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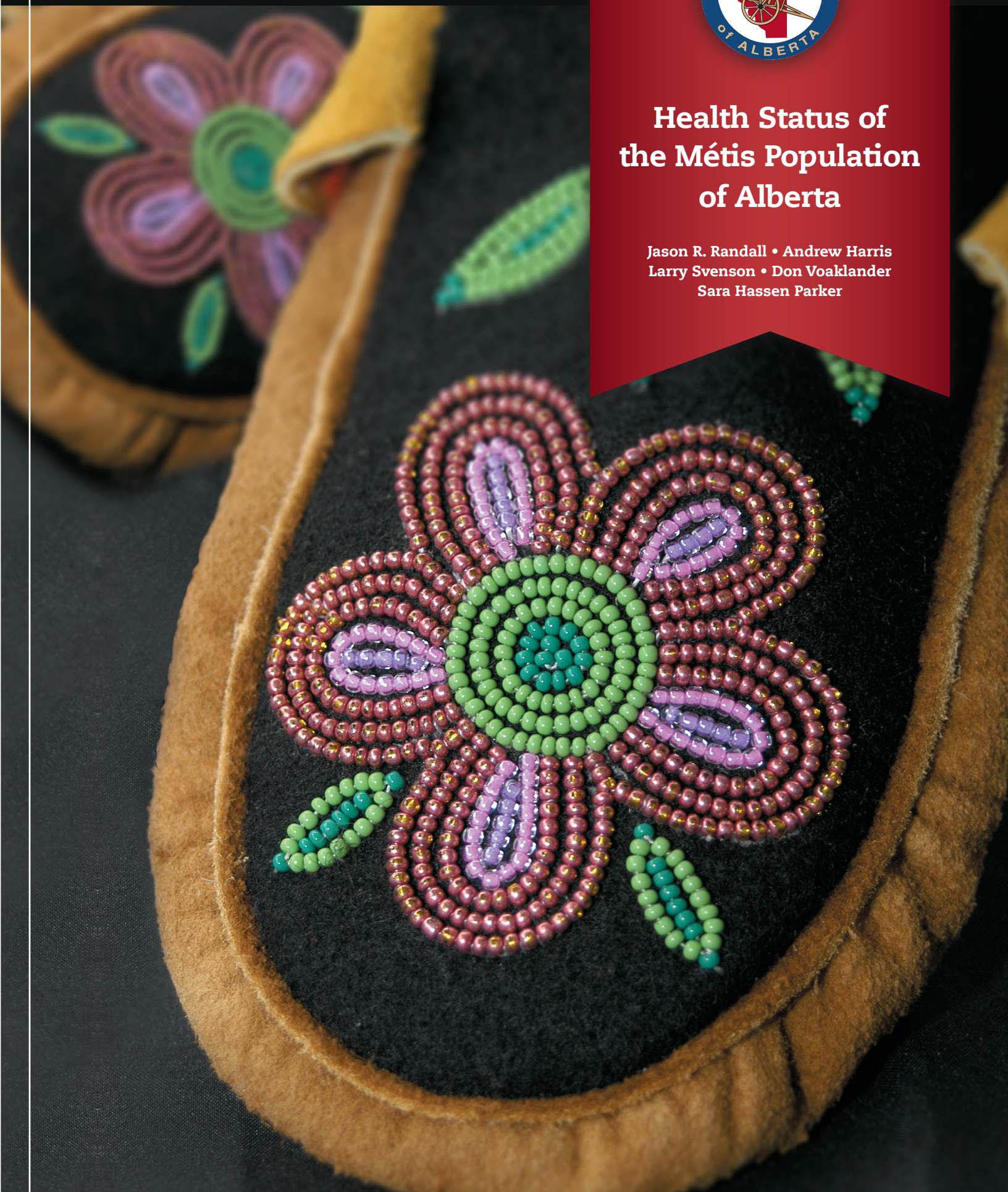

Health Status of the Métis Population of Alberta

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Chapter 1 Introduction and Methodology

1.1 Métis Health in Canada

Comparisons between Aboriginal and non-Aboriginal populations in Canada are often cited to emphasis disparities on a broad range of topics, including health. The Aboriginal population in Canada is comprised of three broad classifications—Métis, Inuit, and First Nations populations—as identified in the Constitution Act of 1982, Part II, Section 35 (Government of Canada, 1982). The 2006 Canadian census reported that slightly more than 1.17 million Canadians (3.75%) identified themselves as an Aboriginal (Statistics Canada, 2008). The majority of these individuals identified primarily as First Nation (59.52%), Métis (33.24%), and Inuit (4.30%).

The Métis National Council defines Métis as "a person who self-identifies as a Métis, is distinct from other Aboriginal peoples, is of historic Métis Nation ancestry, and is accepted by the Métis Nation" (Métis Nation Council, 2010). In the past decade, the Métis population has nearly doubled. Between 1996 – 2006, Statistics Canada reported a 91% increase for people identifying as Métis (Statistics Canada, 2008). Statistics Canada's 2006 Aboriginal People's Survey (APS) reported that the vast majority of Métis (87%) resided in the four western Canadian provinces and Ontario, with the majority living in Alberta (Statistics Canada, 2008). The 2006 APS also reported that the Métis population had a greater proportion of children less than 15 years of age compared to the Canadian population (25% vs. 17%) (Statistics Canada, 2008). The majority of Métis (70%) resided in a urban area, and twice as many Métis (41% vs. 20%) resided in smaller urban centers (population less than 100,000) than non-Aboriginals (Statistics Canada, 2008). Research on the Métis population, and specifically Métis health, has been identified as under-represented (Furgal, Garvin, & Jardine, 2010; Young, 2003). Although numerous studies on Aboriginal health exist, few studies differentiate findings between the Métis, Inuit, and First Nation populations (Wilson & Young, 2008; Young, 2003). By not distinguishing between Métis, First

Nations, and Inuit, previous approaches to describing health issues for Aboriginals may lead to erroneous conclusions and ineffective solutions for improving health, as the Métis, Inuit, and First Nation populations are not the same. Published research conducted solely on Métis populations (or research that differentiates between Métis, Inuit, and First Nation) appears to primarily focus on the prevalence of diabetes (Bruce, 2000; Bruce, Kliewer, Young, Mayer, & Wajda, 2003; Oster & Toth, 2009; Ralph-Campbell et al., 2009). Although the prevalence of diabetes in the Métis is of concern, little research has been conducted on other health issues with a specific focus on the Métis population.

1.1.1 Health

Reporting on findings from the 2006 APS (Statistics Canada, 2008), Janz, Seto, and Turner (Janz, Seto, & Turner, 2009) indicated that 58% of Métis 15 to 34 years of age reported their health status as *very good* or *excellent*. However, the percentage of Métis individuals who reported very good or excellent health status, compared to the general population, declined for all age-groups after 34 years of age. In the previous 12 months, parents reported that 54% of children 6 – 14 years of age had seen a family physician or general practitioner, 32% had seen a specialist, and 18% had been seen by a nurse, while dental care was provided to 82% of the children. A slightly lower percentage of Métis reported having a family physician compared to the Canadian population (81% vs. 86%). A higher proportion of those who reported to have seen a physician resided in urban areas (57% vs. 46%), and compared to the Canadian population, Métis reported similar proportions of satisfaction with the care that was provided (Janz et al., 2009).

Janz et al. (2009) reported that nearly 70% of Métis felt there was something they could do to improve their health status; however, Métis over 65 years of age were least likely to report that they could improve their health (48%), followed by those who rated their health as *poor* (57%), and *excellent*

(63%). The most commonly reported way to improve one's health was to increase exercise, followed by altering eating habits (16%), and quit smoking (12%).

In a study that conducted focus groups with Métis women, Bartlett (2004) reported that Métis women's conceptions of health and well-being could be grouped into *spiritual*, *emotional*, *physical*, and *intellectual/mental* dimensions of well-being; however despite these conceptions of health and well-being, they are not incorporated into health or social programs for Métis women (Bartlett, 2004). Additionally, it was observed that neither the presence nor the absence of disease was directly conveyed as factors related to health or well-being (Bartlett, 2004). Bartlett suggests that culturally appropriate services, programs, and research further explore the inclusion of *spiritual*, *emotional*, *physical*, and *intellectual/mental* dimensions of well-being, rather than the current approach of a primarily physical well-being.

Socio-Economic Status

Socio-economic status (SES) is known to affect health status; however, the effect of SES specific to Métis health has been rarely been researched. Bruce, Kliewer, Young, Mayer, and Wajda (2003), although not strictly investigating SES, observed that Métis who had attained less than a grade 9 education had significantly higher odds of having diabetes by 1.81 times (1.26, 2.60). Bruce (2000) has also observed that Métis have more than double the rate of unemployment than non-Aboriginals, with nearly half of the Métis in western Canada earning less than $10,000 per year. Janz et al. (2009) also reported that twice as many Métis, compared to non-Aboriginals, have less than a grade 9 education (24% vs. 12%). Statistics Canada (Statistics Canada, 2008) found that Métis are nearly twice as likely to live in a crowded residence or a residence in need of major repairs, when compared to non-Aboriginals.

The percentage of Métis living in a crowded residence, compared to the general population, was markedly higher in rural regions of Saskatchewan and Alberta.

1.1.2 Pregnancy

Wenman, Joffres, Tataryn, and the Edmonton Perinatal Infections Group (2004) investigated pregnancy risk factors for Aboriginal and non-Aboriginal women recruited from four obstetric offices. Although this study did not focus on pregnancy risk factors for Métis specifically, the authors did identify some disparities and similarities between pregnant Métis and First Nations women. Compared to First Nation women, significantly more pregnant Métis women were married (46% vs. 16%; $p < 0.01$), and the mean age at enrollment (first prenatal visit) was significantly higher for pregnant Métis women (27.6 years vs. 24.7 years; $p < 0.05$).

The proportion of pregnant Métis women who were living below the poverty line was more than half as many reported for pregnant First Nation's women (15% vs. 43%); however, this difference was not statistically significancant. Smoking and alcohol consumption were reported by 36% and 20% of the pregnant Métis women respectively. Métis women delivered nearly twice as many low birth weight babies (16% vs. 9%) as First Nation females, and slightly more than triple the proportion of low birth weight babies (16% vs. 5%) when compared to non-Aboriginals. Compared to non-Aboriginals, Métis women were observed to have more than double the proportion of premature births (16% vs. 7%), but half as many over-weight (Macrosomia) babies (5% vs. 11%) (12).

1.1.3 Mortality

Using Canadian mortality data, Tjepkema, Wilkins, Senécal, Guimond, and Penney (2009) found that the life expectancy for males, who had attained 25 years of age, was 49.5 addition years for Métis,

compared to 52.8 addition years for non-Aboriginals, and 48.4 addition years for Registered Indians. For females, additional years of life expectancy past the age of 25 were 53.7, 59.2, and 52.9 years for Métis, non-Aboriginals, and Registered Indians, respectively. The probability of survival from 25 to 75 years of age for Métis males and females was 56.7% and 63.3%, compared to 64.3% and 79.4% for non-Aboriginals, and 50.7% and 61.5% for Registered Indians.

Age-standardized mortality rates for Métis males and females were found to be significantly higher when compared to non-Aboriginals (Rate Ratio [RR] males: 1.38, RR females : 1.72). The estimation for the rate ratio for potential years of life lost (PYLL) for this population was 2.01 for males or 1.96 for females. The most common causes of death for Métis males were circulatory system disorders (32%), cancer (all types 23%), and injury (external causes 18%). Causes of death for Métis females were cancer (all types 33%), circulatory system disorders (29%), respiratory diseases (7%), injuries (6%), and digestive system disorders (6%). Mortality rate-ratios for Métis males and females, compared to non-Aboriginals, are displayed in table 1.1 and table 1.2.

Injury

Despite injury being a major cause of death in Aboriginal populations, few published research articles address injuries (Young, 2003). Tjepkema et al. (2009) reported that age-

Table 1.1 Mortality rate-ratios for male Métis

Cause of Death		95% Confidence Interval	
	Rate Ratio	Low	High
All Cause	1.38	1.26	1.51
Infectious Disease	1.74	1.02	2.95
Cancer	0.94	0.78	1.12
Endocrine system diseases	1.86	1.22	2.83
Mental disorders	1.74	0.89	3.38
Nervous system diseases	1.16	0.62	2.17
Circulatory diseases	1.29	1.11	1.50
Respiratory diseases	1.46	1.07	2.01
Digestive diseases	1.93	1.29	2.88
Genitourinary diseases	1.50	0.75	3.02
Musculoskeletal diseases	2.50	0.80	7.79
Ill-defined conditions	1.24	0.55	2.80
External causes	2.65	2.13	3.31
Smoking Related	1.14	0.90	1.43
Alcohol Related	3.23	2.05	5.10
Unknown / Other	2.09	0.86	5.11

Source: Adapted from Tjepkema, Wilkins, Senécal, Guimond, and Penny (2009).
*Reference is non-Aboriginal cohort members; All cohort members 25 years of age or older at baseline

Table 1.1 Mortality rate-ratios for female Métis

Cause of Death		95% Confidence Interval	
	Rate Ratio	Low	High
All Cause	1.72	1.55	1.91
Infectious Disease	2.99	1.41	6.37
Cancer	1.34	1.12	1.61
Endocrine system diseases	2.66	1.68	4.20
Mental disorders	2.90	1.55	5.40
Nervous system diseases	1.55	0.80	3.00
Circulatory diseases	1.71	1.42	2.06
Respiratory diseases	2.00	1.37	2.93
Digestive diseases	3.01	2.00	4.52
Genitourinary diseases	2.97	1.43	6.18
Musculoskeletal diseases	1.99	0.64	6.20
Ill-defined conditions	2.18	0.97	4.92
External causes	1.89	1.24	2.88
Smoking Related	1.75	1.32	2.31
Alcohol Related	6.22	3.42	11.32
Unknown / Other	2.30	0.94	5.61

Source: Adapted from Tjepkema, Wilkins, Senécal, Guimond, and Penny (2009).
*Reference is non-Aboriginal cohort members; All cohort members 25 years of age or older at baseline

standardized mortality rates (ASMR) for Métis males over the age of 25, due to external causes, was 142.9/100,000 person-year at risk, while external cause ASMR for non-Aboriginals and Registered Indians were 53.9/100,000 and 189.4/100,000, respectively. ASMR for Métis females over the age of 25, due to external causes, was 35.0 per 100,000 person-year at risk, while external cause ASMR for non-Aboriginals and Registered Indians were 18.5 per 100,000 and 67.6 per 100,000, respectively.

Tjepkema et al. (2009) observed Rate-ratios for mortality due to overall injury for Métis males to be 2.65, compared to non-Aboriginals. Mortality rate-ratios for Métis male due to falls (1.84), drowning (6.94), suicide (4.60), homicide (4.76), poisoning (3.52), motor vehicle collisions (MVCs) (3.22) were all higher compared to the non-Aboriginal cohort. Mortality rate-ratios for overall injury causes for Métis females were observed to be 1.89, compared to the non-Aboriginal sample. Mortality rates-ratios for cause specific injuries were 0.85 for suicide, 6.71 for poisoning, and 2.37 for MVCs. Mortality rate-ratios for both Métis males and females were lower than for Registered Indians, when compared to non-Aboriginals. A follow up paper (Tjepkema, Wilkins, Senecal, Guimond, & Penny, 2011) also indicated the discrepancy for potential years of life lost (PYLL) was high for injuries compared to other causes of death obtaining a risk ratio of 2.59 for women and 3.26 for men compared to the non-Aboriginal population.

1.1.4 Chronic Disease

Janz et al. (Janz et al., 2009) reported that chronic conditions were self-reported by 54% of Métis 15 years and older. Of those, 25% reported a single chronic condition, while 28% reported two or more chronic illnesses. More females reported both one, and two or more chronic conditions (57% & 31% respectively) compared to 50% and 24% for males, respectively. After age-standardization, arthritis (21%), hypertension (16%), asthma (14%), and stomach problems or intestinal ulcers (12%) were the most commonly reported chronic conditions. For Métis children 6 – 14 years of age, the most commonly

reported chronic health issues by their parents/guardian were allergies (19%), asthma (15%), and ear infections/ear problems (9%) (Janz et al., 2009). More asthma was reported in Métis boys compared to Métis girls (18% vs. 12%), and a greater percentage of children with asthma resided in urban areas (16% vs. 12%).

By age-group, the most commonly reported chronic conditions for Métis 15 years and older, were asthma (20%), arthritis/ rheumatism (19%), and arthritis/ rheumatism (32%) and high blood pressure (24%) for those 15 – 19, 35 – 44, and 45 – 54 years of age, respectively. Similar percentages of reported arthritis/rheumatism and high blood pressure were reported for the Métis and the Canadian population, aged 65 years and older (Janz et al., 2009). It was also reported that males and females had similar rates of hypertension, diabetes, ulcers, and heart conditions.

Diabetes

In the past decade, diabetes has increased across Canada. For Aboriginal Canadians the current prevalence of diabetes is more than double that of non-Aboriginals. Bruce (2000), using data from the 1991 Aboriginal Peoples Survey, reported that the rate of diabetes in the Métis population (6.1%) is double the rate for non-Aboriginals. Métis who reported being a diabetic were also more likely to report to have a poor health status. After controlling for age, sex, arthritis, hypertension, heart problems, and emphysema, individuals reporting to be a diabetic were more likely to report activity limitations (OR: 1.7; 95% CI: 1.2, 2.5), required assistance for activities of daily living (ADL) (OR: 1.7; 95% CI: 1.1, 2.8), and mobility constraints (OR: 1.6; 95%CI: 1.1, 2.4) (Bruce, 2000). Those with diabetes were more likely to report hypertension (OR: 2.7), cardiovascular disease (OR: 2.1), and ophthalmologic disorders, compared to Métis without diabetes.

Bruce et al. (2003) compared the diabetes prevalence of Métis in Manitoba to the general population of Manitoba. Métis 15 years and older as well as Métis 25 years and older had higher prevalence of diabetes for both age-groups (crude and age-standardized) compared to the general population of Manitoba. Female Métis had higher prevalence of diabetes than males (crude and age-standardized), while the prevalence of diabetes for the general population of Manitoba was relatively similar. It was further identified that Manitoba Métis have a higher prevalence of diabetes compared to the broader population of Métis in Canada—this was especially true in the case of male Métis. Among Métis, females were almost twice as likely to have diabetes when compared to males (OR: 1.99; 95% CI: 1.41, 2.80). As age increased, the odds having diabetes dramatically increased to 4.20 (2.98, 6.05) for those aged 25-49, and 12.60 (6.03, 26.4) for those aged 50 and older, compared to those aged 15 – 24 years of age. Métis with a BMI greater than or equal to 30 were more than three times more likely to have diabetes.

Oster and Toth (2009) investigated the prevalence of diabetes risk factors between the Métis, First Nations, and non-Aboriginal individuals, through the use of three separate diabetes screening programs in a number of rural or remote communities in Alberta. The authors found that Métis, after adjusting for age and sex, were 20% less likely to be obese ($p<0.01$), 30% less likely to have abnormal waist circumference ($p<0.01$), and significantly less obesity ($p<0.01$), compared to the First Nations group. Additionally, Métis were also 54% less likely to have reported a history of gestational diabetes (OR: 0.46; $p<0.01$). Conversely, more Métis were overweight ($p<0.05$), hypertensive ($p<0.01$), and 39% more likely to be pre-diabetic ($p<0.01$), when compared to the First Nations group. Also, the risk of heart problems and the risk of high blood pressure were more than two and three times greater for Métis with diabetes compared to Métis without diabetes, respectively. The authors concluded that Métis individuals, despite having fewer risk factors for diabetes than the First Nations group, may constitute

an intermediate risk category, between the First Nations and non-Aboriginal populations (Oster & Toth, 2009).

