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# First Nations Health Status Report - Alberta Region

## 2009-2010

Canada

# First Nations and Inuit Health–Alberta Region

## VISION:

To be an integrated health-focused organization in supporting First Nations quality health systems in an environment of trust, accountability, and partnership.

## MISSION:

First Nations and Inuit Health-Alberta Region enables the best possible outcomes in promoting, improving, and preserving the health status of First Nations members and their communities by:

- facilitating access to health services according to identified health needs;
- providing access to health information;
- building community capacity and promoting self-reliance; and
- demonstrating accountability in the effective use of resources.



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CAT:

ISBN:

## MESSAGE FROM THE MEDICAL OFFICER OF HEALTH

Dear Readers,

One of the most important functions in public health is monitoring and surveillance. 'Surveillance' refers to the systematic collection, analysis, and dissemination of information to users to take action: knowledge from the analysis of data and trends is meant to be used for improving the health of the population.

With this *First Nations Health Status Report - Alberta Region 2009-2010* for Alberta First Nations communities, data have been gathered from many diverse sources into a single document to present an overview of the health of the First Nations in Alberta. I wish to especially acknowledge the collaboration of the First Nations community-based staff members, the regional Health Assessment and Surveillance and Health Protection teams, and our public health partners at Alberta Health and Wellness in the preparation and contribution of the health information analyzed and presented in this report.

The report includes trends in life expectancy, deaths from various causes such as injuries, heart disease, cancer, and respiratory illnesses; communicable disease control measures such as immunization coverage rates among preschool and school-age First Nations children, pandemic and seasonal influenza vaccine coverage, tuberculosis, sexually transmitted infections, and other notifiable disease incidence rates; and environmental public health activities to ensure safe drinking water and healthy indoor environments as efforts are carried out to assess and mitigate risks in the First Nations communities.

The various sections of the report demonstrate how First Nations are doing as a population in key health areas, and allow us to compare with the Alberta general population. The following highlights point to some areas of success and improvement in health, whereas others indicate lingering issues that continue to invite us to strengthen our resolve and ongoing collective efforts to build on achievements.

Over the past decade, the First Nations, the community-based and regional employees, together with our partners in public health in Alberta have made real improvements in areas such as tuberculosis, child immunization initiation and completion of vaccine series, pandemic influenza preparedness and response (with 66% immunization coverage), as well as water sampling and testing, using the public health approach.

In the near future, we must also focus our surveillance and reporting energies on additional areas such as: prescription drug misuse, mental health and addictions, chronic diseases, healthy living, and healthy childhood.

Let us know how this report can serve the communities better and assist in improving the health of First Nations in Alberta.

Together on the journey,

Dr. Wadieh Yacoub, MBBCh MSc FRCPC
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# Highlights

## VITAL STATISTICS

- First Nations had an average life expectancy that was 9.6 years lower than non-First Nations in 2000; by 2009, the average life expectancy of First Nations was 12.2 years lower than that of non-First Nations. This is in contrast to national trends between 1980 and 2000, where the gap was narrowing.
- There was no significant year-to-year variability of infant death rates among First Nations from 2002-2009. Similar trends were observed among non-First Nations. However, First Nations had higher infant death rates compared to non-First Nations.
- The four leading causes of death are similar between First Nations and non-First Nations. These are injuries, diseases of the circulatory system, neoplasms, and diseases of the respiratory system.
- First Nations injury-related death rates were between 1.8 and 5.9 times higher across all age groups, compared to non-First Nations.
- From 2000-2009, the leading cause of injury-related death among First Nations females was suicides (25.3%); it was the second leading cause of injury-related death among non-First Nations females (20.6%).
- Circulatory system diseases (heart disease) were the second leading cause of death among Alberta First Nations, between 1990 and 1999 and also between 2000 and 2009.
- The five leading causes of cancer-related death among all First Nations were lung cancer (19.5%), colon cancer (9.2%), breast cancer (8.8%), stomach cancer (5.3%), and prostate cancer (5.0%). Among First Nations males and females, lung cancer was the top cancer.

## COMMUNICABLE DISEASE CONTROL

- While the coverage rates for the various vaccines each year is similar among the one-year-old children (e.g. coverage rate for each vaccine in 2009 was around 60%), there is considerable variation among the rates for two-year-old children.
- Known factors which impact immunization coverage rates include community health nurse shortages and First Nations individuals accessing services off-reserve, making their data unavailable.
- The human papillomavirus (HPV) vaccine is a new vaccine that was offered to Grade 5 girls, beginning in the 2008-2009 school year, and Grade 9 girls, in the 2009-2010 school year. This three-dose vaccine protects against genital cancers, especially cervical cancer. During the 2009-2010 school year, 43% of Grade 5 and Grade 9 girls in First Nations community schools received all three doses of HPV vaccine, an additional 47% received one or two doses.
- In Alberta, the overall regional on-reserve pandemic influenza vaccine uptake was 66%.
- The total percentage of vaccine wasted in the Region was at 0.4%, the lowest level in the last seven years.
- Although sexually transmitted infections rates remain several times higher among First Nations than in the Alberta general population, there were no cases of congenital syphilis reported in First Nations communities in 2009.

- In 2009, the human immunodeficiency virus (HIV) infection rate was approximately four times higher in the First Nations (on- and off-reserve) population (2.4 per 10,000) compared to the non-First Nations population (0.6 per 10,000). The highest HIV rates among First Nations occurred in the 30-49 year age group; injection drug use and partner at-risk were the most identified risk exposures.
- Consistent with previous years, rates of active tuberculosis (TB) in First Nations communities continue to be higher (more than four times) than rates observed in the Alberta general population.
- Consistent with previous years, a large proportion of cases of notifiable diseases was attributable to enteric diseases (29%), hepatitis C (29%), and invasive pneumococcal disease (19%) in 2009.
- In 2009, there were a total of 208 animal bites reported from First Nations communities, a considerable increase from 2008, but comparable to 2007.

## ENVIRONMENTAL PUBLIC HEALTH

- Continuing improvements in data management and analysis tools used by Environmental Public Health Services have facilitated mapping and reporting of water data. This has facilitated the timely identification of potential issues of concern, as well as improving information for communities regarding local water systems.
- The regional water sampling average was 80%, the level consistently achieved since 2006. Approximately one-third of Alberta First Nations communities exceeded 95% of their drinking water sampling requirements.
- By the end of fiscal year 2009-2010, most communities' water samples were analyzed for microbiology at Alberta's Provincial Lab.
- There was a decline in the number of drinking water advisories in 2009-2010 from the previous five fiscal years.
- Operational issues are the leading factor impacting drinking water quality in communities.
- The drinking water advisories occurring in semi-public water supplies tend to have a longer duration compared to drinking water advisories issued for public water supply types (median = 456 and 36 days, respectively).
- Of the 84 public water systems scheduled for annual chemical analysis, 48% were sampled according to target (twice per year); another 39% were sampled once, and 13% had no sampling undertaken.
- Housing inspections have shown that there are significant amounts of exterior deficiencies that are likely contributing to water or moisture damage. This continues to be an area of concern, as the presence of moisture can predispose building materials to deterioration and potentially lead to mould issues.
- The proper operation and monitoring of solid waste disposal facilities continues to raise significant public health concerns in communities across the region.

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# Introduction

Welcome to the *First Nations Health Status Report - Alberta Region 2009-2010*. Using a population health approach, data in this year's report are provided for Alberta First Nations, predominantly those living on-reserve, and are compared with non-First Nations in Alberta as well as the entire population in Alberta (Alberta general population).

This information supports community decision and policymakers, tribal councils, public health partners and the Region in formulating goals and priorities to address the identified health needs, while developing evidence-based programming and services in the communities.

# Vital Statistics
Alberta First Nations

OVERVIEW

# Vital Statistics

Vital statistics are a set of records consisting of information related to events in the life of an individual within a population. These events range from the birth of a person to the person's death and all other health-related events in between.

Vital statistics are one of the most widely used measures by public health officials within population health. Disease prevalence, health services utilization, life expectancy at birth, infant mortality, and specific causes of death are some of the measures of vital statistics. Demographic information about First Nations people in Alberta can be found in a recently published report by Lachance et al[1].

### DATA SOURCES AND LIMITATIONS

This section of the report is based on the analysis of the following data sources

- FNMD: First Nations Mortality Database held by Health Canada FNIH-Alberta Region
- AVS death file: Alberta Vital Statistics data from Alberta Government Services
- INAC population file: Indian and Northern Affairs Canada population data
- Interactive Health Data Application of Alberta Health and Wellness: Population data and data on First Nations indicators
- Canadian population data: 2006 Canadian Census population obtained from Statistics Canada

Data limitations include the following

- The Alberta Vital Statistics death file does not have First Nations identifiers, therefore a subset of INAC's Indian Registry was used to identify First Nations death events. The Indian Registry listings may be incomplete due to late registration and missed notification.
- At the writing of this report, data was unavailable for death events of Alberta First Nations individuals that occurred outside the province of Alberta.

[1] Lachance N, Hossack N, Wijayasinghe C, Yacoub W, Toope T. *Health Determinants for First Nations in Alberta*, 2010. Edmonton: First Nations and Inuit Health-Alberta Region, Health Canada.

## LIFE EXPECTANCY AT BIRTH

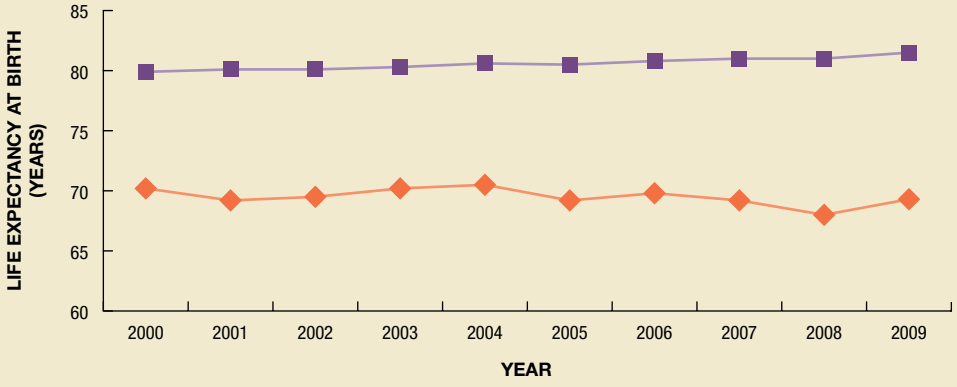
Life expectancy is the average number of years people can expect to live, if in the future they experience the current age-specific mortality rates in the population[2]. Thus, it estimates the average number of years a newborn child may live based on the current population death rates at each age. Life expectancy varies with marital status, gender, income and geographical location, but is not affected by the age structure of the population. It may be influenced by past living conditions or consequences of past events, such as epidemics. Higher life expectancy is normally associated with better socioeconomic and health conditions[3].

In Alberta, the First Nations'[4] life expectancy at birth, in 2000, was 70.9 years (compared to 79.9 years for non-First Nations) and decreased over the years to 69.3 years, in 2009 (compared to 81.5 years for Non-First Nations). The gap between the life expectancy of First Nations and Non-First Nations has been getting wider since 2000. First Nations had an average life expectancy that was 9.6 years lower than Non-First Nations in 2000. By 2009, the average life expectancy of First Nations was 12.2 years lower than that of Non-First Nations (Figure 1.1). This is in contrast to national trends between 1980 and 2000, where the gap was narrowing (Figure 10 in Lachance et al, p 16).

Life expectancy in the Canadian general population is always higher for females than males. A similar trend is also observed among Alberta First Nations; however, the male life expectancy trends appears to be slightly decreasing (Figure 1.2).

**FIGURE 1.1**

Trends in Life Expectancy at Birth, First Nations and Non-First Nations, Alberta, 2000-2009



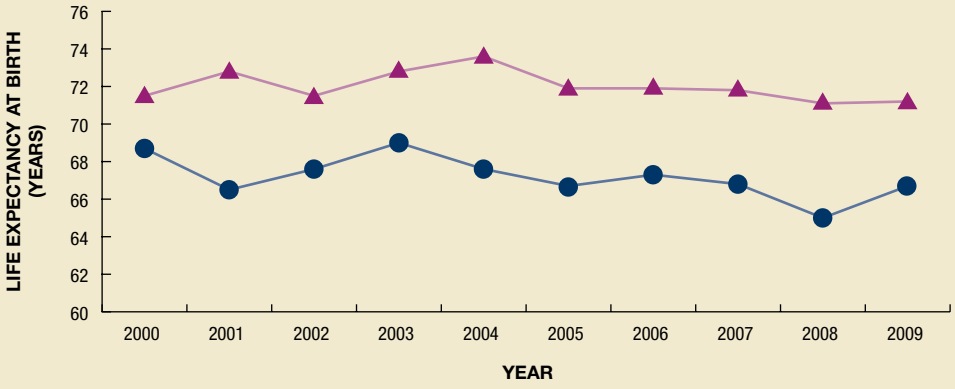

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| First Nations | 70.2 | 69.2 | 69.5 | 70.2 | 70.5 | 69.2 | 69.8 | 69.2 | 68.0 | 69.3 |
| Non-First Nations | 79.9 | 80.1 | 80.1 | 80.3 | 80.6 | 80.5 | 80.8 | 81.0 | 81.0 | 81.5 |

***Source:*** *Alberta Health and Wellness, Interactive Health Data Application*

[2] World Health Organization. 2011. *Life Expectancy.* www.who.int/topics/life_expectancy/en/ (accessed February 2011).
[3] Health Canada. 2009. *First Nations Health Status Report, Alberta Region, 2007-2008.* Edmonton: First Nations and Inuit Health-Alberta Region.
[4] First Nations includes all infants of mothers with First Nations status whose birth and/or death occurred in Alberta and any one ever having registered with Alberta Health Care Insurance Plan as status First Nation. This includes residents of Alberta belonging to out of province bands. All others are considered Non-First Nations.

**FIGURE 1.2**

Trends in Life Expectancy at Birth, by Gender, First Nations, Alberta, 2000-2009




| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Males | 68.7 | 66.5 | 67.6 | 69.0 | 67.6 | 66.7 | 67.7 | 66.8 | 65.0 | 66.7 |
| Females | 71.5 | 72.8 | 71.5 | 72.8 | 73.6 | 71.9 | 71.9 | 71.8 | 71.1 | 72.2 |

***Source:*** *Alberta Health and Wellness, Interactive Health Data Application*

## DEATHS

Death statistics are very useful in providing health status information about a population, such as the number of people dying, causes of deaths, causes of premature deaths, and access to health and medical care of a population. However, it does not reflect the number of sick individuals or the impact of diseases that do not result in death. Information on the causes of premature deaths and preventable deaths (e.g. injuries) are useful to public health officials and other stakeholders for health planning.

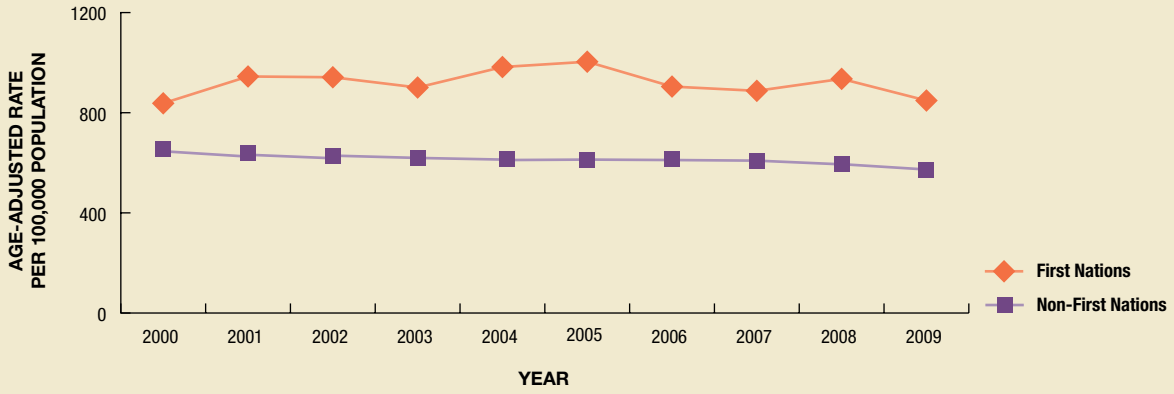
With the exception of information on infant deaths, this section includes First Nations[5] and non-First Nations[6] who were residents of Alberta at the time of their death.

[5] First Nations includes all First Nations registered with an Alberta band who died within Alberta and were included in the Alberta Vital Statistics (AVS) death file. The term 'First Nations' does not include First Nations registered to non-Alberta bands, who died in Alberta or First Nations from Alberta who died outside the province.

[6] Non-First Nations includes all Alberta residents not previously defined by the term 'First Nations', who died during 2000-2009 in Alberta and may include some First Nations belonging to out-of-province bands.

**FIGURE 1.3**

Trends in Age-Adjusted Death Rates*, First Nations and Non-First Nations, Alberta, 2000-2009

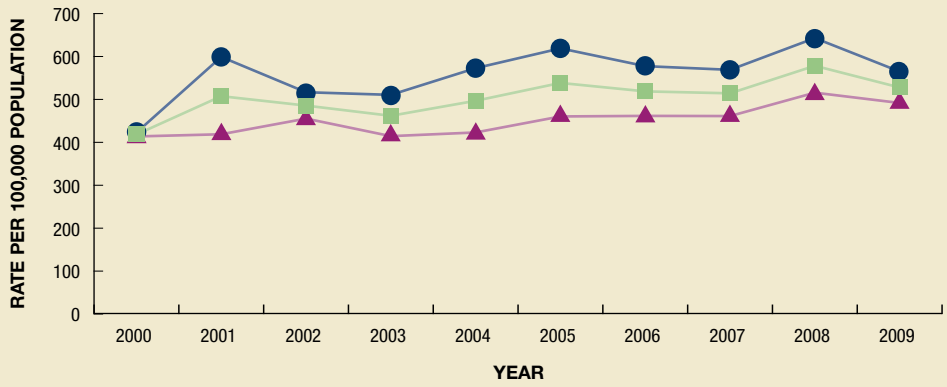



* Rates are adjusted to the 2006 Canadian population.

***Source:*** *Health Canada, FNIH-Alberta Region, FNMD; Alberta Government Services, AVS, Death file; Indian and Northern Affairs Canada, Population file; Alberta Health and Wellness, Interactive Health Data Application*

**FIGURE 1.4**

Trends in Death Rates, by Gender, First Nations, Alberta, 2000-2009

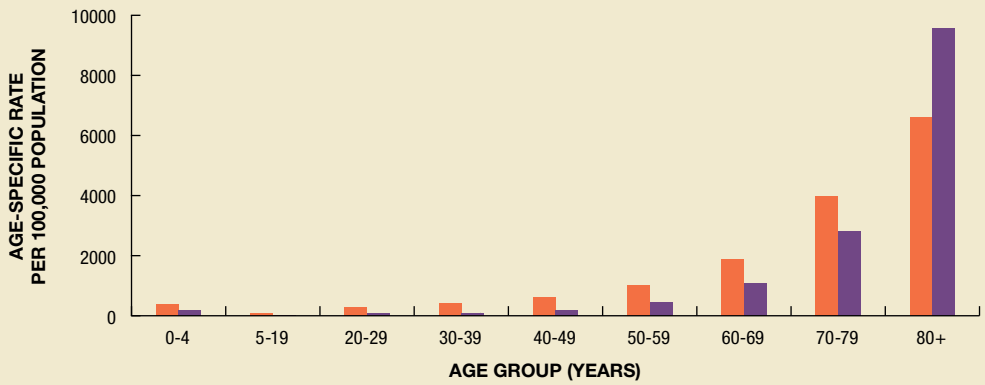



| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Males** | 421.6 | 597.8 | 515.5 | 509.4 | 571.6 | 617.7 | 576.3 | 567.7 | 641.7 | 563.7 |
| **Females** | 412.5 | 417.6 | 454.1 | 413.2 | 421.8 | 459.1 | 460.4 | 460.0 | 514.5 | 490.5 |
| **All** | 417.0 | 506.3 | 484.4 | 460.6 | 495.6 | 537.2 | 517.5 | 513.0 | 577.1 | 526.6 |

***Source:*** *Health Canada, FNIH-Alberta Region, FNMD; Alberta Government Services, AVS, Death file; Indian and Northern Affairs Canada, Population file*

**FIGURE 1.5**

Age-Specific Death Rates, First Nations and Non-First Nations, Alberta, 2000-2009




| | 0-4 | 5-19 | 20-29 | 30-39 | 40-49 | 50-59 | 60-69 | 70-79 | 80+ |
|---|---|---|---|---|---|---|---|---|---|
| **First Nations** | 396.6 | 86.3 | 285.6 | 413.5 | 631.0 | 1027.3 | 1897.0 | 3964.8 | 6595.0 |
| **Non-First Nations** | 182.9 | 25.9 | 67.8 | 89.5 | 187.9 | 433.2 | 1088.6 | 2821.4 | 9584.2 |

***Source:*** *Health Canada, FNIH-Alberta Region, FNMD; Alberta Government Services, AVS, Death file; Indian and Northern Affairs Canada, Population file; Alberta Health and Wellness, Interactive Health Data Application*

An average of 480 First Nations people die each year within Alberta. When the First Nations and non-First Nations populations are adjusted using the age distribution of the 2006 Canadian Census population, the death rates among First Nations did not vary significantly from one year to another, between 2000 and 2009. The First Nations adjusted death rates are consistently between 20% and 60% higher than the non-First Nations adjusted rate (Figure 1.3).

Significantly[7] more First Nations males die each year than First Nations females and this trend is consistent between 2000 and 2009 (Figure 1.4).

The proportion of First Nations deaths in age groups less than 80 years is significantly higher than the corresponding proportion of non-First Nations deaths in the same age groups, when considering the age distribution (Figure 1.5). First Nations are dying at younger ages than non-First Nations.

[7] There is statistical significance difference between males and females for all years except in 2000 and 2002 at the 95% confidence interval level.

## Infant Death

Infant death is defined as the death of an infant before his or her first birthday (i.e. less than 1 year of age). Infant death rate[8] is an important measure of the well-being of infants and pregnant women. It is associated with a variety of factors, such as economic and social conditions (e.g. living conditions of mothers and their children); quality of, and access to, medical care; as well as public health practices. It is seen by many health experts as a sentinel indicator of child health and the well-being of a society over time[9].

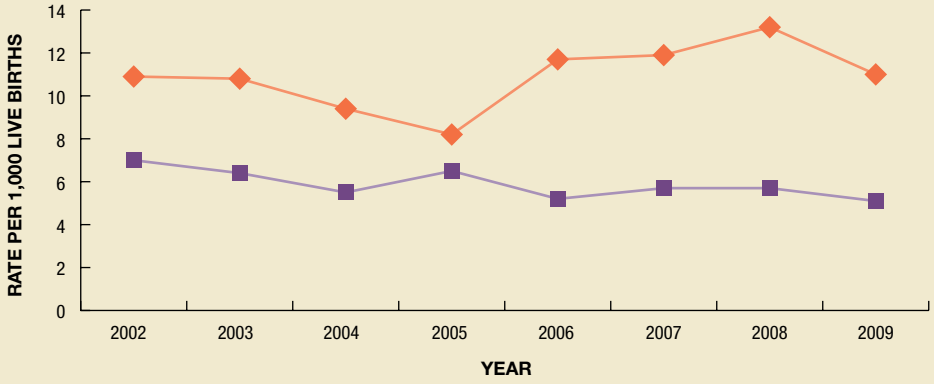
There was no significant year-to-year variability of infant death rate among First Nations[10] from 2002-2009 (Figure 1.6). Similar trends were observed among non-First Nations. First Nations had a higher infant death rates compared to non-First Nations.

## Leading Causes of Death

Table 1.1 summarizes the leading causes of death in Alberta between 2000 and 2009. The four leading causes of death are similar between First Nations and non-First Nations. These are injuries, diseases of the circulatory system, neoplasms[11], and diseases of the respiratory system. Although the leading causes of death are similar, the rankings have a different pattern. Injuries were the leading cause of death for First Nations, accounting for 32.4% of deaths from all causes, compared to 8.3% among non-First Nations.

**FIGURE 1.6**

Trends in Infant Death Rates, First Nations and Non-First Nations, Alberta, 2002-2009




| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|
| First Nations | 10.9 | 10.8 | 9.4 | 8.2 | 11.7 | 11.9 | 13.2 | 11.0 |
| Non-First Nations | 7.0 | 6.4 | 5.5 | 6.5 | 5.2 | 5.7 | 5.7 | 5.1 |

***Source:*** *Alberta Health and Wellness, Interactive Health Data Application*

[8] Infant death rate is the number of children dying before they are one year old in a given year divided by the number of live births in that same year.
[9] The Conference Board of Canada. 2009. *Health-Infant Mortality*. www.conferenceboard.ca/hcp/details/health/infant-mortality-rate.aspx#_ftnref1 (accessed February 2011).
[10] First Nations includes all infants of mothers with First Nations status whose birth and/or death occurred in Alberta. This includes infants of residents of Alberta belonging to out of province bands. All others infants are considered non-First Nations.
[11] More than 97% of the neoplasms deaths were malignant (i.e. cancers).

**TABLE 1.1**

Distribution of Leading Causes of Death*, First Nations and Non-First Nations, Alberta, 2000-2009

| UNDERLYING CAUSE OF DEATH | FIRST NATIONS | | | NON-FIRST NATIONS | | |
|---|---|---|---|---|---|---|
| | Deaths | % | Rank | Deaths | % | Rank |
| Injuries (and poisonings) | 1,564 | 32.4 | 1 | 15,621 | 8.3 | 4 |
| Diseases of the circulatory system | 844 | 17.5 | 2 | 64,879 | 34.5 | 1 |
| Neoplasms | 697 | 14.5 | 3 | 53,196 | 28.3 | 2 |
| Diseases of the respiratory system | 374 | 7.8 | 4 | 15,788 | 8.4 | 3 |
| Diseases of digestive system | 294 | 6.1 | 5 | 7,322 | 3.9 | 6 |
| Endocrine, nutritional, and metabolic diseases | 223 | 4.6 | 6 | 5,506 | 2.9 | 8 |
| Infectious and parasitic diseases | 148 | 3.1 | 7 | 2,615 | 1.4 | 10 |
| Mental and behavioural disorders | 148 | 3.1 | 8 | 6,307 | 3.4 | 7 |
| Conditions originating during perinatal period | 136 | 2.8 | 9 | 1,289 | 0.7 | 11 |
| Ill-defined conditions | 96 | 2.0 | 10 | 1,221 | 0.6 | 12 |
| Diseases of genitourinary system | 82 | 1.7 | 11 | 3,597 | 1.9 | 9 |
| Diseases of the nervous system | 79 | 1.6 | 12 | 7,529 | 4.0 | 5 |
| Congenital anomalies | 64 | 1.3 | 13 | 1,088 | 0.6 | 14 |
| Diseases of the musculoskeletal system and connective tissue | 51 | 1.1 | 14 | 1,160 | 0.6 | 13 |
| All others | 21 | 0.4 | - | 884 | 0.5 | - |
| **Total** | **4,821+** | **100.0** | **-** | **188,002++** | **100.0** | **-** |

* Based on International Classification of Diseases, Version 10 (ICD-10).
\+ Excludes 10 deaths with no underlying cause of death registered.
++ Excludes 94 deaths with no underlying cause of death registered.

