year per 100,000.

### **Denominator Population**

Aboriginal Affairs and Northern Development Canada (AANDC) population figures were used in the calculation of disease rates. The AANDC numbers are based on the population registered in the Indian Registry System as of December 31 of each year; these are published for on and off-reserve. They are unadjusted for late reporting of births and deaths.

Although these figures are considered the most accurate population estimates for First Nations, the breakdown between on and off-reserve is difficult. As a result, the true on-reserve population may be slightly higher or lower than the AANDC figures. This could affect the accuracy of the disease rates presented. For example, if the on-reserve population was underestimated, disease rates would be overestimated. However, because the same source of population data was used for all years covered in this report, it is less likely that disease trends from year to year would be affected.

### Limitations

#### Surveillance

Surveillance data can underestimate the magnitude of infectious diseases and consequently may not represent the total proportion of people infected (prevalence) or the number of newly-diagnosed infections each year (incidence).<sup>6</sup> Surveillance data are only reflective of the proportion of individuals who tested positive for a disease, and do not include individuals with asymptomatic infections who are not tested. Surveillance data are also subject to underreporting, delays in reporting, and changes in testing behaviors.<sup>6</sup>

The increasing incidence of certain infectious diseases may not necessarily reflect a true increase in infection rate; it may reflect increasing detection of the infectious disease due to increasing testing.

# Appendix D – Reporting and Follow-up Timelines in Saskatchewan

Saskatchewan Ministry of Health: The clinician must report all diseases to the local Medical Health Officer (MHO) within 48 hours. Do not wait for lab confirmation prior to initiating follow-up.<sup>2</sup>

CATEGORY I COMMUNICABLE DISEASES	PUBLIC HEALTH TO START INVESTIGATION <sup>E</sup>		PUBLIC HEALTH REPORTING TO POPULATION HEALTH BRANCH (PHB) <sup>E</sup>		
	Within 24-48 hrs	Within 72 hrs	Upon notification by lab or physician <sup>F,H</sup>	Within 3 days <sup>G,H</sup>	Within 2 weeks <sup>H</sup>
Acute flaccid paralysis	•		•		
Aeromonas		•			•
Amoebiasis		•			•
Anthrax	● <sup>A</sup>		● <sup>B</sup>		
Antibiotic resistant organisms (VRE, MRSA, penicillin resistant pneumococcus)		•			•
Botulism	● <sup>A</sup>		•		
Brucellosis	•				•
Campylobacteriosis	•				•
Chickenpox		● <sup>C</sup>			•
Cholera	•		•		
Clostridium difficile		•			•
Congenital rubella syndrome		•		•	
Creutzfeldt-Jakob disease, classical or variant	•		● <sup>B,D</sup>		
Cryptosporidiosis	•				•
Cyclospora	•				•
Diphtheria	•		•		
Encephalitis – vector-borne	•			•	
Food poisoning: viral, animal, bacterial, or chemical origin, excluding shigellosis or salmonellosis	•			•	
Giardiasis		•			•

CATEGORY I COMMUNICABLE DISEASES	PUBLIC HEALTH TO START INVESTIGATION <sup>E</sup>		PUBLIC HEALTH REPORTING TO POPULATION HEALTH BRANCH (PHB) <sup>E</sup>		
	Within 24-48 hrs	Within 72 hrs	Upon notification by lab or physician <sup>F,H</sup>	Within 3 days <sup>G,H</sup>	Within 2 weeks <sup>H</sup>
Haemophilus influenzae invasive disease (types a, b, c, d, e, and f)	•			•	
Haemorrhagic fevers – viral including suspect cases	• <sup>A</sup>		● <sup>B</sup>		
Hantavirus	•			•	
Hepatitis A	•				•
Influenza (lab-confirmed)		•			٠
Legionellosis	•			•	
Leptospirosis		•			•
Leprosy		•			● <sup>B</sup>
Listeriosis		•			•
Lyme disease		•			● <sup>B</sup>
Malaria		•			•
Measles	•			•	
Meningococcal invasive disease	•			● <sup>B</sup>	
Mumps		•			•
Paratyphoid	•			•	
Parvovirus B 19		• <sup>C</sup>			•
Pertussis	•				•
Plague	● <sup>A</sup>		•		
Pneumococcal invasive disease		•			•
Poliomyelitis	•		•		
Psittacosis		•			•
Rabies (human)	•		•		
Rickettsial disease (Rocky Mountain Spotted Fever, Q Fever, relapsing fever)		•		•	•
Rubella	•		1	-	