In another study, Ralph-Campbell et al. (2009) observed a 66% increase (2.8% vs. 4.6%; p=0.01) in the prevalence of diabetes in Métis living on Alberta settlements from 1998 – 2006. Adjusting for age, they observed the prevalence of diabetes had also increased significantly ($p<0.05$) from 5.1% to 6.9%, while females had a significantly higher prevalence compared to males (7.8% vs. 6.1%; $p<0.05$). The reported prevalence of undiagnosed diabetes was 5.3% and the prevalence of pre-diabetes was 20.3% using the Canadian Diabetes Association (CDA) criteria and 51.9% using the American Diabetes Association (ADA) criteria. The prevalence of a low to medium ADA risk score was 27.8% (95%CI: 24.5, 31.1) while the prevalence of a high ADA risk score was 67.4% (95%CI: 63.9, 70.9) (Ralph-Campbell et al., 2009). Furthermore, the authors also reported that 46% of the adults were found to have metabolic syndrome. Nearly 50% of those screened for diabetes were obese, nearly 70% had abnormal waist circumferences, 80% were physically inactive, and 43% reported a parent who had diabetes.

1.1.5 Infectious Diseases

In Alberta, Yip, Bhargava, Yao, Sutherland, Manfreda, and Long (Yip et al., 2007) investigated pediatric tuberculosis (TB) occurring from 1990 to 2004. Of 95 cases that met their inclusion criteria, 12 cases were observed for Métis children less than 15 years of age. Canadian born non-Aboriginals accounted for 18 cases (11 parents foreign, 7 parents Canadian born) and Status Indians accounted for 45 cases.

1.1.6 Summary

The Métis population has grown substantially since 1996 (Statistics Canada, 2008). Mortality in the Métis population for numerous causes was higher than the non-Aboriginal population (Tjepkema et al., 2009). As such, there is likely to be a greater proportion of Métis, compared to non-Aboriginals, suffering from these same chronic conditions that result in higher mortality rates. The Métis carry a substantially disproportionate burden of disease, considering the Métis account for only 1.25% of the entire Canadian population. As the prevalence of diabetes in the Métis population is more than double that of non-Aboriginals (Bruce, 2000; Ralph-Campbell et al., 2009; Bruce et al., 2003) the vast number of co-morbidities, such as obesity and hypertension, are concerning. More research, on a variety of health topics, that distinguishes between Métis and other Aboriginal populations need to be completed with the goal of improving health and understanding culturally important issues that affects health outcomes.

1.2 Outline of Report

This report will outline the health status of the Aboriginal population in the province of Alberta with a focus on Métis health. This study will examine the main causes of mortality in the Métis population and compare standardized rates between Aboriginal groups (including the Métis) and the rest of the population of Alberta. This study will also attempt to examine the burden of disease for Albertan's with the focus once again being targeted at the health of the Métis population. This report will attempt to determine the burden of disease by assessing measures of health systems utilization, namely physician contact and the rate of physician services utilized, as well as determine a period prevalence rate for the major disease clusters identified in the International Classification of Disease 10th Revision Canadian Version (ICD-10-CA). The goal of this endeavour is to get up-to-date information on

the current health status of the Métis population, compared to the general population of Alberta, and to determine specific areas of concern regarding Métis health. Identifying conditions with the greatest health disparities will allow policy makers and other stakeholders to determine priorities for health interventions and begin to implement health strategies.

This report is divided in 7 Chapters:

Chapter 2 Demographics

This chapter briefly outlines the current demographic profile of the populations being examined in this study.

Chapter 3 Mortality

This chapter examines the standardized rates of mortality for the populations divided by ICD General Mortality, Condensed list of causes of death.

Chapter 4 Health Service Utilization

This chapter examines the rate of utilization of physician services. It examines physician claims records as well as the usage of emergency departments and inpatient services.

Chapter 5 Morbidity

This chapter estimates 1 year period prevalence of disease and injury. It examines the morbidity of the populations of interest by ICD-10 CA chapter as well as by the selected diseases outlined earlier.

Chapter 6 Disease-specific health utilization

This chapter will focus on several selected physical and mental health conditions as well as injuries. The rates of these conditions will be assessed using the emergency, inpatient and physician claims records.

Chapter 7 Conclusions and Recommendations

This chapter examines the usage of the emergency department and inpatient wards by ICD-10 CA chapter diagnosis. Visits attributed to external causes are examined in further detail to determine the main external causes of acute care patient visits.

1.3 Methodology

Populations

The definitions for the First Nations, Métis, Inuit, and the non-Aboriginal populations were determined to be as follows: 1) the First Nations population refers to any person who is registered with the Government of Canada under the *Indian Act* of Canada, 2) Inuit refers to any individual who is registered with the Government of Canada as an Inuit, 3) Métis refers to any individual who has satisfied the registration requirements of the Métis Nation of Alberta (MNA) is registered on the MNA Identification Registry, and 4) the non-Aboriginal population refers to any and all individuals who are not identified to be a member of the First Nations, Métis, or Inuit. Any First Nations, Inuit, or Métis who were not able to be accurately indicated as such, were also included in the non-Aboriginal population. Those who were classified in more than one group in the data were classified in the following order: Métis, Inuit, First Nations and then non-Aboriginal. Therefore, all patients classified as Métis at any point in the database would be considered Métis throughout the whole database. Additionally, data classified

as both First Nations and Inuit were categorized as only Inuit for this analysis. This is done to ensure that the Métis and Inuit categories are as comprehensive as possible.

Data

This study is a population-based, descriptive epidemiological study of mortality data from 1 January 2000 to 31 December 2008. Data were obtained from Alberta Health (AH). Data from Alberta Vital Statistics Registry were linked with Personal Health Numbers from the Alberta Health Care Insurance Plan (AHCIP). The AHCIP registry file contains a field that indicates which records are for First Nations, Inuit, and members of the general population. To indicate mortality records for the Métis population, data from the AHCIP were linked with the Métis Nation of Alberta Identification Registry, supplied by the Métis Nation of Alberta. Ethical approval for this multi-year, retrospective review of Alberta mortality data was obtained from the Health Research Ethics Board (HREB) at the University of Alberta. Mortality, morbidity and health system utilization estimates were obtained using data obtained from AH for the calendar year of 2009. These data were coded using the International Classification of Diseases, Ninth revision (ICD-9). The ambulatory care and emergency department (ED) data were obtained from the Ambulatory Care Classification System (ACCS). Inpatient data were obtained from the Discharge Abstract Database (DAD). The sections on ambulatory care, ED and inpatient data, were coded using the 10th revision of the International Classification of Diseases Canadian Adaptation (ICD-10-CA).(2009) Age-standardized mortality rates (ASMRs) and mortality rate-ratios (MRRs) were tabulated according to the ICD-10-CA chapter categories for mortality tabulation list 1 (General mortality, condensed list).(2009)

Disease Coding

In addition to coding diseases based on ICD-10-CA chapter, diseases of particular interest were also coded. Physical diseases of interest included heart disease, hypertension, respiratory diseases, cancer, diabetes and stroke. Mental health illnesses including mood disorders, neurotic disorders, schizophrenia, personality disorders, dementia, and alcohol and drug abuse were also analyzed. Injuries were examined in fuller detail based on the coding for external causation of injury as well as the intentionality of the injury (i.e., unintentional versus intentionally caused injuries). The specific coding for each of the diseases is contained within the appendix at the end of this report.

Analysis

Age- and sex specific rates were calculated as well as age-standardized rates, standardized to the 1991 Canadian Census population, using the direct method. Data were grouped for every 5 years of age (i.e., <5, 5 – 9, 10 – 14, 85+). While no corrections were made for the standardized rate itself, where the residual standard error was higher and the number of events observed for an age-specific stratum was 0, we estimated the number of events age-specific strata's to be 0.5 events to correct for the zero variance that was observed. Where zero events were indicated for a specific diagnostic code for an entire population, upper 95% confidence intervals (CI) were calculated as by using the rule of three's (Eypasch et al. 1995). Rate ratios for mortality, morbidity and health utilization were calculated by taking the exponentiation (antilog) of the difference between the logs of the standardized rates (SRs) for the smaller population and larger population (Formula 1). Confidence intervals for the rate ratios were calculated by taking the exponentiation of the log difference of the SR multiplied by the product of plus/minus 1.96 multiplied by the standard error of the smaller population's SMR divided by the smaller population's SR (Formula 2).

Formula 1

$\ln(\text{diff}) = \text{Exp}((\ln(SR_b)) - (\ln(SR_a)))$

Formula 2

$\text{Exp}((\ln(\text{diff})) \pm (1.96(SE_b / SR_b)))$

Age specific rates were graphed for service utilization, including emergency department, inpatient ward and ambulatory care usaged. Age-specific rates were also graphed depicting the percent in each group that visited atleast one physician during the 2009 calendar year. These graphs were also created for the specific diseases identified in the Disease Coding section.

Reference List

Bartlett, J. (2004). Conceptions and dimensions of health and well-being for Métis women in Manitoba. *Int J Circumpolar Health, 63,* 107-113.

Bruce, S. (2000). The impact of diabetes mellitus among the Métis of western Canada. *Ethn Health, 5,* 47-57.

Bruce, S., Kliewer, E., Young, T., Mayer, T., & Wajda, A. (2003). Diabetes among the Métis of Canada: Defining the population, estimating the disease. *Canadian Journal of Diabetes, 27,* 442-448.

Eypasch, E. Lefering, R., Kum, C.K.,Troidl, H. (1995). Probability of adverse events that have not yet occurred: a statistical reminder. *BMJ* 311 (7005): 619-620.

Furgal, C., Garvin, T., & Jardine, C. (2010). Trends in the study of Aboriginal health risks in Canada. *International Journal of Circumpolar Health, 69,* 322-332.

Government of Canada, D. o. J. (1982). Constitution Act, 1982. Section 35(2).

Janz, T, Seto, J, and Turner, A (2009). Aboriginal Peoples Survey, 2006. An Overview of the Health of the Métis Population. Statistics Canada.

Métis Nation Council (2010). Who are the Métis? National Definition of Métis.

Oster, R. & Toth, E. (2009). Differences in the prevalence of diabetes risk-factors among First Nation, Métis and non-Aboriginal adults attending screening clinics in rural Alberta, Canada. *Rural Remote Health, 9,* 1170.

Ralph-Campbell, K., Oster, R., Conner, T., Pick, M., Pohar, S., Thompson, P. et al. (2009). Increasing rates of diabetes and cardiovascular risk in Métis Settlements in northern Alberta. *Int J Circumpolar Health, 68,* 433-442.

Statistics Canada (2008). Aboriginal Peoples in Canada in 2006: Inuit, Métis and First Nations, 2006 Census. http://dsp-psd.pwgsc.gc.ca/collection_2008/statcan/97-558-X/97-558-XIE2006001.pdf.

Tjepkema, M., Wilkins, R., Senecal, S., Guimond, E., & Penny, C. (2009). Mortality of Métis and Registered Indian Adults in Canada: An 11-year follow-up study. *Health Reports, 20*.

Tjepkema, M., Wilkins, R., Senecal, S., Guimond, E., & Penny, C. (2011). Potential years of life lost at ages 25 to 74 among Métis and non-Status Indians, 1991 to 2001. *Health Reports, 22,* 37-46.

Wenman, W., Joffres, M., Tataryn, I., & Edmonton Perinatal Infections Group (2004). A prospective cohort study of pregnancy risk factors and birth outcomes in Aboriginal women. *CMAJ, 171,* 585-589.

Wilkins, R., Tjepkema, M., Mustard, C., & Choiniere, R. (2008). The Canadian census mortality follow-up study, 1991 through 2001. *Health Reports, 19,* 25-43.

Wilson, K. & Young, T. (2008). An overview of Aboriginal health research in the social sciences: current trends and future directions. *Int J Circumpolar Health, 67,* 179-189.

Yip, D., Bhargava, R., Yao, Y., Sutherland, K., Manfreda, J., & Long, R. (2007). Pediatric tuberculosis in Alberta: epidemiology and case characteristics (1990-2004). *Can J Public Health, 98,* 276-280.

Young, T. (2003). Review of research on aboriginal populations in Canada: relevance to their health needs. *BMJ, 327,* 419-422.

Chapter 2 Demographics

This chapter details the demographics of the Métis population in Alberta and compares demographics between the Métis, First Nations, Inuit and the rest of Alberta's population. The size of the populations to be analyzed in this report and the distribution of those populations, by age and sex, will have an impact on the reliability of the estimates obtained. Small populations increase the variability of the estimates and make them unreliable. A small population within specific age-groups will increase the variability of the graphs produced to show rate by age-group even if the total population is large enough to gain a reasonably accurate age/sex-standardized estimate of rate. Finally, if there are large derivations in the shape of the population depicted in a population pyramid then this indicates the potential for bias in results.

Key Findings

The Métis population has an unusual distribution. This may be due to the demographic composition of the MNA Registry. Specifically there is a distinct underrepresentation of children relative to adults registered with the MNA. This is likely due to the use of the Métis membership list as the method of identifying the Métis population used in the study. This observation could suggest that the results of the analysis in the following chapters may result in results that are applicable only to the adult Métis population. Readers of this report should be cautious in applying the results of this analysis to those Métis that are not officially registered with the MNA.

The age distribution of the Inuit population is comprised to largely by seniors (age > 65) with a relatively lower proportion of children and working age adults. This suggests that the population is comprised of a significant portion of Inuit that have immigrated to Alberta from the northern territories. The large proportion of Inuit over the age of 60 may be due to retirees moving into Alberta for

geographical reasons such as a more hospitable climate or for increased access to services such as health care. The unusual population distribution and small number of Inuit in the province will reduce the reliability of the estimates for this population in some portions of the data analysis. The Inuit will therefore not always be a consistent group to use as a comparison for the Métis. The First Nations and non-Aboriginal populations have a more typical age and sex distribution. They should be able to provide reliable estimates to use as comparisons for the Métis population.

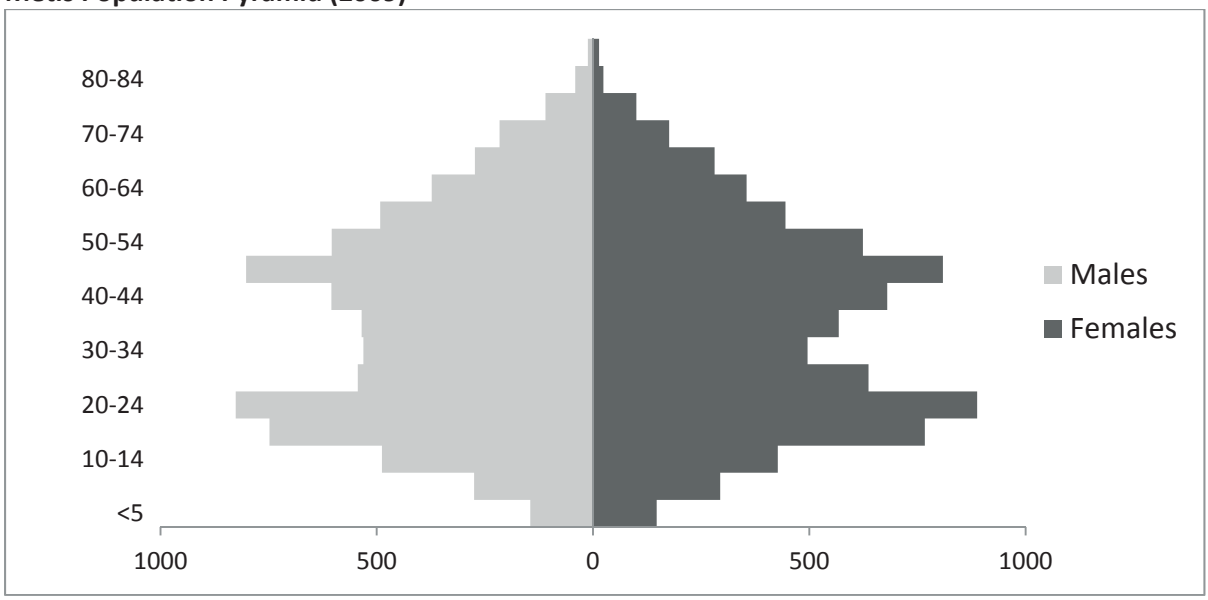
Section 2.1 Population Distribution

The population of the Métis, Inuit and First Nations and the non-Aboriginal population are depicted in the graphs and tables below. For simplicity, the years compared are those from the year 2009 that are used for the chapters discussing health system utilization and morbidity. **Graph 2.1** is the population pyramid for the Métis population in 2009. A triangular shape with a large bottom and narrow top is indicative of a population with a high birthrate and death rate with a correspondingly low life expectancy. Advanced western countries are expected to have a population pyramids that more closely approximate rectangles rather than pyramids; particularly in the early and middle age-groups. The population pyramid for the Métis indicates two population spikes at the age-groups 45-49 and 20-24. The lower age brackets have populations that are considerably lower than would be expected. Although this may be due partially to a recent reduction in birthrates among the Métis population other factors are certainly involved in order to create the populations detected. One reason for this discrepancy may be that very young Métis may be less likely to be registered as Métis. The irregularity of the population pyramid may also suggest a possible bias in the Métis that are registered in Alberta. Any possible bias to the incomplete registration of Métis may result in the rates of diseases being skewed. A possible risk is that the Métis that are officially registered in Alberta have higher socio-economic status compared to

those that are not included in the registry. While the rate estimates in this report should be accurate for the registered Métis they may not be accurate for those who self-identify as Métis and meet the criteria for Métis status but are not classified as Métis. Use of this data to reflect on the health conditions of non-registered Métis should be done with caution.

One potential issue with analyzing the data is that the small number of Métis in the two youngest age brackets (i.e., <5, 5-9) may lead to widely varying estimates for morbidity, mortality and health system utilization for these age-groups. Caution should be used when examining the rates as the low numbers in some age groups may result in some abnormal findings. A similar effect is likely to occur in these graphs for the older age-groups as the number of Métis in the 80+ age-group is particularly small.

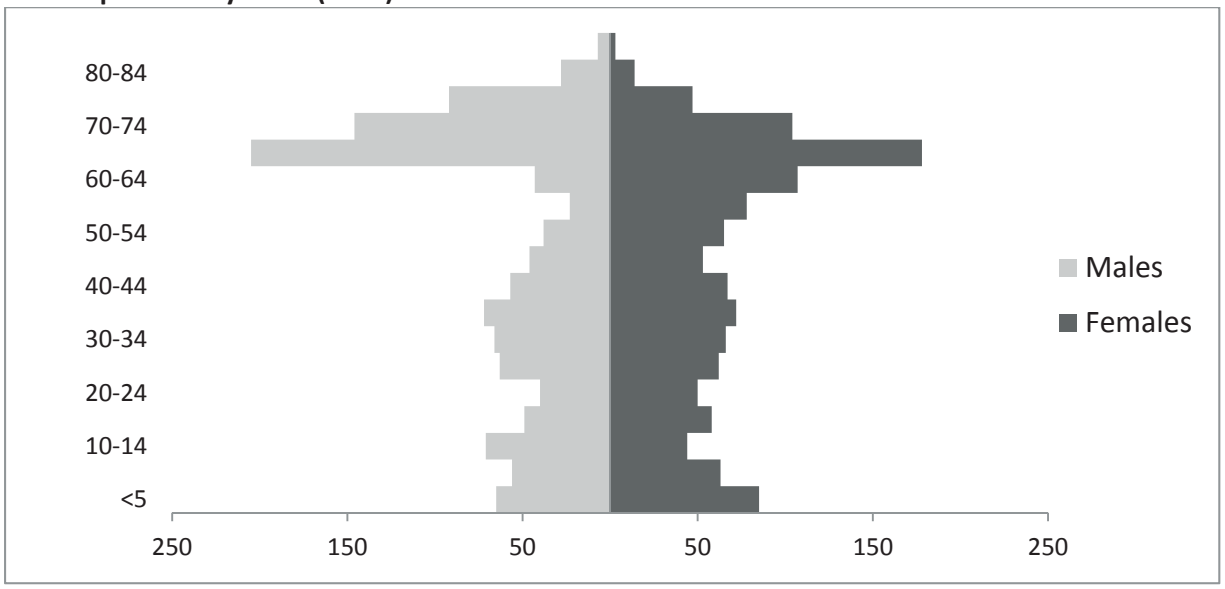
Graph 2.1
Métis Population Pyramid (2009)



The Inuit population pyramid (Graph 2.2) is skewed towards older ages. The pyramid for the Inuit is flat for those aged 0-60. However, the population for the Inuit increases dramatically after age 60

in Alberta. This could be due to several factors. It is possible that younger Inuit are no longer identified as Inuit either by themselves or the government. A more likely explanation is that the Alberta Inuit population could be heavily comprised of retirees from the northern territories. It is possible that Alberta could be drawing immigrants from these territories as they age and need more healthcare services. It is possible that the underlying cause of the irregular population pyramid may also result in a difference in the morbidity and mortality experienced by the Inuit population. If the large population of elderly Inuit is due to migration for health reasons then this will be reflected in higher than expected mortality and morbidity for this population. However, this increased mortality and morbidity will not necessarily indicate health problems due to socioeconomic conditions or other factors because of selection bias.