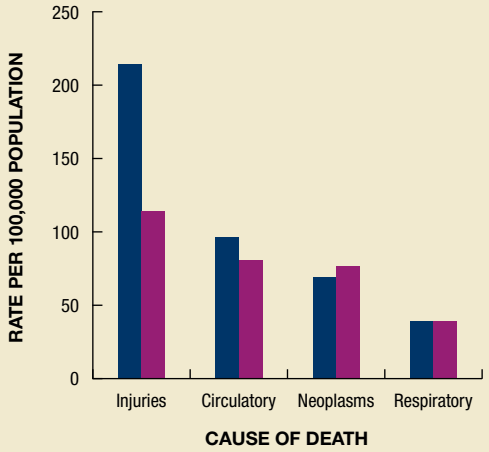
***Sources:*** *Health Canada, FNIH-Alberta Region, FNMD; Alberta Government Services, AVS, Death file*

The four leading causes of death by gender for First Nations are injuries, diseases of the circulatory system, neoplasms, and diseases of the respiratory system. First Nations males had significantly higher death rates than First Nations females for injuries (88% higher) and circulatory diseases (20% higher). Deaths from neoplasms had a higher (11%) impact on First Nations females, compared to First Nations males (Figure 1.7).

The death rates between First Nations and non-First Nations for diseases of the circulatory system and neoplasms were similar, when the First Nations and non-First Nations populations were adjusted using age and gender distribution of the 2006 Canadian Census population.

**FIGURE 1.7**

Death Rates, by Leading Causes of Death and Gender, First Nations, Alberta, 2000-2009




| | Injuries | Circulatory | Neoplasms | Respiratory |
|---|---|---|---|---|
| **Males** | 214.6 | 96.5 | 69.1 | 39.1 |
| **Females** | 114.3 | 80.5 | 76.7 | 39.2 |

***Source:*** *Health Canada, FNIH-Alberta Region, FNMD; Alberta Government Services, AVS, Death file; Indian and Northern Affairs Canada, Population file*

However, the adjusted death rates for First Nations were 3.7 times higher for injuries and 1.7 times higher for respiratory diseases than those of non-First Nations (Figure 1.8).

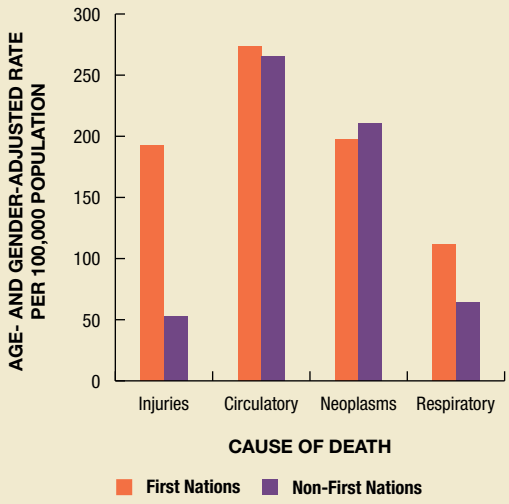
### *Injuries*

Injuries are a significant cause of preventable deaths among Canadian children and youth. They are also the leading cause of deaths among Canadians under the age of 45 years[12,13,14]. Injuries were the leading cause of deaths among Alberta First Nations and also the leading cause of premature deaths among Alberta First Nations in terms of potential years of life lost before age 75 between 1990 and 1999[15]. Between 2000 and 2009, injuries continue to be the leading cause of deaths among Alberta First Nations.

Trends in injury-related death rates among First Nations did not vary significantly from one year to another, between 2000 and 2009, when the First Nations and non-First Nations populations were adjusted using the age distribution of the 2006 Canadian Census population. First Nations consistently had higher (3.3 to 4.4 times) injury-related adjusted death rates compared to non-First Nations (Figure 1.9).

**FIGURE 1.8**

Age- and Gender-Adjusted Death Rates*, by Leading Causes of Death, First Nations and Non-First Nations, Alberta, 2000-2009

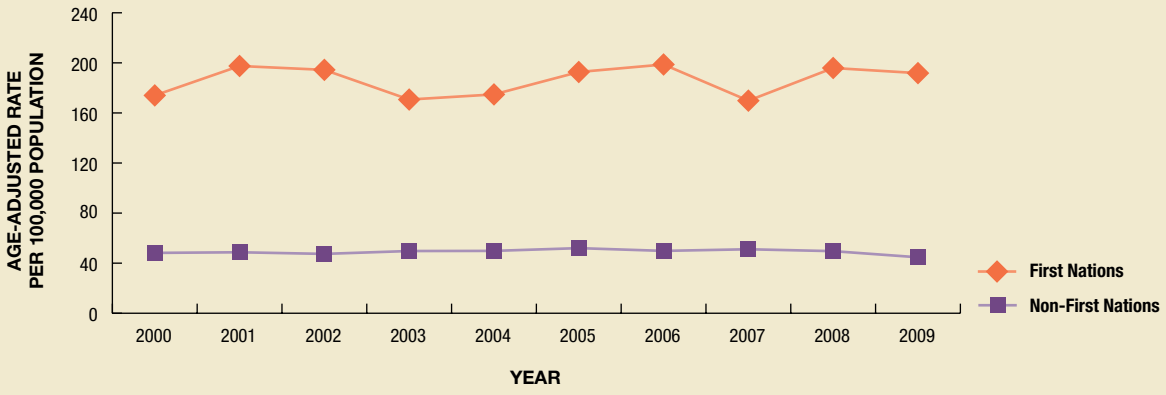



* Rates are adjusted to the 2006 Canadian population.

***Sources:*** *Health Canada, FNIH-Alberta Region, FNMD; Alberta Government Services, AVS, Death file; Indian and Northern Affairs Canada, Population file; Alberta Health & Wellness, Interactive Health Data Application*

**FIGURE 1.9**

Trends in Age-Adjusted Injury-Related Death Rates*, First Nations and Non-First Nations, Alberta, 2000-2009




* Rates are adjusted to the 2006 Canadian population.

***Source:*** *Health Canada, FNIH-Alberta Region, FNMD; Alberta Government Services, AVS, Death file; Indian and Northern Affairs Canada, Population file; Alberta Health & Wellness, Interactive Health Data Application*

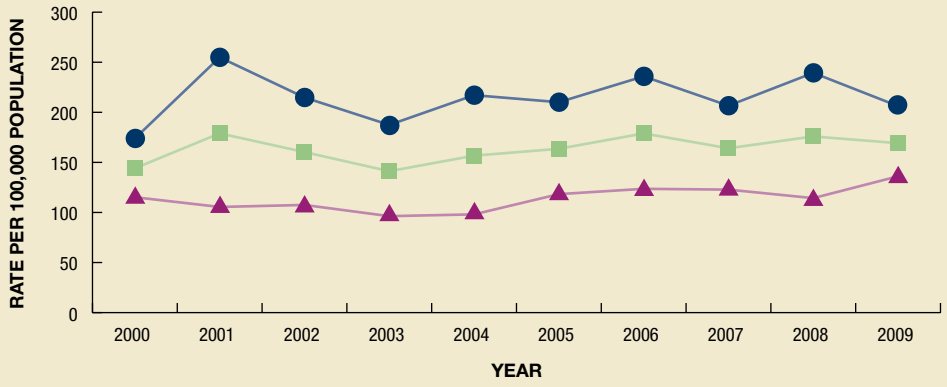
[12] Public Health Agency of Canada. 1999. *Injury Mortality.* www.phac-aspc.gc.ca/publicat/meas-haut/mu_w-eng.php (accessed February 2011).
[13] Public Health Agency of Canada. *Leading causes of death, Canada, 2005, males and females combined.* www.phac-aspc.gc.ca/publicat/lcd-pcd97/table1-eng.php (accessed February 2011).
[14] Health Canada. 1999.*Canadian Injury Data: Mortality -1997 and Hospitalization-1996-1997.* http://dsp-psd.pwgsc.gc.ca/Collection/H47-71-1999E.pdf (accessed February 2011).
[15] Health Canada. 2007. *Report to Alberta First Nations: Injury Related Mortality 1990-1999.* Edmonton: First Nations and Inuit Health-Alberta Region.

First Nations males had significantly higher injury-related death rates, compared to First Nations females. First Nations males are between 1.5 and 2.2 times more likely to die from injuries than First Nations females (Figure 1.10).

First Nations injury-related death rates were between 1.8 and 5.9 times higher across all age groups, compared to non-First Nations (Figure 1.11).

**FIGURE 1.10**

Trends in Injury-Related Death Rates, by Gender, First Nations, Alberta, 2000-2009

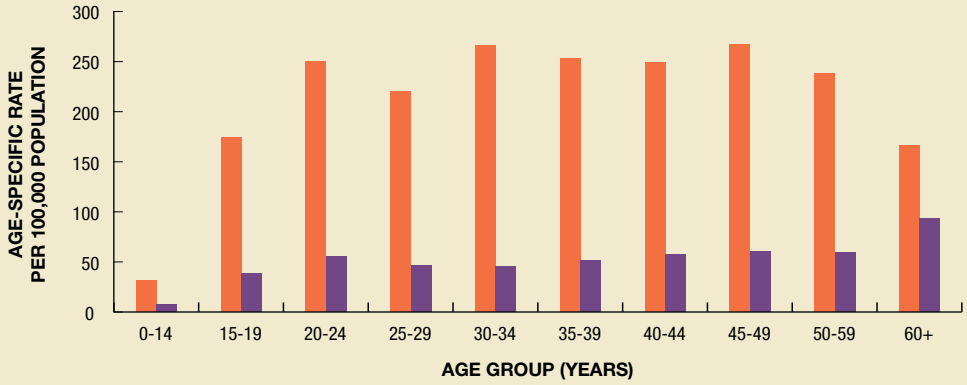



| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Males | 173.9 | 254.9 | 214.8 | 187.4 | 217.1 | 210.1 | 235.9 | 206.6 | 239.4 | 203.2 |
| Females | 115.2 | 105.5 | 107.5 | 96.3 | 98.1 | 118.3 | 123.6 | 122.8 | 114.3 | 136.1 |
| All | 144.1 | 179.0 | 160.3 | 141.2 | 156.7 | 163.6 | 178.9 | 164.1 | 175.9 | 169.2 |

***Source:*** *Health Canada, FNIH-Alberta Region, FNMD; Alberta Government Services, AVS, Death file; Indian and Northern Affairs Canada, Population file*

**FIGURE 1.11**

Age-Specific Injury-Related Death Rates, First Nations and Non-First Nations, Alberta, 2000-2009




| | 0-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-59 | 60+ |
|---|---|---|---|---|---|---|---|---|---|---|
| First Nations | 31.2 | 174.2 | 249.8 | 220.4 | 265.8 | 253.0 | 249.3 | 267.3 | 238.3 | 166.5 |
| Non-First Nations | 7.4 | 38.2 | 55.4 | 46.0 | 45.3 | 51.7 | 57.4 | 60.1 | 59.3 | 93.6 |

***Source:*** *Health Canada, FNIH-Alberta Region, FNMD; Alberta Government Services, AVS, Death file; Indian and Northern Affairs Canada, Population file; Alberta Health and Wellness, Interactive Health Data Application*

Table 1.2 summarizes the leading types of injury-related deaths by gender for the years 2000-2009. Motor vehicle crashes were the leading cause of injury-related death among First Nations males (22.6%); it ranked second among non-First Nations males (22.7%). The top leading cause of injury-related death among First Nations females was suicides (25.3%); it was the second leading cause of injury-related death among non-First Nations females (20.6%).

The proportion of suicide deaths among First Nations females was higher than that of First Nations males and non-First Nations females. The proportion of assault or homicide deaths were double in First Nations, compared to non-First Nations for both males and females, but highest in First Nations males. The percentage of events of undetermined intent[16] was higher in First Nations females compared to First Nations males and non-First Nations.

### *Diseases of the Circulatory System*

Circulatory system diseases remain the leading cause of hospitalization, disability, and death in Canada, accounting for nearly 18% of all hospitalization and more than 33% of all deaths[17,18]. They were the second leading cause of deaths among Alberta First Nations, from 1990 to 1999[15], and again from 2000 to 2009.

When the First Nations and non-First Nations populations were adjusted, using the age distribution of the 2006 Canadian Census population, the circulatory-related death rate among First Nations did not vary significantly from one year to the next (Figure 1.12) and can be considered comparable to the non-First Nations rate.

Overall, First Nations males had higher circulatory-related death rates, compared to First Nations females; these differences were significant in 2004 and 2008 (Figure 1.13).

**TABLE 1.2**

Distribution of Injury-Related Death*, by Gender, First Nations and Non-First Nations, Alberta, 2000-2009

| TYPE OF INJURY-RELATED DEATH | FIRST NATIONS | | | | | | NON-FIRST NATIONS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Males (n=1010) | | Females (n=554) | | Total (n=1,564) | | Males (n=11,023) | | Females (n=4,596) | | Total (n=15,619) | |
| | % | RANK | % | RANK | % | RANK | % | RANK | % | RANK | % | RANK |
| Suicides | 21.6 | 2 | 25.3 | 1 | 22.9 | 1 | 29.1 | 1 | 20.6 | 2 | 26.6 | 1 |
| Motor vehicle crashes | 22.6 | 1 | 22.9 | 2 | 22.7 | 2 | 22.7 | 2 | 20.9 | 1 | 22.2 | 2 |
| Events of undetermined intent** | 15.1 | 3 | 21.5 | 3 | 17.4 | 3 | 12.4 | 3 | 13.7 | 3^ | 12.8 | 3^ |
| Assaults/homicides | 11.4 | 4 | 6.7 | 4^ | 9.7 | 4 | 4.8 | 4^ | 3.4 | 4^ | 4.4 | 4^ |
| All other injuries | 29.3 | - | 23.6 | - | 27.3 | - | 31.0 | - | 41.4 | - | 34.0 | - |

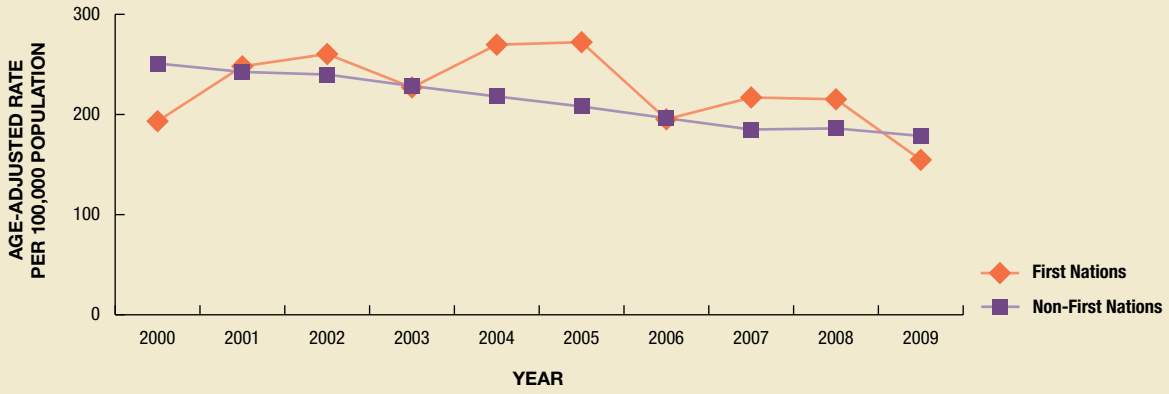
* Based on International Classification of Diseases, Version 10 (ICD-10).
** Event of undetermined intent represents a case where it is not clear whether the death was the result of intentional self-harm, an accident or an assault.
^ Based on the top four ranked types of injury-related deaths among all Alberta First Nations.

***Sources:*** *Health Canada, FNIH-Alberta Region, FNMD; Alberta Government Services, AVS, Death file*

[16] An event of undetermined intent represents a case where it is not clear whether the death was the result of intentional self-harm, an accident, or an assault.
[17] The Conference Board of Canada. 2011. Health-Mortality Due to Circulatory Diseases. www.conferenceboard.ca/hcp/details/health/mortality-circulatory-diseases.aspx (accessed, February 2011).
[18] Heart and stroke Foundation of Canada. 2003. The Growing Burden of Heart and Stroke in Canada. www.cvdinfobase.ca/cvdbook/CVD_En03.pdf (accessed February 2011).

**FIGURE 1.12**

Trends in Age-Adjusted Circulatory-Related Death Rates*, First Nations and Non-First Nations, Alberta, 2000-2009

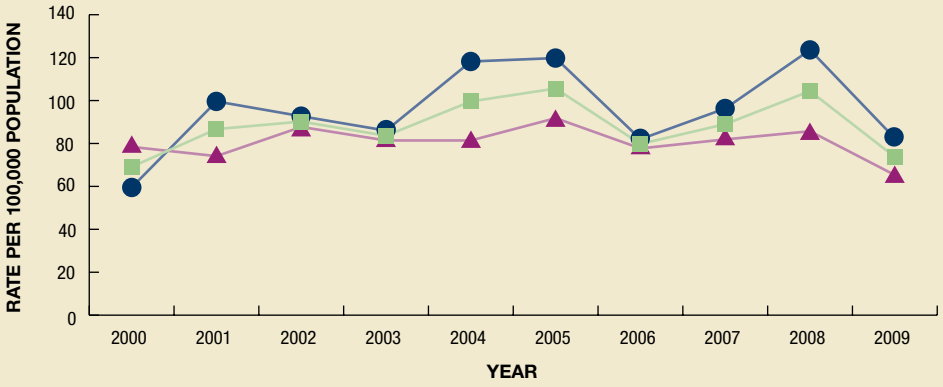



* Rates are adjusted to the 2006 Canadian population.

***Source:*** *Health Canada, FNIH-Alberta Region, FNMD; Alberta Government Services, AVS, Death file; Indian and Northern Affairs Canada, Population file; Alberta Health and Wellness, Interactive Health Data Application*

**FIGURE 1.13**

Trends in Circulatory-Related Death Rates, by Gender, First Nations, Alberta, 2000-2009

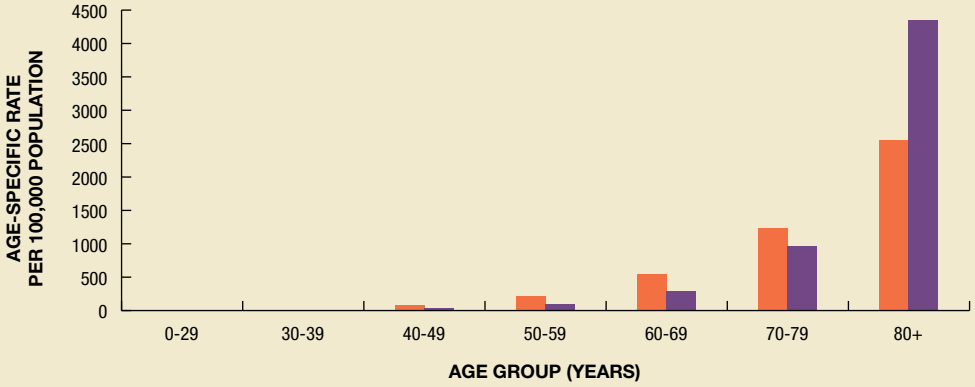



| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Males** | 59.5 | 99.6 | 92.7 | 86.0 | 118.2 | 119.8 | 82.0 | 96.3 | 123.6 | 82.4 |
| **Females** | 78.4 | 74.1 | 87.7 | 81.4 | 81.4 | 91.8 | 77.7 | 81.9 | 85.7 | 65.3 |
| **All** | 69.1 | 86.7 | 90.2 | 83.6 | 99.6 | 105.6 | 79.8 | 89.0 | 104.4 | 73.7 |

***Source:*** *Health Canada, FNIH-Alberta Region, FNMD; Alberta Government Services, AVS, Death file; Indian and Northern Affairs Canada, Population file*

**FIGURE 1.14**

Age-Specific Circulatory-Related Death Rates, First Nations and Non-First Nations, Alberta, 2000-2009




| | 0-29 | 30-39 | 40-49 | 50-59 | 60-69 | 70-79 | 80+ |
|---|---|---|---|---|---|---|---|
| First Nations | 2.4 | 13.5 | 80.3 | 222.2 | 542.4 | 1236.7 | 2548.3 |
| Non-First Nations | 2.0 | 8.6 | 33.4 | 100.7 | 299.0 | 960.6 | 4343.9 |

***Source:*** *Health Canada, FNIH-Alberta Region, FNMD; Alberta Government Services, AVS, Death file; Indian and Northern Affairs Canada, Population file; Alberta Health & Wellness, Interactive Health Data Application*

**TABLE 1.3**

Distribution of Circulatory-Related Death*, by Gender, First Nations and Non-First Nations, Alberta, 2000-2009

| TYPE OF CIRCULATORY-RELATED DEATH | FIRST NATIONS | | | | | | NON-FIRST NATIONS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Males (n=454) | | Females (n=390) | | Total (n=844) | | Males (n=32,873) | | Females (n=32,006) | | Total (n=64,879) | |
| | % | RANK | % | RANK | % | RANK | % | RANK | % | RANK | % | RANK |
| Ischaemic heart diseases | 65.9 | 1 | 52.8 | 1 | 59.8 | 1 | 63.6 | 2 | 50.1 | 1 | 56.9 | 1 |
| Cerebrovascular diseases | 14.3 | 2 | 19.5 | 2 | 16.7 | 2 | 15.9 | 1 | 22.3 | 2 | 19.0 | 2 |
| Other forms of heart disease | 12.1 | 3 | 17.9 | 3 | 14.8 | 3 | 10.7 | 3 | 14.1 | 3 | 12.4 | 3 |
| Diseases of arteries, arterioles, and capillaries | 2.6 | 4^ | 4.6 | 4 | 3.6 | 4 | 6.2 | 4 | 7.3 | 4 | 6.7 | 4 |
| All other diseases of the circulatory system | 5.1 | - | 5.1 | - | 5.1 | - | 3.6 | - | 6.3 | - | 4.9 | - |

* Based on International Classification of Diseases, Version 10 (ICD-10).
^ Based on the top four ranked types of circulatory-related deaths among all Alberta First Nations.

***Sources:*** *Health Canada, FNIH-Alberta Region, FNMD; Alberta Government Services, AVS, Death file*

First Nations circulatory-related death rates are significantly higher than non-First Nations death rates in age groups 40-49, 50-59, 60-69, and 70-79 years. However, the First Nations circulatory-related death rate was significantly lower compared to non-First Nations in the age group 80 years and older (Figure 1.14).

Table 1.3 ranks the leading types of circulatory-related deaths, including ischaemic heart diseases, cerebrovascular diseases, other forms of heart diseases, and diseases of arteries, arterioles, and capillaries. Ischaemic heart disease deaths were the leading type of circulatory-related deaths for both genders among First Nations and non-First Nations. An example of ischaemic heart disease is acute myocardial

infarction (heart attacks). The proportion of First Nations males dying from ischaemic heart diseases is 25% higher than for First Nations females, and is the only category among the top types of circulatory-related deaths where the proportion of First Nations males exceeds the First Nations females.

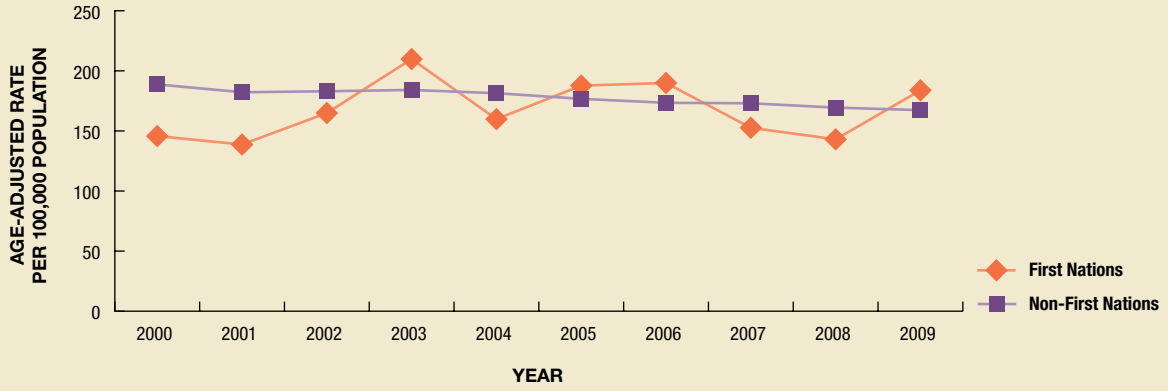
### *Neoplasms*

Neoplasms represent one of the major health problems in Canada. It is estimated that more than 33% of all Canadians will have some form of neoplasm in their lifetime, with more than half of all new malignant cases (cancers) occurring after age 65 years[19]. Cancer is the leading cause of death in Alberta, accounting for 29% of deaths in Alberta, for all ages, in 2006. Approximately one in two Albertans will develop cancer in their lifetime and one in four will die from cancer[20].

There was no significant year-to-year variability between neoplasm-related death rates among First Nations and non-First Nations when adjusted using the age distribution of the 2006 Canadian Census population (Figure 1.15).

**FIGURE 1.15**

Trends in Age-Adjusted Neoplasm-Related Death Rates*, First Nations and Non-First Nations, Alberta, 2000-2009



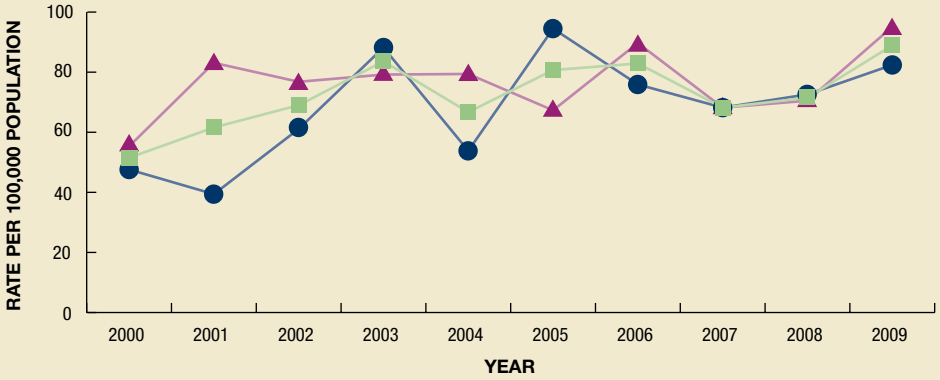

* Rates are adjusted to the 2006 Canadian population.