CATEGORY I COMMUNICABLE DISEASES	PUBLIC HEALTH TO START INVESTIGATION <sup>E</sup>		PUBLIC HEALTH REPORTING TO POPULATION HEALTH BRANCH (PHB) <sup>E</sup>		
	Within 24-48 hrs	Within 72 hrs	Upon notification by lab or physician <sup>F,H</sup>	Within 3 days <sup>G,H</sup>	Within 2 weeks <sup>H</sup>
Salmonellosis, excluding typhoid and paratyphoid	•				•
Severe Acute Respiratory Syndrome (SARS)	•		● <sup>B</sup>		
Shigellosis	•			•	
Smallpox	• <sup>A</sup>		● <sup>B</sup>		
Staphylococcal disease – invasive, toxigenic	•				•
Streptococcal A - invasive	•				•
Streptococcal B – neonatal		•			•
Tetanus		•			•
Toxoplasmosis		•			•
Transmissible spongiform encephalitis (TSE)	•			•	
Trichinosis		•			•
Tularaemia		● <sup>A</sup>			•
Typhoid	•			•	
Verotoxigenic E. coli infections	•			•	
West Nile Virus (WNNS)		•		•	
Yellow fever	•		•		
Yersinia enterocolitica		•			•

CATEGORY II COMMUNICABLE DISEASES	PUBLIC H START INVE	EALTH TO	PUBLIC HEALTH REPORTING TO POPULATION HEALTH BRANCH (PHB)		
	Within 24-48 hrs	Within 72 hrs	Upon notification by lab or physician <sup>F,H</sup>	Within 3 days <sup>G,H</sup>	Within 2 weeks <sup>H</sup>
AIDS (see HIV)					•
Chancroid		•			•
Chlamydia trachomatis		•			•
Gonococcal infections		•			•
Granuloma inguinale		•			•
Hepatitis B	•				•
Hepatitis C		•			•
Hepatitis D		•			•
Hepatitis – other viral		•			•
Human immunodeficiency virus (HIV) infection, including acquired immune deficiency syndrome		•			•
Human T lymphotropic virus, Types I and II		•			•
Lymphogranuloma venereum		•			•
Neonatal/congenital herpes		•			•
Syphilis	•				•
Tuberculosis	•				•

<sup>A</sup> If bioterrorism is suspected, PHB should be notified immediately and investigation should occur immediately.

<sup>B</sup> Probable cases must also be reported.

<sup>c</sup> Prenatal and neonates may require follow-up in less than 48 hours.

<sup>D</sup> Possible cases of vCJD must also be reported.

<sup>E</sup> Investigation and reporting of all suspected outbreaks should be immediate.

<sup>F</sup> Alert by phone call to Deputy Chief Medical Health Officer and a follow-up email with details of case and disease name included in the email subject line to cdc@health.gov.sk.ca.

<sup>G</sup> Alert by email with details of case and disease name included in the email subject line to cdc@health.gov.sk.ca.

<sup>H</sup> Details of case entered into iPHIS.

# References

- 1. Saskatchewan Ministry of Health. *Communicable Disease Control Manual (reviewed May 2010).* Available from: http://www.health.gov.sk.ca/cdc-section1#page=1.
- 2. Saskatchewan Ministry of Health. *Communicable Disease Control Manual, Appendix A (reviewed November 2012).* Available from: http://www.health.gov.sk.ca/cdc-appendixA.
- 3. Public Health Agency of Canada (2003). *Genital Chlamydia*. Available from: http://dsolsmed.phac-aspc.gc.ca/dsol-smed/ndis/diseases/chlm-eng.php.
- 4. Public Health Agency of Canada (2003). *Gonorrhea*. Available from: http://dsol-smed.phac-aspc.gc.ca/dsol-smed/ndis/diseases/gono-eng.php.
- 5. Public Health Agency of Canada (2003). *Syphilis*. Available from: http://dsol-smed.phac-aspc.gc.ca/dsol-smed/ndis/diseases/syph-eng.php.