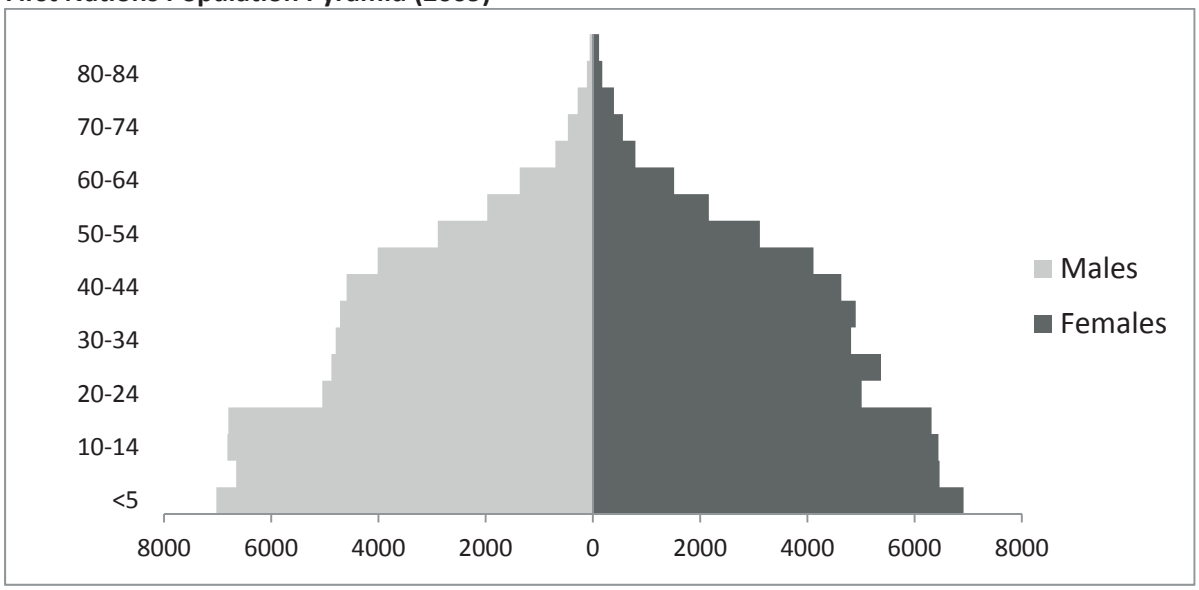
Graph 2.2
Inuit Population Pyramid (2009)



The First Nations population pyramid (Graph 2.3) shows the First Nations population is considerably younger with the largest age-groups all being under 20 years of age. This is indicative of a

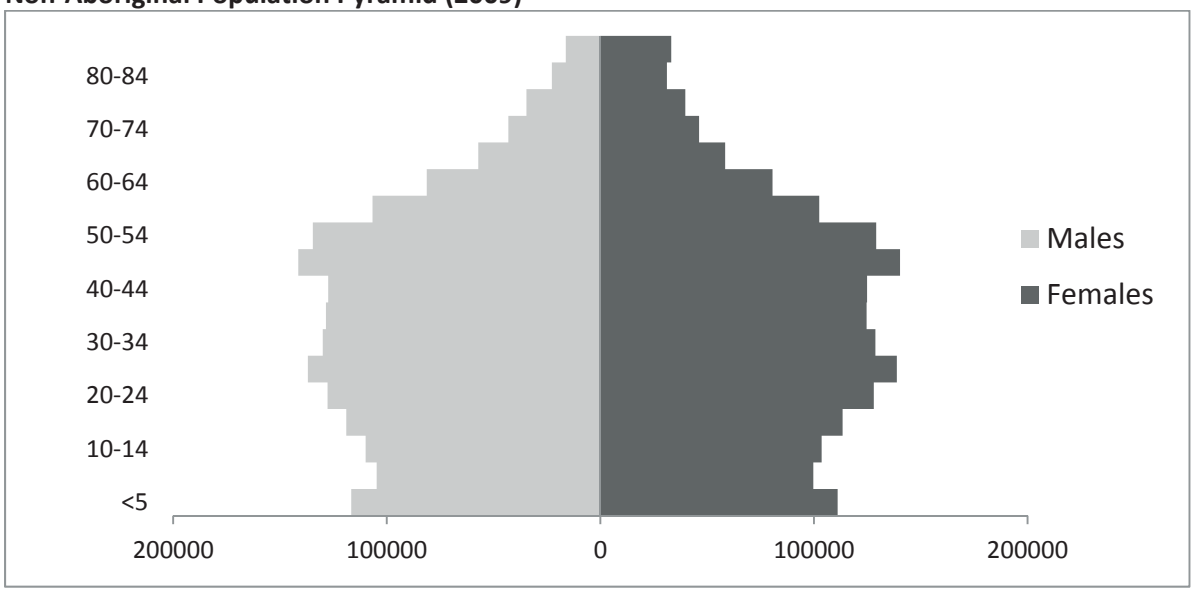
population with a high birthrate and possibly higher than expected mortality for the modern era. The shape of the pyramid attained for the First Nations indicates that it should not experience the problems of bias and erratic estimate in certain age-groups that the Métis and Inuit estimates are likely to suffer from.

Graph 2.3
First Nations Population Pyramid (2009)



The population pyramid for the non-Aboriginal population of Alberta is located in **Graph 2.4**. The non-Aboriginal population is typical of an advanced country with a fairly rectangular shape in the young and working age populations. The population of the non-Aboriginals is sufficiently large in all age-groups to provide a reliable estimate for both age/sex-standardized rates and for graphs of age-specific rates.

Graph 2.4
Non-Aboriginal Population Pyramid (2009)



Chapter 3 Mortality

Chapter summary of objectives and data analysis

This chapter examines the age/sex-standardized mortality rates. The first section examines the rates by ICD-10 chapter and the second section examines in fuller detail the causes of injury mortality. Mortality rates were determined by the ICD-10 code identified as the cause of death in mortality records for the years 2000-2008 obtained from AH. Due to the recent initiation of the Métis registration within AH records, mortality data for this population were only available for the years of 2007-2009 and therefore these records were used in lieu of the 2001-2009 records.

Causes of mortality were divided into groups based on ICD-10-CA chapter and adjusted mortality rates were produced for each of the disease groups. Limited mortality data for the Métis and Inuit restricted analysis to all-cause mortality, cancer mortality, circulatory disease mortality and injury mortality. There were not enough deaths for the other causes to obtain accurate estimates for the Métis fatality rate due to those diseases. The rates obtained were compared between those belonging to an Aboriginal group (First Nations, Inuit, and Métis) and the non-Aboriginal population of the province.

Key Findings

The mortality rate of the Métis was significantly lower than the mortality rate of the non-Aboriginal population (400 deaths per 100,000 versus 538 deaths per 100,000). Mortality rates in the First Nations population (1,058 deaths per 100,000) continue to be significantly greater than that of the non-Aboriginal population in Canada. The Inuit have a slightly elevated rate of death compared to the non-Aboriginal population and also experience a higher rate of mortality than the Métis.

The main causes of death were cancer, circulatory disease and injury. The Métis had lower rates of mortality from all three of these causes when compared to the non-Aboriginal population. This is in stark contrast to the First Nations which had higher rates of mortality from all of these causes when compared to the non-Aboriginal population. The Inuit population has lower death rates due to cancer and circulatory disease than both the non-Aboriginal and Métis populations. The mortality rate of injury-related death was higher in the Inuit compared to both the Métis and non-Aboriginal populations. Female mortality rates in the Métis appear to be similar to the rates experience by male Métis though slightly lower. The rate of cancer mortality in Métis females is significantly higher than would be expected and exceed the cancer mortality of both the Métis males and the non-Aboriginal population. However, the Métis female cancer mortality rate is lower than the cancer mortality rate experienced by the First Nations female population.

3.1 Mortality Rates by ICD-10 Chapter

Population counts for the First Nations, Inuit, Métis, and the non-Aboriginal populations of Alberta are displayed in **Table 3.1**. From 2001 – 2009, there were 4,820 all cause fatalities (males, 2,748; females, 2,072) identified in the First Nations population, 124 fatalities (males, 74 ; females, 50) identified in the Métis population, 127 fatalities (males, 83; females, 44) identified in the Inuit population, and 163,268 fatalities (males, 85,762; females, 79,438) in the non-Aboriginal population of Alberta.

Table 3.1
Population and mortality counts by sex (2001 – 2009)

Population	Males (n)		Females (n)		Total (n)	
	Population	Deaths	Population	Deaths	Population	Deaths
Non-Aboriginal	14,101,030	85,762	14,133,204	79,438	28,234,234	165,200
First Nation	535,021	2,748	538,454	2,072	1,073,475	4,820
Inuit	8,730	83	8,925	44	17,655	127
Métis	22,829	74	23,197	50	46,026	124

Source: Alberta Health
Note: Population figures are the sum of the mid-year population counts for the years included
Note: Métis figures were only available for the years 2007-2009

The leading cause of death for the 2001 – 2009 period for all Albertans was circulatory disease (57,602), cancers (48,120), and injury (14,437). The four most common causes of death are listed in **Table 3.2**, by rank, along with the number of corresponding fatalities for the First Nation, Métis, Inuit, and the non-Aboriginal populations.

Table 3.2
Leading cause of death by population (2001-2009)

Rank	Cause of death	Total	Non-Aboriginal	First Nation	Métis	Inuit
1	Circulatory Disease	57,602	56,680	858	27	37
2	Cancer	48,120	47,290	740	52	38
3	Injury	14,437	12,883	1,531	15	8
4	All Other Causes	50,109	48,366	1,668	30	45

Source: Alberta Health
Note: Population figures are the sum of the mid-year population counts for the years included
Note: Métis figures were only available for the years 2007-2009

Age/sex-standardized mortality rates, 95% confidence intervals (CIs), relative standard error (RSE) and mortality rate ratios (RR) are shown in **Table 3.3**. The mortality RRs are calculated using the non-Aboriginal mortality rate as the basis of comparison. Using the three years of data (2007-2009) available for the Métis, the mortality rate of the Métis (400 deaths per 100,000) is lower than that of the non-Aboriginal population (538 deaths per 100,000) with a mortality RR of 0.74. The mortality of the Métis is considerably lower than the mortality rate of the First Nations (RR: 0.38). From 2001 – 2009, compared to the non-Aboriginal population, the rate for all-cause mortality was 1.97 times higher for

the First Nation population. The all-cause mortality rate for the Inuit population was also significantly lower than that of the First Nations (RR: 0.54). The mortality rate of the Inuit was slightly higher than the non-Aboriginal populations (RR: 1.07).

Of the leading causes of death shown in **Table 3.3**, the Métis had significantly lower rates of mortality compared to both the non-Aboriginal and First Nation populations. The mortality ratios compared to the non-Aboriginal are 0.91 (cancer), 0.73 (circulatory) and 0.75 (injury). The rate of mortality for the Métis is less than half than that of the First Nations for these major causes of death with the sole exception of cancer where the First Nations have 1.37 times higher mortality rate. The Métis had higher rates of mortality due to cancer and circulatory diseases compared to the Inuit population while having a significantly lower rate of injury mortality. The mortality rates for the First Nations population, when compared to the non-Aboriginal population, were 4.08 times greater due to injury, 1.58 times greater for diseases of the circularity system and 1.23 times greater for cancers. Compared to the non-Aboriginal population, the mortality rates for the Inuit were not significantly different for injuries but were significantly lower than the non-Aboriginal population's mortality due to diseases of the circulatory system (RR: 0.52) and cancers (RR: 0.80).

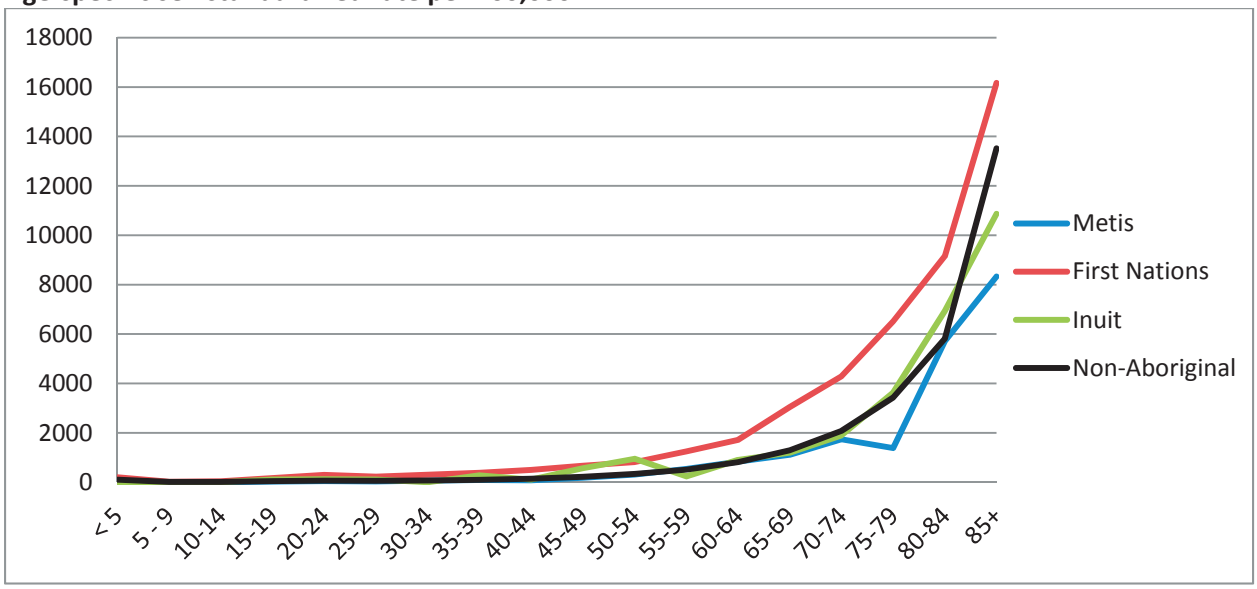
Table 3.3
Mortality (2001-2009)
Age/sex-standardized rate per 100,000

Diagnosis	Rate	95% CI		RSE†	RR‡
All-cause mortality					
Métis	**399.9**	386.9	412.9	9.0	**0.74**
Inuit	**574.7**	553.7	595.7	8.9	**1.07**
First Nation	**1,058.1**	1,052.1	1,064.2	1.4	**1.97**
Non-Aboriginal	**537.8**	537.4	538.3	0.3	---
Cancer					
Métis	**144.6**	137.2	152.1	13.9	**0.91**
Inuit	**107.6**	99.7	115.5	16.2	**0.68**
First Nation	**198.3**	195.6	201.0	3.7	**1.25**
Non-Aboriginal	**159.1**	158.8	159.4	0.5	---
Circulatory					
Métis	**131.0**	123.4	138.5	19.3	**0.73**
Inuit	**93.7**	88.3	99.1	16.4	**0.52**
First Nation	**289.0**	285.8	292.3	3.4	**1.61**
Non-Aboriginal	**179.8**	179.6	180.0	0.4	---
Injury					
Métis	**32.4**	26.7	38.1	25.8	**0.75**
Inuit	**54.8**	38.2	71.5	35.4	**1.26**
First Nation	**169.5**	167.2	171.7	2.6	**3.91**
Non-Aboriginal	**43.4**	43.2	43.6	0.9	---
All other causes					
Métis	**85.8**	80.0	91.6	18.3	**0.55**
Inuit	**277.0**	263.0	291.1	14.9	**1.78**
First Nation	**389.7**	386.1	3393.4	2.4	**2.50**
Non-Aboriginal	**155.7**	155.5	155.9	0.5	---

† RSE >25 indicates uncertainty in estimates
‡ non-Aboriginal population used as comparison group
Note: Métis data were only available for the years 2007-2009

Graph 3.1 illustrates the age-specific sex-standardized all-cause mortality rate by age-group. The mortality rate of the First Nations is consistently higher than that of the other groups starting in early adulthood. The mortality rates of the Métis, Inuit and non-Aboriginal are similar throughout most of the graph; however, there is a discrepancy between the Métis and non-Aboriginal group in the 75-79 and 85+ age-groups. These two age-groups seem to be responsible for the lower mortality rate of the Métis.

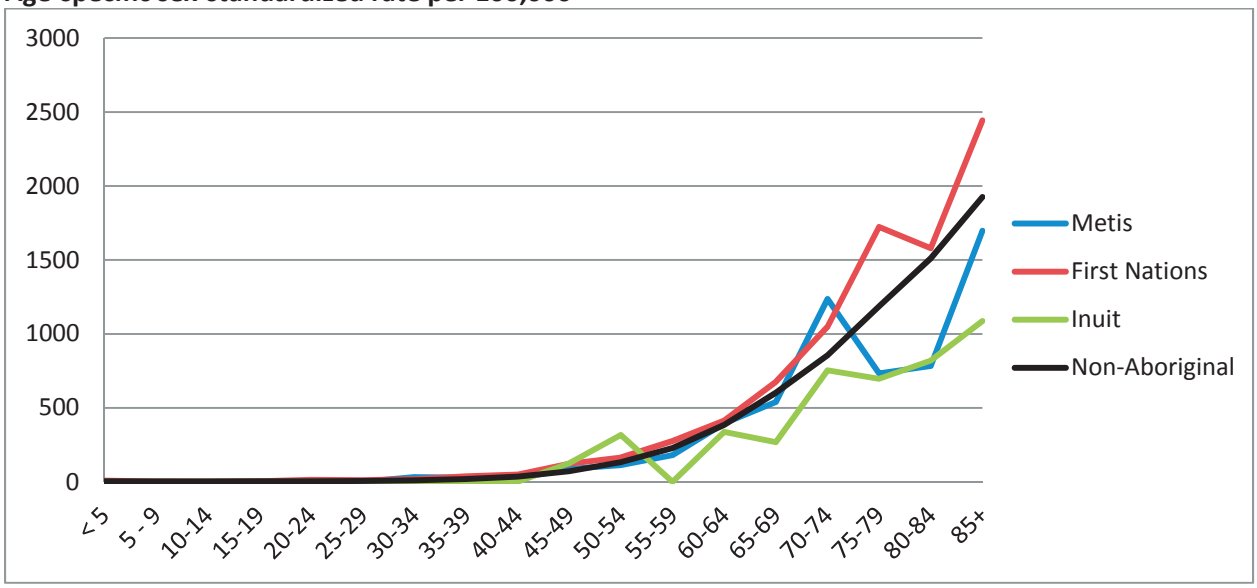
Graph 3.1
Mortality (2001-2009)
Age-specific sex-standardized rate per 100,000



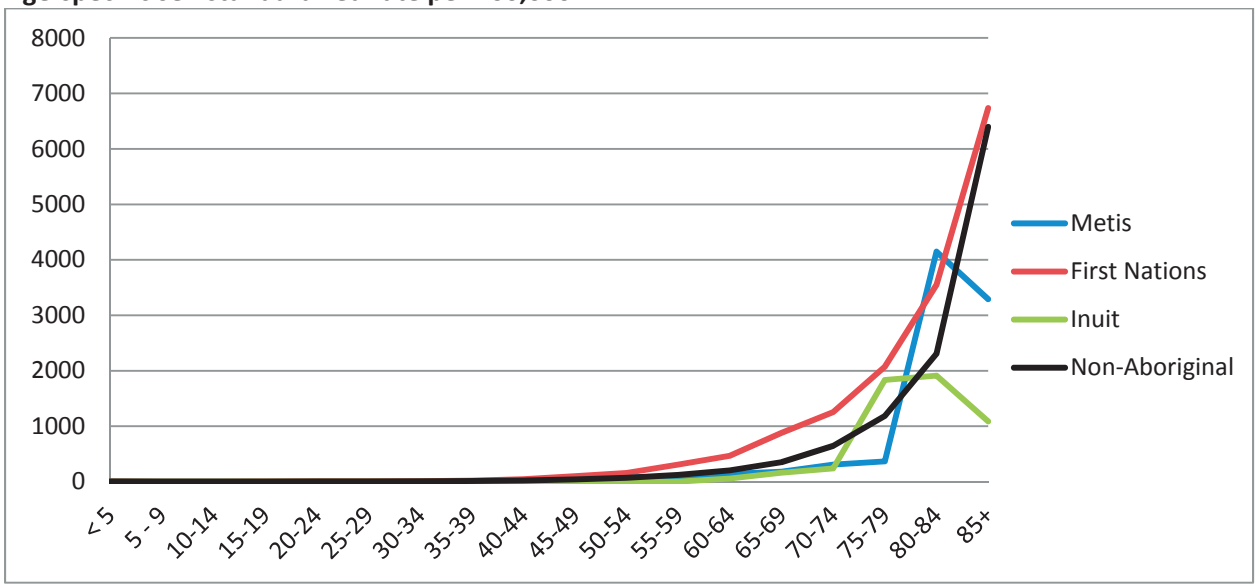
Graphs 3.2 and **3.3** show the sex-standardized mortality rate by age-group for cancer and circulatory diseases. Due to the smaller number of deaths for these causes, these graphs are more erratic than the previous all-cause mortality graphs. The cancer mortality rate appears to be similar for all groups until the older age-groups (70+). Although the lines are somewhat erratic, at this point the Métis and Inuit rate of mortality does not increase as fast with age as the non-Aboriginal population. The rate of mortality in the First Nations, however, is higher than the other populations in this age span.