***Source:*** *Health Canada, FNIH-Alberta Region, FNMD; Alberta Government Services, AVS, Death file; Indian Northern Affairs Canada, Population file; Alberta Health and Wellness, Interactive Health Data Application*

[19] Public Health Agency of Canada. *Cancer Mortality Over Time: 1984-2007*. http://dsol-smed.phac-aspc.gc.ca/dsol-smed/cancer/d_time-eng.php (accessed February 2011).
[20] Alberta Health Services. 2009. *Report on Cancer Statistics in Alberta*. www.albertahealthservices.ca/poph/hi-poph-surv-cancer-cancer-in-alberta-2009.pdf (accessed February 2011).

**FIGURE 1.16**

Trends in Neoplasm-Related Death Rates, by Gender, First Nations, Alberta, 2000-2009

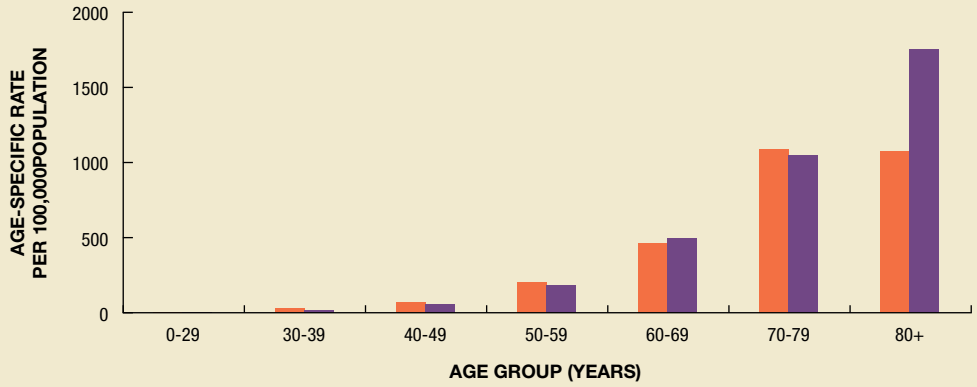



| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Males** | 47.6 | 39.4 | 61.1 | 88.2 | 53.7 | 94.5 | 75.9 | 68.2 | 72.6 | 82.4 |
| **Females** | 55.3 | 83.1 | 76.8 | 79.2 | 79.4 | 67.3 | 89.7 | 68.2 | 70.5 | 95.1 |
| **All** | 51.5 | 61.6 | 69.0 | 83.6 | 66.7 | 80.7 | 82.9 | 68.2 | 71.5 | 88.9 |

***Source:*** *Health Canada, FNIH-Alberta Region, FNMD; Alberta Government Services, AVS, Death file; Indian and Northern Affairs Canada, Population file*

**FIGURE 1.17**

Age-Specific Neoplasm-Related Death Rates, First Nations and Non-First Nations, Alberta, 2000-2009




| | 0-29 | 30-39 | 40-49 | 50-59 | 60-69 | 70-79 | 80+ |
|---|---|---|---|---|---|---|---|
| **First Nations** | 6.0 | 27.8 | 69.5 | 206.1 | 464.5 | 1085.2 | 1075.7 |
| **Non-First Nations** | 3.6 | 15.0 | 54.7 | 180.1 | 497.7 | 1046.0 | 1756.2 |

***Source:*** *Health Canada, FNIH-Alberta Region, FNMD; Alberta Government Services, AVS, Death file; Indian and Northern Affairs Canada, Population file; Alberta Health and Wellness, Interactive Health Data Application*

There was no significant year-to-year variability of neoplasm-related death rates between First Nations males and females (Figure 1.16). The overall ten-year trend of the neoplasm-related death rates among all First Nations, First Nations males, and First Nations females suggests an upward trend.

First Nations had a significantly higher neoplasm-related death rate than non-First Nations in the 30-39 year age group and a significantly lower death rate than non-First Nations in the 80 years and older age group (Figure 1.17).

The five leading causes of neoplasm-related deaths among all First Nations were lung cancer (19.5%), colon cancer (9.2%), breast cancer (8.8%), stomach cancer (5.3%), and prostate cancer (5.0%). Among First Nations males and females, lung cancer was the top cancer (Table 1.4). Although the proportion of First Nations females dying from lung cancer is lower than the proportions among non-First Nations females and non-First Nations in general, it was 29% higher than that of First Nations males. The proportion of colon cancer deaths among First Nations males was 48% (or more) higher than among First Nations females and both genders of non-First Nations.

**TABLE 1.4**

Distribution of Neoplasm-Related Death*, by Gender, First Nations and Non-First Nations, Alberta, 2000-2009

| TYPE OF NEOPLASM-RELATED DEATH | FIRST NATIONS | | | | | | NON-FIRST NATIONS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Males (n=325) | | Females (n=372) | | Total (n=697) | | Males (n=28,172) | | Females (n=25,024) | | Total (n=53,196) | |
| | % | RANK | % | RANK | % | RANK | % | RANK | % | RANK | % | RANK |
| Lung cancer | 16.9 | 1 | 21.8 | 1 | 19.5 | 1 | 24.8 | 1 | 22.6 | 1 | 23.8 | 1 |
| Colon cancer | 11.1 | 2 | 7.5 | 3 | 9.2 | 2 | 7.5 | 3 | 7.0 | 3 | 7.2 | 3 |
| Breast cancer | 0.6 | 5^ | 15.9 | 2 | 8.8 | 3 | 0.1 | 5^ | 15.4 | 2 | 7.3 | 2 |
| Stomach cancer | 5.8 | 4 | 4.8 | 4^ | 5.3 | 4 | 3.0 | 4^ | 2.2 | 4^ | 2.6 | 5^ |
| Prostate cancer | 10.8 | 3 | - | - | 5.0 | 5 | 12.2 | 2 | - | - | 6.5 | 4 |
| All other neoplasms cancer | 54.8 | - | 23.6 | - | 52.2 | - | 52.4 | - | 52.8 | - | 52.6 | - |

* Based on International Classification of Diseases, Version 10 (ICD-10).
^ Based on the top five ranked types of neoplasm-related deaths among all Alberta First Nations.

***Sources:*** *Health Canada, FNIH-Alberta Region, FNMD; Alberta Government Services, AVS, Death file*

# **Communicable Disease Control** in Alberta First Nations Communities

OVERVIEW

# Communicable Disease Control

Communicable Disease Control (CDC) activities are part of an overall regional public health program aimed at protecting and promoting health through the prevention and control of communicable diseases. CDC is a mandatory program and functions within the context of the *Alberta Public Health Act*.

The goal of CDC, within Health Canada's Alberta Region First Nations and Inuit Health (FNIH), is that all First Nations community residents, regardless of where they live, will receive appropriate and comparable service. Community-based staff members provide CDC program activities for residents living in First Nations communities. As many other services (e.g. acute care, laboratory, medical) occur off-reserve, liaison is made with neighbouring communities, regional health authorities (now known as Alberta Health Services), and Alberta Health and Wellness to ensure that the activities of CDC are undertaken in a timely and effective manner.

Ongoing monitoring and surveillance is coordinated at the regional level, and includes:

- establishing standards and goals;
- assessing immunization coverage rates;
- tracking disease incidence, ensuring appropriate follow-up is completed; and
- analyzing trends and evaluating interventions.

This year's report provides a summary of ongoing CDC Program activities in the areas of immunization, vaccine management, notifiable infectious diseases, and animal bites.

**DATA SOURCES AND LIMITATIONS:**

This section of the report is based on the analysis of the following data sources

- Health Canada, FNIH - Alberta Region: Data on immunization uptake, vaccine management, tuberculosis preschool screening, notifiable diseases, and animal bites reported to Health Canada by First Nations communities
- INAC population file: Indian and Northern Affairs Canada population data
- Interactive Health Data Application of Alberta Health and Wellness: Population Data
- Surveillance and Assessment of Alberta Health and Wellness: Data on infectious diseases
- Alberta Health Services: Data on tuberculosis incidence and treatment

Data limitations include the following

- The Alberta First Nation on-reserve population is variable over time
- Data for services provided to Alberta First Nations communities may include some non-First Nations individuals living in First Nations communities

## IMMUNIZATION

Immunization is defined as the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine[21].

Successful control of vaccine-preventable disease depends on high levels of immunization coverage. Historically, First Nations on-reserve populations have had immunization coverage rates which are on average 20% lower than those observed in the general population. First Nations have also experienced higher rates of vaccine-preventable diseases (e.g. meningococcal disease, pneumococcal disease, and pertussis) which contribute to hospitalization rates that are significantly higher for First Nations than for the general population[22]. Immunization remains the most cost-effective public health intervention to date, greatly reducing the rates of serious, sometimes fatal, diseases.

Immunization data collected by Health Canada Alberta Region First Nations and Inuit Health include:

- immunization coverage rates, defined as the percentage of individuals within a specific age group immunized as recommended;
- immunization uptake rates, defined as the percentage of individuals within a specific age group that have started the recommended vaccines; and
- immunization target rates for each vaccine. Meeting or exceeding a target provides the greatest level of individual and community protection against disease.

The number of recommended vaccine doses depends on the particular vaccine, the child's immunization history, and age. At each visit, a community health nurse determines what immunizations need to be administered based on the *Alberta Routine Immunization Schedule* (see Appendix 2). When a child has completed the appropriate number of doses for any particular vaccine, it is considered a "series complete" (SC). This process is especially important when children are not immunized according to the recommended schedule.

We would like to commend community-based staff members for their work: the immunization coverage rates were minimally impacted in 2009, despite the increased workload relating to the pandemic influenza response.

### Reporting Immunization Coverage

Alberta First Nations communities support health surveillance activities by reporting immunization data to Health Canada Alberta Region First Nations and Inuit Health every year. This annual reporting is very important in developing strategic processes to maximize the effectiveness of the immunization program in the community.

The data submitted by community nurses include:

- numbers of persons eligible for immunization in particular age groups;
- numbers of complete and incomplete immunization series administered to eligible persons; and
- information on history of disease (e.g. chickenpox vaccine is not needed if the person has had the disease).

In order to provide accurate statistics in reports to communities, it is important that the data collection process be as comprehensive as possible.

In 2009, preschool immunization reports were submitted for all communities in the Treaty 6 and 7 areas (Figure 2.1). All Treaty 8 communities, except two, submitted preschool immunization reports; these two communities were limited in nursing capacity, due to staffing issues.

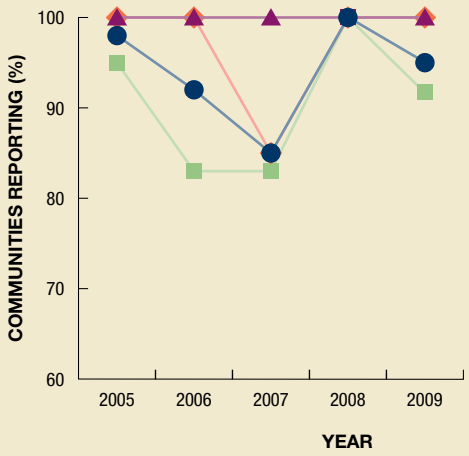
Immunization rates for those vaccines administered in schools, in Grades 5 and 9 (shown in Figure 2.2), are collected separately at the end of each school year. All Alberta First Nations communities with schools submitted school-age immunization data for 2009.

We would like to recognize all communities for their continued and commendable efforts in supporting the collection of this important health surveillance data.

[21] World Health Organization. 2011. *Immunization.* www.who.int/topics/immunization/en/ (accessed January 2011).
[22] Health Canada. 2007. *First Nations and Inuit Health - Strategies and Initiatives.* www.hc-sc.gc.ca/ahc-asc/activit/strateg/fnih-spni-eng.php (accessed January 2011).

**FIGURE 2.1**

Proportion of Alberta First Nations Communities Reporting Preschool Immunization Rates, by Treaty Area and Region, 2005-2009

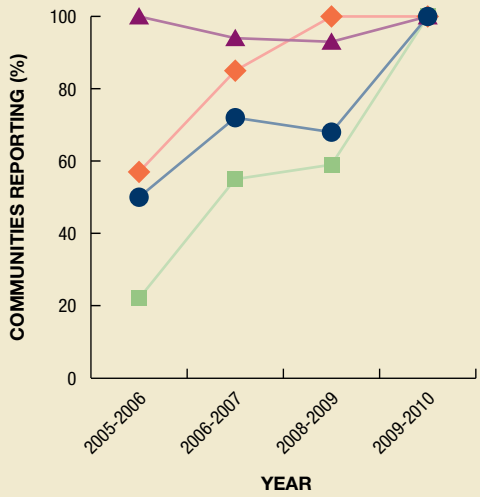



| | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|
| Alberta Region | 98 | 92 | 85 | 100 | 95 |
| Treaty 6 | 100 | 100 | 100 | 100 | 100 |
| Treaty 7 | 100 | 100 | 85 | 100 | 100 |
| Treaty 8 | 95 | 83 | 83 | 100 | 91 |

***Source:*** *Health Canada FNIH-Alberta Region*

**FIGURE 2.2**

Proportion of Alberta First Nations Communities Reporting School-Age Immunization Rates, by Treaty Area and Region, 2005-2006 to 2009-2010 School Years*




| | 2005-2006 | 2006-2007 | 2008-2009 | 2009-2010 |
|---|---|---|---|---|
| Alberta | 50 | 72 | 68 | 100 |
| Treaty 6 | 100 | 94 | 93 | 100 |
| Treaty 7 | 57 | 85 | 100 | 100 |
| Treaty 8 | 22 | 55 | 59 | 100 |

* Data were unavailable for the 2007-2008 school year.

***Source:*** *Health Canada FNIH-Alberta Region*

## Routine Immunizations

This section of the report contains immunization coverage and uptake rates for vaccine-preventable diseases. It presents immunization information from preschool children to Grade 9 students, as well as individuals over the age of 65. Appendix 3 provides an overview of diseases for which routine vaccines[23] are currently available to Alberta First Nations.

### *Preschool Immunizations*

A series of vaccines is recommended throughout the childhood years, with the majority administered during the first two years of life. Table 2.1 summarizes the immunization series that are recommended to be completed by two years of age. The vaccines for diphtheria, tetanus, pertussis, and polio (DTaP-IPV) and *Haemophilus influenzae* type b (Hib) are administered together in a series of four doses (at two, four, six, and 18 months of age).

[23] Public Health Agency of Canada. 2008. *Vaccine-Preventable Diseases*. www.phac-aspc.gc.ca/im/vpd-mev/index-eng.php (accessed January2011).

**TABLE 2.1**

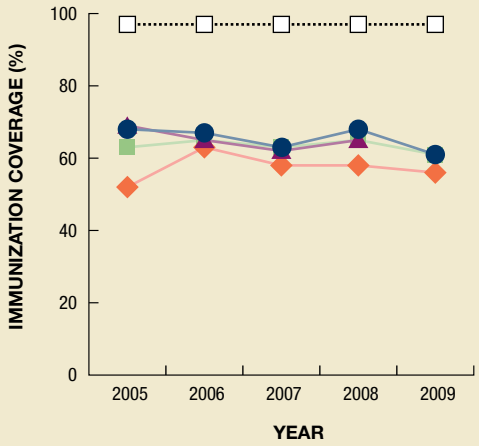
Routine Immunizations Recommended for Children During the First and Second Years*, Alberta, 2009

| IMMUNIZATION YEAR | RECOMMENDED AGE | VACCINES |
|---|---|---|
| FIRST YEAR | 2 months | DTaP-IPV-Hib** |
| | | PCV7 (pneumococcal conjugate) |
| | | MenC (meningococcal conjugate) |
| | 4 months | DTaP-IPV-Hib** |
| | | PCV7 (pneumococcal conjugate) |
| | | MenC (meningococcal conjugate) |
| | 6 months | DTaP-IPV-Hib** |
| | | PCV7 (pneumococcal conjugate) |
| SECOND YEAR | 12 months | MMR (measles, mumps, rubella) |
| | | VZV (varicella/ chickenpox) |
| | | MenC (meningococcal conjugate) |
| | 18 months | DTaP-IPV-Hib** |
| | | PCV7 (pneumococcal conjugate) |

* Complete immunization schedule available in Appendix 2.
** Diphtheria, tetanus, acellular pertussis, polio, *Haemophilus influenzae* type b

**FIGURE 2.3**

Proportion of One-Year-Old Children in Alberta First Nations Communities with Complete Immunization for #3 DTaP-IPV, #3 Hib, SC MenC, and SC PCV7, 2005-2009




| | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|
| #3 DTap-IPV | 68% | 67% | 63% | 68% | 61% |
| #3 Hib | 69% | 65% | 62% | 65% | * |
| #2 MenC | 63% | 65% | 63% | 65% | 61% |
| #3 PCV7 | 52% | 63% | 58% | 58% | 56% |
| Target | 97% | 97% | 97% | 97% | 97% |

n = 1677 children in 2009
* In 2009 the Hib and DTaP-IPV coverage rates were combined.

***Source:*** *Health Canada FNIH-Alberta Region*

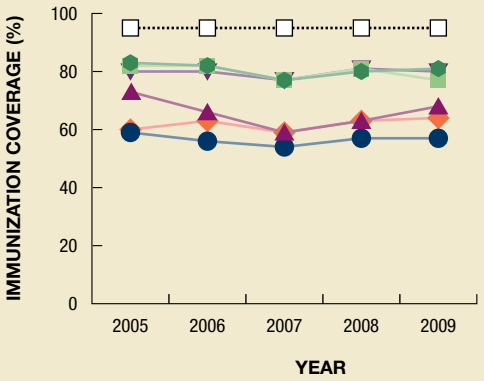
Figures 2.3 and 2.4 show the percentage of First Nations children who received the complete series of recommended immunizations by one and two years of age, respectively. In order to achieve optimal protective effects of these vaccines, at least 97% of the age group population (i.e. target line on the charts) should have completed the recommended immunizations. The proportion of children receiving the complete series of immunizations has been relatively stable in recent years, but remains well below the recommended target of 97% immunization coverage.

While the coverage rates for the various vaccines each year is similar among the one-year old children (e.g. Figure 2.3: coverage rate for each vaccine in 2009 was around 60%), there is considerable variation among the rates for two-year-old children (Figure 2.4). This variation is likely, in part, due to the number of vaccine doses required for the best protection; the coverage rates for the vaccines that require only one dose prior to two years of age (MMR, VZV) are higher than other vaccines requiring more doses (i.e. DTaP-IPV requires four doses for optimal protection).

The schedule (Appendix 2) is designed to provide the best protection for children at the ages they are most vulnerable to diseases. However, many children do not receive their immunizations according to the recommended vaccine schedule.

**FIGURE 2.4**

Proportion of Two-Year-Old Children in Alberta First Nations Communities with Complete Immunization for #4 DTaP-IPV, SC Hib, SC MenC, SC PCV7, MMR, and VZV, 2005-2009




| | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|
| #4 DTaP-IPV | 59% | 56% | 54% | 57% | 57% |
| SC Hib | 73% | 66% | 59% | 63% | 68% |
| SC MenC | 82% | 82% | 77% | 81% | 77% |
| SC PCV7 | 60% | 63% | 59% | 63% | 64% |
| MMR | 83% | 82% | 77% | 80% | 81% |
| VZV | 80% | 80% | 77% | 81% | 80% |
| Target | 97% | 97% | 97% | 97% | 97% |

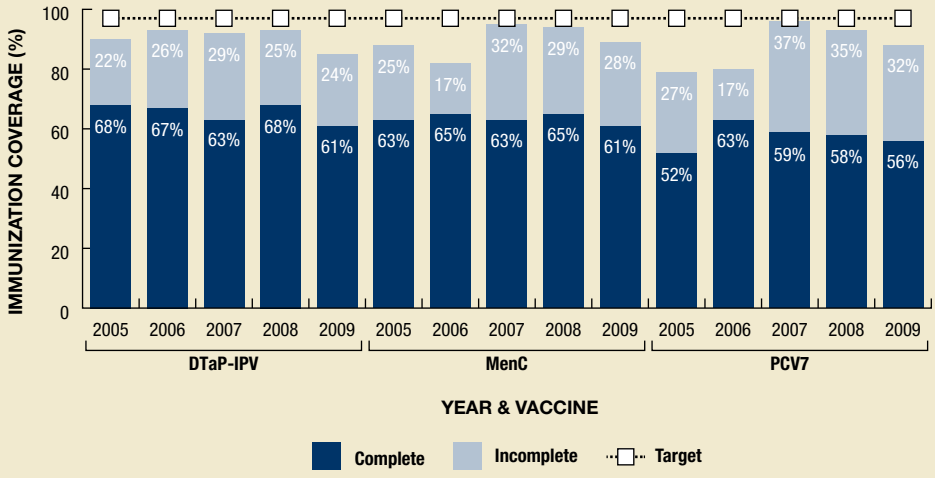
n = 1683 children in 2009

***Source:*** *Health Canada FNIH-Alberta Region*

Collection of data, for partial or incomplete immunizations, began in 2005 and indicates the uptake of vaccine within the population. These additional data, shown for one-year-old children in Figure 2.5, indicate that a large proportion of children have some protection against most vaccine-preventable diseases. If children were to complete their immunization schedules in the recommended time period, the coverage would be much closer to, or meeting, the target levels. Although incomplete immunization may impart some protection against disease, improvement in the timeliness of immunization is recommended in order to achieve the optimal benefits of the immunization program. In September 2007, series complete for meningococcal vaccine changed from three doses, required for those less than 12 months of age, to two doses. This may have impacted the interpretation of what is considered a series complete for this vaccine.

**FIGURE 2.5**

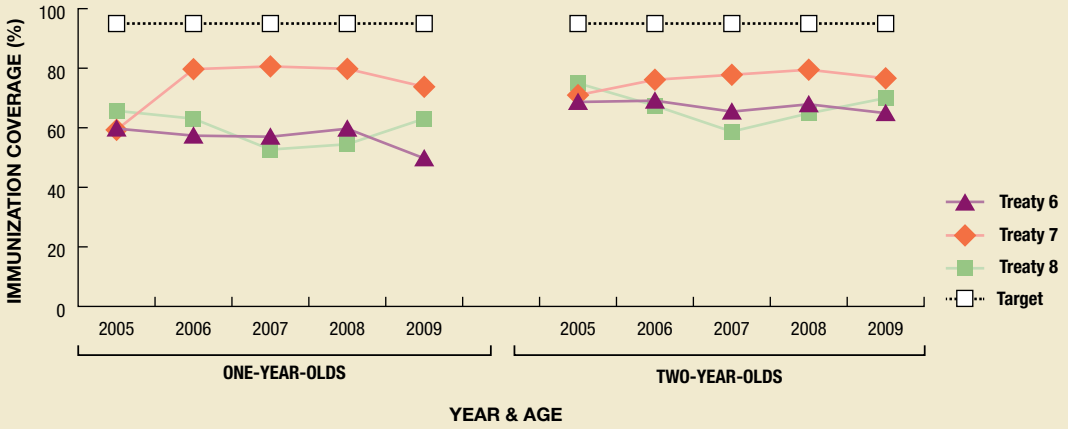
Proportion of One-Year-Old Children in Alberta First Nations Communities with Complete and Incomplete Routine Immunization Uptake, 2005-2009




***Source:*** *Health Canada FNIH-Alberta Region*

**FIGURE 2.6**

Average Immunization Coverage for One- and Two-Year-Old Children in Alberta First Nations Communities with Complete Routine Immunization*, by Treaty Area, 2005-2009




* excluding varicella/chickenpox vaccine (VZV)

***Source:*** *Health Canada FNIH-Alberta Region*

Since 2006, immunization coverage rates for both one- and two-year-old children have been in the 70-80% range in the Treaty 7 communities (Figure 2.6). In Treaty 6 and Treaty 8, the coverage rates for two-year-old children appear to be slightly higher than those for one-year-old children.

Factors which are known to impact immunization coverage rates include community health nurse shortages and individuals accessing services off–reserve, making their data unavailable.

### *Immunizations for School-Age Children*

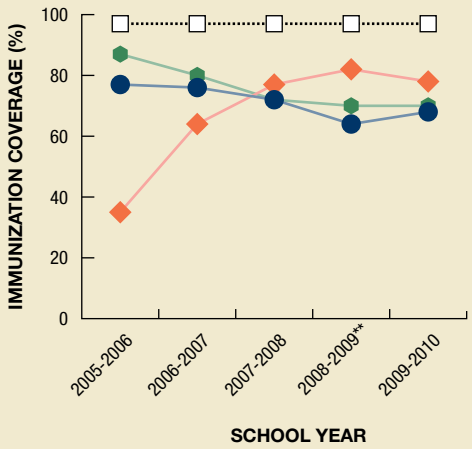
Some vaccines require boosters (additional doses) to maintain protection against a specific disease. The *Alberta Routine Immunization Schedule* (see Appendix 2) outlines the vaccines that are provided in the school setting. School-age data are collected in June to reflect immunizations administered throughout the school year. Some Alberta First Nations communities do not have schools and several only have elementary schools on-reserve. Many First Nations children attend schools off-reserve and immunization data for those children are not captured in this report, but are included in the Alberta Health Services (AHS) vaccine databases.

The immunization and/or disease histories of six-year-old children are assessed by a community health nurse and DTaP-IPV, MMR, or VZV immunizations are provided as required. In addition, their PCV7 histories are evaluated as a final measure of coverage for the preschool pneumococcal program. This vaccine is not administered routinely after 60 months or five years of age. As illustrated in Figure 2.7, immunization coverage rates for the last DTaP-IPV dose (5th dose, or 4th if administered after age four) and #2 MMR have declined slightly in recent years, although there has been a moderate increase in the PCV7 coverage. (Note: In the 2008-2009 school year, reporting for immunization coverage changed from Grade 1 students on-reserve to the six-year-old population.)

**Grades 5 and 9** immunization coverage rates are shown in Figures 2.8 and 2.9. A three-dose hepatitis B vaccine (HBV) series is administered to children in Grade 5. At the same time, students are assessed for chickenpox immunity (either a history of chickenpox disease or immunization) and all students who are not immune are offered the varicella vaccine. For Grade 5 students, coverage rates for chickenpox have been relatively stable over the past five years. In 2009-2010, there was a considerable increase in HBV coverage.