http://www.phac-aspc.gc.ca/aids-sida/publication/survreport/estimat2011-eng.php

- 6. Public Health Agency of Canada (2008). *Estimates of HIV prevalence and incidence in Canada, 2011.* Available from:
- Public Health Agency of Canada. Centre for Communicable Diseases and Infection Control. *HIV and AIDS in Canada. Surveillance report to December 31, 2009*. Available from: http://www.phac-aspc.gc.ca/aids-sida/publication/survreport/2009/dec/index-eng.php.
- 8. Saskatchewan Ministry of Health (2010). *Saskatchewan's HIV strategy, 2010-2014*. Available from: http://www.health.gov.sk.ca/hiv-strategy-2010-2014
- 9. Public Health Agency of Canada (2010). *Canadian guidelines on sexually transmitted infections*. Available from: http://www.phac-aspc.gc.ca/std-mts/sti-its/guide-lignesdir-eng.php.
- 10. Public Health Agency of Canada (2009). *Hepatitis C Fact Sheet*. Available from: http://www.phac-aspc.gc.ca/hcai-iamss/bbp-pts/hepatitis/hep\_c-eng.php.
- 11. Public health Agency of Canada (2010). *Hepatitis C.* Available from: http://www.phac-aspc.gc.ca/hepc/index-eng.php.
- 12. Public Health Agency of Canada (2010). *Hepatitis C: Get the facts. You can have it and not know it.* Available from: http://www.phac-aspc.gc.ca/hepc/pubs/getfacts-informezvous/index-eng.php.
- 13. Public Health Agency of Canada (2009). *Epidemiology of acute Hepatitis C infection in Canada: Results from the enhanced hepatitis strain surveillance system (EHSSS).* Available from: http://www.phac-aspc.gc.ca/sti-its-surv-epi/pdf/hcv-epi-eng.pdf.
- 14. Wong T, and Lee SS. (2006). Hepatitis C: A review for primary care physicians. *Canadian Medical Association Journal*, *174*(5), 649-659.
- 15. Public Health Agency of Canada (2008). *Fact sheet: Community acquired methicillin-resistant staphylococcus aureus*. Available from: http://www.phac-aspc.gc.ca/id-mi/camrsa-eng.php
- 16. Public Health Agency of Canada. *Report on Sexually Transmitted Infections in Canada: 2008*. Available from: http://www.phac-aspc.gc.ca/std-mts/report/sti-its2008/03-eng.php