The **Graph 3.3** shows a similar pattern of mortality for circulatory disease. The mortality rate for the First Nations begins to increase at a younger age than the rates of the other three groups. In the older age-groups the groups once again become similar. The mortality rate for the Métis and Inuit are once again closer to the mortality rate of the non-Aboriginal population until the older age-groups where the graph becomes more erratic. However, the mortality rate for these groups appears to be lower than that of the non-Aboriginals for the 60-69 year old age-group. Due to a smaller number of injury-related deaths a graph was not constructed for injury-related deaths.

Graph 3.2
Cancer mortality (2001-2009)
Age-specific sex-standardized rate per 100,000



Graph 3.3
Circulatory disease mortality (2001-2009)
Age-specific sex-standardized rate per 100,000



Tables 3.4 and **3.5** show the sex specific mortality rates for the major causes of death in the four populations. The male all-cause mortality rate is higher than the female mortality rate for the Métis, First Nations and non-Aboriginals. The Inuit experienced no significant difference in the mortality rate between males and females. While the mortality RRs are largely similar, when comparing the male and female results there are some significant differences. Métis females have a significantly higher rate of cancer mortality than both Métis Males and non-Aboriginals (both male and female).

Table 3.4
Male mortality (2001-2009)
Age/sex-standardized rate per 100,000

Diagnosis	Rate	95% CI		RSE†	RR‡
All-cause mortality					
Métis	**420.3**	404.6	436.6	11.6	**0.77**
Inuit	**563.1**	532.0	594.3	11.0	**1.03**
First Nation	**1,101.3**	1,093.0	1,109.5	1.9	**2.02**
Non-Aboriginal	**545.8**	545.1	546.4	0.3	---
Cancer					
Métis	**110.3**	102.5	118.8	20.9	**0.68**
Inuit	**141.8**	129.1	154.4	19.6	**0.87**
First Nation	**189.8**	186.4	193.3	5.3	**1.17**
Non-Aboriginal	**162.7**	162.4	163.1	0.6	---
Circulatory					
Métis	**139.5**	131.5	147.9	22.9	**0.78**
Inuit	**138.3**	132.1	144.4	18.3	**0.78**
First Nation	**283.0**	278.8	287.1	4.5	**1.59**
Non-Aboriginal	**177.9**	177.6	178.3	0.6	---
Injury					
Métis	**52.2**	41.8	62.7	30.2	**0.87**
Inuit	**19.2**	0.0	43.6	70.7	**0.32**
First Nation	**225.2**	221.5	228.9	3.1	**3.73**
Non-Aboriginal	**60.3**	60.0	60.7	1.1	---

† RSE >25 indicates uncertainty in estimates
‡ non-Aboriginal population used as comparison group
Note: Métis data were only available for the years 2007-2009

Table 3.5
Female mortality (2001-2009)
Age/sex-standardized rate per 100,000

Diagnosis	Rate	95% CI		RSE†	RR‡
All-cause mortality					
Métis	**379.9**	358.5	402.5	14.1	**0.72**
Inuit	**586.0**	545.4	626.6	15.1	**1.11**
First Nation	**1,015.7**	1,006.6	1,024.8	2.2	**1.92**
Non-Aboriginal	**528.0**	527.4	528.6	0.4	**---**
Cancer					
Métis	**178.4**	165.3	178.4	18.6	**1.15**
Inuit	**74.0**	48.1	99.9	28.9	**0.48**
First Nation	**206.7**	202.5	210.9	5.1	**1.33**
Non-Aboriginal	**155.4**	155.0	155.8	0.7	**---**
Circulatory					
Métis	**122.6**	105.6	139.5	35.4	**0.67**
Inuit	**49.8**	24.4	75.2	37.8	**0.27**
First Nation	**295.0**	290.0	300.1	5.2	**1.62**
Non-Aboriginal	**181.6**	181.3	181.9	0.6	**---**
Injury					
Métis	**12.8**	1.6	24.0	50.0	**0.49**
Inuit	**89.8**	62.4	117.3	40.8	**3.40**
First Nation	**114.6**	112.0	117.3	4.4	**4.34**
Non-Aboriginal	**26.4**	26.2	26.6	1.6	---

† RSE >25 indicates uncertainty in estimates
‡ non-Aboriginal population used as comparison group
Note: Métis data were only available for the years 2007-2009

Chapter 4 Health system utilization

Chapter summary of analysis

Estimates for the age- and sex-standardized rate of emergency department (ED) and inpatient usage were obtained for the calendar year of 2009. The relative rate of usage was calculated comparing the rate for the registered Métis and the other Aboriginal groups with that of the general population. Estimates were obtained for physician usage of the Aboriginal and non-Aboriginal populations. An estimate of physician contacts was determined from the data. The results were age-standardized and compared between population groups. Graphs were created to depict the rate of physician usage for specific age-groups and populations.

Key findings

4.1 Emergency Department

There were 13,373 ED visits for 5,547 unique identifiers (37.2% of population after age/sex standardization) for the Métis population in 2009. This is 1.59 times the proportion of the non-Aboriginal population of Alberta (23.4%) that was treated in an ED during the same period of time. This is less than the rate experienced by First Nations (46.7%), though more than experienced by the Inuit in Alberta (32.7%). The most common reasons for presentation to the ED were injuries, factors influencing health status (Chapter 21 of the ICD 10-CA), respiratory diseases, and laboratory findings. These four categories were also the most common presentation types for the First Nations, Inuit, and the non-Aboriginal population.

4.2 Inpatient care usage

There were 1,015 unique Métis inpatients (age/sex-adjusted rate: 7,009 cases per 100,000) that identified with 1,327 total visits (rate: 9,275). These are both slightly higher than the equivalent rates found in the non-Aboriginal population with rate ratios of 1.23 (total visits) and 1.15 (unique patients). The rate of admission for the Métis was considerably lower than both the Inuit (rates: 12,071 and 8,257) and First Nations (rates: 17,256 and 11,786). Pregnancy was the most common admission reason for all groups except the Inuit. Digestive, circulatory, injury and respiratory were the other major causes of admission for the Métis, First Nations, Inuit, and the non-Aboriginal population.

4.3 Utilization

The rate of service usage for the Métis was similar to the rate found for the non-Aboriginal and Inuit populations—9.6 services per person compared to 9.5 for the Inuit and non-Aboriginal. The First Nations had a significantly higher rate of service usages with an average of 11.9 services used per person. In 2009, 87.4% of the Métis population had at least one recorded physician visit, whereas the Inuit, First Nations, and non-Aboriginal populations had significantly lower rates of 71.3%, 77.8% and 84.3%, respectively.

Section 4.1 Presentation to Emergency Department

The age/sex-standardized rates of presentation for the four populations are located below in **Table 4.1.1**. The rate of ED presentations for the Métis (Rate: 88,188/100,000 population) is significantly higher than that of the non-Aboriginal population (Rate Ratio (RR): 2.03) though it is considerably lower than the rate of the First Nations (143,252). If only unique patients in the database were counted in the analysis the rate of ED use by the Métis population (37,165) is still significantly higher than the non-Aboriginal population (23,400; RR: 1.59), but lower than the First Nations rate (46,666).

Table 4.1.1
Rate of emergency presentation (2009)
Age/sex-standardized rate per 100,000

Intent	Rate	95% CI		RSE†	RR‡
Emergency presentations					
Métis	**88,188**	87,785	88,591	0.9	**2.03**
Inuit	**81,293**	80,291	82,295	2.1	**1.77**
First Nation	**143,252**	143,076	143,427	0.2	**3.30**
Non-Aboriginal	**43,430**	43,413	43,448	0.1	---
Unique patients rate*					
Métis	**37,165**	36,888	37,443	1.3	**1.59**
Inuit	**32,714**	32,037	33,392	3.4	**1.40**
First Nation	**46,666**	46,564	46,768	0.4	**1.99**
Non-Aboriginal	**23,400**	23,387	23,413	0.1	---

* Only counts the first ED presentation for each person
† RSE >25 indicates uncertainty in estimates
‡ non-Aboriginal population used as comparison group

The frequency of the most responsible diagnoses, categorized by ICD-10-CA coding chapter, is located in **Table 4.1.2**. The most common diagnosis is injury for all groups except the Inuit. The top four diagnoses for the Métis are: Injury (2571; 19.2%), factors influencing health status (2560; 19.1%), respiratory diseases (1763; 13.2%), and laboratory findings (1619; 12.1%). These results are similar to those obtained for the non-Aboriginal population. There is a higher rate of presentations that are

diagnosed with a chapter 21 code (factors influencing health status) compared to the non-Aboriginal population (19.1% versus 14.4%) as well as the rate for the Inuit (16.9%) and First Nations (15.8%).

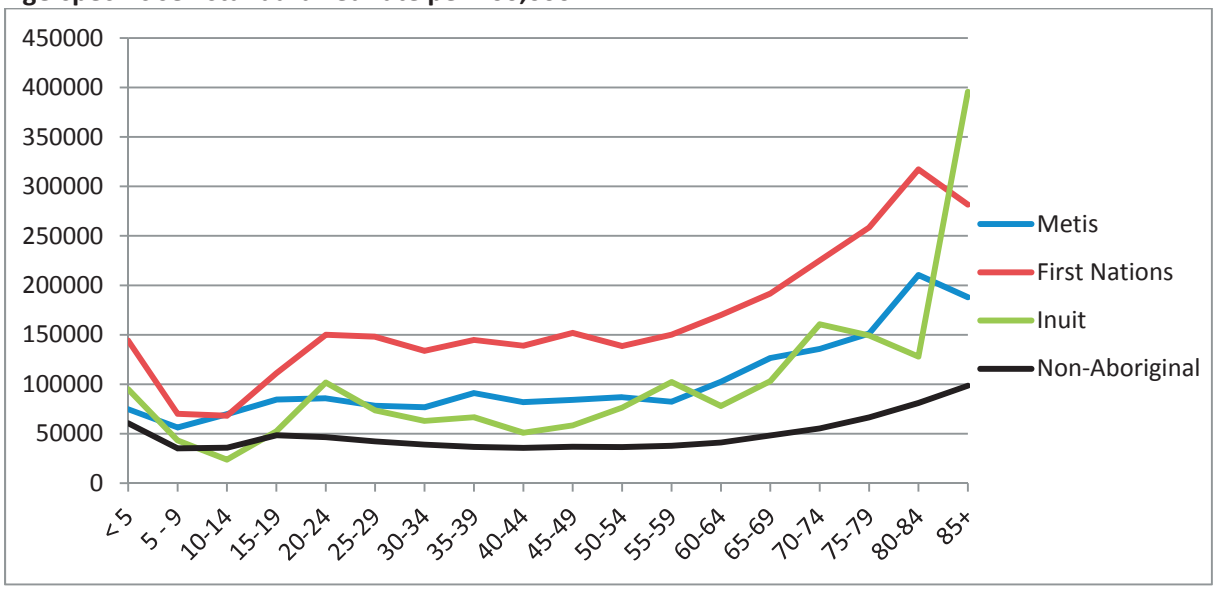
Table 4.1.2
Frequency and proportion of emergency department visits (2009)

	Métis		Inuit		First Nations		Non-Aboriginal
ICD-10-CA Category	**Visits (n)**	**Visits (%)**	**Visits (n)**	**Visits (%)**	**Visits (n)**	**Visits (%)**	**Visits (%)**
Injury	2571	**19.2**	296	13.7	30930	19.0	21.1
*Factors influencing health status	2560	**19.1**	365	16.9	25722	15.8	14.4
Respiratory	1763	**13.2**	324	15.0	26966	16.5	13.4
Laboratory findings	1619	**12.1**	296	13.7	17439	10.7	13.8
Musculoskeletal	827	**6.2**	129	6.0	7806	4.8	5.1
Digestive	727	**5.4**	143	6.6	9637	5.9	5.5
Genitourinary	644	**4.8**	90	4.2	6892	4.2	4.5
Skin and subcutaneous	484	**3.6**	64	3.0	6902	4.2	3.5
Infectious disease	437	**3.3**	65	3.0	5525	3.4	3.5
Other	1741	**13.0**	392	18.1	25292	15.5	15.2
Total	13,373	**100.0%**	2164	**100.0%**	163111	**100.0%**	**100.0%**

*Chapter 20 of ICD-10-CA coding

Graph 4.1.1 illustrates the rate of ED presentation by age-group. The pattern of presentation is similar for the Métis, First Nations and Inuit with lower rates in childhood and adolescence, a steady rate in the working age population and a gradually increasing rate of presentation in the older population starting at approximately 60 years of age. The rate experienced by the First Nations population is consistently higher than the rates experienced by the Métis and Inuit. The Métis experience rates similar to the Inuit but consistently higher than those of the non-Aboriginal population.

Graph 4.2.1
Emergency department presentations (2009)
Age-specific sex-standardized rate per 100,000



Section 4.2 Hospital Admission to inpatient units

The age/sex-standardized rates of presentation for the 4 population groups are located below in **Table 4.2.1**. The rate of admission for the Métis was 9,275 which is slightly higher than the non-Aboriginal population (7,559; RR: 1.23). Both the Inuit (12,071) and First Nations (17,256) obtained significantly higher rates of admission than both the Métis and non-Aboriginal populations. The admission results were also analyzed for unique patients. This means that each individual would only be counted for the first admission they have for the year and estimates the proportion of the population which was admitted one or more times for the year of 2009. The results were similar when the rate of admission was analyzed for unique patients. The Métis were once again more likely to be admitted compared to the non-Aboriginal population but less likely to be admitted during the year compared to the First Nations and Inuit. The First Nations had a particularly high rate of admission for both unique patients and for all admissions.

Table 4.2.1
Rate of admission and admission of unique inpatients (2009)
Age/sex-standardized rate per 100,000

Intent	Rate	95% CI		RSE†	RR‡
Inpatient admission					
Métis	**9,275**	9,152	9,398	2.7	**1.23**
Inuit	**12,071**	11,682	12,459	5.1	**1.60**
First Nation	**17,256**	17,190	17,321	0.8	**2.28**
Non-Aboriginal	**7,559**	7,552	7,566	0.2	---
Admission prevalence*					
Métis	**7,009**	6,898	7,120	3.1	**1.15**
Inuit	**8,257**	7,930	8,583	6.3	**1.35**
First Nation	**11,786**	11,732	11,840	0.9	**1.93**
Non-Aboriginal	**6,111**	6,104	6,117	0.2	---

*rate of admission for unique individuals (discounts repeat admission for the same person)
† RSE >25 indicates uncertainty in estimates
‡ non-Aboriginal population used as comparison group

The number and percent of total visits for the most common ICD-10-CA chapter diagnosis is located in **Table 4.2.2.** The most common cause of admission by a significant margin is pregnancy for all groups but the Inuit. For the Métis, 15.6% of the admissions were due to pregnancy compared to 18.6% for the non-Aboriginal and 20.3% for the First Nations population. Digestive, circulatory and Injury were the next most common most responsible diagnoses for both the Métis and non-Aboriginal populations. After these four the diagnoses begin to differ between the two groups with more respiratory and mental health diagnoses for the Métis and more cancer and diagnoses in the factors influencing health chapter for the non-Aboriginals. The Inuit had higher number of visits for digestive, circulatory and respiratory issues with very few pregnancy-related admissions. The First Nations had particularly high rates of pregnancy, injury and respiratory-related admissions compared to both the Métis and non-Aboriginal populations. The proportion of First Nations admission related to cancer is particularly low in comparison to the Métis and non-Aboriginal populations.

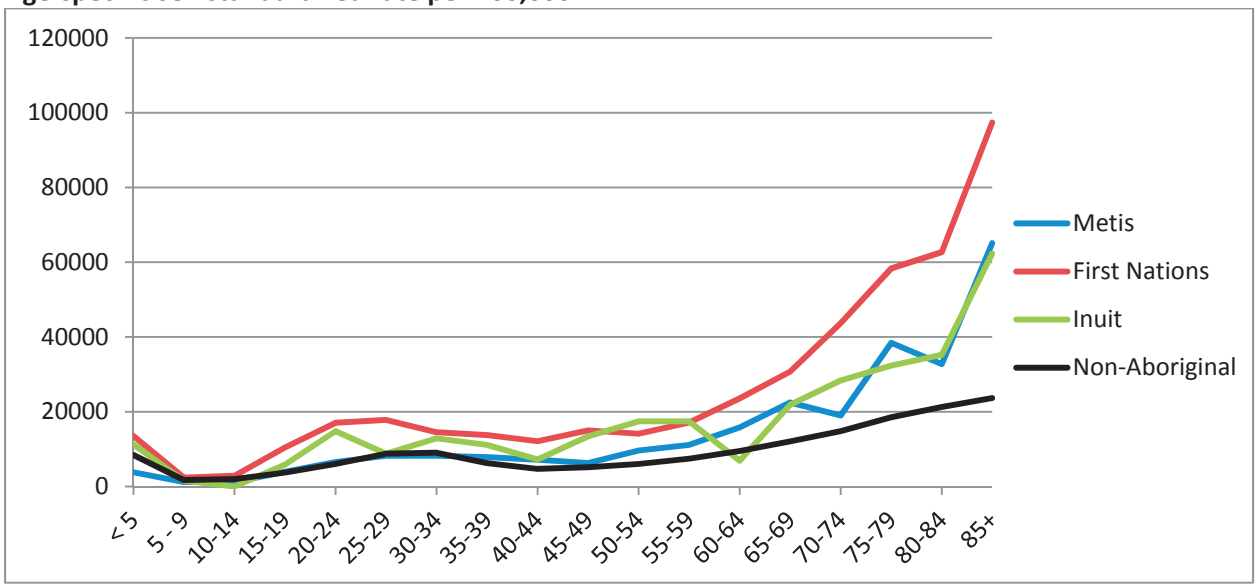
Table 4.2.2
Frequency and proportion of inpatient visits (2009)

	Métis		Inuit		First Nations		Non-Aboriginal
ICD-10-CA Category	**Visits (n)**	**Visits (%)**	**Visits (n)**	**Visits (%)**	**Visits (n)**	**Visits (%)**	**Visits (%)**
Pregnancy	205	**15.6%**	28	**7.3**	3357	**20.3**	**18.6**
Digestive	146	**10.9%**	51	**13.4**	1608	**9.7**	**9.6**
Circulatory	131	**9.9%**	49	**12.9**	641	**3.9**	**9.0**
Injury	126	**9.6%**	28	**7.3**	1959	**11.9**	**9.0**
Respiratory	116	**8.8%**	49	**12.9**	2136	**12.9**	**7.2**
Mental health	85	**6.5%**	17	**4.5**	1435	**8.7**	**5.7**
*Factors influencing health	77	**5.8%**	25	**6.6**	1149	**7.0**	**8.3**
Cancer	66	**5.0%**	18	**4.7**	310	**1.9**	**6.2**
Endocrine	33	**2.5%**	24	**6.3**	585	**3.5**	**2.2**
Other	342	**25.8%**	92	**24.1**	3329	**20.2%**	**24.3**
Total	1327	**100.0%**	381	**100.0%**	16509	**100.0%**	**100.0%**

*Chapter 20 of ICD-10 CA coding

The rate of inpatient hospitalization by age-group is displayed below in **Graph 4.2.1.** The rate of admission for the Aboriginal populations appears to increase more rapidly than the non-Aboriginal population. With the exception of the Inuit, which experience larger fluctuations due to their smaller population in Alberta, there is a consistent structure to the graph. After similar rates of injury in youth the populations begin to diverge in the late teens and from that point onwards, the First Nations consistently have higher rates than the Métis and Inuit which also have consistently higher rates than the non-Aboriginal population (with a larger margin of error for the Inuit).