**FIGURE 2.7**

Proportion of Six-Year-Old Children in Alberta First Nations Communities with Complete Immunization for DTaP-IPV, #2 MMR, and PCV7, 2005-2006 to 2009-2010 School Years




| | 2005-2006 | 2006-2007 | 2007-2008 | 2008-2009** | 2009-2010 |
|---|---|---|---|---|---|
| DTap-IPV | 77% | 76% | 72% | 64% | 68% |
| #2 MMR | 87% | 80% | 72% | 70% | 70% |
| PCV7 | 35% | 64% | 77% | 82% | 78% |
| Target | 97% | 97% | 97% | 97% | 97% |

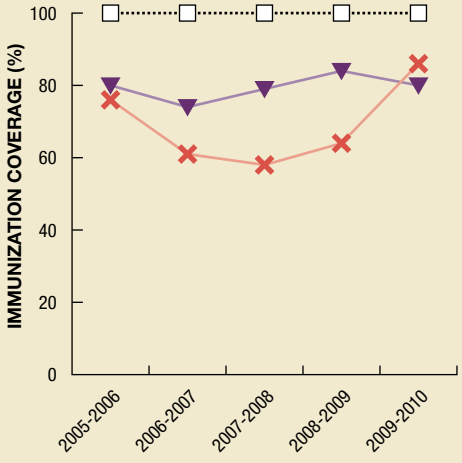
* #5 DTaP-IPV, or #4 if fourth dose was not previously administered

** In 2008-2009, the denominator changed from Grade 1 students on-reserve to the six-year-old population.

***Source:*** *Health Canada FNIH-Alberta Region*

**FIGURE 2.8**

Proportion of Grades 5 Students in Alberta First Nations Communities with Complete Immunization for HBV and VZV, 2005-2006 to 2009-2010 School Years

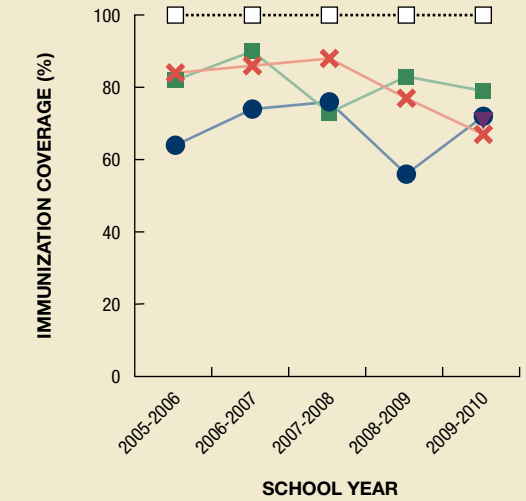



| | 2005-2006 | 2006-2007 | 2007-2008 | 2008-2009 | 2009-2010 |
|---|---|---|---|---|---|
| HBV | 76% | 61% | 58% | 64% | 86% |
| VZV | 80% | 74% | 79% | 84% | 80% |
| Target | 100% | 100% | 100% | 100% | 100% |

***Source:*** *Health Canada FNIH-Alberta Region*

**FIGURE 2.9**

Proportion of Grade 9 Students in Alberta First Nations Communities with Complete Immunization for HBV, #2 MMR, dTap, and VZV, 2005-2006 to 2009-2010 School Years




| | 2005-2006 | 2006-2007 | 2007-2008 | 2008-2009 | 2009-2010 |
|---|---|---|---|---|---|
| HBV | 84% | 86% | 88% | 77% | 67% |
| #2 MMR | 82% | 90% | 73% | 83% | 79% |
| dTap* | 64% | 74% | 76% | 56% | 72% |
| VZV** | | | | | 71% |
| Target | 100% | 100% | 100% | 100% | 100% |

* 97% is the target for dTap for all years.
** VZV data for Grade 9 students collected only for 2009-2010 school year.

***Source:*** *Health Canada FNIH-Alberta Region*

A booster of tetanus-containing vaccine (dTap) is offered in Grade 9 to eligible students. At the same time, students' immunization histories are assessed for HBV and MMR. All students who are not up-to-date are offered the appropriate vaccines (Figure 2.9). The 2009-2010 school year was the first in which data was available for the VZV coverage among this age group. Immunization coverage for HBV, dTap, and VZV was around 70% in 2009, and slightly higher (approximately 79%) for the MMR vaccine. With the exception of a decrease in the coverage for the HBV vaccine among the Grade 9 students over the previous three years, there are no consistent trends in these coverage rates.

The HPV vaccine is a new vaccine and was offered to Grade 5 girls, beginning in the 2008-2009 school year, and Grade 9 girls, in the 2009-2010 school year. This three-dose vaccine protects against genital cancers, especially cervical cancer – a leading cancer among First Nations women[24]. During the 2009-2010 school year, 43% of Grade 5 and 9 girls in First Nations community schools received all three doses of HPV vaccine and an additional 47% received one or two doses.

Overall, immunization coverage is below the protective target for school-age children. As noted above, there may be some underreporting of immunization coverage for school-age children if vaccines were received at immunization clinics off-reserve, as this information may not be captured by the community health nurses. Further efforts may be needed to improve the uptake of school-based immunization programs and to explore the possibility of accessing off-reserve immunization services information, to mitigate the potential underestimation of this coverage. As electronic records become accessible in the future, in a partnership with provincial public health authorities, a more complete and accurate picture will emerge about the immunization coverage in all age groups.

[24] Marrett LD, Chaudhry M. 2003. *Cancer incidence and mortality in Ontario First Nations, 1968-1991 (Canada).* Cancer Causes Control; 14(2):259-268.

### *Influenza and Pneumococcal Vaccines*

The viruses that cause seasonal influenza change; this results in the need to develop a new vaccine each year. Immunization against influenza must therefore be administered annually in order to provide optimal protection. The seasonal "flu shot" campaigns begin each year in mid-October with the bulk of the activity completed by mid-November.

Those at high risk for influenza-related complications and their contacts include:

- people 65 years and older;
- persons living in group settings, such as long-term care or assisted living environments;
- health care workers who work in group settings (e.g. long-term care);
- persons with certain chronic conditions (e.g. heart or respiratory conditions);
- pregnant women; and
- children six to 23 months old[25].

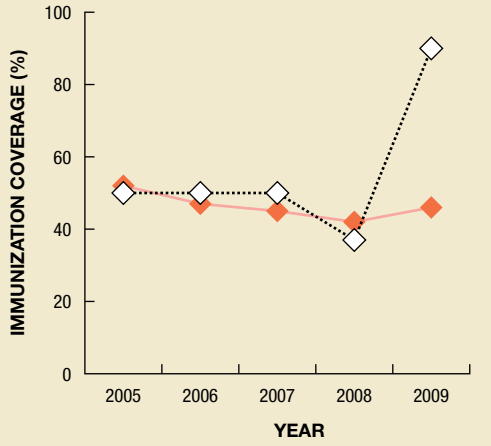
Since September 2009, Alberta has been offering government-funded seasonal influenza vaccine to all Albertans six months of age and older.

As pneumonia is one complication that may result following influenza, a vaccine that protects against 23 types of pneumococcal bacteria (PPV23) is offered to eligible individuals.

Influenza and PPV23 immunization coverage rates for the 65-years-and-older age group have been relatively stable up to 2008. However, while uptake of the PPV23 immunization remained stable, there was a marked increase in uptake of the seasonal influenza vaccine in 2009 (Figure 2.10). These findings should be interpreted with caution as an influenza pandemic was declared in 2009, resulting in increased uptake of both seasonal and pandemic influenza vaccines. Individuals who received the vaccines in the communities also included a number of non-residents.

**FIGURE 2.10**

Proportion of Individuals 65 Years and Older in Alberta First Nations Communities Immunized for Seasonal Influenza and Pneumococcal Disease, 2005-2009



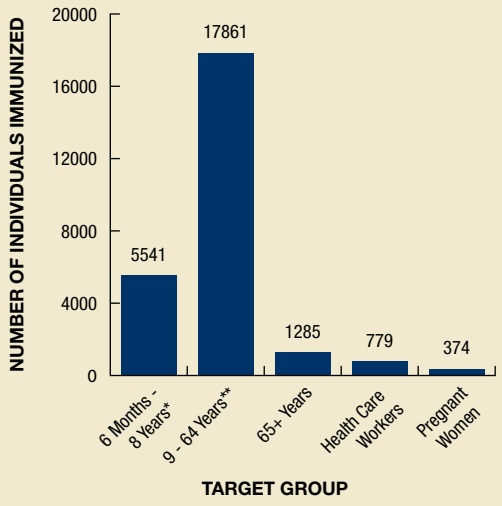

| | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|
| Seasonal Influenza | 50% | 50% | 50% | 37% | 90% |
| PPV23 | 52% | 47% | 45% | 42% | 46% |

***Source:*** *Health Canada FNIH-Alberta Region*

[25] Alberta Health and Wellness. 2009. *Influenza Vaccine.* www.health.alberta.ca/health-info/imm-influenza.html (accessed October 2009).

**FIGURE 2.11**

Distribution of Individuals in Alberta First Nations Communities Who Received the Seasonal Influenza Immunization, by Target Group, 2009

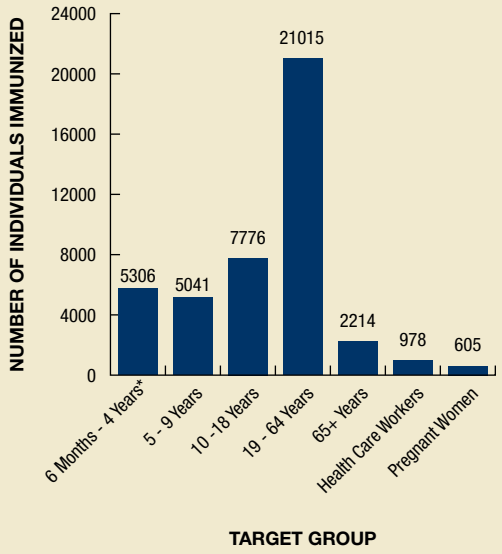



* In the six month to eight year target group, 615 at-risk individuals were immunized.
** In the nine to 64 year target group, 3,233 at-risk individuals were immunized.

***Source:*** *Health Canada FNIH-Alberta Region*

**FIGURE 2.12**

Distribution of Individuals in Alberta First Nations Communities Who Received the Pandemic Influenza (H1N1) Immunization, by Target Group, 2009




* In the six month to four year age group, 1,456 at-risk individuals were immunized.

***Source:*** *Health Canada FNIH-Alberta Region*

Data reported in 2009 for the seasonal influenza and pandemic influenza (H1N1) immunization coverage among the various target groups in First Nations communities are shown in Figures 2.11 and 2.12. The overall regional on-reserve pandemic influenza vaccine uptake was 66%. It should be noted that the total number of persons eligible for immunization may be underreported for the high-risk groups, in particular those with chronic diseases.

## VACCINE MANAGEMENT

Vaccine management refers to the process of vaccine distribution, from the time that vaccines are ordered until they are administered. One measure used to evaluate the effectiveness of the vaccine management process is vaccine wastage. There is no national standard for vaccine-wastage levels in Canada as there are many variables that must be considered, including vaccine type, the local environment, and external circumstances. Procedures and equipment are in place to minimize wastage of vaccine products in the Alberta Region.

The relationship between wasted vaccine and immunization coverage is key to assessing what level of wastage is reasonable, both should be analyzed over a period of time. In order to monitor vaccine utilization, each Alberta First Nations community submits a monthly report of vaccine discarded for any reason. The reasons for vaccine wastage include:

- expired or defective products;
- dosage variance;
- cold chain break (CCB) incidences; and
- vaccine discarded for a reason determined by the nurse.

A CCB occurs when vaccines are exposed to temperatures outside of the recommended range of 2°C to 8°C. Each break is assessed to determine if the vaccine can still be used or if it must be discarded. Fewer CCB incidents were reported in 2009, compared to previous years, and the cost of discarded vaccine declined considerably (Table 2.2). The total percentage of vaccine wasted remained very low – at 0.4%.

**TABLE 2.2**

Vaccine Cold Chain Break Information for Alberta First Nations Communities, 2003-2009

| Vaccine Cold Chain Break Information | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|
| Total Value of Vaccines Distributed | $1,028,277 | $1,019,100 | $937,638 | $918,661 | $834,174 | $896,151 | $905,199 |
| Number of Cold Chain Breaks | 35 (25 communities) | 51 (26 communities) | 56 (29 communities) | 65 (25 communities) | 43 (20 communities) | 59 (28 communities) | 46 (24 communities) |
| Value of Vaccines Exposed But Not Wasted | $154,260 | $174,489 | $157,844 | $149,896 | $166,725 | $161,181 | $122,231 |
| Value of Vaccines Discarded | $48,909 | $62,954 | $34,624 | $30,904 | $7,755 | $11,366 | $3,655 |
| Percent of Distributed Vaccines Wasted | 4.7% | 6.1% | 3.7% | 3.4% | 0.9% | 1.3% | 0.4% |

***Source:*** *Health Canada FNIH-Alberta Region*

Table 2.3 breaks down the Region's cold chain break incidents by cause. In 2009, power outages and human error accounted for the majority of cold chain breaks incidents (54% and 17%, respectively).

Although wastage has decreased considerably since 2003, ongoing monitoring of vaccine wastage is still important to ensure that vaccine products are appropriately managed and that the cost-effectiveness of immunization programs is maintained.

**TABLE 2.3**

Number of Vaccine Cold Chain Breaks in Alberta First Nations Communities, by Cause, 2003-2009

| Cause of CCB | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|
| Power Outage | 22 | 38 | 36 | 48 | 28 | 33 | 25 |
| Human Error | 3 | 11 | 11 | 4 | 4 | 15 | 8 |
| Electricity Discontinued | 3 | 2 | 3 | 2 | 1 | 1 | 2 |
| Equipment Malfunction | 2 | 0 | 0 | 4 | 3 | 1 | 1 |
| Other | 5 | 0 | 5 | 7 | 7 | 9 | 10 |

***Source:*** *Health Canada FNIH-Alberta Region*

## NOTIFIABLE INFECTIOUS DISEASES

The *Alberta Public Health Act* identifies specific communicable diseases that are required to be reported to the Chief Medical Officer of Health for the province at Alberta Health and Wellness. Alberta First Nations community-based staff members ensure appropriate follow-up is carried out to prevent further spread of disease. These diseases are monitored to understand their occurrence in Alberta First Nations communities and the Alberta Region, and to assess the impact and/or effectiveness of control strategies.

### Sexually Transmitted Infections and Bloodborne Pathogens

The Bloodborne Pathogens and Sexually Transmitted Infections (BBP/STI) Prevention Program is part of the mandatory CDC Program. Additional funds are available for communities to support on-reserve community-based initiatives to control and prevent the spread of sexually transmitted infections and bloodborne pathogens.

#### *Sexually Transmitted Infections*

Sexually transmitted infections are the most frequently occurring notifiable diseases in Alberta, accounting for almost two-thirds of all reported infectious diseases in the Province. These infections are outlined in Appendix 4. Most of these infections (chlamydia, gonorrhea, and syphilis) are preventable and curable. If untreated, these infections can result in serious complications, including fatal disease in the unborn and newborn babies. Co-infection of STIs is common and some STIs act as a gateway for the human immunodeficiency virus (HIV), further highlighting the importance of prevention and treatment.

The BBP/STI Prevention Program, of Health Canada's CDC Unit in Alberta, works toward reducing the infection rates for these infections alongside community health teams, Alberta Health Services (AHS), and Alberta Health and Wellness. Each year, Alberta First Nations communities have the opportunity to develop a BBP/STI prevention work plan specific to their community needs. Case management and partner notification are the responsibility of AHS. The community health centre staffs support AHS by assisting in specific situations with the follow-up of cases and with partner notification, as needed.

Sexually transmitted infections are reported through STI Services at Alberta Health Services. This is the fourth year that on-reserve case numbers are available. However, these figures may underestimate the actual number of on-reserve cases for a variety of reasons, including:

- missing information regarding residency (on- or off-reserve) on STI reporting form;
- lack of testing among the Alberta First Nations population;
- transiency, or high mobility of the Alberta First Nations population moving from on- to off-reserve or vice versa; and
- some Alberta First Nations people have an on-reserve home address and live off-reserve or vice versa.

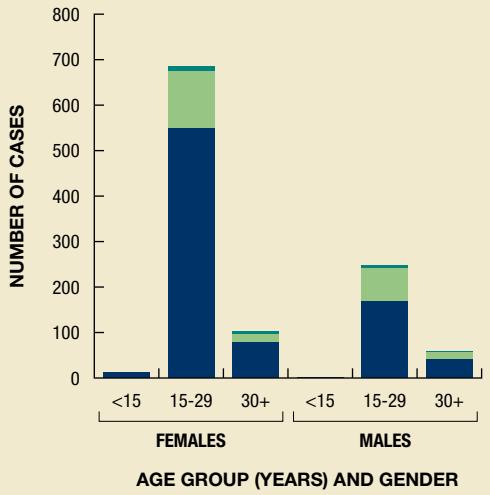
#### *Incidence of Sexually Transmitted Infections*

There were a total 1,108 cases of chlamydia, gonorrhea, and syphilis reported among First Nations living on-reserve, in 2009. Similar to 2008 data, and consistent with overall trends in Canada, the largest number of these cases were chlamydia (77%), followed by gonorrhea (21%), with very few cases of syphilis (<3%). The age at diagnosis ranged from four to 69 years. Figure 2.13 shows the age and gender distribution of persons diagnosed with these diseases. The majority of total cases was among females aged 15-29 years. On First Nations reserves, the majority (72%) of STI cases is among females and this pattern is consistent among all age groups.

The rates of chlamydia, gonorrhea, and syphilis are higher among First Nations living on-reserve, compared to the general population in Alberta (Table 2.4). The rates of chlamydia have increased in both the Alberta First Nations communities and the Alberta general population from 2007 to 2009. Syphilis rates in First Nations communities in 2009 increased approximately three times the 2007 rate, while the rates for the Alberta general population remained stable.

**FIGURE 2.13**

Distribution of New Cases of Chlamydia, Gonorrhea, and Syphilis in Alberta First Nations Communities, by Age and Gender, 2009




| | FEMALES | | | MALES | | |
|---|---|---|---|---|---|---|
| | <15 | 15-29 | 30+ | <15 | 15-29 | 30+ |
| Syphilis | 0 | 12 | 7 | 0 | 6 | 1 |
| Gonorrhea | 0 | 125 | 18 | 0 | 73 | 17 |
| Chlamydia | 13 | 549 | 77 | 1 | 169 | 40 |

n = 1,108 cases (26 syphilis; 233 gonorrhea; 849 chlamydia)

***Source:*** *Alberta Health and Wellness*

**TABLE 2.4**

Rates* of New Cases of Chlamydia, Gonorrhea, and Syphilis in Alberta First Nations Communities and Alberta General Population, 2007-2009

| DISEASE | 2007 | | 2008 | | 2009 | |
|---|---|---|---|---|---|---|
| | First Nations On-reserve | Alberta General Population | First Nations On-reserve | Alberta General Population | First Nations On-reserve | Alberta General Population |
| Chlamydia | 101.2 | 30.2 | 127.1 | 33.7 | 139.1 | 37.1 |
| Gonorrhea | 35.8 | 6.3 | 42.8 | 5.9 | 38.2 | 4.3 |
| Syphilis | 1.5 | 0.7 | 3.2 | 0.7 | 4.3 | 0.7 |

* Rates are per 10,000 population

***Source:*** *Alberta Health and Wellness, Surveillance and Assessment*

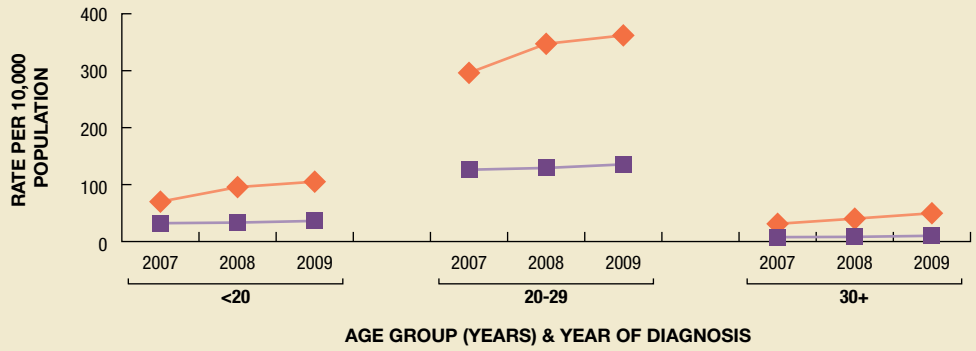
## CHLAMYDIA

In 2009, chlamydia rates in all age groups among First Nations on-reserve were considerably higher, compared to the Alberta general population. Chlamydia rates for First Nations on-reserve in the 20-29 and 30+ year age groups were almost three to five times higher than the rates for the provincial population (Figure 2.14).

The chlamydia rates for First Nations on-reserve were more than three times higher for females than for males (Figure 2.15) in 2009. A steady increase among the female cases within the First Nations population should be noted. Rates among both genders in the Alberta general population, and among male First Nations on-reserve, have been relatively stable for the years 2007-2009.

**FIGURE 2.14**

Age-Specific Rates of New Cases of Chlamydia in Alberta First Nations Communities and Alberta General Population, 2007-2009



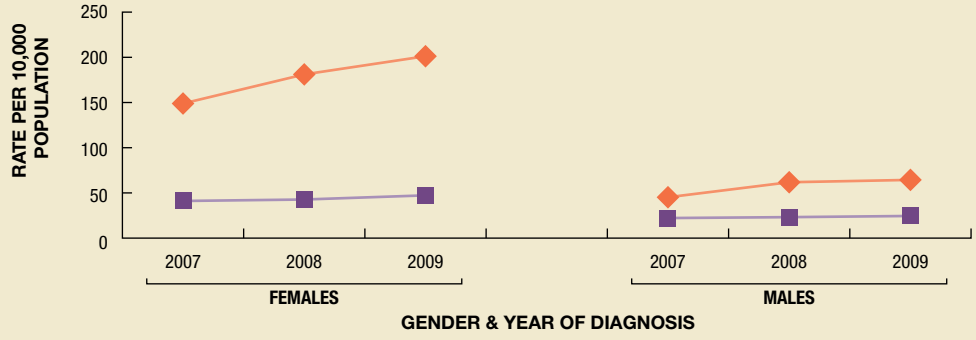

| | <20 | | | 20-29 | | | 30+ | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2007 | 2008 | 2009 | 2007 | 2008 | 2009 | 2007 | 2008 | 2009 |
| First Nations On-Reserve | 70.0 | 95.6 | 105.1 | 296.2 | 347.2 | 362.0 | 31.1 | 40.2 | 49.7 |
| Alberta General Population | 32.0 | 33.3 | 36.2 | 126.1 | 129.2 | 135.5 | 7.7 | 8.2 | 10.1 |

n = 849 cases in Alberta First Nations communities in 2009

***Source:*** *Alberta Health and Wellness; Indian and Northern Affairs Canada, Indian Registry On-Reserve Population*

**FIGURE 2.15**

Rates of New Cases of Chlamydia in Alberta First Nations Communities and Alberta General Population, by Gender, 2007-2009




| | FEMALES | | | MALES | | |
|---|---|---|---|---|---|---|
| | 2007 | 2008 | 2009 | 2007 | 2008 | 2009 |
| First Nations On-Reserve | 148.9 | 181.1 | 201.2 | 45.2 | 61.8 | 64.4 |
| Alberta General Population | 41.1 | 42.7 | 47.3 | 22.2 | 23.0 | 24.5 |

n = 849 cases in Alberta First Nations communities in 2009

***Source:*** *Alberta Health and Wellness; Indian and Northern Affairs Canada, Indian Registry On-Reserve Population*

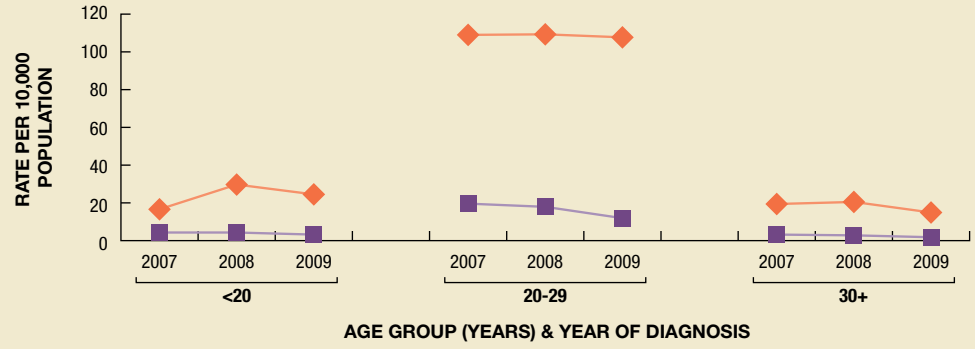
## GONORRHEA

Historically, the rates of gonorrhea are higher among the First Nations on-reserve population than the overall Alberta population (Figure 2.16). In particular, the rates among First Nations on-reserve, in the 20-29 year age group, are considerably higher; although, the rates in this group have remained consistent over the years.

The gonorrhea rates in 2009 for First Nations on-reserve, compared to the Alberta general population, are seven and thirteen times higher for males and females, respectively (Figure 2.17).