- 17. Public Health Agency of Canada. Centre for Communicable Diseases and Infection Control. *Reported cases and rates of gonorrhea, chlamydia, syphilis and hepatitis C by province/territory and sex, 1980 to 2010.*
- 18. Saskatchewan Ministry of Health. *HIV and AIDS in Saskatchewan 2010 Annual Report*. Available from: http://www.health.gov.sk.ca/HIV-AIDS-annual-report-2010
- 19. Mitruka K, Winston CA, and Navin, TR. *Predictors of failure in timely tuberculosis treatment completion, United States*. Division of Tuberculosis Elimination, Centers for Disease Control and Prevention, 2012.
- National Institute of Allergy and Infectious Diseases. Enteric Diseases [Internet]. 2010 Oct 20 [cited 2011 July 28]. Available from: http://www.phac-aspc.gc.ca/im/measure-interventioneng.php
- Public Health Agency of Canada. Enteric disease: A major health concern in Canada [Internet].
  2010 Aug 31 [cited 2011 July 28]. Available from: http://www.phac-aspc.gc.ca/c-enternet/ed-me-eng.php#a1
- 22. Centers for Disease Control and Prevention. Enteric Diseases Epidemiology Branch [Internet].
  2011 Apr 20 [cited 2011 July 28]. Available from: http://www.cdc.gov/ncezid/dfwed/edeb/index.html
- 23. Rosenberg T, Kendall O, Blanchard J, Martel S, Wakelin C, Fast M. Shigellosis on Indian reserves in Manitoba, Canada: Its relationship to crowded housing, lack of running water and inadequate sewage disposal. Am J Pub Health 1997;87(9):1547-1551.
- BC Centre for Disease Control. Streptococcal Disease, Invasive Group A [Internet]. 27 May 2011 [cited 2011 July 28]. Available from: http://www.bccdc.ca/dis-cond/az/\_s/StreptococcalDiseaseInvasiveGroupA/default.htm
- 25. Public Health Agency of Canada. Guidelines for the Prevention and Control of Invasive Group A Streptococcal Disease. CCDR 2006;32S2:1-26. Available from: http://www.phacaspc.gc.ca/publicat/ccdr-rmtc/06pdf/32s2\_e.pdf
- Government of Saskatchewan. West Nile Virus awareness and prevention [Internet]. 2007 [cited 28 Jul 2011]. Available from: http://www.health.gov.sk.ca/about-west-nile-virus
- 27. Government of Saskatchewan. West Nile Virus surveillance results archive [Internet]. 2007 [cited 28 Jul 2011]. Available from: http://www.health.gov.sk.ca/wnv-surveillance-results-archive
- 28. Government of Saskatchewan. Pandemic planning [Internet]. No Date [Cited 28 Jul 2011]. Available from: http://www.health.gov.sk.ca/pandemic-planning
- 29. World Health Organization. World now at the start of 2009 influenza pandemic: Statement to the press by WHO Director-General Dr. Margaret Chan. [Internet]. 2009 Jun 11 [cited 2011 Jul 28]. Available from:

http://www.who.int/mediacentre/news/statements/2009/h1n1\_pandemic\_phase6\_20090611/ en/index.html

30. World Health Organization. H1N1 in post-pandemic period: Director-General's opening statement at virtual press conference. [Internet]. 2010 Aug 10 [cited 2011 Jul 28]. Available

from:

http://www.who.int/mediacentre/news/statements/2010/h1n1\_vpc\_20100810/en/index.html