Graph 4.2.1
Inpatient hospitalization rate (2009)
Age-specific sex-standardized rate per 100,000



Section 4.3 Health utilization rates

A summary of the health service utilization is located in **Table 4.3.1.** After adjusting for age and sex, the Métis have very similar rates of service usage and physician contact at 9.6 physician services per person compared to 9.5 for the Inuit and non-Aboriginals. The First Nations use significantly more services with an adjusted rate of 11.9 services per person. The estimates for physician contacts are very similar with the Métis, Inuit and non-Aboriginals having similar rates (7.2, 7.1 and 7.2 respectively). The First Nations once again had a higher rate than the other groups with an estimated 9.0 physician contacts per person.

The percentage of each population which visited at least one physician during the year of 2009 was estimated using the physicians claims data. After adjusting for age and sex, 87.4% of the Métis had contact with at least one physician. This is higher than the adjusted rate for the other groups. The non-

Aboriginal population had an adjusted percentage of 84.3%. The Inuit and First Nations both had rates that were significantly below the non-Aboriginal and Métis with 71.3% and 77.8%, respectively.

Table 4.3.1
Summary of Health Utilization (2009)
Age/sex standardized

	Services Per Person	Physician Contacts per person	Percent with at least one physician visit
Métis	9.6	7.2	87.4
First Nations	11.9	9.0	77.8
Inuit	9.5	7.1	71.3
Non-Aboriginals	9.5	7.2	84.3

Graph 4.3.1 depicts the percent of people in the four populations with at least one physician contact during the year. The Métis have the highest rate of physician contact for almost the entire spectrum of ages with a notable exception being during late childhood and early adolescence. The First Nations and Inuit consistently have lower rates. The gap between the Métis and the other Aboriginal groups narrows significantly in the older age-groups where all four of the populations obtain fairly high rates of physician contact. **Table 4.3.2** shows the standardized rate of physician service usage. The Métis rate of use is only slightly higher than the non-Aboriginals; however, it is noticeably lower than the usage rate of the First Nations population.

Graph 4.3.1
Proportion of population with at least one physician contact (2009)
Age-specific sex-standardized proportion

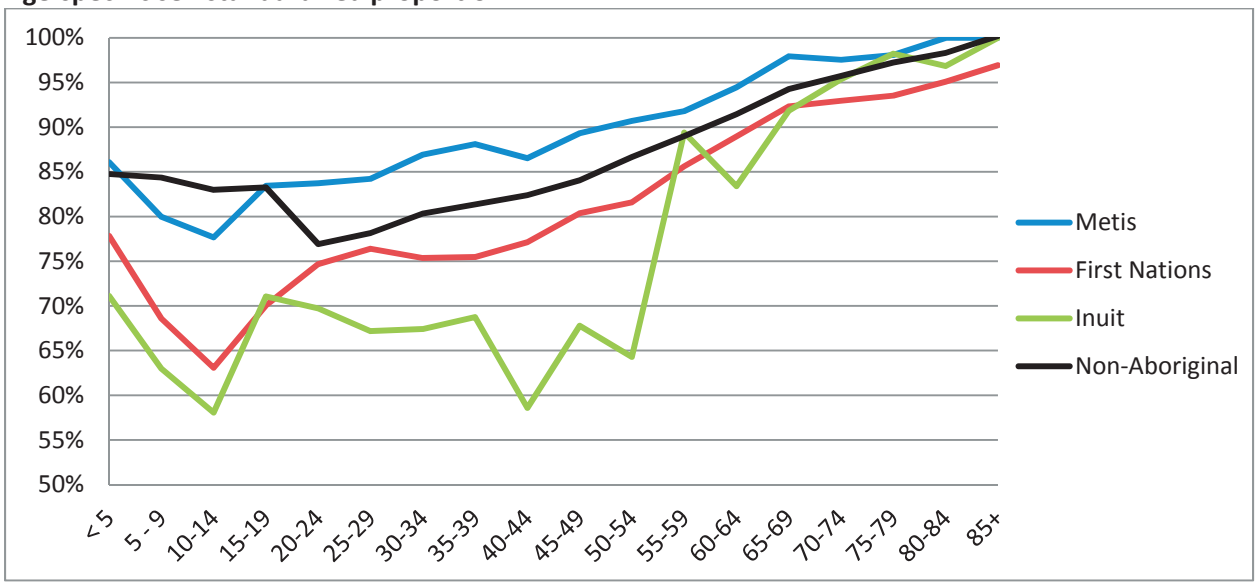


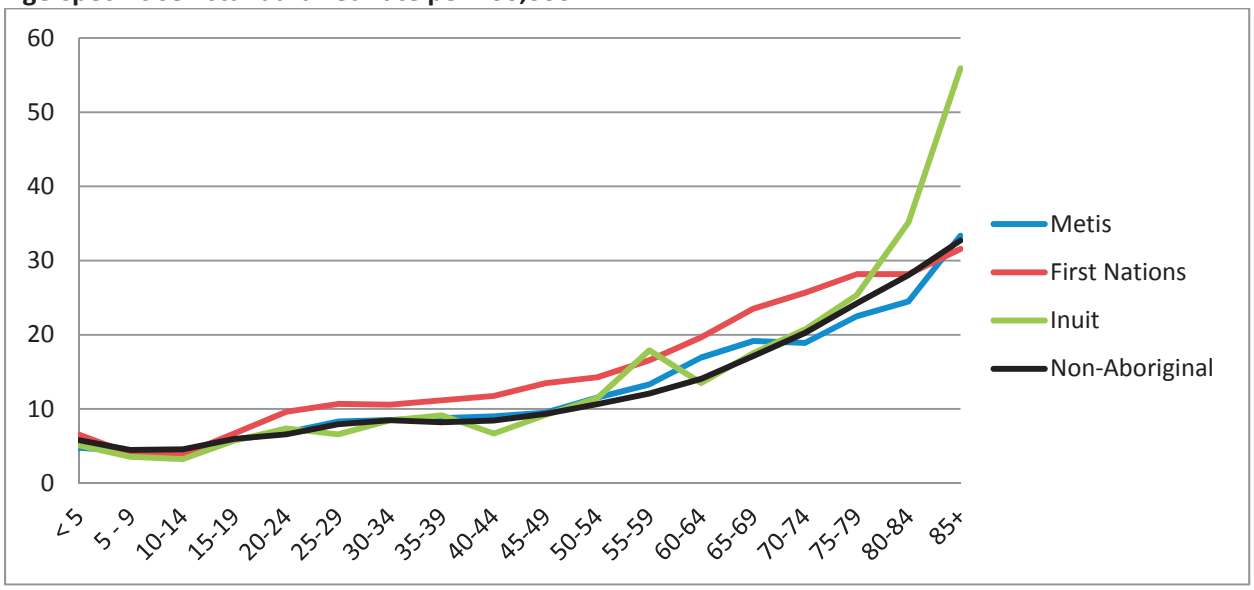
Table 4.3.2
Total health physician services used (2009)
Age/ sex-standardized rate per 100,000

	Rate	95% CI		RSE†	RR‡
Métis	**962,942**	962,104	963,779	0.3	**1.02**
First Nations	**1,194,432**	1,194,182	1,194,683	0.1	**1.26**
Inuit	**949,363**	947,195	951,531	0.6	**1.01**
Non-Aboriginal	**945,827**	945,777	945,878	0.0	---

† RSE >25 indicates uncertainty in estimates
‡ non-Aboriginal population used as comparison group

Graph 4.3.2 shows the usage of health services by population over age. The pattern of system usage is similar for all groups with a slow increase in the rate of use with increasing age. The First Nations rate of use increases above that of the other groups in the late teenage years and continues to be elevated compared to the other populations until the 80-84 age-group where the rates of the Métis, First Nations and non-Aboriginal populations are similar. The Inuit usage is very close to the Métis and non-Aboriginal until the 80+ age range where the Inuit experience a sudden increase in the usage per person. The population of Inuit in this age range is small so it is possible a handful of people in poor health are skewing the results for this age-group.

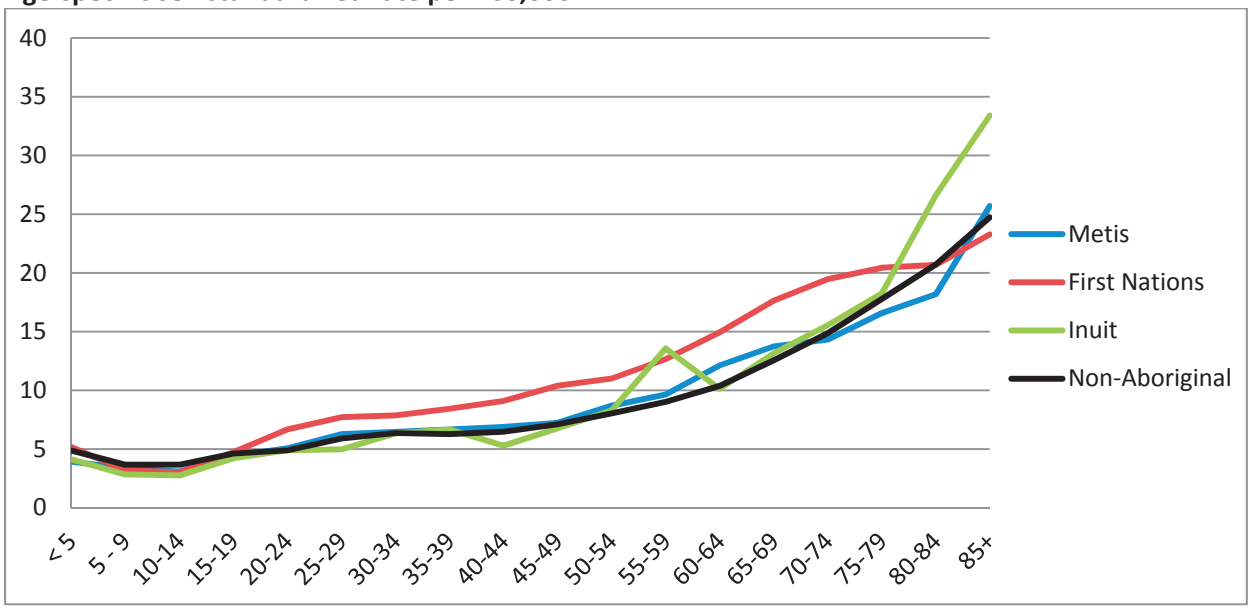
Graph 4.3.2
Physician services utilization (2009)
Age-specific sex-standardized rate per 100,000



Physician contacts

An estimate for the number of physician contacts per person was generated by grouping claims based on date and physician specialty. The graph of the contact rate, by population and age-group, is located below in **Graph 4.3.3.** The results of this graph are essentially identical to **Graph 4.3.2.**

Graph 4.3.3
Physician contacts per person (2009)
Age-specific sex-standardized rate per 100,000



Chapter 5 Métis-specific morbidity

Chapter summary of objectives and data analysis

Métis morbidity was estimated using a 1-year treated prevalence rate from the year 2009. Several pre-identified physical conditions were analyzed. The specific conditions assessed were cancer, diabetes, heart disease, hypertension, injury, respiratory disease and stroke. Mental health conditions were also assessed further based on the categories in the ICD-10-CA. The categories of mental health used were schizophrenia, mood disorder, neurotic disorders (including stress and adjustment disorders), dementia, personality disorders and alcohol and drug abuse. Sections 5.1 and 5.2 assess the specific physical and mental health conditions identified and assessed their rates, rate ratios (RR) compared to the non-Aboriginal population and graphed the prevalence for these conditions by age-group. Diseases rates and RRs were also estimated by using the ICD-10 CA chapter structure and are shown for the four population groups by chapter in section 5.3.

Key findings

Section 5.1 Morbidity of physical illness and injury

The rates for six physical illnesses (cancer, diabetes, heart disease, hypertension, respiratory disease, and stroke) and injury are discussed in this section. The period prevalence was calculated for all of these conditions for the year 2009. The results of this analysis show that for six of these seven conditions the prevalence rates of the Métis are higher than that found in the non-Aboriginal population. The one exception to this is cancer where the rate found in the Métis is slightly less than that of non-Aboriginals. The greatest discrepancy in prevalence between the Métis and the non-Aboriginal population is for diabetes with a RR of 1.68. Compared to the First Nations, the Métis have lower prevalence for four of the seven identified conditions. The three conditions where the Métis do not have lower prevalence rates are hypertension, heart disease and cancer.

Graphing the physical and mental disorders illustrates that the physical diseases tend to show consistent patterns between the populations and that the increased prevalence for the diseases tends to be distributed across the full age spectrum. The Métis tend to show prevalence patterns that are either similar to those found in the non-Aboriginal population or midway between the rates of the First Nations and non-Aboriginals. The prevalence of circulatory disease is unusually high in the older age groups for the Métis compared to both the First Nations and non-Aboriginal population.

Section 5.2 Morbidity of mental disorders and addictions

The prevalence of six types of mental disorders were estimated for the Aboriginal and non-Aboriginal populations. The Métis experienced higher rates of morbidity for three of the six types of mental disorders. These diseases were alcohol and drug abuse, mood disorder and neurotic disorders (i.e., anxiety and related mental disorders). The Métis experienced significantly lower rates of dementia and schizophrenia. Personality disorders were equally prevalent in Métis and the non-Aboriginal population. The Métis experienced lower prevalence rates for all of these diseases compared to the First Nations with the notable exception of mood disorders which were similar. For all the diseases except mood disorder the Métis rates were closer to those experienced by the non-Aboriginal population than those experienced by the First Nations. However, the rate of neurotic disorders in the Métis is almost perfectly midway between the non-Aboriginal and First Nations rates.

For the three disorders with higher rates of prevalence in the Métis population, graphing the prevalence by age shows that the difference between the Métis and non-Aboriginal populations is entirely due to an increase in the middle age-groups (e.g., approximately 20-65). The rate of mental illness is similar for children and the elderly. For mental illnesses with lower rates in the Métis the

difference in prevalence occurs in the oldest age-groups and the rate of morbidity is similar in the younger and middle-aged.

Section 5.3 Morbidity of disease by ICD-10-CA chapter

The disease burden for the Métis, based on the 1-year period prevalence of diseases categorized by ICD-10-CA chapter, appears to fluctuate between the high rates of disease found in the First Nation population and the disease level found in the non-Aboriginal population. The most prevalent diseases in the Métis population are respiratory diseases (36,696 age/sex-standardized cases per 100,000), injury (24,116), musculoskeletal disorders (22,378), genitourinary conditions (19,366) and mental disorders (18,006).

A total of thirteen of the eighteen disease categories were more commonly diagnosed in the Métis population compared to the non-Aboriginals. The other five diseases categories (cancer, congenital malformations, diseases of the eye and adnexa, diseases of the nervous system and pregnancy-related) were less commonly diagnosed in the Métis population.

Compared to the First Nations population, the disease burden for the Métis is lower for almost all of the disease categories with fourteen of the eighteen categories of diseases being more prevalent in the First Nations population. The only diseases more commonly encountered in the Métis population were cancer, circulatory diseases and endocrine diseases. Eye and adnexa-related conditions were similar for the First Nations and Métis.

Chapter 5 Morbidity

Section 5.1 Morbidity of physical illness

The rates of several selected physical illnesses and conditions are contained below in **Table 5.1.1**. The three most common disorders were the same for all groups and, listed in order by rate, are respiratory disease, injury and hypertension. Out of the seven conditions tabulated, 6 conditions are more prevalent in the Métis population than in the non-Aboriginal population. The sole exception is cancer where the Métis have a prevalence that is only 0.97 times that found in the non-Aboriginal population (6,264 versus 6,483 cases per 100,000). The rate of cancer prevalence found in the First Nations (3,903 per 100,000) is considerably lower than that of the Métis. For those conditions which are more commonly diagnosed in the Métis, relative to the non-Aboriginal population, the greatest discrepancies are the rates of diabetes, heart disease and stroke. The prevalence of diabetes for the Métis (6,639 per 100,000) is 1.68 times the rate found in the non-Aboriginal population (3,957). The rates for heart disease (3,168) and stroke (510) are 1.49 and 1.34 times higher than the rates of the non-Aboriginal population, respectively.

Compared to the First Nations, the Métis rates of disease prevalence are usually lower. The three conditions where the Métis experience higher prevalence rates are heart disease, hypertension and cancer. For hypertension, the rate for the Métis (13,041 per 100,000) is 1.13 times the rate found in the First Nations (11,499). The rate of heart disease is 1.09 times higher in the Métis compared to the First Nations. The Métis prevalence of cancer is 1.44 times greater than the rate experienced by the First Nations. The remaining four conditions are more prevalent in the First Nations than the Métis. The discrepancy in rates between the Métis and First Nations is greatest for diabetes where the rate for the Métis (6,639) is only 73% of the rate found in the First Nations (9,073). The difference between the Métis and First Nations is also fairly large for the prevalence of injury and stroke where the rates for the

First Nations population are 1.19 and 1.16 times higher, respectively, than that of the Métis. The First Nations prevalence rate is also 1.12 times higher than the Métis for respiratory diseases.

Table 5.1.1
Physical illness morbidity (2009)
Age/sex-standardized morbidity rate (cases per 100,000)

Diagnosis	Rate	95% CI		RSE†	RR‡
Cancer					
Métis	**6,264.7**	6,167.2	6,264.7	3.1	**0.97**
Inuit	**4,822.8**	4,611.9	5,033.7	7.3	**0.74**
First Nation	**3,902.8**	3,871.4	3,934.2	1.7	**0.60**
Non-Aboriginal	**6,483.1**	6,476.8	6,489.3	0.2	---
Diabetes					
Métis	**6,638.8**	6,552.4	6,725.1	3.1	**1.68**
Inuit	**5,670.5**	5,493.6	5,847.4	5.7	**1.43**
First Nation	**9,072.6**	9,023.9	9,121.3	1.2	**2.29**
Non-Aboriginal	**3,956.5**	3,952.1	3,960.8	0.3	---
Heart disease					
Métis	**3,167.7**	3,110.1	3,225.3	4.7	**1.49**
Inuit	**3,105.6**	2,980.1	3,231.1	8.2	**1.46**
First Nation	**2,924.8**	2,896.9	2,952.8	2.4	**1.37**
Non-Aboriginal	**2,129.1**	2,126.1	2,132.0	0.4	---
Hypertension					
Métis	**13,041.1**	12,918.1	13,164.2	2.3	**1.32**
Inuit	**9,934.9**	9,694.5	10,175.4	4.5	**1.01**
First Nation	**11,499.1**	11,444.7	11,553.5	1.1	**1.17**
Non-Aboriginal	**9,846.4**	9,839.8	9,852.9	0.2	---
Injury					
Métis	**24,115.6**	23,896.2	24,335.0	1.6	**1.16**
Inuit	**22,987.7**	22,408.5	23,566.9	4.2	**1.11**
First Nation	**28,808.0**	28,726.7	28,889.3	0.5	**1.39**
Non-Aboriginal	**20,785.7**	20,773.2	20,798.2	0.1	---
Respiratory					
Métis	**36,695.8**	36,412.2	36,979.3	1.4	**1.23**
Inuit	**30,445.1**	29,798.3	31,091.8	3.5	**1.02**
First Nation	**41,094.0**	40,995.7	41,185.2	0.4	**1.38**
Non-Aboriginal	**29,822.5**	29,807.3	29,837.7	0.1	---
Stroke					
Métis	**509.6**	485.2	534.1	12.9	**1.34**
Inuit	**554.1**	509.5	598.6	19.2	**1.46**
First Nation	**589.7**	577.1	602.3	5.1	**1.56**
Non-Aboriginal	**379.0**	377.8	380.2	0.8	---

† RSE >25 indicates uncertainty in estimates
‡ non-Aboriginal population used as comparison group

The use of a prevalence rate for stroke-related morbidity may be misleading because strokes can have long lasting effects therefore stroke treatment that is received this year may be due to a stroke in a previous year. To estimate the morbidity due to new strokes the most accurate measure is the rate of inpatient treatment of stroke. This information is located in **Table 5.1.2**. The incidence rate of stroke for the Métis, according to this estimate, is significantly higher than that experienced in the non-Aboriginal and First Nations populations. The rate of strokes is almost twice as high in the Métis population compared to the non-Aboriginal populations (RR: 1.87).