**FIGURE 2.16**

Age-Specific Rates of New Cases of Gonorrhea in Alberta First Nations Communities and Alberta General Population, 2007-2009



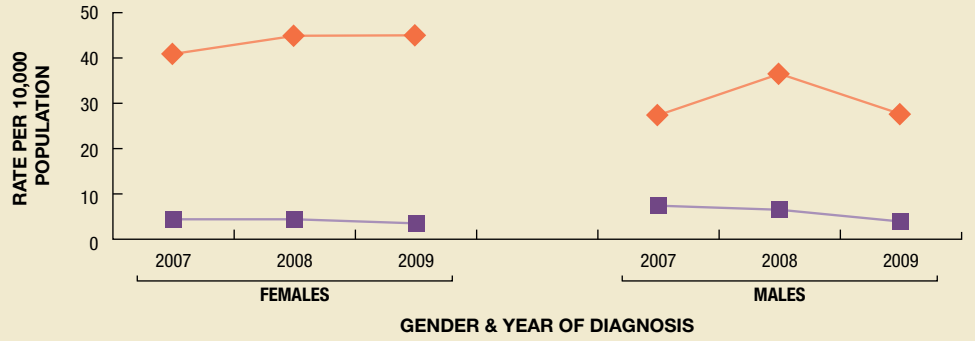

| | <20 | | | 20-29 | | | 30+ | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2007 | 2008 | 2009 | 2007 | 2008 | 2009 | 2007 | 2008 | 2009 |
| First Nations On-Reserve | 16.6 | 29.7 | 24.5 | 109.0 | 109.3 | 107.7 | 19.4 | 20.5 | 14.9 |
| Alberta General Population | 4.3 | 4.3 | 3.2 | 19.6 | 17.9 | 11.9 | 3.2 | 2.8 | 1.8 |

n = 233 cases in Alberta First Nations communities in 2009

***Source:*** *Alberta Health and Wellness; Indian and Northern Affairs Canada, Indian Registry On-Reserve Population*

**FIGURE 2.17**

Rates of New Cases of Gonorrhea in Alberta First Nations Communities and Alberta General Population, by Gender, 2007-2009




| | FEMALES | | | MALES | | |
|---|---|---|---|---|---|---|
| | 2007 | 2008 | 2009 | 2007 | 2008 | 2009 |
| First Nations On-Reserve | 40.9 | 44.9 | 45.0 | 27.4 | 36.5 | 27.6 |
| Alberta General Population | 4.4 | 4.4 | 3.5 | 7.4 | 6.5 | 3.9 |

n = 233 cases in Alberta First Nations communities in 2009

***Source:*** *Alberta Health and Wellness; Indian and Northern Affairs Canada, Indian Registry On-Reserve Population*

## SYPHILIS

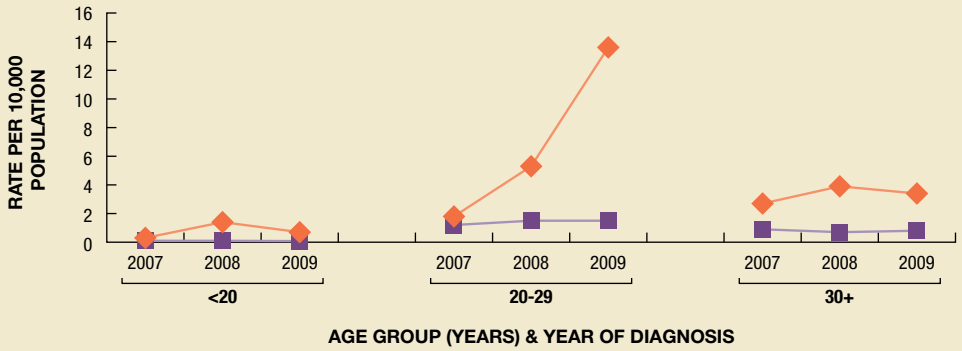
Age-specific rates of syphilis have been consistent from 2007-2009, among most age groups, in both the First Nations on-reserve population and the Alberta general population (Figure 2.18). In 2009, there was a sharp increase in syphilis cases among First Nations living on-reserve in the 20-29 year age group, more than doubling the rate in 2008. Overall, in 2009 there were more female cases (Figure 2.19).

In 2009, an outbreak occurred in one First Nations community, accounting for 12 cases, of which females comprised 92%.

Congenital syphilis occurs when a pregnant woman has untreated syphilis and transmits the disease to her unborn baby through the placenta. There were no cases of congenital syphilis reported in First Nations communities, in 2009.

**FIGURE 2.18**

Age-Specific Rates of New Cases of Syphilis in Alberta First Nations Communities and Alberta General Population, 2007-2009



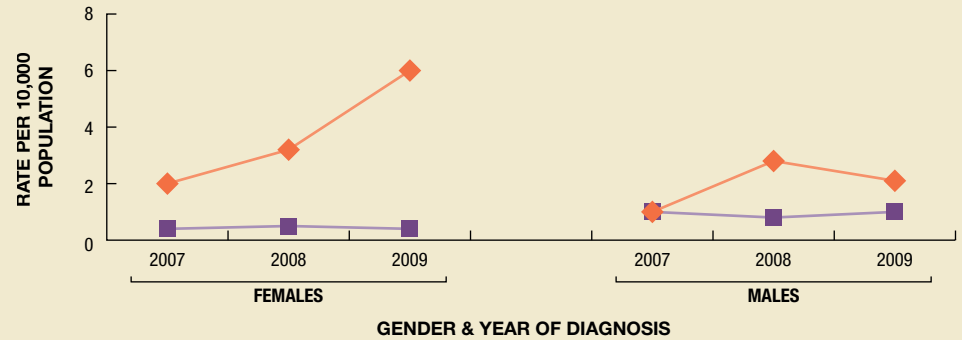

| | <20 | | | 20-29 | | | 30+ | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2007 | 2008 | 2009 | 2007 | 2008 | 2009 | 2007 | 2008 | 2009 |
| First Nations On-Reserve | 0.3 | 1.4 | 0.7 | 1.8 | 5.3 | 13.6 | 2.7 | 3.9 | 3.4 |
| Alberta General Population | 0.1 | 0.1 | 0.1 | 1.2 | 1.5 | 1.5 | 0.9 | 0.7 | 0.8 |

n = 26 cases in Alberta First Nations communities in 2009

***Source:*** *Alberta Health and Wellness; Indian and Northern Affairs Canada, Indian Registry On-Reserve Population*

**FIGURE 2.19**

Rates of New Cases of Syphilis in Alberta First Nations Communities and Alberta General Population, by Gender, 2007-2009




| | FEMALES | | | MALES | | |
|---|---|---|---|---|---|---|
| | 2007 | 2008 | 2009 | 2007 | 2008 | 2009 |
| First Nations On-Reserve | 2.0 | 3.2 | 6.0 | 1.0 | 2.8 | 2.1 |
| Alberta General Population | 0.4 | 0.5 | 0.4 | 1.0 | 0.8 | 1.0 |

n = 26 cases in Alberta First Nations communities in 2009

***Source:*** *Alberta Health and Wellness; Indian and Northern Affairs Canada, Indian Registry On-Reserve Population*

## HIV INFECTION

In addition to other serious but curable STIs, HIV infection continues to impact the Alberta First Nations population. Prior to 2008, HIV infection rates for the entire Aboriginal population (First Nations, Métis, and Inuit) in Alberta were used because HIV infection data, specific to the First Nations on-reserve population, were not available from Alberta Health and Wellness (now Alberta Health Services). In 2009, 31 cases of HIV were identified among First Nations in Alberta, of which five cases were among the First Nations population living on-reserve.

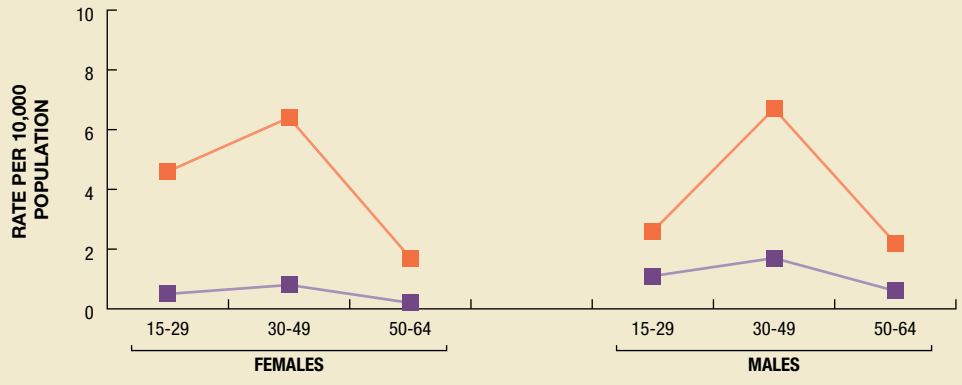
Across Alberta, there were a total of 219 HIV cases. The HIV infection rate was approximately four times higher in the First Nations (on- and off-reserve) population (2.4 per 10,000) compared to the non-First Nations population (0.6 per 10,000). The most predominant HIV rates occur in the 30-49 year age group (see Figure 2.20), with higher rates for both males and females among the First Nations population, compared to the non-First Nations population. First Nations females aged 15-29 and 30-49 years had significantly higher rates of HIV infection, compared to non-First Nations females of the same age groups. This highlights the need for HIV prevention strategies targeted at this population.

Among all First Nations HIV cases in Alberta, during 2009, injection drug use and partner at-risk were the most identified risk exposures (Figures 2.21 and 2.22). The majority of First Nations female cases of HIV infection can be attributed to heterosexual relationships with partners at risk (41%). In 2009, 29% of newly diagnosed HIV cases occurred among First Nations females with injection drug use exposure (Figure 2.21). The leading causes for HIV infection among males in 2009 were associated with injection drug use. Among non-First Nations males, males having sex with males represented 89% of the “Other” category.

Given that simple testing and treatment options are available for STIs, it is important for all persons who think they may be at risk, for any of these diseases, to follow up with their physicians in order to decrease the risk of complications and transmission of disease to others. However, it should be noted that the best solution is not ‘treatment’, but prevention.

**FIGURE 2.20**

Rates of New Cases of HIV Infection, First Nations and Non-First Nations*, Alberta, by Age and Gender, 2009




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| First Nations Rate | 4.6 | 6.4 | 1.7 | | 2.6 | 6.7 | 2.2 |
| Non-First Nations Rate | 0.5 | 0.8 | 0.2 | | 1.1 | 1.7 | 0.6 |

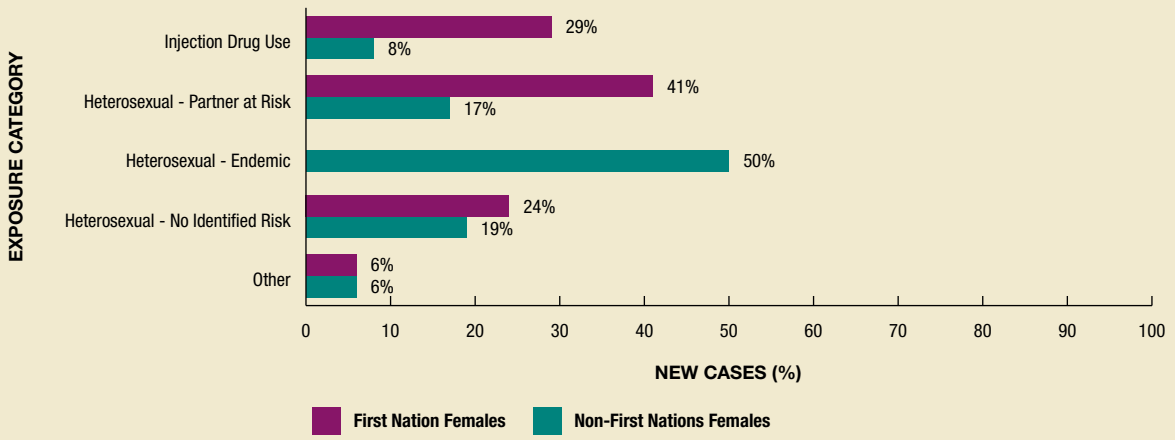
n = 31 First Nations; 216 Non-First Nations

* Non-First Nations population = Alberta general population minus all First Nations (on- and off-reserve).

***Source:*** *Alberta Health and Wellness; Indian and Northern Affairs Canada, Indian Registry On-Reserve Population*

**FIGURE 2.21**

Distribution of New Cases of HIV Infection Among Females, First Nations and Non-First Nations, Alberta, by Risk Exposure Category, 2009

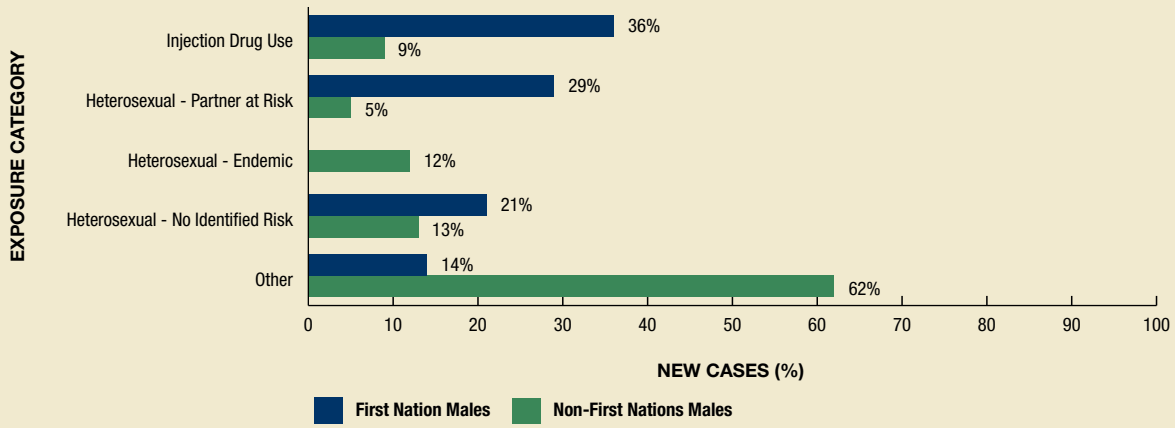



N =17 First Nations female cases

***Source:*** *Alberta Health and Wellness*

**FIGURE 2.22**

Distribution of New Cases of HIV Infection Among Males, First Nations and Non-First Nations, Alberta, by Risk Exposure Category, 2009




N =14 First Nations male cases

***Source:*** *Alberta Health and Wellness*

### *Bloodborne Pathogens*

**Hepatitis C** (HCV) is a bloodborne virus that attacks the liver and can cause liver damage (cirrhosis), chronic liver disease, liver failure, and liver cancer. HCV is transmitted through infected blood, mainly from injection drug use through sharing needles, syringes, and other drug equipment.

HCV can also be spread by:

- tattooing, when sharing tattoo ink and sharing or reusing needles;
- body piercing, when sharing needles;
- sharing needles and injection-drug equipment;
- sharing straws for snorting;
- sharing crack pipes; and
- sharing personal hygiene items, including toothbrushes, razors, and nail clippers.

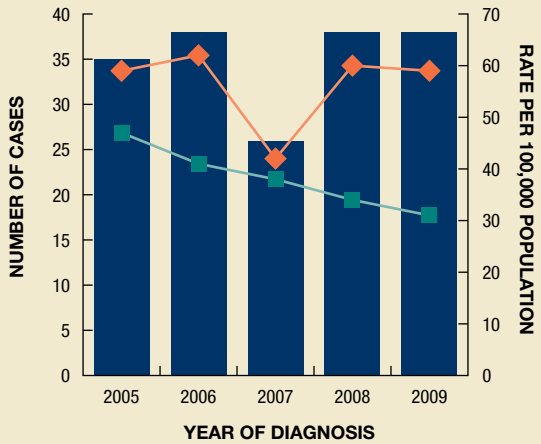
HCV and HIV co-infection is a problem, as one infection intensifies the other, and it is difficult to treat both of these preventable infections at the same time. Note that even though cleaning equipment with bleach will kill HIV, it may not kill HCV. Hepatitis C lives much longer outside the body than HIV.

In recent years, HCV infection rates in Alberta First Nations communities have been above that of the Alberta general population. The 2009 rate observed among First Nations was nearly twice the rate for the general population (Figure 2.23). With the exception of a rate decrease in 2007, historically, rates of HCV have remained relatively stable for First Nations. Note that the rate in the Alberta general population has decreased steadily.

A slightly higher proportion of HCV cases was found among men (53% men versus 47% women). The age-specific rates (Figure 2.24) indicate that HCV infection appears to affect Alberta First Nations at a younger age (15-49 years of age)

**FIGURE 2.23**

Number of On-Reserve Cases of Hepatitis C and HCV Incidence Rates in Alberta First Nations Communities and Alberta General Population, 2005-2009

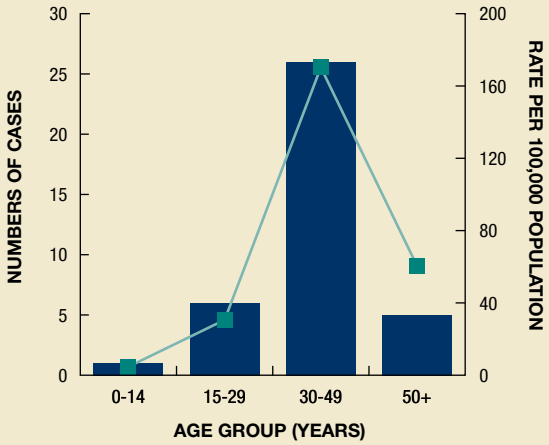



| Year | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|
| First Nations On-Reserve Cases | 35 | 38 | 26 | 38 | 38 |
| First Nations On-Reserve Rates | 59 | 62 | 42 | 60 | 59 |
| Alberta General Population Rates | 47 | 41 | 38 | 34 | 31 |

***Source:*** *Alberta Health and Wellness; Indian and Northern Affairs Canada, Indian Registry On-Reserve Population File*

**FIGURE 2.24**

Distribution of New Cases of Hepatitis C and HCV Incidence Rates in Alberta First Nations Communities, by Age, 2009




| Age Group (Years) | 0-14 | 15-29 | 30-49 | 50+ |
|---|---|---|---|---|
| Cases | 1 | 6 | 26 | 5 |
| Rates | 4.7 | 30.6 | 170.3 | 60.4 |

***Source:*** *Health Canada, Alberta Region FNIH; Indian and Northern Affairs Canada, Indian Registry On-Reserve Population*

when compared to data reported for the Alberta general population, where persons 40 years and older are most affected[26]. Ongoing monitoring of these population-specific demographic trends in HCV infection is important to ensure that interventions are appropriately targeted at the relevant high-risk groups.

## Tuberculosis

The Tuberculosis (TB) Control Program is a mandatory public health program. In Alberta, the responsibilities are shared among the First Nations communities, Health Canada's Alberta Region First Nations and Inuit Health, Alberta Health Services - TB Control Services, and Alberta Health and Wellness.

Tuberculosis is a preventable, contagious disease that can be treated with medication. Early diagnosis and treatment of TB disease is the most effective method of preventing the spread of infection. People become infected when they breathe in the bacterium which causes TB (*mycobacterium tuberculosis*), but most do not develop active disease. This condition is referred to as inactive or latent TB infection (LTBI). Persons with LTBI will not exhibit disease symptoms and cannot spread the disease to others. However, up to 10% of persons with LTBI may develop active disease. LTBIs are detected through targeted screening of high-risk groups.

To control tuberculosis among Alberta First Nations, community health nurses (CHNs), community health representatives (CHRs), and regional Health Canada public health staff work as a team to implement the various areas of the TB program. These areas include:

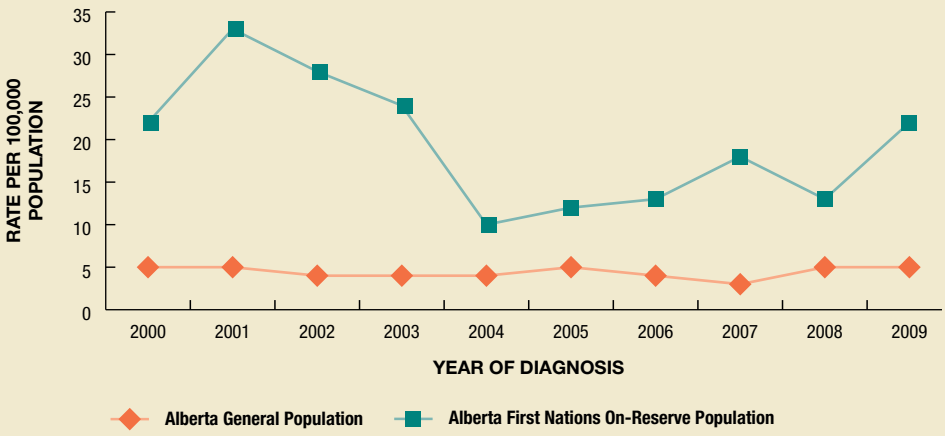
- managing the delivery of client care in active cases;
- assessing contacts of active TB cases;
- administering TB medications by direct-observed therapy;
- screening groups at risk for disease and infection; and
- providing community TB education.

TB data are collected on a calendar-year basis and are compiled by FNIH using the numbers of clients reported by Alberta Health Services and Alberta First Nations communities.

In 2009, there were 14 active cases of TB reported among First Nations on-reserve in Alberta, representing eight communities, adding to the 100 active cases that

**FIGURE 2.25**

Rates of Active Tuberculosis Cases in Alberta First Nations Communities and Alberta General Population, 2000-2009




***Source:*** *Alberta Health Services; Indian and Northern Affairs Canada, Indian Registry On-Reserve Population.*

[26] Alberta Health and Wellness. *Notifiable Disease in Alberta: 2004 Annual Report*. www.health.alberta.ca/documents/Notifiable-Diseases-Report-2004.pdf (accessed January 2011).

were previously reported for the years 2000-2008[27]. Men represented slightly more than half (55%) of the 114 active TB cases reported from 2000-2009. Consistent with previous years, rates of active TB in First Nations communities in 2009 continue to be higher (more than four times) than rates observed in the Alberta general population (Figure 2.25).

### *Preventive Treatment for Tuberculosis*

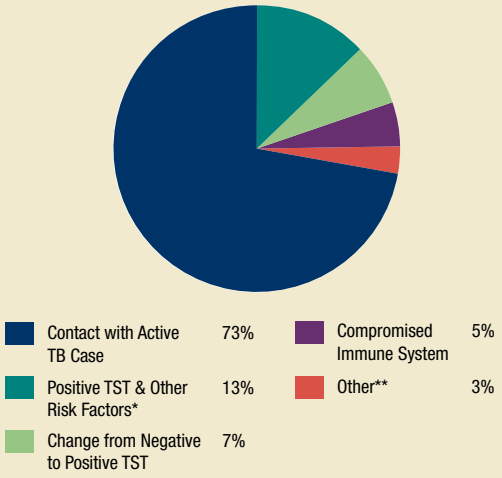
Recent publications suggest that up to 30% of Aboriginals (First Nations, Métis, and Inuit) in Canada may have LTBI[28]. In 2009, 199 Alberta First Nations people were recommended for LTBI treatment. In the majority of LTBI cases, treatment was recommended due to possible contact with a person with active TB (Figure 2.26). Of these LTBI cases:

- 143 (72%) initiated treatment;
- 27 (14%) had not yet initiated therapy; and
- 29 (15%) refused treatment.

Among those recommended for treatment for LTBI, the age ranged from less than one year to 79 years, with the largest proportion of cases occurring in females aged 30-49 years (Figure 2.27).

**FIGURE 2.26**

Reasons for Recommending Treatment for Individuals with Latent Tuberculosis Infection in Alberta First Nations Communities, 2009

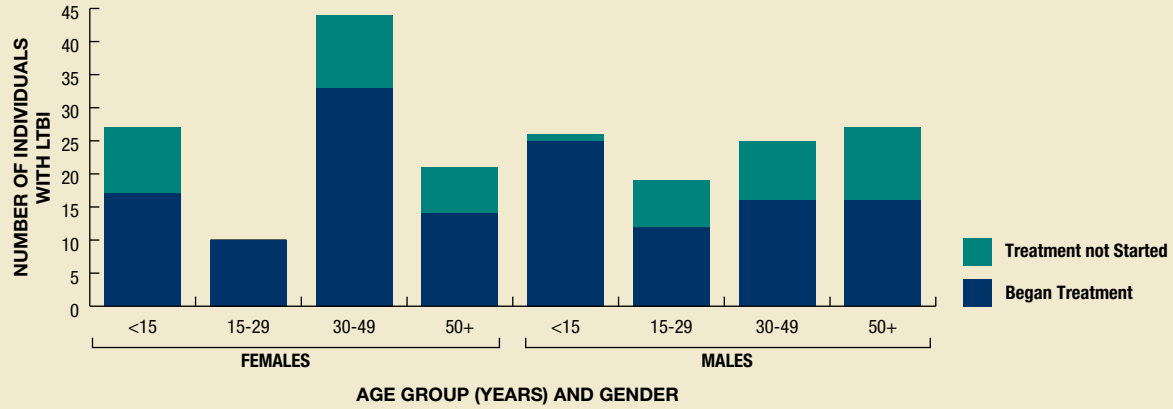



n = 199 individuals with LTBI
* Based on clinical guidelines: 35 years of age or younger, or other potential risk factors.
** OTHER includes diabetes and high- risk lung scars.

***Source:*** *Alberta Health Services*

**FIGURE 2.27**

Distribution of Individuals with Latent Tuberculosis Infection in Alberta First Nations Communities Who Were Recommended for Treatment, by Age and Gender, 2009




***Source:*** *Alberta Health Services*

[27] Health Canada. 2008. *First Nations Health Status Report: Alberta Region 2007-2008.* Edmonton: Alberta Region First Nations and Inuit Health.
[28] Public Health Agency of Canada. 2007. *Compendium of Latent Tuberculosis Infection (LTBI) Prevalence Rates in Canada.* www.phac-aspc.gc.ca/tbpc-latb/ltbi_compendium-eng.php (accessed October 2009).

Of the 143 people who initiated treatment in 2009, 100 (70%) were still undergoing treatment at the end of 2009. Overall, 87 people (61%) had completed an adequate course of treatment. Twenty-five individuals did not complete treatment. Reported reasons for discontinuation included:

- TB contact was found to be negative on second test;
- medical advice to cease treatment;
- refusal to continue treatment;
- deceased; and
- non-compliance with therapy.

### *Tuberculosis Preschool Screening*

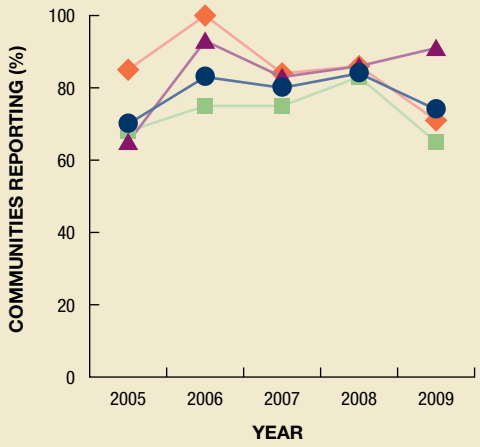
Preschool screening is an important tool for early identification of TB infection in the community because disease can be prevented in all age groups. In 2009, 74% of Alberta First Nations communities reported data for preschool screening activities (Figure 2.28).

As illustrated in Figure 2.29, the levels of screening achieved in this program are still well below the target. However, it is important to note that of the 623 children screened, there were no positive test results. One-year-old children were not included in the preschool screening in 2009.

There is an ongoing annual review of TB incidence and screening activities for each First Nations community in Alberta. This is carried out by TB Control Services (now Alberta Health Services) together with the Health Canada's FNIH TB team in the region. Based on this review, preschool screening has been discontinued in some communities.