- 31. Saskatchewan Ministry of Health. Saskatchewan Disease Control Laboratory newsletter: Update on testing for pandemic influenza [Internet]. 2009 Oct [cited 2011 Jul 28]. Available from: http://www.health.gov.sk.ca/adx/aspx/adxGetMedia.aspx?DocID=6cd5d886-f04e-40b3-af8c-4b10c72a5d4c&MediaID=3389&Filename=sdcl-newsletter-oct2009.pdf&l=English
- 32. Saskatchewan Ministry of Health. Saskatchewan Disease Control Laboratory newsletter: Update on testing for pandemic influenza [Internet]. 2009 Oct [cited 2012 Nov 15]. Available from: http://www.health.gov.sk.ca/adx/aspx/adxGetMedia.aspx?DocID=503387e5-0463-458c-9fdfe4dda04ccc4f&MediaID=3635&Filename=sdcl-newsletter-jan2010.pdf&l=English
- National Institute of Allergy and Infectious Diseases. Community Immunity ("Herd" Immunity) [Internet]. 2010 Oct 21; [cited 2011 July 14]. Available from: http://www.niaid.nih.gov/topics/pages/communityimmunity.aspx
- First Nations and Inuit Health Alberta Region. First Nations Health Status Report Alberta Region, 2009-2010. Alberta: Health Canada; 2011. 80 p. Report no.:H26-4/2010E.
- 35. First Nations and Inuit Health Targeted Immunization Strategy (FNIHB-TIS) 2003-2008. Health Canada; 2006. 53 p. Catalogue Number: H34-161/2007. Catalogue record available at: http://publications.gc.ca/pub?id=308988&sl=0
- 36. McMurchy T. Immunization urged for whopping cough. Government of Saskatchewan News Release [Internet]. 2010 Sep 24 [cited 2011 Jul 18]. Available from: http://www.gov.sk.ca/news?newsId=c8c4fca4-0dd1-4821-ad34-eda7dfa78398
- 37. Saskatchewan Ministry of Health. Saskatchewan Immunization Manual, April 2012. Chapter 1 Section 5.2. Available from: http://www.health.gov.sk.ca/sim-chapter1
- 38. Public Health Agency of Canada. Vaccine-Preventable Diseases: Pertussis. Available from: http://www.phac-aspc.gc.ca/im/vpd-mev/pertussis-eng.php
- Public Health Agency of Canada. Vaccine-Preventable Diseases: Rabies [Internet]. 2007 [cited 2011 Jul 22]. Available from: http://www.phac-aspc.gc.ca/im/vpd-mev/rabies-eng.php
- 40. Health Canada. First Nations Environmental Public Health Program [Internet]. 2008 [cited 2011 July 20]. Available from: http://www.hc-sc.gc.ca/fniahspnia/pubs/promotion/\_environ/2009\_env\_prog/index-eng.php
- 41. Aboriginal Affairs and Northern Development Canada. National Assessment of First Nations Water and Wastewater Systems [Internet]. 2011 Jan [cited 2012 May 9]. Available from: http://www.aadnc-aandc.gc.ca/eng/1315530095418
- 42. Health Canada. Guidelines for Canadian Drinking Water Quality [Internet]. 2010 Dec [cited 2011 July 20]. Available from: http://www.hc-sc.gc.ca/ewh-semt/alt\_formats/hecs-sesc/pdf/pubs/water-eau/2010-sum\_guide-res\_recom/sum\_guide-res\_recom-eng.pdf
- 43. World Health Organization. *Pandemic Influenza Preparedness Framework*. 2011. Available at: http://www.who.int/influenza/preparedness/en/
- 44. Canadian Tuberculosis Committee. *Housing Conditions that serve as risk factors for tuberculosis infection disease*. Canada Communicable Disease Report 2007; 33 ACS-9:1-13.
- 45. Clark M, Riben P, Nowgesic E. *The association of housing density, isolation and tuberculosis in Canadian First Nations communities*. International Journal of Epidemiology 2002; 31:940-945.
- 46. Federation of Saskatchewan Indian Nations. First Nations of Saskatchewan RHS (Regional Longitudinal Health Survey) 2002/2003 Final Report.
- Public Health Agency of Canada / Canadian Lung Association / Canadian Thoracic Society 2007. Canadian Tuberculosis Standards, 6<sup>th</sup> Edition. Available at: http://www.lung.ca/ctssct/pdf/tbstand07\_e.pdf
- 48. Public Health Agency of Canada 2006. *Canadian Immunization Guide,* 7<sup>th</sup> Edition.
- 49. Gardy JL. Whole-Genome Sequencing and Social Network Analysis of a Tuberculosis Outbreak. 2011. NEJM 374; 8; 730-739.
- 50. Saskatchewan Ministry of Health. Saskatchewan TB Profile, 2012.
- 51. Red Book: *Report of the Committee on Infectious Diseases*. American Academy of Pediatrics, 28th Edition, 2009. p 682.
- 52. Saskatchewan TB partnership working group. *TST Screening of Children in Saskatchewan Review of 2011/12 program and proposals for 2012/13*. February 2011.
- 53. TB Control Saskatchewan. *A Reference Guide to the Tuberculosis Program in Saskatchewan*. Reviewed 2005.
- 54. Health Canada. Health Canada's Strategy Against Tuberculosis for First Nations On-Reserve.
  2012. Available at: http://www.hc-sc.gc.ca/fniah-spnia/pubs/diseasesmaladies/\_tuberculos/tuberculos-strateg/fact-fiche-eng.php
- 55. World Health Organization. *Global Health and Immunization Strategy 2006-2015*. October 2005. Available at: http://whqlibdoc.who.int/hq/2005/WHO\_IVB\_05.05.pdf
- 56. Centers for Disease Control and Infection. Tuberculosis Fact Sheets. November 2011. Available at: http://www.cdc.gov/tb/publications/factsheets/general/ltbiandactivetb.htm