Table 5.1.2
Stroke incidence estimate, 2009
Age/ sex-standardized incidence rate (cases per 100,000)

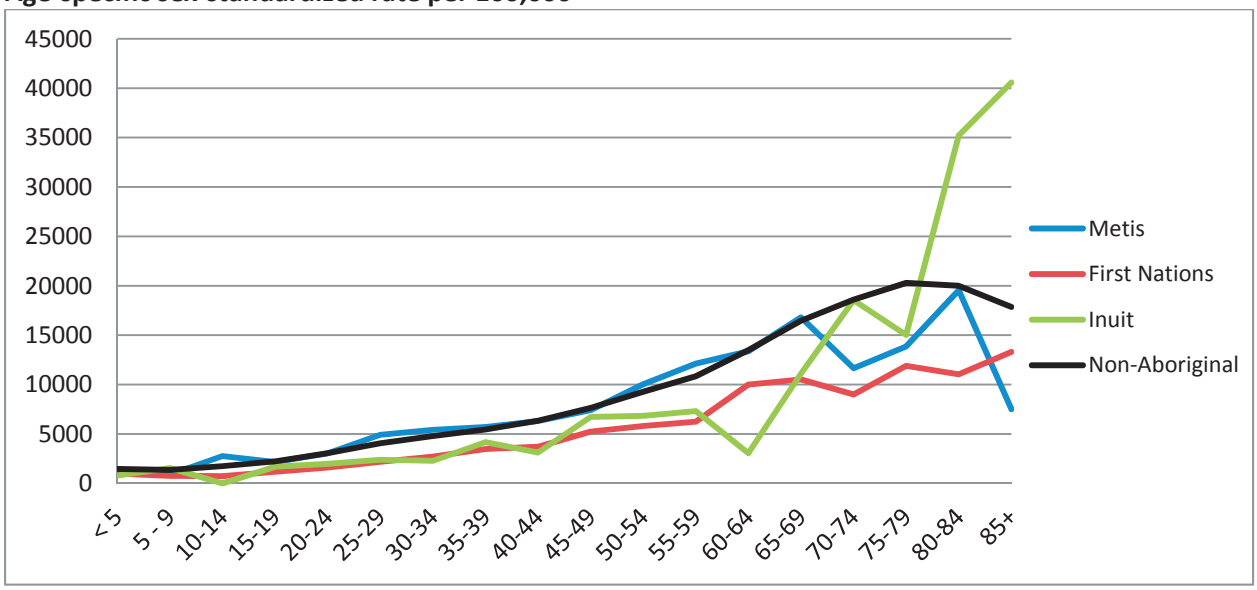
Stroke Incidence Rate*	Rate	95% CI		RSE†	RR‡
Métis	**113.15**	90.81	135.49	31.6	**1.87**
Inuit	**37.81**	0.00	155.29	57.7	**0.63**
First Nations	**72.46**	67.97	76.95	15.4	**1.20**
Non-Aboriginal	**60.48**	60.04	60.93	2.1	**---**

† RSE >25 indicates uncertainty in estimates
‡ non-Aboriginal population used as comparison group
*estimate based on rate of inpatient admission for stroke

Graph 5.1.1 below shows the prevalence of cancer by age for the Aboriginal and non-Aboriginal populations. The prevalence of cancer in the Métis increases slowly till the 60+ age-groups where it begins to fluctuate. The rate seen in the Métis is very similar to that of the non-Aboriginal population for most age-groups. The difference between the two groups occurs in the oldest age-groups (70+) where the non-Aboriginal prevalence continues to rise but the Métis rate plateaus (with some fluctuations). The First Nations prevalence by comparison stays slightly lower than that of the Métis and non-Aboriginal populations until the oldest age-groups where the fluctuations in the Métis prevalence rates brings them close to the First Nations rate for some age-groups. The Inuit prevalence is relatively low until old age when it increases sharply to a rate that is considerably higher than the other groups. This is

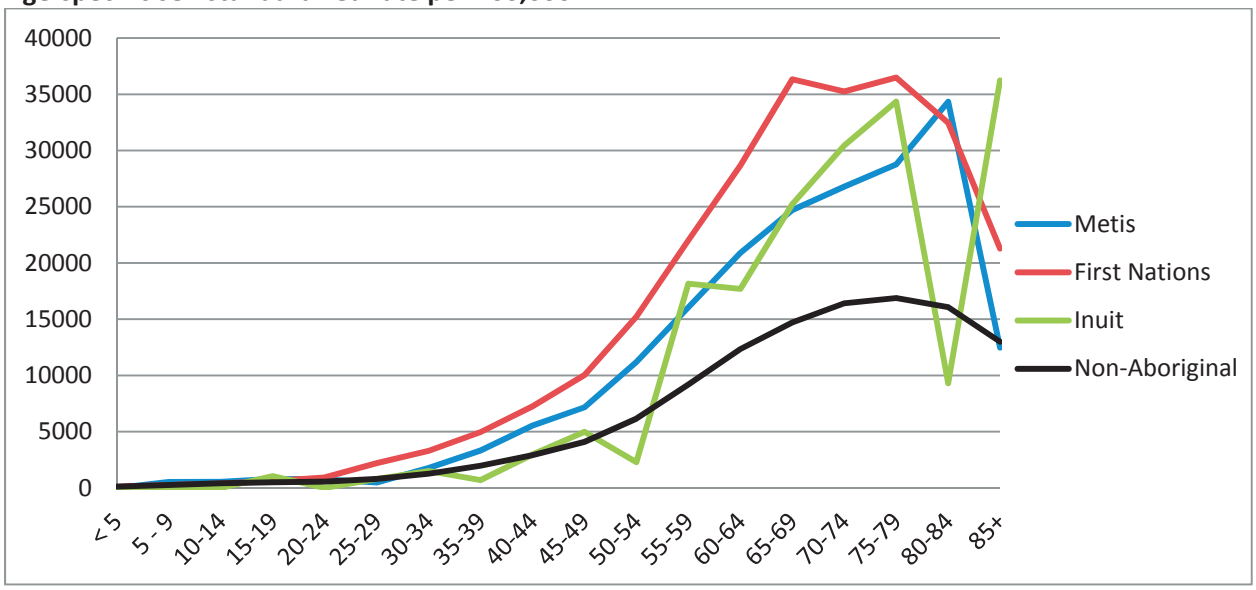
possibly due to immigration to Alberta from the northern territories due to increasing health concerns and possible a cancer diagnosis in particular.

Graph 5.1.1
Cancer Morbidity (2009)
Age-specific sex-standardized rate per 100,000



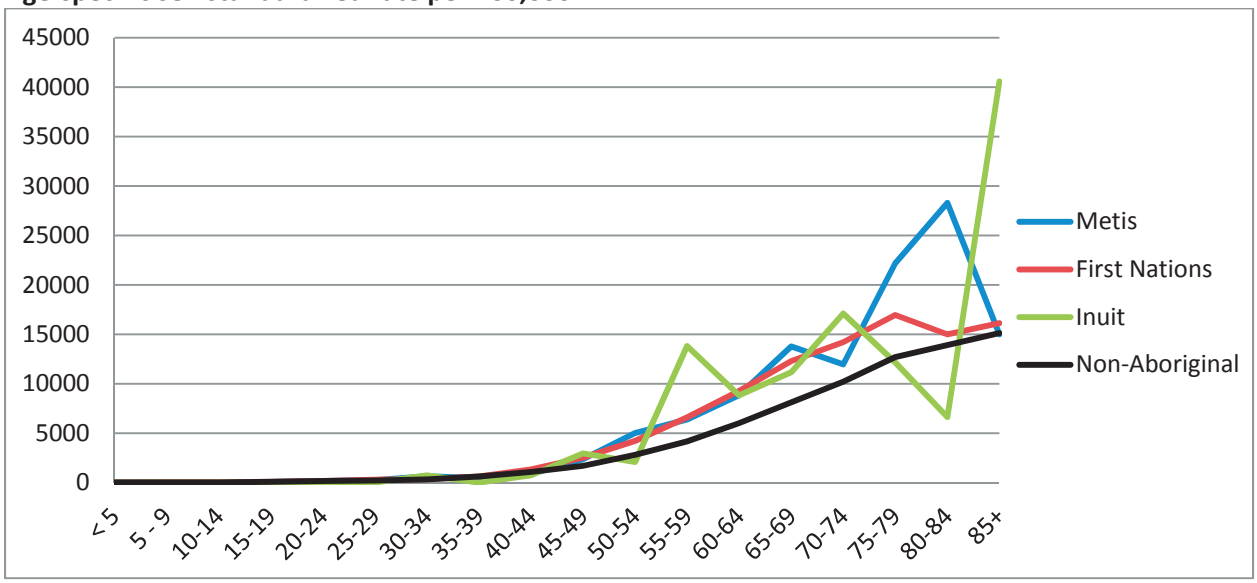
Diabetes prevalence is depicted below in **Graph 5.1.2**. The rate of diabetes is higher in the Aboriginal population starting at age 20 for the First Nations and age 30 for the Métis. Compared to the non-Aboriginals, the Inuit appear to have similar rates of diabetes until age 50 when the prevalence for them increases and begins to closely follow that of the Métis. While all the Aboriginal groups have considerably higher rates of diabetes throughout much of the graph, the rates of diabetes experienced by the Métis and Inuit are lower than that of the First Nations (with the exception of a few of the older age-groups where the rates are similar). The pattern of diabetes prevalence is fairly consistent between all four groups with rates increasing in early adulthood and peaking in the 70-79 age range and then declining slightly after age 80. The rate of diabetes in the Inuit population becomes erratic in the oldest age-group so it is uncertain whether they do not follow this trend or if the increase in the highest age-group is due greater variation in the small Inuit population.

Graph 5.1.2
Diabetes morbidity (2009)
Age-specific sex-standardized rate per 100,000



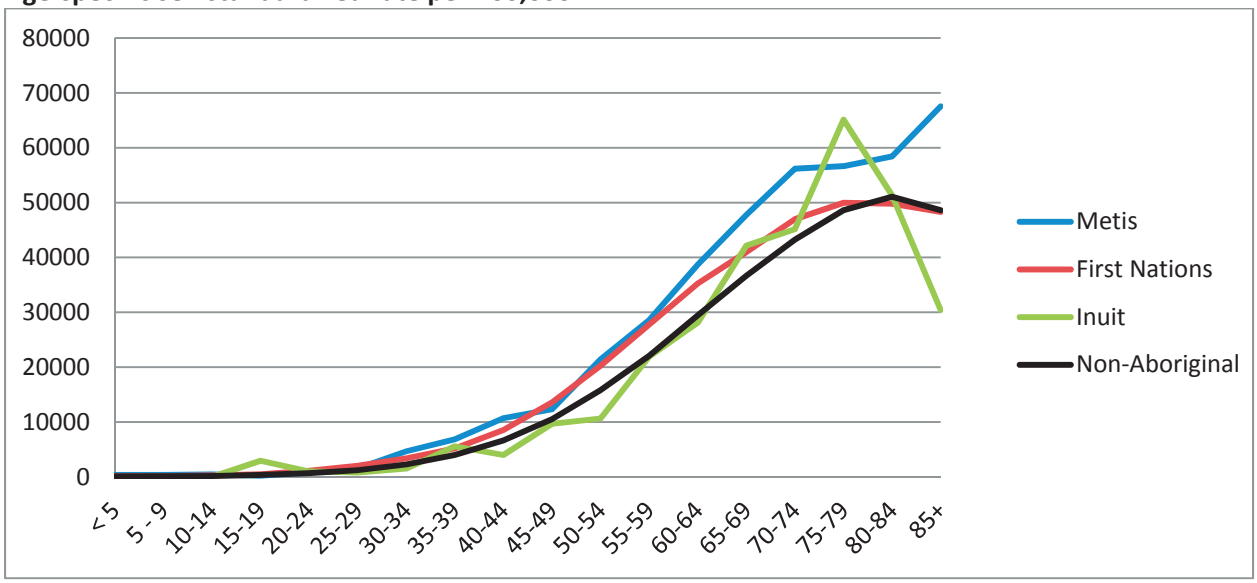
The prevalence of heart disease is graphed below in **Graph 5.1.3**. The pattern of heart disease prevalence is very similar among all groups. The prevalence of heart disease is essentially non-existent until the 40-44 years of age where a steady increase in prevalence begins in all groups. The rates of the three Aboriginal groups are similar throughout this graph though the Inuit rates fluctuate widely. Heart disease prevalence for Aboriginals increases faster than that of the non-Aboriginals. It does appear that the rates begin to converge in the oldest age categories for the First Nations and non-Aboriginals. The rates for the Métis and Inuit become more erratic in the oldest age-groups which is likely due to the relatively small populations for those subgroups.

Graph 5.1.3
Heart disease morbidity (2009)
Age-specific sex-standardized rate per 100,000



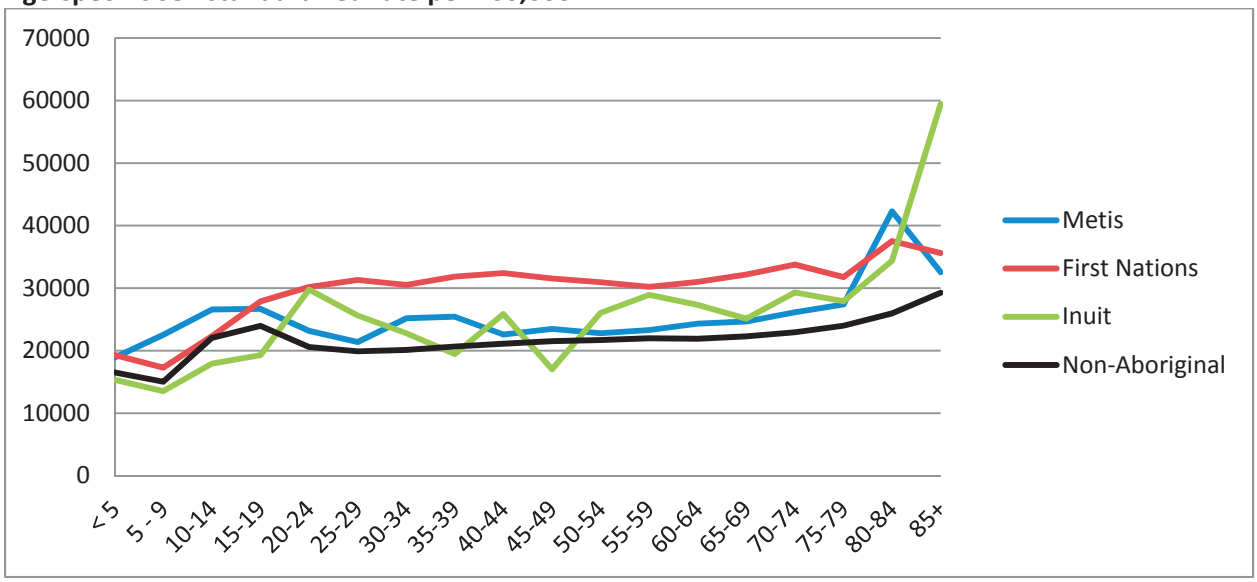
Graph 5.1.4 depicts the prevalence of hypertension for the Aboriginal and non-Aboriginal groups. The graph is very similar to the previous graph of heart disease. However the Métis rate of hypertension begins to exceed that of the First Nations at an earlier age then they do for heart disease. The occurrence of hypertension is essentially non-existent until the 20-24 year age-group. After this point there is a steady increase in the prevalence of hypertension in all of the population groups. Prevalence peaks for the non-Métis populations in the 75-79 year age-group and then declines slightly thereafter. The Métis prevalence continues to increase with advancing age. The prevalence rate for Métis and First Nations is always slightly higher than that of the non-Aboriginal population. The prevalence for the Inuit is similar to that of the non-Aboriginal population until the older ages where it begins to fluctuate too erratically to make a good determination of the prevalence in those age-groups.

Graph 5.1.4
Hypertension morbidity (2009)
Age-specific sex-standardized rate per 100,000



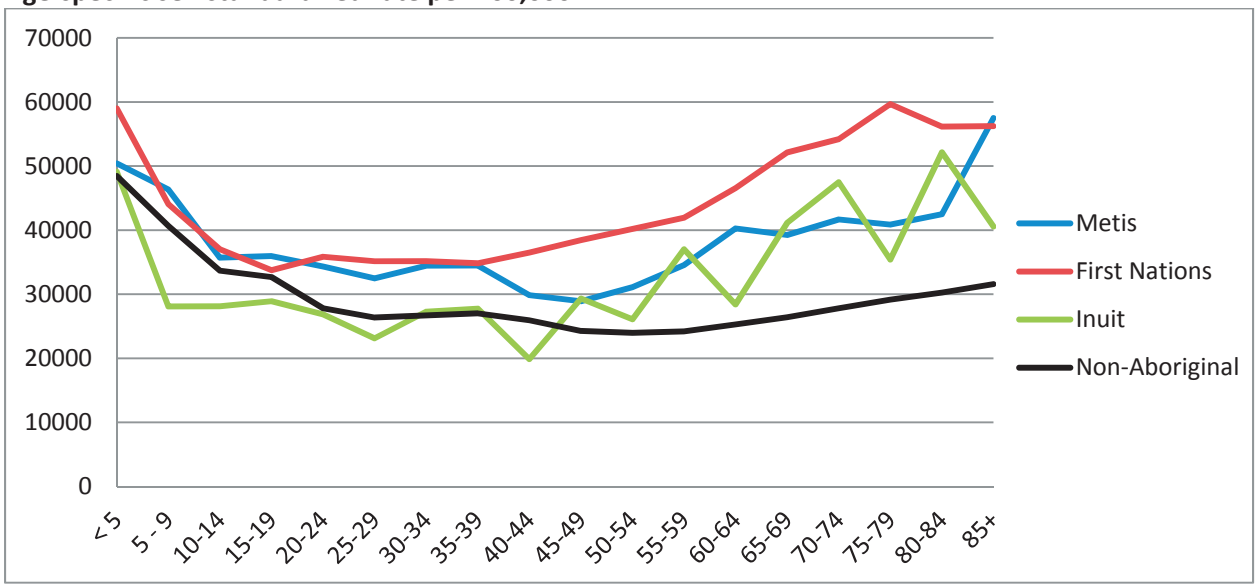
Injury prevalence rates are graphed below in **Graph 5.1.5**. There is some variation in pattern between the four groups but the general trend is similar for all. Injury rates are lowest in childhood with a sharp increase in adolescence. Through adulthood the prevalence rate is relatively stable with a continuous slight trend upwards with increasing. The prevalence of injury begins to increase more after the 70-74 year age-group. The Métis prevalence rates for injury are similar to those experienced by the non-Aboriginal though the Métis are always slightly higher than the non-Aboriginals. There appears to be an increased discrepancy in the highest age-groups due to a sharp increase in the Métis rate for the 80-84 year age-group. The First Nations experiences a noticeably higher rate than the Métis for almost all age-groups. The exceptions are the youngest age-groups and the 80-84 year age-group.