**FIGURE 2.28**

Proportion of Alberta First Nations Communities* Reporting Tuberculosis Preschool Screening Rates, by Treaty Area and Region, 2005-2009



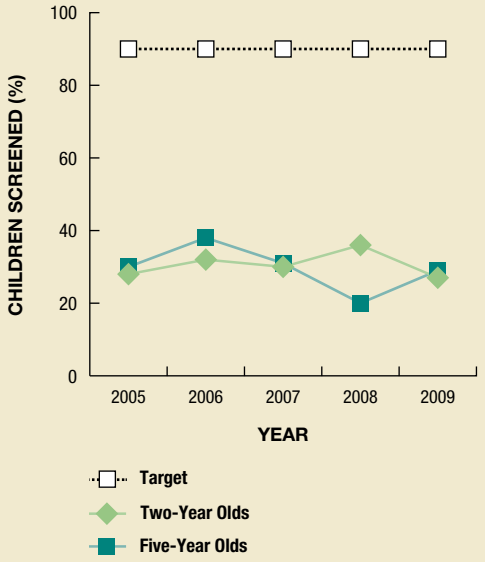

| | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|
| Alberta Region | 70 | 83 | 80 | 84 | 74 |
| Treaty 6 | 65 | 93 | 83 | 86 | 91 |
| Treaty 7 | 85 | 100 | 84 | 86 | 71 |
| Treaty 8 | 68 | 75 | 75 | 83 | 65 |

* Preschool screening has been discontinued in some communities.

***Source:*** *Health Canada FNIH-Alberta Region*

**FIGURE 2.29**

Proportion of Preschool Children Screened for Tuberculosis in Alberta First Nations Communities*, by Age, 2005-2009

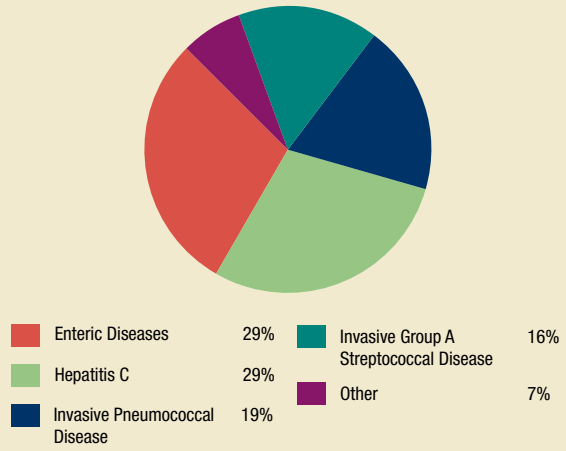



* Preschool screening has been discontinued in some communities.

***Source:*** *Health Canada FNIH-Alberta Region*

**FIGURE 2.30**

Proportion of New Cases of Notifiable Infectious Diseases as Reported by Alberta First Nations Communities, 2009




n = 133 cases

***Source:*** *Health Canada FNIH-Alberta Region*

## OTHER NOTIFIABLE DISEASES

First Nations notifiable diseases data are based on reports received from Alberta First Nations community-based staff members and are maintained in the regional Notifiable Diseases Report (NDR) database. Data for the Alberta general population include First Nations and are based on the annual Alberta Health and Wellness report.

Consistent with previous years[29], a large proportion of cases of notifiable diseases was attributable to enteric diseases (29%), hepatitis C (29%), and invasive pneumococcal disease (19%) in 2009 (Figure 2.30).

The overall rates of notifiable disease occurrences in Alberta First Nations communities, in 2009, are presented in Table 2.5, with the rates observed in the Alberta general population as comparators. The rates in First Nations communities of several diseases, including invasive pneumococcal disease, invasive group A streptococcal disease, ameobiasis, and invasive meningococcal disease, were all between two and seven times the rates in the Alberta general population.

Some disease rates were lower in Alberta First Nations communities than in the Alberta general population. For example, the rate of salmonella was two times higher in the Alberta general population than in First Nations communities. Similarly, the rate of varicella was 14 times higher in off-reserve populations. These rates may be impacted by underreporting, the frequency of seeking medical care, testing, or other factors. However, the variations observed should be interpreted with caution, particularly when very few cases are observed. As well, other factors, such as differences in the age and gender distribution of the two populations or lifestyle habits (e.g. smoking), may also result in apparent differences in disease rates.

[29] Vik S, Menon D, Richardson R, Yacoub W. 2009. *Communicable Disease Control in Alberta First Nations Communities 2008-2009*. Siksika: First Nations EpiCentre of Alberta.

**TABLE 2.5**

Notifiable Diseases in Alberta First Nations Communities and Alberta General Population, 2009

| Disease | Cases Reported by First Nations Communities* | Rate per 100,000 Population | |
|---|---|---|---|
| | | First Nations On-reserve | Alberta General Population |
| Invasive Pneumococcal Disease (IPD) | 26 | 40.4 | 8.4 |
| Invasive Group A Streptococcal Disease (iGAS) | 21 | 32.6 | 4.2 |
| Campylobacteriosis | 15 | 23.3 | 26.4 |
| Giardiasis | 12 | 18.6 | 16.3 |
| Salmonellosis | 8 | 12.4 | 25.3 |
| Ameobiasis | <5 | 4.7 | 2.6 |
| Cryptosporidiosis | <5 | 4.7 | 3.1 |
| *E.coli* 0157 | <5 | 4.7 | 3.4 |
| Varicella (Chickenpox) | <5 | 3.1 | 44.9 |
| Invasive Meningococcal Disease (IMD) | <5 | 1.6 | 0.6 |

* Exact numbers are not reported for counts <5 to ensure privacy of individuals.

***Source:*** *Health Canada FNIH-Alberta Region; Alberta Health and Wellness; Indian and Northern Affairs Canada, Indian Registry On-Reserve Population*

### *Pneumococcal and Streptococcal Diseases*

Since 2005, invasive pneumococcal disease (IPD) and invasive group A streptococcal (iGAS) disease has consistently been among the top five non-BBP/STI notifiable diseases reported among First Nations communities. These two diseases accounted for 35% of the notifiable diseases reported in 2009.

There are two vaccines available that protect against some strains of pneumococcal disease. Some research indicates that the pneumococcal conjugate vaccine (PCV7) covers about 62% of the strains causing IPD among Aboriginal and non-Aboriginal children under two years of age[30]. The pneumococcal polysaccharide vaccine (PPV23) has been reported to cover approximately 86% of the IPD strains, causing disease among persons 65 years and older[31].

**Invasive group A streptococcal** infection occurs when the disease-causing bacteria gets past the defences of an infected person. Although healthy people can get iGAS disease, people with chronic illnesses like cancer, diabetes, and chronic heart or lung disease, and those who use medications such as steroids are at higher risk. Persons with skin lesions (such as cuts and chickenpox), the elderly, and adults with a history of alcohol abuse or injection drug use also have a higher risk for disease. There is no vaccine against iGAS infection; however, varicella immunization contributes to the reduction of the risk of iGAS infection following the occurrence of chickenpox.

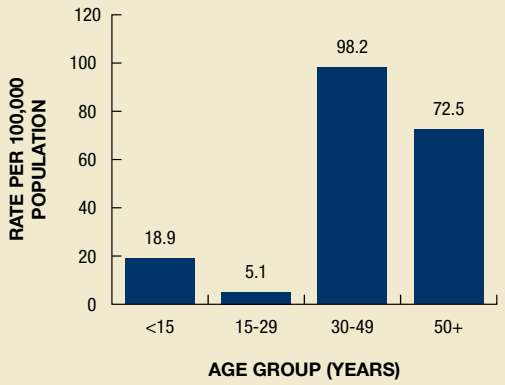
The age-specific incidence rates for IPD and iGAS in 2009 are shown in Figures 2.31 and 2.32. Both diseases show higher rates of incidence among those 30 years and older. This may be due to the accumulating effects of chronic conditions like diabetes, heart, liver, and kidney damage. Also, years of smoking and alcohol abuse can increase the susceptibility of IPD infection.

There remains a downward trend in the number of on-reserve cases of IPD, as shown in Figure 2.33 by a slight decrease in the number of cases from 2008. However, the rates among First Nations on-reserve still exceeded those in the Alberta general population.

[30] Public Health Agency of Canada. 2007. *Pneumococcal Vaccine*. www.phac-aspc.gc.ca/publicat/cig-gci/p04-pneu-eng.php (accessed January 2011).
[31] Morbidity and Mortality Weekly Report. September 2010;59(34);1102-1106.

**FIGURE 2.31**

Rates of Invasive Pneumococcal Disease Reported in Alberta First Nations Communities, by Age, 2009

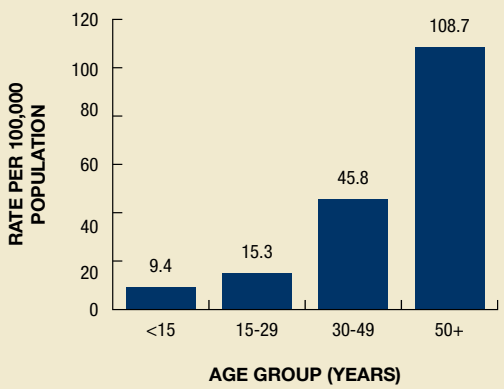



n = 26 cases

***Source:*** *Health Canada FNIH-Alberta Region; Indian and Northern Affairs Canada, Indian Registry On-Reserve Population*

**FIGURE 2.32**

Rates of Invasive Group A Streptococcal Disease Reported in Alberta First Nations Communities, by Age, 2009

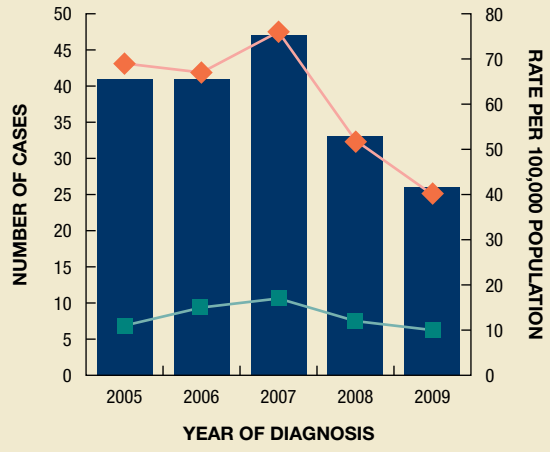



n = 21 cases

***Source:*** *Health Canada FNIH-Alberta Region; Indian and Northern Affairs Canada, Indian Registry On-Reserve Population*

**FIGURE 2.33**

Number of On-Reserve Cases of Invasive Pneumococcal Disease and IPD Incidence Rates in Alberta First Nations Communities and Alberta General Population, 2005-2009




| Year | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|
| First Nations On-Reserve Cases | 41 | 41 | 47 | 33 | 26 |
| First Nations On-Reserve Rates | 69 | 67 | 76 | 52 | 40 |
| Alberta General Population Rates | 11 | 15 | 17 | 12 | 10 |

***Source:*** *Health Canada FNIH-Alberta Region; Alberta Health and Wellness; Indian and Northern Affairs Canada, Indian Registry On-Reserve Population*

Rates of iGAS cases have remained relatively stable from 2007-2009 (Figure 2.34). However, rates in the Alberta First Nations on-reserve population were over six times higher than in the Alberta general population in 2009.

Monitoring of the incidence of these diseases will continue, as well as the uptake of the pneumococcal vaccines as a mechanism to minimize impact of IPD.

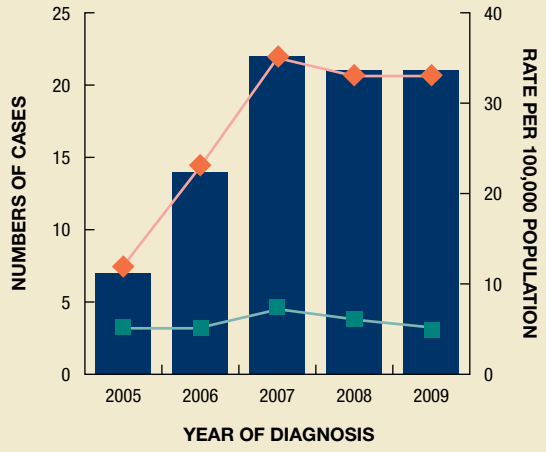
### *Enteric Diseases*

Consistent with previous years, a large proportion of notifiable diseases reported by Alberta First Nations communities were enteric diseases (approximately 29% in 2009 – Figure 2.30). These include diseases caused by salmonella, campylobacter, giardia, and other organisms. They affect the intestines and can cause bloating, nausea, diarrhea (stool may also contain blood), abdominal cramps, fever, and chills. Most commonly, these conditions are related to sanitary and environmental conditions and can be waterborne, foodborne, or transmitted from person-to-person. This highlights the need for ongoing monitoring of water systems as well as safe food-handling practices and appropriate environmental cleaning practices. Risk factors for enteric diseases include overcrowding in homes, lack of adequate water supplies, housing deficiencies, and poor sanitation in homes.

Figures 2.35-2.37 present the infection rates of the three most common enteric conditions reported in Alberta First Nations communities in recent years – salmonellosis, campylobacteriosis, and giardiasis. Compared to previous years, the number of on-reserve cases of salmonellosis was the lowest in 2009. Although there was a slight increase in the

**FIGURE 2.34**

Number of On-Reserve Cases of Invasive Group A Streptococcal Infection and iGAS Incidence Rates in Alberta First Nations Communities and Alberta General Population, 2005-2009

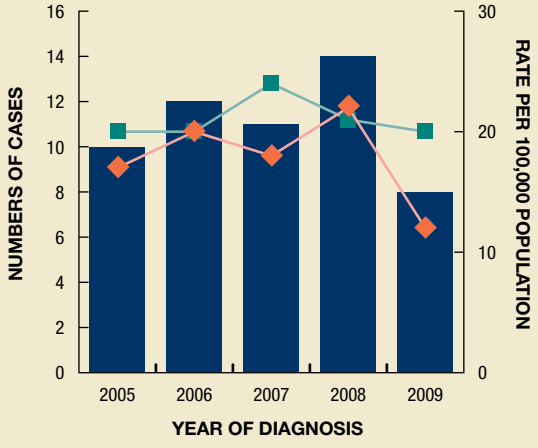



| Year | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|
| First Nations On-Reserve Cases | 7 | 14 | 22 | 21 | 21 |
| First Nations On-Reserve Rates | 12 | 23 | 35 | 33 | 33 |
| Alberta General Population Rates | 5 | 5 | 7 | 6 | 5 |

***Source:*** *Health Canada FNIH-Alberta Region; Alberta Health and Wellness; Indian and Northern Affairs Canada, Indian Registry On-Reserve Population*

**FIGURE 2.35**

Number of On-Reserve Cases of Salmonellosis and Salmonellosis Incidence Rates in Alberta First Nations Communities and Alberta General Population, 2005-2009




| Year | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|
| First Nations On-Reserve Cases | 10 | 12 | 11 | 14 | 8 |
| First Nations On-Reserve Rates | 17 | 20 | 18 | 22 | 12 |
| Alberta General Population Rates | 20 | 20 | 24 | 21 | 20 |

***Source:*** *Health Canada FNIH-Alberta Region; Alberta Health and Wellness; Indian and Northern Affairs Canada, Indian Registry On-Reserve Population*

number of cases of campylobacteriosis from 2007, the case numbers for 2008 and 2009 remained steady. The number of cases of giardiasis doubled in 2009 when compared to 2008, but there was no evidence of an outbreak. These cases were spread across two First Nations communities.

Age-adjusted rates for salmonellosis and campylobacteriosis (not illustrated) indicate that rates of these diseases have been relatively stable in Alberta First Nations communities and are comparable with the Alberta general population.

Table 2.6 lists less common enteric conditions which have occurred in the Region since 1999. With the exception of cryptosporidiosis, *E.coli* O157, and ameobasis, none of the other conditions identified in the table occurred in 2009.

**TABLE 2.6**

Number of Cases of Less Common Enteric Conditions in Alberta First Nations Communities, 1999-2009

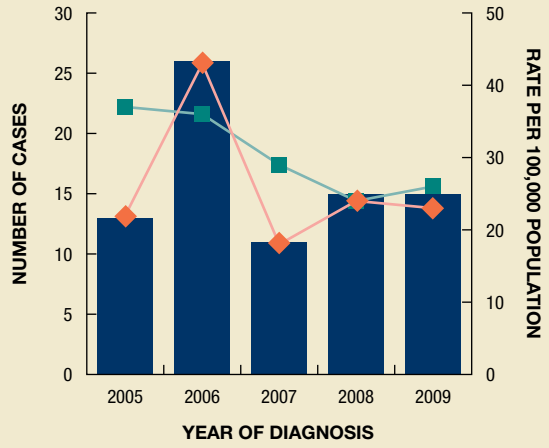
| Organism | Number of Cases* |
|---|---|
| Shigellosis | 67 |
| Cryptosporidiosis | 38 |
| *E.coli* 0157 | 30 |
| Dientamoeba Fragilis | 21 |
| Aeromonas | 20 |
| Blastocystis Hominis | 20 |
| Ameobasis | 7 |
| Yersiniosis | <5 |
| Haemolytic Uremic Syndrome | <5 |

* Exact numbers are not reported for counts <5 to ensure privacy of individuals.

***Source:*** *Health Canada FNIH-Alberta Region*

**FIGURE 2.36**

Number of On-Reserve Cases of Campylobacteriosis and Campylobacteriosis Incidence Rates in Alberta First Nations Communities and Alberta General Population, 2005-2009

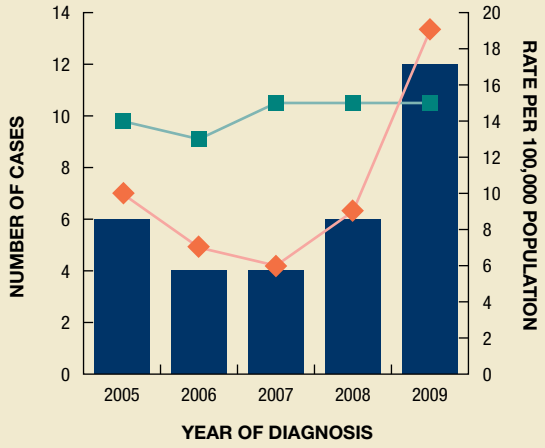



| Year | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|
| First Nations On-Reserve Cases | 13 | 26 | 11 | 15 | 15 |
| First Nations On-Reserve Rates | 22 | 43 | 18 | 24 | 23 |
| Alberta General Population Rates | 37 | 36 | 29 | 24 | 26 |

***Source:*** *Health Canada FNIH-Alberta Region; Alberta Health and Wellness; Indian and Northern Affairs Canada, Indian Registry On-Reserve Population*

**FIGURE 2.37**

Number of On-Reserve Cases of Giardiasis and Giardiasis Incidence Rates in Alberta First Nations Communities and Alberta General Population, 2005-2009




| Year | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|
| First Nations On-Reserve Cases | 6 | 4 | 4 | 6 | 12 |
| First Nations On-Reserve Rates | 10 | 7 | 6 | 9 | 19 |
| Alberta General Population Rates | 14 | 13 | 15 | 15 | 15 |

***Source:*** *Health Canada FNIH-Alberta Region; Alberta Health and Wellness; Indian and Northern Affairs Canada, Indian Registry On-Reserve Population*

## ANIMAL BITES

Figure 2.38 shows the trend in numbers of reported animal bites in Alberta First Nations communities for the years 2000 to 2009. During that period, 1,184 animal bites were reported to Health Canada's CDC Unit in Alberta.

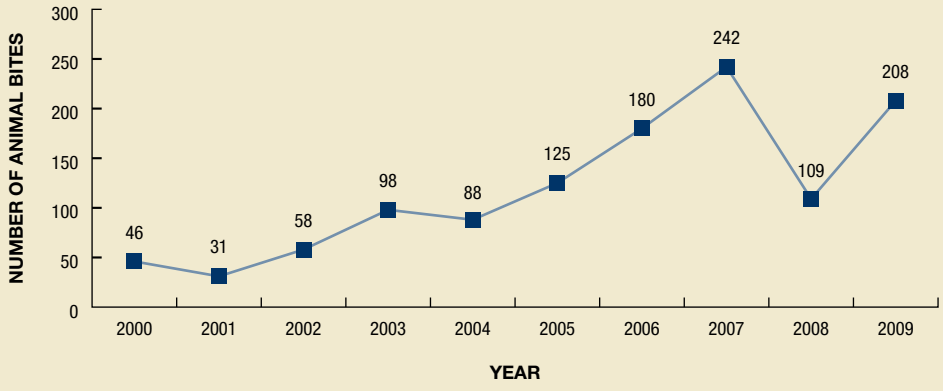
In 2009, there were a total of 208 animal bites, a considerable increase from 2008, but comparable to 2007. The proportions of male cases were higher than female cases for all age groups (Figure 2.39). Treatment was administered in 207 cases (treatment information is unknown for one case), the majority involving a combination of wound cleaning and administration of tetanus vaccine, antibiotics, and stitches. In one case, a series of rabies vaccine was administered. Also, two cases were serious enough to require hospitalization. There have been three reported animal bite-related deaths in the Alberta First Nations communities in the last seven years. No fatalities were reported in 2009.

Consistent with previous years, the large majority (94%) of animal bites was from dogs, and 15 cases were attributed to other animals (9 cats, 2 mice, 2 rabbits, 1 gerbil, and 1 unspecified animal). Five per cent of the dogs had been involved in previous attacks. In almost 14% of dog bite cases, the reports indicated that the dogs were strays. In addition, the reports indicated that an animal was provoked in 88 cases, 25 of these involving children 10 years of age and younger.

These observations suggest that there is need for more stringent animal control measures in some Alberta First Nations communities. While large-scale animal control facilities may not be feasible options for smaller communities, there may be opportunities to collaborate with animal control facilities in larger centres or nearby municipalities. In addition, public education may help to reduce provoked animal attacks.

**FIGURE 2.38**

Number of Reported Animal Bites in Alberta First Nations Communities, 2000-2009

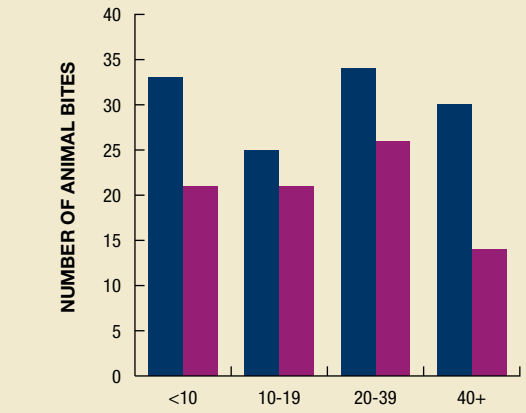



n = 208 cases in 2009; data are not included for three cases with community not identified.

***Source:*** *Health Canada FNIH-Alberta Region*

**FIGURE 2.39**

Distribution of Reported Animal Bites in Alberta First Nations Communities, by Age and Gender, 2009




| | <10 | 10-19 | 20-39 | 40+ |
|---|---|---|---|---|
| Males | 33 | 25 | 34 | 30 |
| Females | 21 | 21 | 26 | 14 |

**AGE GROUP (YEARS)**

n = 204 cases; data were not included for one female and three males with age not reported.

***Source:*** *Health Canada FNIH-Alberta Region*

# **Environmental Public Health**
in Alberta First Nations Communities

OVERVIEW

# Environmental Public Health

Both natural and built environments can impact a person's ability to achieve and maintain good health. A healthy environment includes safe water, safe food supplies, safe air, and safe physical environments. This includes, but is not limited to, properly designed, constructed, and maintained housing and community facilities, as well as suitable treatment and disposal of wastewater and solid waste[32]. Environmental Public Health Services (EPHS) in Health Canada Alberta Region, works to identify, prevent, and mitigate environmental public health risks that could impact the health of First Nations communities.

Working with the communities, Environmental Health Officers (EHOs) provide advice, guidance, education, public health risk assessments, inspections, investigations, and recommendations to First Nations officials and community members, while assisting them in the management of public health risks associated with the environment.

This section begins with a summary of major public health occurrences in Alberta First Nations communities during the 2009-2010 fiscal year (April 1, 2009 - March 31, 2010). This is followed by a summary of ongoing EPHS activities in six key program areas:

1. Drinking Water Safety
2. Facility Inspections
   - Housing
   - Private Sewage Disposal Systems
   - Food Facilities
   - Institutions
3. Solid Waste Disposal
4. Wastewater
5. Environmental Public Health Training
6. Environmental Contaminants and Research

**DATA SOURCES:**

This section of the report is based on the analysis of the following data sources

- Health Canada, WEI Database: Data on drinking water sampling and testing
- Health Canada, CNPHI Water Advisory Database: Data on drinking water advisories
- Health Canada, Hedgehog Inspection Database: Date on environmental health inspections

[32] Council of Managers-Environmental Health. 2001. *A Common Reference System and Operational Standards for Alberta Regional Health Authority Environmental Health Programs.*

## ENVIRONMENTAL PUBLIC HEALTH MAJOR OCCURRENCES

### National Assessment of Water and Wastewater Systems in First Nations Communities

Providing First Nations with access to reliable drinking water, similar to other Canadians, remains a priority for the Government of Canada. Between September 2009 and November 2010, a comprehensive, independent engineering assessment of water and wastewater systems was undertaken in 607 First Nations communities across Canada. This was initiated by Indian and Northern Affairs Canada (INAC) and carried out by Neegan Burnside Limited. The assessments were to provide information on the needs of each system, to identify critical physical and operational deficiencies, and to compare existing conditions to INAC standards and protocols, as well as other federal and provincial regulations, guidelines, and standards.

Assessments were carried out in all 45 First Nations communities in Alberta Region, and included 81 public water systems and 79 community wastewater systems. The assessments also considered, to a lesser extent, private water and sewage disposal systems. A team approach was arranged for the majority of assessments carried out in Alberta. Team members consisted of a representative from INAC, Neegan Burnside, a Circuit Rider Trainer, an EHO, and members from each respective community.

EPHS actively ensured that public health-related issues for each system assessed were brought to the forefront. Following receipt of a signed release form from INAC, EPHS made available microbiological and chemical water data, inspection reports, drinking water advisories, and other studies that were supportive of needed changes for water and wastewater systems in each community. EPHS information was also used for historical review and in making recommendations in the final report.

This work is an important component and a positive step towards identifying and correcting short-term and chronic problems existing in community water and wastewater infrastructure. EPHS are reviewing the final reports and continue to work with stakeholders and the First Nations communities to improve the safety of drinking water and wastewater disposal systems.

### Restaurant Closure in a First Nations Community

EPHS conducts at least two routine annual health inspections of facilities that prepare, distribute, or sell food (such as restaurants) in First Nations communities. During a routine inspection of a restaurant in an Alberta First Nations community in 2009, numerous critical[33] and non-critical violations of regulations were observed. Some of the critical violations found during this inspection included large containers of raw meat and cooked rice stored at room temperature, which should have been kept cold below 4˚C or hot above 60˚C. Also, mice droppings were found throughout the facility. Mice urine and fecal material were even present in one of the sugar storage containers. The facility was in need of immediate cleaning, yet lacked an approved sanitizing solution such as bleach. In addition, the staff was not practicing safe food handling techniques, and food sanitation and hygiene training had not been completed. These and several other violations had been identified repeatedly in previous inspections at this restaurant but attempts to remedy the situation were unsuccessful.

Immediately following the inspection, the community Health Director was contacted by an EHO who recommended that the facility be closed until the longstanding concerns were addressed. The Health Director acknowledged the risk to the community, discussed the issues with the Chief and Council and acted to protect the health of the community by ensuring immediate closure of the facility. As a result of the support of both the Health Director and Chief and Council, the decision of the EHO to close the facility was enforced. The facility remained closed for approximately one week until it complied with public health legislation. Through cooperation with EPHS and the swift action of the leadership of this First Nations community, the health of the community was protected.

[33] Critical violations are those that require immediate actions as their conditions may cause growth of disease causing microorganisms or may result in public exposure to severe health hazards.

## Hobbema Fire

An air quality advisory was issued by EPHS when heavy dense smoke covered the skies of the Hobbema area in the spring of 2009. Smoke from the ongoing fires in and around the area resulted in reduced air quality. Several community members had to be evacuated to temporary accommodations due to the fire's proximity to their homes. People with breathing problems (e.g. asthma, bronchitis, emphysema) or heart conditions were advised to take preventative measures, such as remaining indoors, keeping their windows closed, limiting outdoor physical activities, or leaving the area as necessary. EPHS conducted public health inspections of the temporary accommodations, drinking water, food services, in addition to solid waste and wastewater disposal systems, as required. Overall, EPHS partnered with community departments in protecting the community during this emergency.

## DRINKING WATER SAFETY MONITORING PROGRAM

Access to a safe drinking water supply is a basic need for good health. With growing populations and stresses placed upon drinking water supplies, safeguards such as routine water sampling must be in place to prevent waterborne diseases and ensure safe drinking water. Regular water sampling, which includes bacteriological and disinfectant testing according to a set schedule and protocol, is extremely important to protect the health of communities. The quality of the treated water must meet the *Guidelines for Canadian Drinking Water Quality*[34].

## Water Sampling/Testing

### *Public and Semi-Public Water System Microbiological Sampling/Testing*

All First Nations communities in Alberta are required to conduct weekly microbiological water sampling[35] for public and semi-public water supplies at locations identified by an EHO in consultation with the band's community-based water team. Water sampling and testing at these sites are necessary to determine the safety of the drinking water and to support informed decisions that protect the public's health. By the end of fiscal year 2009-2010, the majority of communities sent water samples to the accredited Alberta Provincial Laboratory of Public Health for analysis.

The use of accredited laboratories has improved the reliability of results. By using accredited laboratories for testing, the need for additional quality control samples is eliminated. Test results are communicated to the Health Canada Alberta Region office and back to the First Nations community health centres.

Table 3.1 shows the public and semi-public water supply microbiological sampling rates achieved over the last seven years. The rate of microbial sampling (actual samples taken in comparison to the set schedule[36]) is used as the performance indicator for each community and has implications for public health as well as community funding. The regional rate is calculated by averaging the annual sampling rates for each First Nations community.

**TABLE 3.1**

Levels of Public and Semi-Public Water Microbiological Sampling/Testing* in Alberta First Nations Communities, Fiscal Years 2003-2004 to 2009-2010

| Fiscal Year | Percentage Of Required Routine Sampling/Testing Achieved |
|---|---|
| 2003-2004 | 39% |
| 2004-2005 | 58% |
| 2005-2006 | 72% |
| 2006-2007 | 83% |
| 2007-2008 | 79% |
| 2008-2009 | 83% |
| 2009-2010 | 80% |

*EPHS are continually improving the manner in which data are collected for reporting.

***Source:*** *Health Canada, WEI Database*

[34] *Guidelines for Canadian Drinking Water Quality*. www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/2010-sum_guide-res_recom/index-eng.php
[35] A microbiological water sample involves testing for total coliforms and *E.coli*.
[36] A set schedule is a list of sampling locations identified by the EHO in consultation with the band's community-based water team.

**A public water system is a drinking water supply that services five or more buildings or facilities and involves the distribution of water through pipes or other constructed conveyances, like water trucks, to at least five different places. Often the public water supply serves 50 to 1000 people.**

**A semi-public water system provides water generally to a smaller population (<50) for human consumption, possibly but not necessarily, through pipes or other constructed conveyances.**

The regional average of 80% for routine scheduled samples for fiscal year 2009-2010 remains below the target of 100%. However, **several communities are to be congratulated for meeting the target and/or showing significant improvements** in following the accepted protocols for sampling and testing (Figure 3.1). Regional efforts continue to support all First Nations to achieve this goal.

## *Private Water System Microbiological Sampling/Testing*

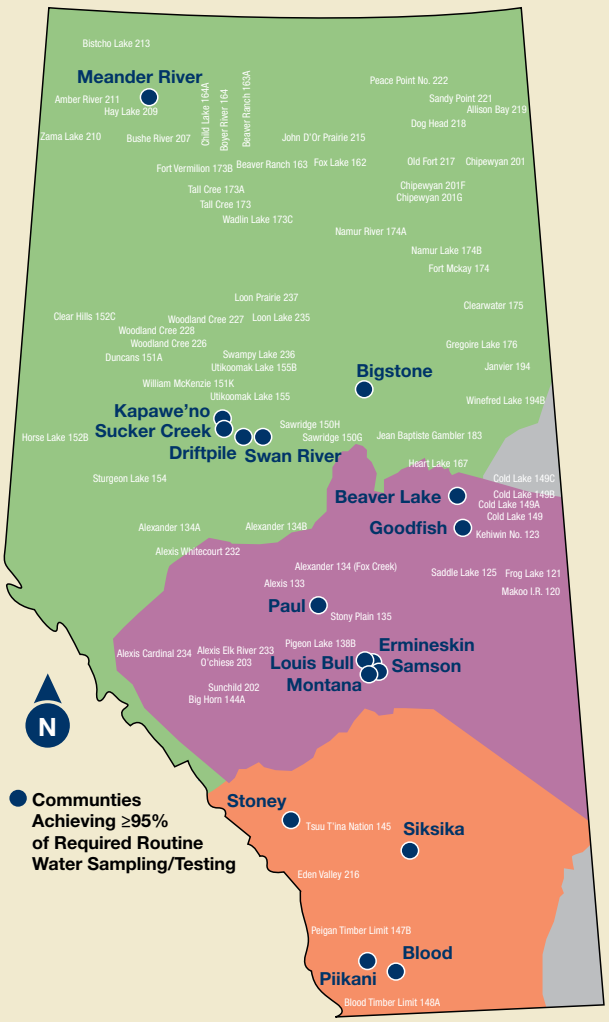
It is estimated that approximately two-thirds of houses in Alberta First Nations communities are served by private water supplies (wells or cisterns). A private water supply is a water supply that serves a single residence, building, lot, or workplace.

Table 3.2 summarizes the number of microbiological samples taken in fiscal year 2009-2010 for private wells and cisterns in addition to how many of these samples had at least one positive result for total coliforms and *E.coli*. Eighteen percent of private homes serviced by cisterns and 11% serviced by wells were positive for total coliforms. Of those houses that had at least one positive test for total coliforms, 11% with cisterns and 8% with wells tested positive for *E.coli* as well.

The data illustrate a greater proportion of positive results for total coliforms and *E.coli* in cisterns compared to wells, highlighting the fact that **cisterns are more likely to become contaminated with bacteria** compared to groundwater wells.

**FIGURE 3.1**

Alberta First Nations Communities Achieving ≥ 95% of Routine Water Sampling/Testing Goals, Fiscal Year 2009-2010




***Source:*** *Health Canada, WEI Database*

**Table 3.2.**

Summary of Sampling in Private Water Systems in Alberta First Nations Communities, Fiscal Year 2009-2010

| Water System Type | Number of Houses Tested | Number of Houses with at least one positive result for total coliforms (% of houses tested) | Number of Houses with at least one positive result for both total coliforms **and** ***E.coli*** (% of houses positive for total coliforms) |
|---|---|---|---|
| Well | 1951 | 219 (11%) | 18 (8%) |
| Cistern | 1183 | 213 (18%) | 24 (11%) |

***Source:*** *Health Canada, WEI Database*

### *Public Water System Chemical Sampling/Testing*

Chemical sampling of public water systems is required on a scheduled basis twice per year in First Nations communities, ideally once in the summer and once during the winter months. Parameters for chemical water sample tests are listed in the *Guidelines for Canadian Drinking Water Quality*. The parameters have guidelines that are listed as "aesthetic objectives" or "maximum acceptable concentrations" (health-related parameters). The maximum acceptable concentrations are based on scientific research and in most cases are set according to safe levels of consumption for a lifetime (70 years).

The fiscal year 2009-2010 was the first year EPHS statistics were accurately compiled for chemical monitoring of public water systems. A total of 84 public water systems were scheduled to be sampled: 40 (48%) were sampled twice, 33 (39%) were sampled once, and 11 (13%) had no samples taken. As the target is twice per year, steps are being taken to achieve this priority.

## Drinking Water Advisories

Drinking water advisories (DWAs) are issued by environmental health officers with the purpose of notifying the public about the safety of a particular drinking water supply. The EHOs work with a number of key individuals and organizations that have respective roles to maintain, provide, and/or monitor safe drinking water in Alberta First Nations communities. These include Chiefs and Councils, public works departments, water treatment plant operators, water truck drivers, community health representatives, circuit riders, and Indian and Northern Affairs Canada representatives.

In the 2009-2010 fiscal year, the number of advisories in Alberta First Nations communities declined to 41. This is mainly due to fewer drinking water advisories issued for semi-public water systems compared to previous years. Twenty-two were new advisories and 19 were carried forward from previous years (Table 3.3). It is important to note that an advisory is usually associated with a specific water system in a community. There may be multiple water systems in a community, but an advisory may only apply to a portion of that community (for example, part of a distribution line or a pumphouse that serves 10 homes). All 41 advisories were boil-water advisories.

**Table 3.3.**

Drinking Water Advisories in Alberta First Nations Communities, Fiscal Years 2004-2005 to 2009-2010

| Fiscal Year | Number of Drinking Water Advisories |
|---|---|
| 2004-2005 | 54 (in 21 communities) |
| 2005-2006 | 54 (in 23 communities) |
| 2006-2007 | 51 (in 23 communities) |
| 2007-2008 | 52 (in 22 communities) |
| 2008-2009 | 50 (in 27 communities) |
| 2009-2010 | 41 (in 24 communities) |

***Source:*** *Health Canada, CNPHI Water Advisory Database*

**A drinking water advisory can be in one of three forms:**

- **boil-water advisory**
- **do-not-consume/drink advisory**
- **do-not-use advisory**

### *Reasons for the 2009-2010 Drinking Water Advisories*

A drinking water advisory can be issued for a number of reasons, including operational issues and/or water quality issues. Operational reasons refer to equipment and processes that normally are involved in the safe production of drinking water. When one of the processes or pieces of equipment fails, there is an impact on the treatment process and the water quality. Water quality reasons refer to the impact or finding in the treated water, and are quite often the resulting consequence of operational issues. For example, if a chlorine pump fails (operational reason), then the resulting treated water will not be effectively disinfected, and bacteria may be present (water quality reason).

The method of reporting DWAs for 2009-2010 represents a change from previous years. The new advisory database through the Canadian Network of Public Health Intelligence (CNPHI) allows for more advanced analysis and interpretation. **The data have demonstrated that there is a clear impact of operational issues affecting the drinking water quality in First Nations communities. This highlights the need for preventive maintenance and measures to correct issues related to equipment failure, an underlying cause for many drinking water advisories.**

The majority of operational reasons for DWAs was treatment/distribution equipment damage, or failure (30%); inadequate disinfection residual in the distribution system (20%); and undetermined source of contamination (15%). The majority of the water quality concerns resulted from total coliforms (bacteria) being detected in the drinking water supply (61%). Further details are discussed in the following sections.

**FIGURE 3.2**

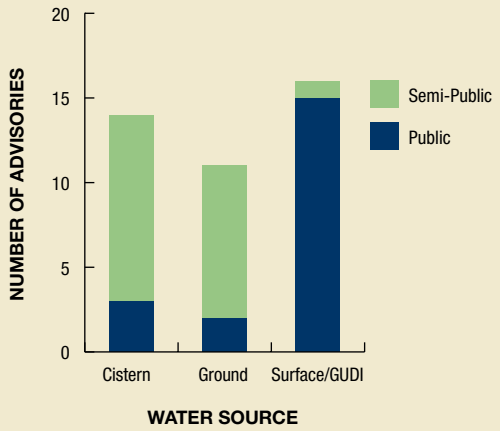
Alberta First Nations Communities with Drinking Water Advisories, by Drinking Water Supply Type, Fiscal Year 2009-2010


***Source:*** *Health Canada, CNPHI Water Advisory Database*

The map in Figure 3.2 illustrates Alberta First Nations communities that had at least one DWA in fiscal year 2009-2010, by drinking water supply type.

**FIGURE 3.3**

Drinking Water Advisories in Alberta First Nations Communities, by Water Supply and Source Type, Fiscal Year 2009-2010




n = 41 advisories

***Source:*** *Health Canada, CNPHI Water Advisory Database*

Types of drinking water *supply* are categorized as public, semi-public, or private. DWAs for private systems are not systematically reported to EPHS, therefore this report only includes public and semi-public water advisories. The water *source* type refers to the location from which the water supply is taken (e.g. ground, surface, etc.). The water source will usually depend on accessibility, quality, and quantity of the water available. More detailed definitions of the various drinking water supply and source types can be found in Appendix 5.

Figure 3.3 shows the number of drinking water advisories by water supply and source type. The 16 DWAs issued for **surface water and groundwater under the direct influence (GUDI) of surface water** mainly occurred because of failure or damage to the treatment/distribution equipment, inadequate disinfection residual found in the distribution system, and an undetermined source of contamination.

Factors that lead up to DWAs for these two water supply types differ and are important to examine because they allow for a better understanding of why advisories occur. DWAs issued for total coliforms found in the drinking water supply were primarily found in semi-public water systems versus public (over 50% more). Similarly, advisories issued because of the detection of *E.coli* in the drinking water system were found more frequently in semi-public water supply systems (14%) as compared to the public water supply systems (5%). The presence of *E.coli* in the semi-public water system was likely due to lack of treatment and disinfection.

Fourteen advisories were issued for cisterns. It is important to note that a cistern is not a true water source as it can have water from a surface or ground water treatment plant. DWAs in 2009-2010 associated with cisterns all had surface water as the source. Operational issues with cisterns were predominantly related to damage to the cistern. The use of a cistern as a means to supply drinking water is challenging due to the lack of standards for their design (CSA standards do not currently exist). Also, once installed, cisterns are prone to cracking and/or leaking due to weather/environmental conditions (freeze/thaw cycles, settling), as well as surface contamination.

The following section examines DWAs for public and semi-public water systems by type of water source and duration of advisories.

### *Public Water System Drinking Water Advisories*

In the fiscal year 2009-2010, 20 DWAs were related to public water systems. The duration of the water advisories (the number of days for which an advisory is issued) ranged from six days to 1,355 days. The median duration was 36 days. Of the 20 advisories issued, eight were for 15 to less than 90 days and eight lasted for 90 days or more (Figure 3.4).

The majority of DWAs in public water systems resulted from failure or damage to treatment/distribution equipment (30%) or poor disinfection in the distribution system (20%). The remaining 50% were due to seven other reasons as outlined in Figure 3.5.

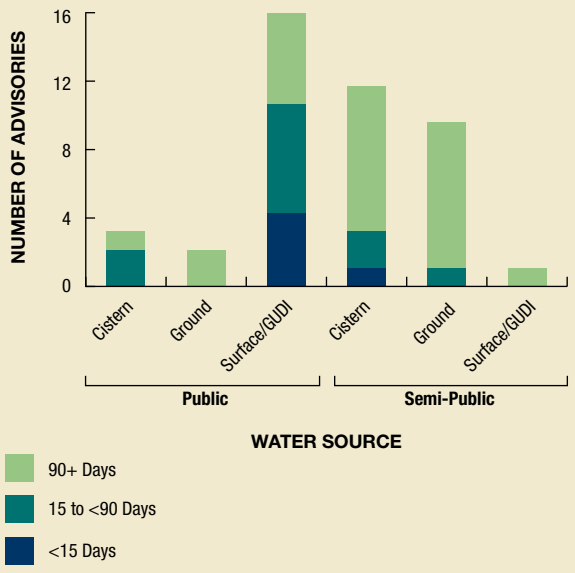
Thirty-five per cent of the water quality reasons for DWAs in public systems were due to total coliforms being detected in the drinking water supply (see Figure 3.6). Line breaks or pressure loss found in the distribution system (25%) also contributed to many DWAs in public water systems.

Operational issues related to the storage, treatment, and distribution of drinking water are, in most cases, the root causes for compromised water quality. The detection of total coliforms in the drinking water system in public supply types often resulted from inadequate disinfection residual found in the distribution system. Similarly, line breaks or loss of pressure in the distribution system occurred as a result of treatment/distribution failure or damage.

As shown in Figure 3.4, the number of DWAs for surface water sources is higher in public water systems compared to semi-public water systems. Semi-public systems are usually serviced by a cistern or a well and not directly by surface water sources. Several DWAs issued for public systems with surface water sources occurred because of treatment/ distribution equipment failure or damage (Figure 3.5).

**FIGURE 3.4**

Drinking Water Advisories in Alberta First Nations Communities, by Type of Water Supply and Source, and Duration of Advisory, Fiscal Year 2009-2010

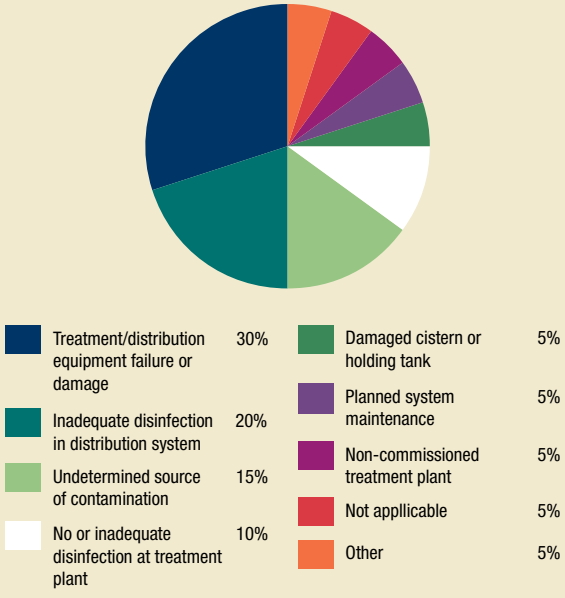



n = 41 advisories

***Source:*** *Health Canada, CNPHI Water Advisory Database*

**FIGURE 3.5**

Distribution of Drinking Water Advisories in Public Water Supply Systems of Alberta First Nations Communities, by Operational Reason, Fiscal Year 2009-2010

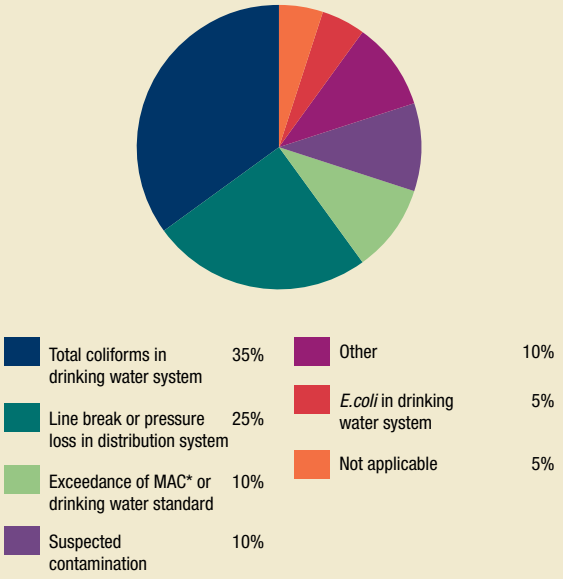



n = 20 advisories

***Source:*** *Health Canada, CNPHI Water Advisory Database*

**FIGURE 3.6**

Distribution of Drinking Water Advisories in Public Water Supply Systems of Alberta First Nations Communities, by Water Quality Reason, Fiscal Year 2009-2010



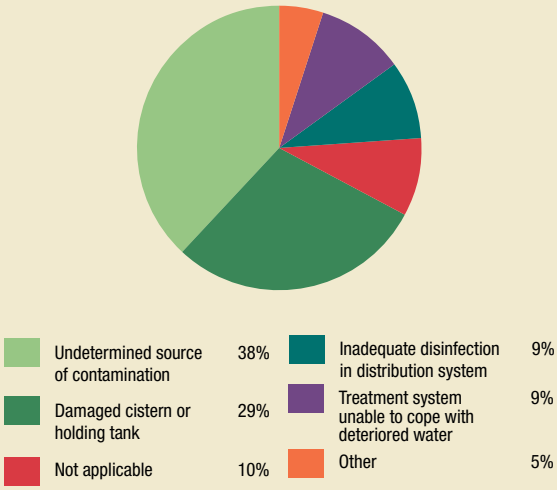

n = 20 advisories

* MAC = maximum acceptable concentration. This is a health-related parameter set out in the Guidelines for Canadian Drinking Water Quality.

***Source:*** *Health Canada, CNPHI Water Advisory Database*

**FIGURE 3.7**

Distribution of Drinking Water Advisories in Semi-Public Water Supply Systems of Alberta First Nations Communities, by Operational Reason, Fiscal Year 2009-2010




n = 21 advisories

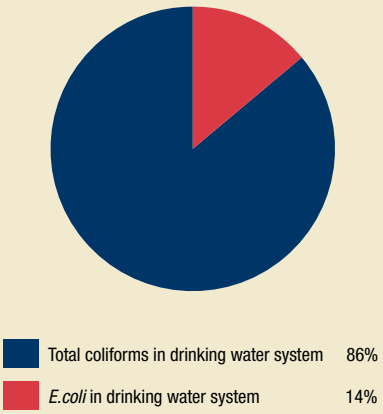
***Source:*** *Health Canada, CNPHI Water Advisory Database*

## *Semi-Public Water System Drinking Water Advisories*

In the 2009-2010 fiscal year, 21 DWAs were related to semi-public water system types. Thirty-eight percent of these DWAs were the result of an undetermined source of contamination, meaning identification of the source or reason for the contamination could not be achieved (Figure 3.7). Two water quality reasons were assigned for the semi-public advisories: 86% for total coliforms found in the drinking water system and 14%for the identification of *E.coli* in the drinking water system (Figure 3.8). Upon further analysis of these advisories, the detection of total coliforms in the drinking water system often resulted from damage to a cistern and undetermined source of contamination (12 out of 18). Once a cistern is damaged, it is subject to contamination.

**FIGURE 3.8**

Distribution of Drinking Water Advisories in Semi-Public Water Supply Systems of Alberta First Nations Communities, by Water Quality Reason, Fiscal Year 2009-2010




n = 21 advisories

***Source:*** *Health Canada, CNPHI Water Advisory Database*

Forty-three percent of DWAs issued in the semi-public systems were due to contamination in groundwater sources (as compared to 10% in the public systems) (Figure 3.4). However, semi-public systems were more likely to have an advisory on a cistern versus groundwater. Issues with cisterns in these systems generally occurred as a result of damage to the cistern and undetermined source of contamination. Only one advisory for the semi-public systems was issued for groundwater under direct influence.

Advisories lasted longer in semi-public systems compared to public systems (median 456 days versus 36 days, respectively) (Figure 3.4). This may be attributed to the larger number of carried-forward DWAs for semi-public systems.

Factors affecting the number and long duration of drinking water advisories in semi-public water supplies can vary, and may include the following:

- Less attention may be provided to smaller systems during construction.
- Semi-public water supplies may not be considered a high priority for the community, as these supplies often serve a smaller population than a public water supply.
- Semi-public water supplies often serve a business or organization that may not have sufficient funding to address the issue.
- Regular maintenance may not occur on semi-public water supplies, compared to a public water supply.
- Access to contractors may be difficult depending on the location. For example, remote communities may have more difficulty accessing contractors than First Nations communities that are situated closer to major cities or towns.
- Semi-public water supplies are most commonly supplied by cisterns or wells. Cisterns, in particular, are prone to contamination if not properly installed and/or maintained. Surface runoff and soil can enter through improperly sealed joins, cracks, and/or missing/broken lids and vents. As the access opening is most often above ground, the cistern is also potentially accessible to the general public and animals. Wells may be contaminated due to a contaminated aquifer, cracked well casings, missing cover, etc.

## ENVIRONMENTAL PUBLIC HEALTH INSPECTION PROGRAMS

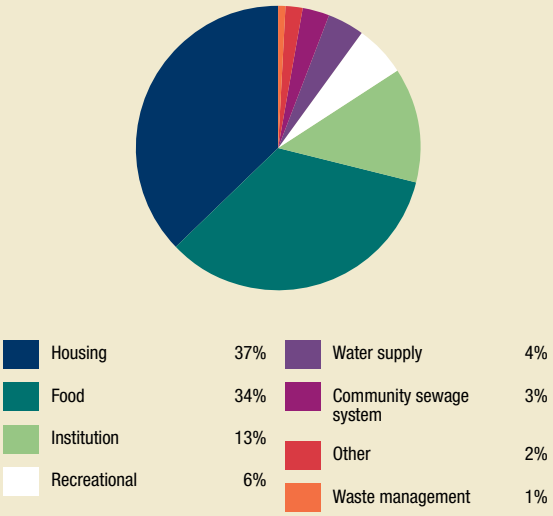
Environmental health officers carry out routine, requested, and follow-up public health inspections in First Nations communities. EHOs work in collaboration with health centre staff and other community staffs from band departments, such as Public Works and Housing.

Inspections of facilities are conducted on a routine basis as outlined in community-specific environmental public health workplans. They are carried out in accordance with the *Alberta Public Health Act* standards and regulations. The Act and its supporting regulations are used as guides for minimum requirements to protect the health and safety of the public.

A total of 2,355 facility inspections were carried out in 2009-2010, compared to 2,100 in the previous fiscal year. Figure 3.9 illustrates the types of facilities inspected by EHOs in the communities. Housing and food facility inspections constituted the majority (71%) of inspections conducted over the 2009-2010 fiscal year.

**FIGURE 3.9**

Distribution of Facility Inspections Conducted in Alberta First Nations Communities, by Type, Fiscal Year 2009-2010




n = 2,355 inspections
* Other = animal and aquatic facilities, personal services, worksites, special events.