Graph 5.1.5
Injury morbidity (2009)
Age-specific sex-standardized rate per 100,000



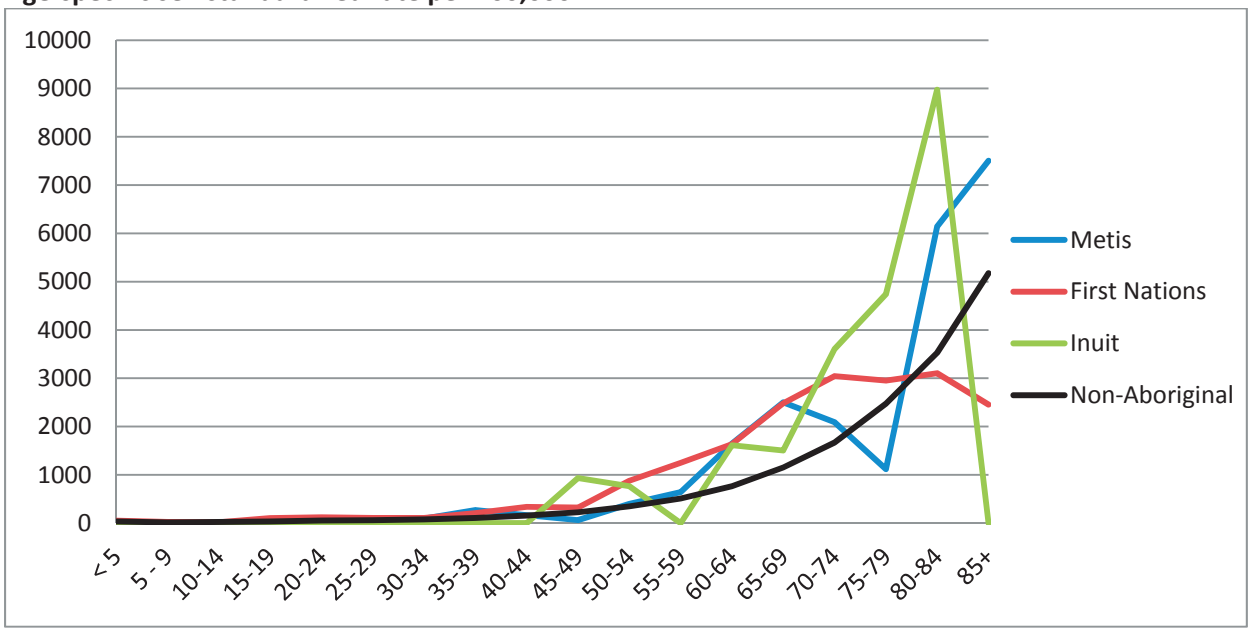
Graph 5.1.6 illustrates the morbidity of respiratory disease. The prevalence rates for all the groups start off high in early childhood and decrease throughout adulthood. In the older ages the rate of respiratory disease increases for all of the groups. The rate for the Métis is consistently higher than the non-Aboriginal and the discrepancy is most pronounced in the higher age-groups. Compared to the First Nations, the Métis rates are similar in children and early adulthood but start to diverge around the age of 40. Overall the rates of respiratory disease in the Métis hover near the midway point between the First Nations and non-Aboriginals.

Graph 5.1.6
Respiratory disease morbidity (2009)
Age-specific sex-standardized rate per 100,000



The prevalence rates of stroke are illustrated below in **Graph 5.1.7**. The Métis stroke prevalence rate is very low until 50 – 54 years of age. In the older ages, the rate of stroke increases significantly but there is great variation in the rate of increase so it is difficult to determine exactly where the rate sits in relation to the First Nations and non-Aboriginal with certainty. It appears that the prevalence of stroke in the Métis closely approximates the pattern seen in the non-Aboriginal population as opposed to the First Nations. Specifically, the stroke prevalence rate appears to be lower, though not consistently, in the Métis until the oldest age-groups. In the highest age-groups both the non-Aboriginal and Métis prevalence begins to exceed that of the First Nations, while the Métis in particular appear to have a very high rate of stroke prevalence in the 80+ year old population.

Graph 5.1.7
Stroke morbidity (2009)
Age-specific sex-standardized rate per 100,000



The morbidity for chronic respiratory diseases and respiratory diseases due to external factors are show in **Table 5.1.3** as well as the overall respiratory rate. The rate of chronic lower respiratory disease in the Métis is significantly higher than the rate for these diseases in the non-Aboriginal population (RR: 1.52). The rate of chronic lower respiratory disease is also lower for the Métis when compared to the First Nations population. The rate of respiratory disorders due to external factors (i.e., diseases caused by the inhalation of dust in the workplace) in the Métis is also higher than the non-Aboriginal population though significantly lower than that experienced by the First Nations.

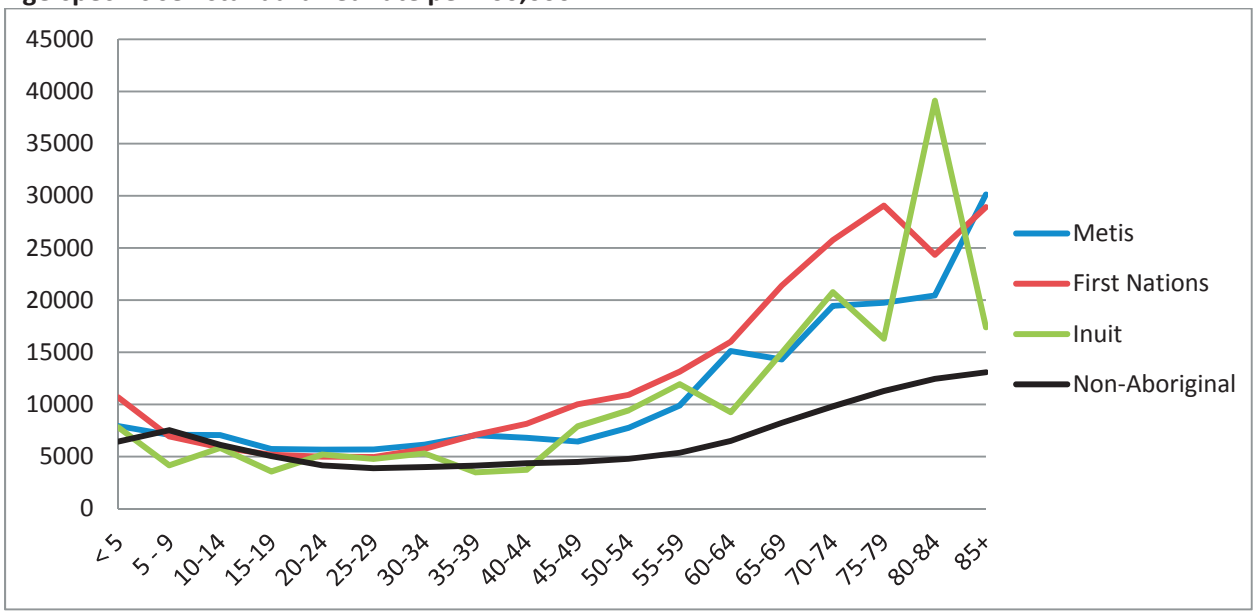
Table 5.1.3
Respiratory disease morbidity (2009)
Age/sex-standardized prevalence rate (cases per 100,000)

	Rate	95% CI		RSE†	RR‡
All respiratory diseases					
Métis	**36,695.8**	36,412.2	36,979.3	1.4	**1.23**
Inuit	**30,445.1**	29,798.3	31,091.8	3.5	**1.02**
First Nation	**41,094.0**	40,995.7	41,185.2	0.4	**1.38**
Non-Aboriginal	**29,822.5**	29,807.3	29,837.7	0.1	---
Chronic lower respiratory diseases					
Métis	**8,505.0**	8,377.6	8,632.4	2.8	**1.52**
Inuit	**7,459.3**	7,171.5	7,747.0	6.1	**1.33**
First Nation	**9,777.8**	9,729.8	9,825.8	1.0	**1.74**
Non-Aboriginal	**5,604.1**	5,597.8	5,610.4	0.2	---
Respiratory disorders due to external factors					
Métis	**132.2**	116.3	148.1	23.6	**1.24**
Inuit	**357.8**	305.3	410.3	31.6	**3.37**
First Nation	**243.4**	235.6	251.2	6.9	**2.29**
Non-Aboriginal	**106.3**	105.6	107.0	1.6	---

† RSE >25 indicates uncertainty in estimates
‡ non-Aboriginal population used as comparison group

The rates of chronic lower respiratory disease are depicted in **Graph 5.1.8**. The rates are fairly similar for all groups from birth through early adulthood. However, throughout adulthood there is a growing discrepancy between the Aboriginal and non-Aboriginal populations that continues to the oldest age groups.

Graph 5.1.8
Chronic lower respiratory diseases morbidity (2009)
Age-specific sex-standardized rate per 100,000



Section 5.2 Morbidity rates for mental disorders and addictions

The prevalence rate for mental health illness is located in **Table 5.2.1.** The rates of alcohol/drug abuse, mood disorder and neurotic disorders are significantly higher in the Métis population than the non-Aboriginal population. The rate of alcohol and drug abuse is particularly high with a rate of 2,748 cases per 100,000 which is slightly more than double the rate experienced by the non-Aboriginal population (1,279; RR: 2.15); however, the rate of alcohol and drug abuse experienced by the Métis is less than half of the rate that is observed within the First Nations population (2,748 versus 6,598 cases per 100,000). The rate of mood disorder in the Métis is 1.22 times that of the non-Aboriginal population (7,119 versus 5,837) but almost identical to that in the First Nations population (7,121). The prevalence of neurotic disorders, that is anxiety and other related disorders, is 9,745 which is 1.32 times the rate of the non-Aboriginal population (7,406 per 100,000). The prevalence rate of neurotic disorders for the Métis is considerably lower than the rate of the First Nations populace (12,195 per 100,000).

The remaining three diagnostic categories examined were significantly less prevalent in the Métis population compared to both the non-Aboriginal population and the First Nations. Dementia in particular is less likely in the Métis population with a rate only 0.65 times the rate found in the non-Aboriginal population (681 versus 1,050). It is difficult to determine whether this is due to better health for the Métis (particularly the elderly) for dementia or whether this is due to a bias in registration as Métis. Specifically it is possible that Métis with dementia may be less likely to be registered as Métis. The rates for personality disorder and schizophrenia were also significantly lower in the Métis than the non-Aboriginal population though the difference for these conditions is not as large as that found for dementia. The rate of personality disorders in the Métis (182 per 100,000) was not significantly different than the rate found in the non-Aboriginal population. The rate of schizophrenia (76) was 0.88 times the rate of the non-Aboriginals. Despite the rate of these disorders being similar or lower for the Métis compared to the non-Aboriginal population, the First Nations experienced a rate more than double that of the non-Aboriginal population for both of these conditions

Table 5.2.1
Mental health morbidity (2009)
Age/sex-standardized morbidity rate (cases per 100,000)

	Rate	95% CI		RSE†	RR‡
Alcohol and drug abuse					
Métis	**2,748.4**	2,679.9	2,816.9	4.6	**2.15**
Inuit	**4,280.1**	4,009.9	4,550.2	10.1	**3.35**
First Nation	**6,598.2**	6,557.5	6,638.8	1.2	**5.16**
Non-Aboriginal	**1,278.7**	1,275.6	1,281.9	0.5	---
Dementia					
Métis	**681.1**	647.7	714.5	11.3	**0.65**
Inuit	**1,330.6**	1,209.1	1,452.1	16.7	**1.27**
First Nation	**2,215.6**	2,191.7	2,239.5	2.4	**2.11**
Non-Aboriginal	**1,049.6**	1,047.6	1,051.5	0.5	---
Mood disorders					
Métis	**7,119.1**	7,007.3	7,230.8	2.9	**1.22**
Inuit	**6,937.3**	6,596.8	7,277.9	8.1	**1.19**
First Nation	**7,120.9**	7,078.9	7,162.9	1.1	**1.22**
Non-Aboriginal	**5,836.7**	5,830.1	5,843.3	0.2	---
Neurotic disorders					
Métis	**9,745.3**	9,614.7	9,875.9	2.5	**1.32**
Inuit	**9,817.0**	9,441.9	10,192.0	6.2	**1.33**
First Nation	**12,194.7**	12,249.7	12,139.7	0.9	**1.65**
Non-Aboriginal	**7,406.1**	7,398.7	7,413.5	0.2	---
Personality disorders					
Métis	**237.3**	217.1	257.4	15.2	**1.02**
Inuit	**471.2**	331.1	611.3	35.4	**2.02**
First Nation	**471.1**	460.3	482.0	4.2	**2.02**
Non-Aboriginal	**233.0**	231.6	234.4	1.1	---
Schizophrenia					
Métis	**275.6**	254.9	296.2	14.0	**0.88**
Inuit	**697.6**	580.8	814.4	28.9	**2.22**
First Nation	**653.5**	640.5	666.4	3.7	**2.08**
Non-Aboriginal	**314.0**	312.5	315.5	0.9	---

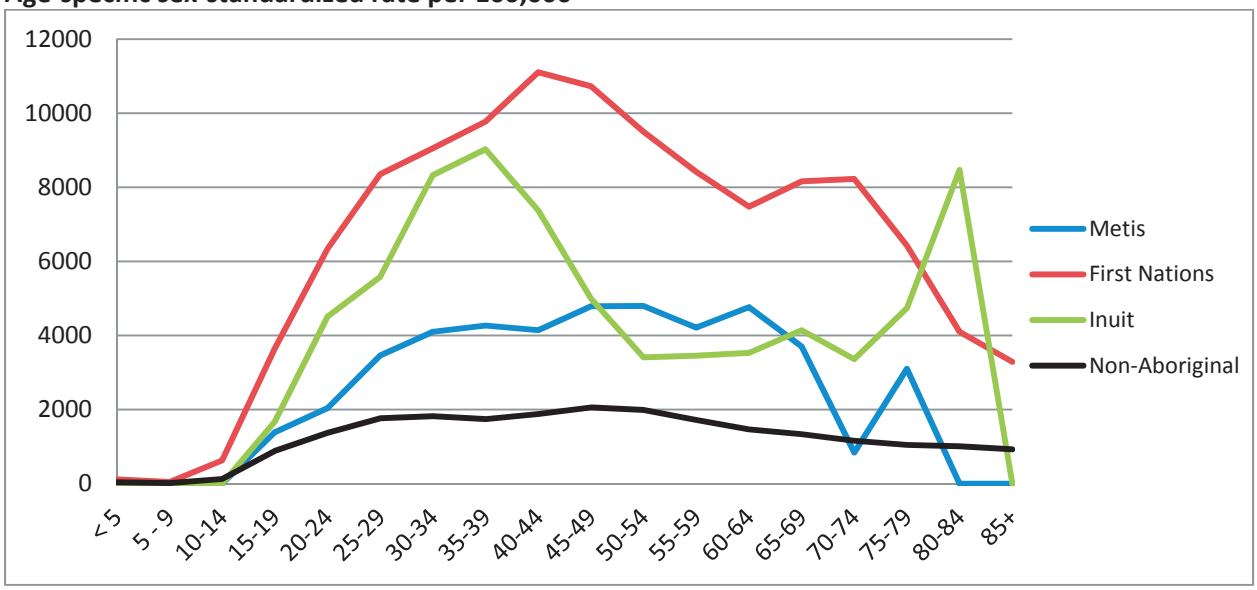
† RSE >25 indicates uncertainty in estimates
‡ non-Aboriginal population used as comparison group

Graph 5.2.1 illustrates the prevalence of alcohol and drug abuse disorders diagnosed in the Aboriginal populations. The graph indicates that the First Nations and Inuit have a consistently higher rate of alcohol and drug abuse than the non-Aboriginal population starting at a young age. The Métis prevalence rate for these disorders diverges significantly in the later age-groups with the first sign of a

large gap from the non-Aboriginals occurring for those aged 20-24 years and the difference disappearing in the 70-74 year age-group. The rate of alcohol and drug abuse in the Métis at no stage approaches the elevated levels found in the First Nations, though the Métis rate is similar to the Inuit for the 45-65 age range.

Graph 5.2.1

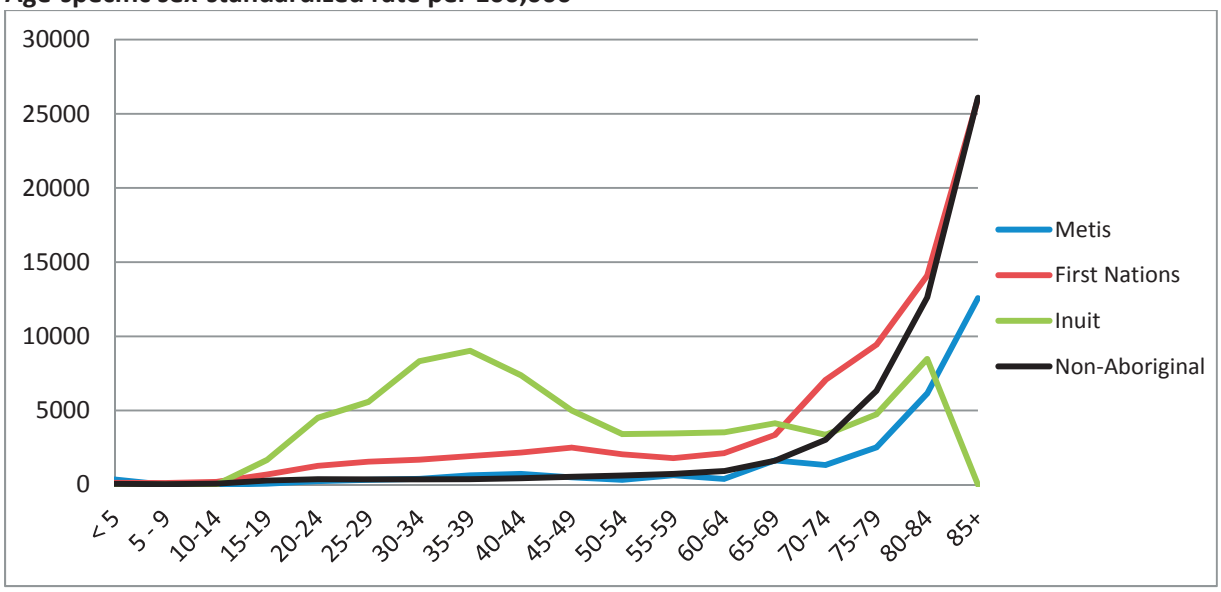
Alcohol and drug abuse disorder morbidity (2009)
Age-specific sex-standardized rate per 100,000



The prevalence rate of dementia, by age-group, is shown below in **Graph 5.2.2.** The graph indicates that the rate of dementia in the Inuit and First Nations increase significantly above both the Métis and non-Aboriginal population at a young age. The most likely explanation for this difference is that since drug and alcohol abuse-related dementias are included in this diagnostic category it is possible that the increase in dementias in these two groups is related to their high rate of alcohol and drug abuse. The rate of dementia in the Métis is almost identical to that of the non-Aboriginal until the 70+ age-groups where the non-Aboriginal's prevalence of dementia begins to increase significantly above the rate found in the Métis. In the more advanced ages, the prevalence of dementia becomes

approximately identical between the First Nations and non-Aboriginals. The Inuit has an unusually high rate of dementia in the early adult years but this rate is due to a small number of cases in a small Inuit population.