***Source:*** *Health Canada, Hedgehog Inspection Database*

## Housing Inspections

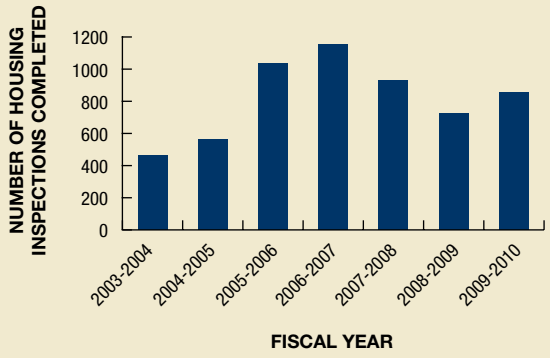
The Ottawa Charter for Health Promotion[37] lists shelter or housing as a prerequisite for a foundation to improve health.

In First Nations communities, housing inspections are carried out **only upon request**[38]. The condition of the house is compared to the standards set in the Minimum Housing and Health Standards under the *Alberta Public Health Act*. The limits set in these standards are intended to establish the minimum conditions essential for good health and to make housing safe, sanitary, and fit for human habitation. There are currently **no enforcement mechanisms** for ensuring compliance with Minimum Housing and Health Standards in First Nations communities. Consequently, once a housing inspection is completed, it is the **responsibility of the First Nations communities and the resident(s)** to deal with any identified issues.

Between April 1, 2009 and March 31, 2010, 857 housing inspections were completed in the Alberta First Nations communities. Figure 3.10 shows trends over time for the total number of housing inspections.

**FIGURE 3.10**

Completed Housing Inspections* (Non-Routine) Requested by Alberta First Nations Communities, by Type, Fiscal Years 2003-2004 to 2009-2010




* These inspections include those completed as a result of major events, such as flooding and investigations into a housing complex containing asbestos (2006).

***Source:*** *Health Canada, Hedgehog Inspection Database*

[37] World Health Organization, Health and Welfare Canada, Canadian Public Health Association. 1986. *Ottawa Charter for Health Promotion*. Ottawa.
[38] Housing inspections are completed based on requests/complaints, which results in the number varying from year to year. PSDS inspections are also completed only upon notification and request from a First Nations community.

While there may be a specific reason for a housing inspection request, an EHO makes observations of other existing potential public health concerns in the course of carrying out that inspection. As shown in Table 3.4, 60% of deficiencies are related to interior and exterior housing structural issues. If exterior deficiencies are not addressed, they can lead to interior structural issues in a house.

A deficiency refers to a public health issue within a particular category. For example, an issue with a floor, whether it is missing or in disrepair, may affect an occupant's health or safety. As seen in Figure 3.11, 54% of the interior deficiencies observed during residential inspections were for floors (19%), walls (18%), and flood or moisture damage (17%). These three interior deficiencies are all potentially related to exterior deficiencies and/or to one another, and can result in the (further) rapid deterioration of building materials and place the health of occupants at risk.

Deficiencies of windows, doors, gutters/downspouts/extensions, and decks/steps/patios make up 81% of all observations related to the exterior of a house (Figure 3.12). The entry of moisture into the building through damaged windows, doors, gutters, downspouts, and extensions that are not functioning properly is of concern to public health. If the exterior deficiencies are allowing moisture to enter a home, then the interior of the house will also be compromised by the presence of moisture, predisposing building materials to deterioration due to water damage and potential mould. These deficiencies pose safety concerns and require targeted prevention measures.

There continues to be a significant lack of implementation of corrective action as recommended in the public health inspection reports. **Housing remains a significant and important public health issue that requires multi-stakeholder intervention and commitment to work towards a sustainable healthy on-reserve housing program**.

**Table 3.4**

Deficiencies Observed in Housing Inspections in Alberta First Nations Communities, by Category, Fiscal Year 2009-2010

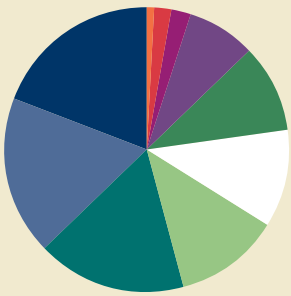
| OBSERVATION CATEGORY | FREQUENCY* | PERCENTAGE |
|---|---|---|
| Structure (interior) | 1,058 | 31% |
| Exterior | 993 | 29% |
| Water system | 224 | 7% |
| Wastewater system | 218 | 6% |
| Mould | 172 | 5% |
| Ventilation system | 162 | 5% |
| Electrical system | 144 | 4% |
| Pest control | 139 | 4% |
| Heating system | 104 | 3% |
| Operational | 87 | 3% |
| Occupancy, indoor air quality, design | 83 | 2% |
| Required appliances/fixtures | 44 | 1% |
| Structure/equipment | 37 | 1% |
| Total Potential Public Health Concerns | 3,385 | 100% |

* An observation may be reported more than once in a home (e.g., structural damage at two different places in the same home), thus the number of observations exceeds the number of inspections.

***Source:*** *Health Canada, Hedgehog Inspection Database*

**FIGURE 3.11**

Distribution of Deficiencies Observed for Interior Sites of Houses Inspected in Alberta First Nations Communities, Fiscal Year 2009-2010



| | | | |
|---|---|---|---|
| Floors | 19% | Structural maintenance | 10% |
| Walls | 18% | Smoke detector | 8% |
| Flood/moisture damage | 17% | Window size (egress) | 2% |
| Cabinets, railings | 12% | Cooking facilities | 2% |
| Ceilings, crawlspaces, attics | 11% | Barrier-free design | 1% |

n = 1,058 deficiencies observed

***Source:*** *Health Canada, Hedgehog Inspection Database*

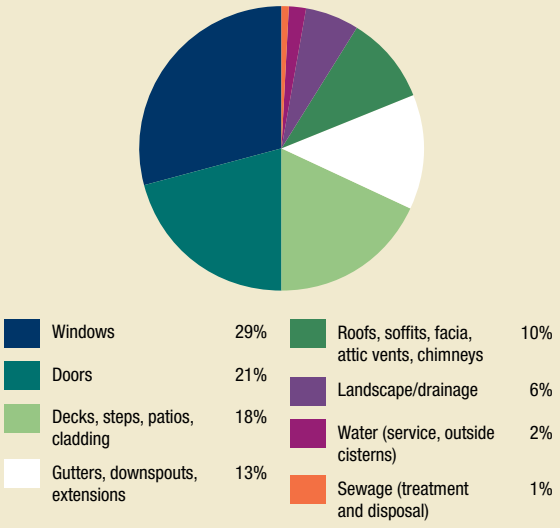
## Private Sewage Disposal Systems Inspections

Private sewage disposal system (PSDS) inspections are completed for new and replacement sewage systems at the request of First Nations communities and may involve several inspections for each location, from pre-site to final installation inspection.

Between April 1, 2009 and March 31, 2010, 304 PSDS inspections were completed in the Alberta First Nations communities. Figure 3.13 shows trends over time for the number of private sewage and disposal system installation inspections completed.

**FIGURE 3.12**

Distribution of Deficiencies Observed for Exterior Sites of Houses Inspected in Alberta First Nations Communities, Fiscal Year 2009-2010

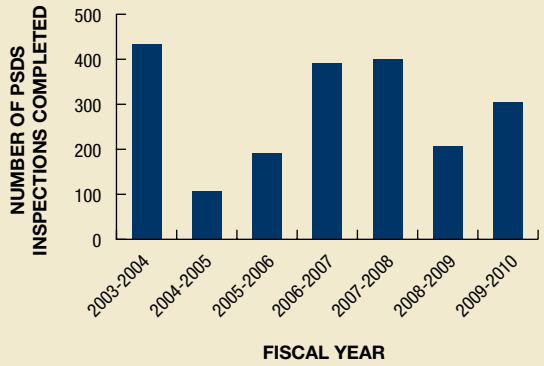



n = 993 deficiencies observed

***Source:*** *Health Canada, Hedgehog Inspection Database*

**FIGURE 3.13**

Number of Private Sewage Disposal System Inspections Completed, Fiscal Years 2003-2004 to 2009-2010




*Health Canada, Hedgehog Inspection Database*

## Food Safety Inspections

Environmental Public Health Services addresses the public health issues related to food safety. This includes proper supply, storage, preparation, and distribution of food. EPHS inspect facilities where food is produced, sold, or prepared in accordance with the *Alberta Public Health Act* and the associated regulations. EPHS work in collaboration with communities in order to increase community awareness, provide training, increase food safety, and ultimately prevent foodborne illnesses.

As illustrated in Figure 3.9, food inspections comprised approximately 34% of all inspections in the communities (n = 795). Nearly 50% of food facility inspections were completed in community food service facilities such as restaurants, school lunch programs, and daycare kitchens. Mobile food vendors, such as those present at powwows, constituted the second largest group at 37%. The remainder of food inspections were in retail food facilities (12%), such as grocery or convenience stores, and only 15 inspections (1%) were conducted in food manufacturing facilities. In retail and food service facilities, the majority of inspections was routine or workplan (i.e. planned) inspections, while requests (not scheduled) were the leading reason for inspections conducted in mobile vendor facilities (Figure 3.14). EHOs follow up to assess outstanding deficiencies.

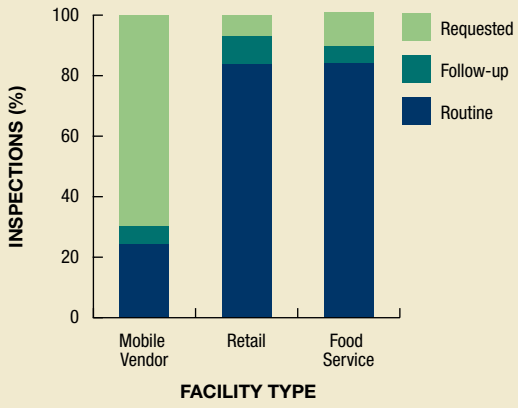
## Institutional Facilities Inspections

Environmental Public Health Services conduct routine and requested inspections of institutional facilities to help prevent the spread of communicable disease, minimize public health risks, and reduce safety hazards. Institutional facilities are considered higher risk facilities as they have more susceptible populations such as children and the elderly. Because of this, it is important to ensure that the health and safety aspects of the operation of these facilities are routinely monitored and inspected.

Institutions, including community care facilities like Head Start and daycares, health care facilities, continuing care centers, and schools accounted for 13% of regional inspections in 2009-2010 (Figure 3.9 on page 63). Of the 300 institutional facility inspections, the majority was conducted in community care facilities (44%) and schools (38%). In each of these types of facilities, a large portion of inspections was routine-based (Figure 3.15).

**FIGURE 3.14**

Distribution of Food Facility Inspections in Alberta First Nations Communities, by Type of Facility* and Inspection, Fiscal Year 2009-2010



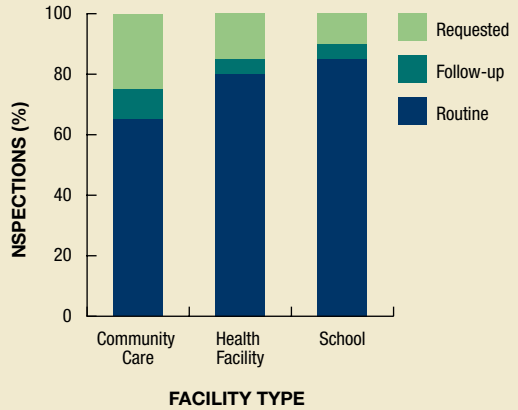

n = 795 inspections

* Data not shown for manufacturing/storage facilities (15 inspections: 9 routine, 2 requested, 4 follow-up).

***Source:*** *Health Canada, Hedgehog Inspection Database*

**FIGURE 3.15**

Distribution of Institutional Facility Inspections in Alberta First Nations Communities, by Facility and Inspection Type, Fiscal Year 2009-2010




n = 300 inspections

***Source:*** *Health Canada, Hedgehog Inspection Database*

## Community Solid Waste Disposal Inspections

Solid waste disposal facilities include water transfer stations, landfills, and unapproved disposal sites (dumps). Risks associated with improper solid waste or garbage disposal present serious public health hazards and can contribute to nuisance conditions within a community[39]. For example, waste disposal sites attract pests and vermin, which may serve as vectors in the spread of communicable disease. Improperly sited and poorly designed and/or maintained waste disposal sites may contribute to contamination of ground and surface water supplies, resulting in potentially serious human health impacts. Additional nuisance problems are often associated with poorly managed waste sites and include concerns with odour, litter, noise, traffic, and air quality.

A total of 31 routine inspections were completed at community solid waste facilities in 2009-2010. Findings of these inspections will be analyzed and are expected to be available in next year's report. The proper operation and monitoring of solid waste disposal facilities continue to be significant public health concerns in many parts of the Alberta Region.

## Wastewater Facilities Inspections

Wastewater, also known as sewage, can be harmful to humans and animals, as it is capable of spreading diseases and polluting surface and groundwater sources. Poorly designed, maintained, and operated facilities can have a significant public health impact in a community and warrant immediate attention. Environmental Public Health Services conduct inspections of community wastewater facilities to identify any potential public health concerns.

In 2009-2010, 36 inspections were conducted at wastewater facilities in First Nations communities in Alberta. The vast majority of these were routine inspections; findings of these inspections will be analyzed and are expected to be available in next year's report.

## ENVIRONMENTAL PUBLIC HEALTH TRAINING PROGRAMS

A component of the Environmental Public Health Food Safety Program is the training of individuals involved with food handling. The following food safety training activities were carried out in 2009-2010:

- ***Food Safety Course:*** EPHS provided 45 food safety courses, resulting in the training of 538 food handlers in First Nations communities in Alberta Region. Participants completing this training obtain a provincially-recognized certificate which complies with the requirements of the Alberta Food Regulation. This certification is also recognized in numerous other provinces across Canada.
- ***Short Food Safety Course:*** EPHS also conducted 16 sessions of the short food safety course to 308 food handlers in First Nations communities in Alberta Region.

## ENVIRONMENTAL CONTAMINANTS AND RESEARCH PROGRAMS

EPHS administers the Regional First Nations Environmental Contaminants Program and assists communities with submissions to the National Environmental Contaminants Program. First Nations communities identify and carry out community-specific research related to environmental public health concerns. In fiscal year 2009-2010, two community projects were funded for the Alberta Regional First Nations Environmental Contaminants Program on housing and health, as well as water contaminants of emerging concern. Final reports on both projects are expected in the near future.

[39] A **nuisance condition** under the *Alberta Public Health Act* is defined as "a condition that is or might become injurious or dangerous to public health, or that might hinder in any manner in the prevention or suppression of disease."

# Appendices

# APPENDIX 1: LIST OF FIGURES

## Vital Statistics



## Communicable Disease Control

## Environmental Public Health



# LIST OF TABLES

## Vital Statistics

## Communicable Disease Control



## Environmental Public Health

## APPENDIX 2: ALBERTA ROUTINE IMMUNIZATION SCHEDULE 2009

| **Recommended schedule for your child's immunizations** | |
|---|---|
| 2 months | Diptheria, Pertussis, Tetanus, Polio, Hib<br>Meningococcal<br>Pneumoccocal |
| 4 months | Diptheria, Pertussis, Tetanus, Polio, Hib<br>Pneumoccocal |
| 6 months | Diptheria, Pertussis, Tetanus, Polio, Hib<br>Pneumoccocal |
| 12 months | Measles, Mumps, Rubella<br>Chicken Pox<br>Meningococcal |
| 18 months | Diptheria, Pertussis, Tetanus, Polio, Hib<br>Pneumoccocal |
| 4-6 years | Diptheria, Pertussis, Tetanus, Polio<br>Measles, Mumps, Rubella |
| Grade 5 | Hepatitis B<br>Human Papillomavirus (girls only) |
| Grade 9 | Diptheria, Pertussis, Tetanus<br>Tetanus and Diptheria every ten years |

# APPENDIX 3: VACCINE-PREVENTABLE DISEASES

**Diphtheria** is a serious, sometimes fatal, disease affecting the upper respiratory tract and is caused by a type of bacterium. Routine immunization has been in place for many years in Canada; as a result there are currently less than five cases reported nationally each year.

**Genital human papillomavirus** (HPV) is the most common sexually transmitted infection. HPV is responsible for a large proportion of cervical cancers and genital warts. The HPV vaccine, a new vaccine that prevents several genital cancers, especially those of the cervix, became available in Alberta in the fall of 2008 and was offered to Grade 5 girls in schools across the province. Research is underway to examine the possibility of extending this vaccine to boys of the same age group to prevent HPV-related cancers, such as penile cancer.

***Haemophilus influenzae*** **type b** (Hib) was the leading cause of bacterial meningitis prior to introduction of this vaccine. Hib infection can result in severe neurologic outcomes and approximately 5% of cases are fatal. Routine immunization against Hib has led to a significant reduction in the incidence of this disease in Canada.

**Hepatitis B** is an acute illness caused by several viruses, one being the hepatitis B virus (HBV). It has a case fatality rate of 1- 2%, which increases with age. The incidence of hepatitis B has been decreasing in all age groups in recent years, coinciding with the increasing use of the vaccine.

**Influenza** is a respiratory disease caused by influenza A and B viruses and occurs in Canada every year, generally during the late fall and winter months. These viruses change constantly and a new vaccine is developed every year. Immunization against influenza must therefore be administered annually in order to provide optimal protection. In Canada, 2500 - 4000 deaths occur due to seasonal influenza every year, in addition to many more thousands who are hospitalized or require intensive care.

**Invasive meningococcal disease** (IMD) can cause very serious infections similar to pneumococcal organisms and can result in death, even with appropriate treatment. It is also most common in young children, especially those less than one year of age. It is contagious and can be spread through coughing and sneezing, similar to the common cold. The incidence of meningococcal disease has been very low in recent years, with an average of 298 cases reported annually in Canada. In addition, IMD cases have a seasonal variation with the majority of cases occurring in the winter months. Meningococcal C (MenC) vaccine is recommended for routine immunization of infants.

**Invasive pneumococcal disease** (IPD) is common in very young children, the elderly, and specific populations such as First Nations on-reserve populations. Pneumococcal organisms are the leading cause of some very serious infections, including infection of the brain (meningitis), bloodstream (bacteremia), lungs (bacterial pneumonia), or middle ear (otitis media). IPD infection rates in First Nations communities throughout Alberta are four to six times higher than the province rate.

**Measles** is a viral disease which is the leading cause of vaccine-preventable deaths in children worldwide. In Canada, the number of measles cases decreased rapidly with the introduction of the measles vaccine and the addition of a second dose to the routine immunization schedule in 1996-1997.

**Mumps** is an acute infectious disease caused by a virus with an average of 87 cases reported annually in Canada.

**Pertussis**, also known as whooping cough, is a highly communicable respiratory disease that is particularly severe among infants. In the last 50 years, the incidence of pertussis has decreased by more than 90%. However, outbreaks continue to occur throughout Canada, including several in Alberta in the past year.

**Poliomyelitis** is caused by a virus. The disease has not been reported in Canada for many years due to a very effective vaccination program.

**Rubella** is also a viral disease with an average annual incidence of 0.08 per 100,000 in 1998 and 0.03 per 100,000 in 2004.

**Tetanus** is a disease that can often be fatal. It is most frequently caused by a wound becoming contaminated with a bacterium that is commonly found in soils and human or animal feces. In Canada, there has been a considerable decline in cases since development of the vaccine, with fewer than 10 cases per year since the early 1970's.

**Varicella**, also known as chickenpox, is a common childhood disease. The percentage of children who have had the infection increases with age. A reliable history of varicella disease in those more than 12 months of age is adequate evidence of immunity, and there is little value of administering the vaccine to such persons. A history of varicella disease is therefore obtained prior to immunization.

# APPENDIX 4: SEXUALLY TRANSMITTED INFECTIONS

**Chlamydia** is the most commonly reported sexually transmitted infection (STI) in Canada. It is caused by bacteria transmitted by sexual contact or from infected mothers to their babies during delivery. Babies born to females with untreated chlamydia infections can develop eye or lung problems after birth. If left untreated in adults, chlamydia can also lead to long-term complications, such as pelvic inflammatory disease in women and urinary problems in men.

**Gonorrhea** is a sexually transmitted infection caused by bacteria. This STI is usually easily treated with antibiotics. However, many strains of the bacteria that cause gonorrhea have become resistant to antibiotics. Complications similar to that noted for chlamydia can also arise if left untreated. Use of a condom is an effective way to prevent transmission of this disease, thus promotion of safe-sex programs can play an integral part in reducing the incidence of this and other STIs.

**HIV Infection** is a disease caused by the human immunodeficiency virus (HIV). This chronic progressive illness gradually destroys the immune system, making infected people vulnerable to opportunistic infections and cancers. When the body can no longer fight infection, the disease is known as AIDS (Acquired Immunodeficiency Syndrome). On average, it takes more than 10 years to progress from initial HIV infection to AIDS. However, this progression occurs much faster in younger age groups like children. There is no cure for AIDS and currently no vaccine against HIV infection.

**Syphilis** remains the least frequently reported STI, although there are concerns it may be on the rise. Even though rates in recent years were still very low, given the potentially serious consequences of this disease, ongoing monitoring is important.

# APPENDIX 5: DEFINITIONS

**Alberta general population***: the entire population in the province of Alberta.*

**cistern/holding tank:** *used to store treated water delivered from water haulers, generally constructed from concrete, fiberglass, or polyethylene*. As additional handling is required, such as transferring water from a reservoir to a truck and then from the truck to the cistern, there are more opportunities for contamination to occur. It is important to note that a cistern is not a true water source as it can have its water from a surface or ground water treatment plant.

**cold chain break:** *occurs when vaccines are exposed to temperatures outside of the recommended range of 2°C to 8°C.* Each cold chain break incident is assessed to determine if the vaccine can still be used or if it must be discarded.

**groundwater:** *found underground, in the spaces between the rocks and soil, called aquifers*. This drinking water source type is less vulnerable to contamination than other water source types.

**groundwater under the direct influence** (GUDI): *groundwater source is located close enough to nearby surface water, such as a river or lake, to receive direct surface water recharge*. This drinking water source type is vulnerable to contamination.

**H1N1:** *a subtype of influenza A virus.* It was the most common cause of human influenza in 2009. In June 2009, the World Health Organization declared the new strain of swine-origin H1N1, which spread worldwide, as a pandemic. The H1N1 influenza pandemic was declared over in August 2010.

**immunization coverage rates:** *the percentage of individuals within a specific age group immunized as recommended.*

**immunization target rates:** *the percentage of the population that is required to be immunized to obtain the optimal protective effects of vaccines.*

**immunization uptake rates:** *The percentage of individuals within a specific age group that have started the recommended vaccines.*

**neoplasm:** *a tumor; an abnormal growth of tissue.* A neoplasm may be benign or malignant (cancer).

**private water supply:** *services an individual facility that serves a single residence (including residences that have up to four units in their building footprint), building, lot, workplace or similar place, and where the public does not have any interest in such a water supply.* Private water supply drinking water advisories that are issued by Environmental Public Health Services refer to groups of homes serviced by a water truck. This drinking water supply type will usually service less than 10 people.

**provoked animal attack:** *an attack where the human did something to "provoke" the animal (even if the action was unintentional) and the attack would be the animal's normal response to such a human action.* Examples of such human actions could include: attempting to corner or trap an animal, entering an area that the animal considers its territory (e.g. dog in a yard) or approaching an animal's litter, coming too close to an injured animal, trying to break up a fight between two animals, picking up an animal and attempting to take it elsewhere, petting an unfamiliar animal, interfering with an animal's food, and interfering/wrestling with an animal's owner.

**public water supply** (PWS): *drinking water supply that services more than five buildings or facilities and involves the distribution of water through pipes or other constructed conveyances (such as water trucks) to at least five different places.* This drinking water supply type usually serves from 50 to 1000 people.

**semi-public water supply** (SPWS): *system for the provision of water to the public for human consumption, potentially, but not necessarily, through pipes or other constructed conveyances, such as cisterns or wells.* This drinking water supply type usually serves a smaller population (<50), but the public has a reasonable expectation of access.

**surface water:** *water from sources such as rivers, lakes, streams, dugouts.* This drinking water source type is vulnerable to contamination.

**vaccine management:** *the process of vaccine distribution, from ordering vaccines to the time they are administered.*

## APPENDIX 6: ACRONYMS AND INITIALISMS USED IN THIS REPORT

| | |
|---|---|
| AHS | Alberta Health Services |
| AVS | Alberta Vital Statistics |
| BP | Bloodborne Pathogen |
| CCB | Cold Chain Break (Vaccine Management) |
| CDC | Communicable Disease Control |
| CHR | Community Health Representative |
| CHN | Community Health Nurse |
| CNPHI | Canadian Network of Public Health Intelligence |
| CSA | Canadian Standards Association |
| dTap | Diphtheria, Tetanus, and Acellular Pertussis (Vaccine) |
| DTaP-IPV | Diphtheria, Tetanus, Acellular Pertussis, and Inactive Polio Vaccine |
| DWA | Drinking Water Advisory |
| EHO | Environmental Health Officer |
| EPHS | Environmental Public Health Services |
| FNIH | First Nations and Inuit Health |
| FNMD | First Nations Mortality Database |
| GUDI | Groundwater Under the Direct Influence |
| HBV | Hepatitis B Virus (Vaccine) |
| HCV | Hepatitis C Virus |
| Hib | *Haemophilus Influenzae* Type b (Vaccine) |
| HIV | Human Immunodeficiency Virus |
| HPV | Human Papillomavirus (Vaccine) |
| iGAS | Invasive Group A Streptococcal (Infection/Disease) |
| IMD | Invasive Meningococcal Disease |
| INAC | Indian and Northern Affairs Canada |
| IPD | Invasive Pneumococcal Disease |
| LTBI | Latent Tuberculosis Infection |
| MAC | Maximum Acceptable Concentration |
| MenC | Meningococcal Serogroup C (Conjugate Vaccine) |
| MMR | Measles, Mumps, and Rubella (Vaccine) |
| PCV7 | Pneumococcal Conjugate 7-Valent (Vaccine) |
| PPV23 | Pneumococcal Polysaccharide 23-Valent (Vaccine) |
| PSDS | Private Sewage Disposal System |
| SC | Series Complete (Immunization) |
| STI | Sexually Transmitted Infection |
| TB | Tuberculosis |
| TST | Tuberculin Skin Test |
| VZV | Varicella-Zoster Virus (Vaccine and/or History of Varicella Disease) |
| WEI | Water, Environment, and Infrastructure (Database) |

## APPENDIX 7: ALBERTA REGION HEALTH PROTECTION CONTACT INFORMATION

**Medical Officer of Health:**
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