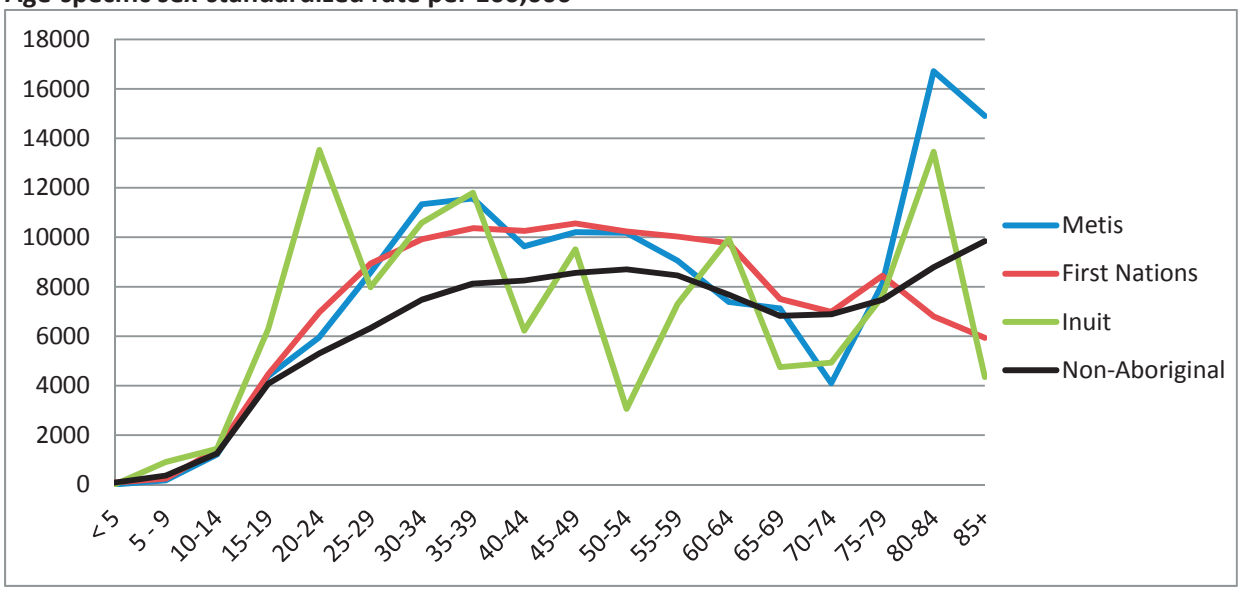
Graph 5.2.2
Dementia morbidity (2009)
Age-specific sex-standardized rate per 100,000



Graph 5.2.3 depicts the prevalence of mood disorders by age-group for the four populations. The four populations have a similar pattern of prevalence with an increase in the adolescent years followed by a decrease in 60-74 age groups followed by a second increase in prevalence in the oldest age-groups. The greatest discrepancy in mood disorder prevalence between the Aboriginal and non-Aboriginal populations occurs in early adulthood. The Métis prevalence begins to decrease around the age of 40 and beings to more closely resemble the prevalence of the non-Aboriginals until old age when the prevalence for Métis increases faster than that of the non-Aboriginal population. Compared to the First Nations, the prevalence of mood disorders in the Métis is similar for adolescence and early adulthood. The Métis prevalence is lower in later adulthood and early retirement ages relative to the

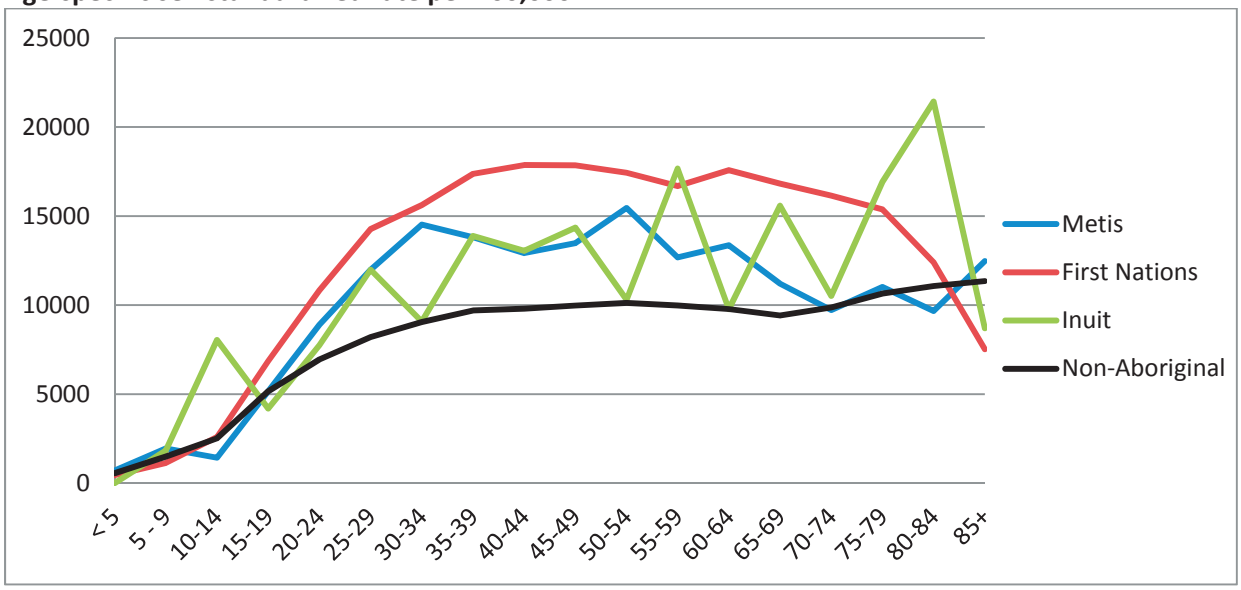
First Nations. In the older age-groups, the First Nations do not have the second increase in prevalence that occurs for the other three populations and the rate of mood disorders in the First Nations decreases below that of the other populations in the oldest age-groups.

Graph 5.2.3
Mood disorder morbidity (2009)
Age-specific sex-standardized rate per 100,000



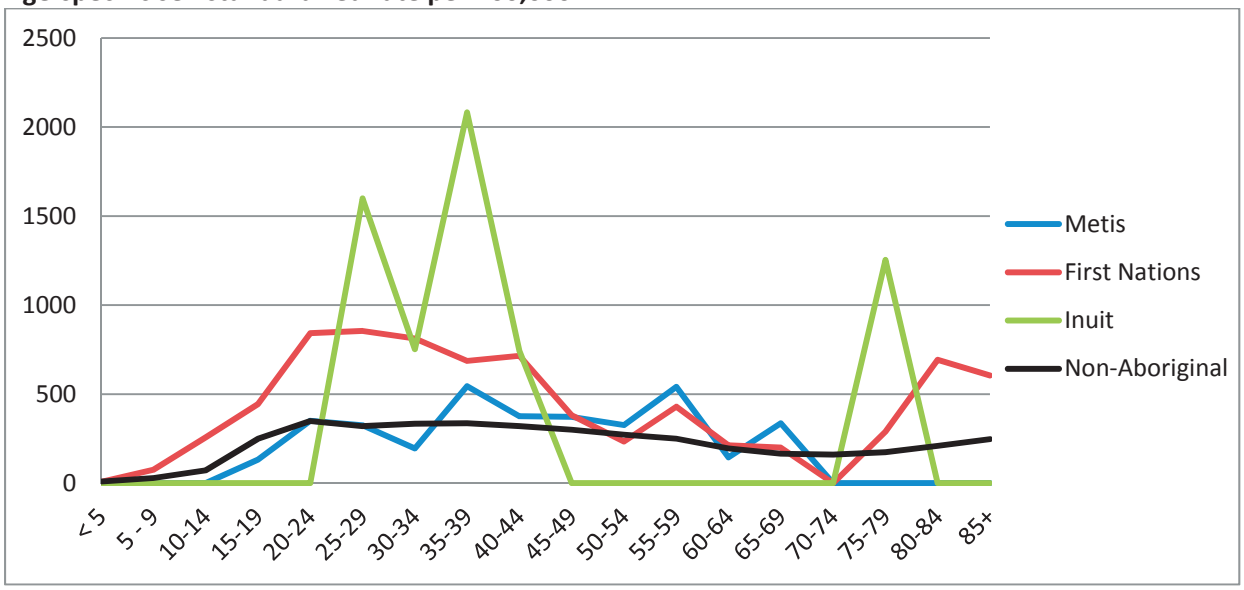
The prevalence of neurotic disorders is graphed over age below in **Graph 5.2.4**. The rates for the three Aboriginal groups diverge from the non-Aboriginals in adolescence, where they become consistently higher than the non-Aboriginal population until the retirement ages when the prevalence for the Aboriginal groups declines to the level seen in the non-Aboriginal population. The Métis appear to experience a prevalence that is midway between the rate seen in the First Nations and that of the non-Aboriginal population during most of adulthood. In the elderly age-groups, the prevalence of neurotic disorders in the Métis decreases to approximately that of the non-Aboriginals faster than the First Nations population.

Graph 5.2.4
Neurotic disorder morbidity (2009)
Age-specific sex-standardized rate per 100,000



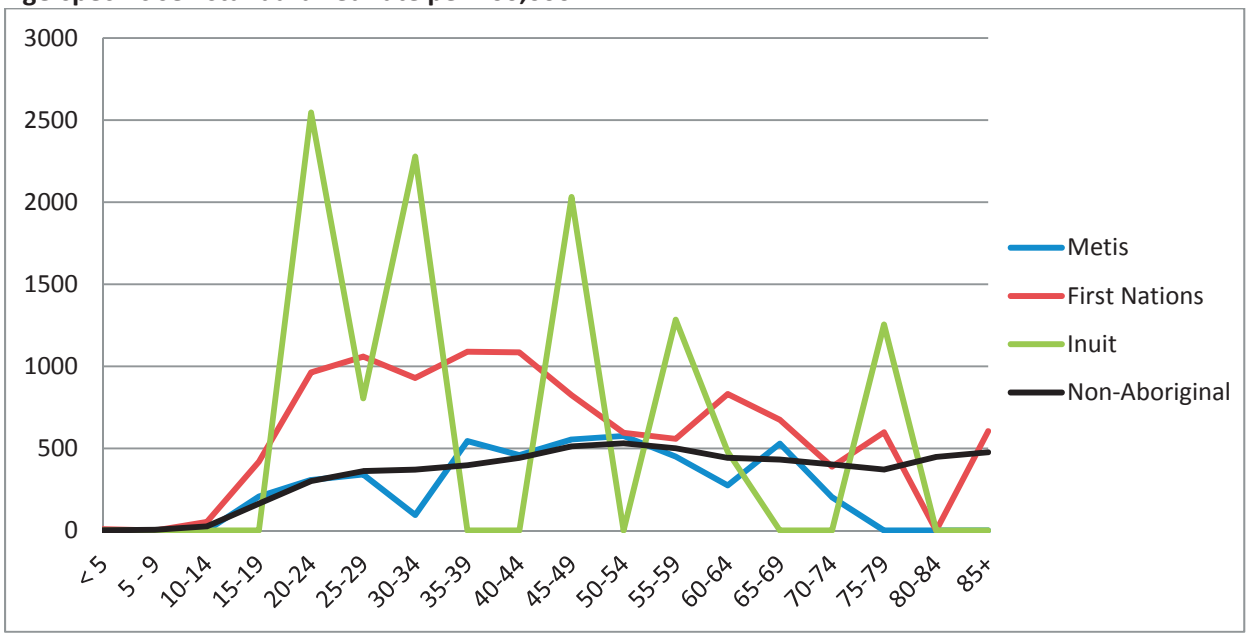
Graph 5.2.5 illustrates the prevalence of personality disorders. In all groups, there is an increase in prevalence in adolescence that peaks in early adulthood and slowly declines as age increases. The Métis and non-Aboriginal populations both have a similar pattern of prevalence. The First Nations have a considerably higher rate of personality disorders throughout most of the adult years but have similar level of these disorders during childhood and the more advanced ages. The prevalence of personality disorders is fairly consistent for the Métis and non-Aboriginal populations over time, while the First Nations exhibit a significant spike in these disorders during the early adult years. The Inuit rates are fairly erratic and it is impossible to say with certainty how their rates related to the other groups.

Graph 5.2.5
Personality disorder morbidity (2009)
Age-specific sex-standardized rate per 100,000



The prevalence of schizophrenia is depicted in **Graph 5.2.6.** The prevalence of schizophrenia in the Métis increases starting in adolescence and peaks in the 50-54 year age-group before declining to a near zero prevalence in the oldest age categories. The prevalence of schizophrenia in the Métis is similar to that of the non-Aboriginal population, with the exception of a decreased in prevalence in the oldest age categories of the Métis which does not occur in the non-Aboriginal population. The First Nations have a considerably higher rate of schizophrenia in almost all of the age-groups compared to the Métis. Due to the small Inuit population and resulting high RSE value, the graph of prevalence for the Inuit is too erratic to draw any solid conclusions.

Graph 5.2.6
Schizophrenia morbidity (2009)
Age-specific sex-standardized rate per 100,000



5.3 Morbidity rates of disease by ICD-10-CA chapter

In addition to the specific physical and mental disorders specified above, the prevalence of illness in the Métis, First Nation, Inuit and non-Aboriginal populations was assessed based on the chapter structure of the ICD-10-CA. This results in eighteen categories of disease (the laboratory findings and health status related codes are not included in this analysis). The rate of each of the categories of disease is located in **Table 5.3.1.**

Respiratory diseases are the most prevalent category of disease for all groups. The rate for respiratory diseases in the Métis is 36,696 per 100,000. Injury is the second most prevalent diagnosis in the Métis with a period prevalence rate of 24,116 per 100,000. The third and fourth most common conditions are musculoskeletal conditions (22,378) and genitourinary conditions (19,366). Mental illness is the fifth most commonly encountered condition with 18,006 people per 100,000 being diagnosed with at least one mental illness.

Chapter 5 Morbidity

Compared to the non-Aboriginal population, the Métis experienced significantly higher prevalence of most diseases. A total of fourteen of the disease categories were more common in the Métis population. The highest discrepancy in prevalence is for Endocrine disorders (e.g., diabetes) where the prevalence rate for the Métis is 1.38 times higher than that found in the non-Aboriginal population. Other diseases with high discrepancies (a RR greater than 1.2) between the Métis and non-Aboriginals are digestive disorders (1.32), respiratory disorders (1.23) , mental health disorders (1.28), genitourinary disorders (1.21), circulatory disorders (1.25), blood and immune system disorders (1.25), nervous system disorders (1.20) and infectious diseases (1.20). The remaining five conditions (diseases of the ear and mastoid process, injury, diseases of the musculoskeletal system, conditions in the perinatal period and skin disorders) were observed to be elevated in the Métis population, with RRs between 1.03 and 1.16, compared to non-Aboriginals.

The prevalence of disease in the Métis is lower than that found in the First Nations for all diseases except for cancer, endocrine diseases and circulatory diseases. Cancer is 1.45 times more prevalent in the Métis population compared to the First Nations and circulatory disease is 1.12 times more prevalent in the Métis. Overall the morbidity rates for the Métis appear to be midway between those of the non-Aboriginal population and those experienced by the First Nations.

Table 5.3.1
Morbidity by ICD-10-CA disease chapters (2009)
Age/sex-standardized morbidity rate (cases per 100,000)

ICD-10-CA category	Rate	95% CI		RSE†	RR‡
Blood and Immune					
Métis	**3,233.9**	3,162.6	3,305.1	4.8	**1.25**
Inuit	**4,046.8**	3,843.1	4,250.5	8.7	**1.56**
First Nation	**4,702.5**	4,667.9	4,737.0	1.5	**1.82**
Non-Aboriginal	**2,588.3**	2,584.4	2,592.2	0.3	---
Cancer					
Métis	**6,264.7**	6,167.2	6,264.7	3.1	**0.97**
Inuit	**4,822.8**	4,611.9	5,033.7	7.3	**0.74**
First Nation	**3,902.8**	3,871.4	3,934.2	1.7	**0.60**
Non- Aboriginal	**6,483.1**	6,476.8	6,489.3	0.2	---
Circulatory					
Métis	**17,508.3**	17,134.8	17,427.3	1.9	**1.25**
Inuit	**14,027.3**	13,722.3	14,332.2	3.9	**1.00**
First Nation	**15,614.9**	15,551.8	15,678.0	0.9	**1.11**
Non- Aboriginal	**14,021.8**	14,013.6	14,030.0	0.1	---
Congenital					
Métis	**779.6**	611.1	685.6	10.4	**0.87**
Inuit	**860.6**	762.4	958.9	21.3	**0.96**
First Nation	**934.1**	919.8	948.3	2.9	**1.04**
Non- Aboriginal	**899.1**	896.4	901.7	0.6	---
Digestive					
Métis	**13,198.8**	13,046.0	13,351.5	2.2	**1.32**
Inuit	**12,200.6**	11,820.1	12,581.1	5.1	**1.22**
First Nation	**16,881.4**	16,818.0	16,944.8	0.7	**1.69**
Non- Aboriginal	**10,014.2**	10,005.9	10,022.4	0.2	---
Ear and Mastoid					
Métis	**8,774.6**	8,621.5	8,927.8	2.9	**1.16**
Inuit	**7,413.6**	7,091.4	7,735.7	7.2	**0.98**
First Nation	**9,436.2**	9,391.6	9,480.9	0.9	**1.25**
Non- Aboriginal	**7,536.5**	7,529.0	7,544.0	0.2	---
Endocrine					
Métis	**17,344.8**	17,191.9	17,497.7	1.9	**1.38**
Inuit	**13,750.9**	13,405.2	14,096.7	4.2	**1.10**
First Nation	**15,949.2**	15,885.7	16,012.7	0.9	**1.27**
Non- Aboriginal	**12,557.7**	12,549.2	12,566.2	0.1	---
Eye and Adnexa					
Métis	**9,881.7**	9,748.3	10,015.0	2.7	**0.89**
Inuit	**9,905.1**	9,600.1	10,210.0	5.4	**0.89**
First Nation	**10,088.8**	10,039.5	10,138.2	1.0	**0.90**
Non- Aboriginal	**11,165.5**	11,157.3	11,173.8	0.2	---
Genitourinary					
Métis	**19,365.5**	19,179.1	19,552.0	1.8	**1.21**
Inuit	**16,309.9**	15,834.7	16,785.2	4.5	**1.02**
First Nation	**19,879.8**	19,810.1	19,949.6	0.7	**1.24**
Non- Aboriginal	**16,041.9**	16,031.0	16,052.9	0.1	---

Infectious Disease					
Métis	**12,727.2**	12,558.8	12,895.5	2.3	**1.20**
Inuit	**9,320.7**	8,968.8	9,672.7	6.4	**0.88**
First Nation	**14,447.4**	14,390.4	14,504.4	0.7	**1.36**
Non- Aboriginal	**10,616.9**	10,607.7	10,626.0	0.2	---
Injury					
Métis	**24,115.6**	23,896.2	24,335.0	1.6	**1.16**
Inuit	**22,987.7**	22,408.5	23,566.9	4.2	**1.11**
First Nation	**28,808.0**	28,726.7	28,889.3	0.5	**1.39**
Non- Aboriginal	**20,785.7**	20,773.2	20,798.2	0.1	---
Mental Health					
Métis	**18,006.3**	17,824.1	18,188.4	1.9	**1.28**
Inuit	**17,977.9**	17,467.7	18,488.0	4.7	**1.28**
First Nation	**21,755.7**	21,683.1	21,828.4	0.7	**1.55**
Non- Aboriginal	**14,013.5**	14,003.4	14,023.6	0.1	---
Musculoskeletal					
Métis	**22,378.2**	22,192.2	22,564.2	1.7	**1.03**
Inuit	**18,822.8**	18,355.6	19,290.0	4.0	**0.87**
First Nation	**27,045.8**	26,964.4	27,127.3	0.6	**1.25**
Non- Aboriginal	**21,678.3**	21,666.2	21,690.4	0.1	---
Nervous					
Métis	**4,578.9**	4,491.8	4,666.0	3.7	**1.20**
Inuit	**3,804.5**	3,591.0	4,892.1	9.1	**0.99**
First Nation	**5,156.3**	5,120.5	5,192.1	1.4	**1.35**
Non- Aboriginal	**3,826.3**	3,821.3	3,831.3	0.3	---
Perinatal					
Métis	**627.0**	577.8	676.2	12.5	**1.15**
Inuit	**430.1**	351.6	508.5	30.2	**0.79**
First Nation	**679.9**	668.1	691.7	3.2	**1.25**
Non- Aboriginal	**543.5**	541.3	545.7	0.8	---
Pregnancy*					
Métis	**4,554.3**	4,412.8	4,695.7	5.3	**0.88**
Inuit	**6,667.3**	6,148.7	7,185.9	13.6	**1.29**
First Nation	**7,860.6**	7,798.9	7,922.3	1.4	**1.52**
Non- Aboriginal	**5,186.6**	5,176.4	5,196.9	0.3	---
Respiratory					
Métis	**36,695.8**	36,412.2	36,979.3	1.4	**1.23**
Inuit	**30,445.1**	29,798.3	31,091.8	3.5	**1.02**
First Nation	**41,094.0**	40,995.7	41,185.2	0.4	**1.38**
Non- Aboriginal	**29,822.5**	29,807.3	29,837.7	0.1	---
Skin					
Métis	**17,139.3**	16,952.9	17,325.6	1.9	**1.12**
Inuit	**14,574.5**	14,122.0	15,027.1	5.0	**0.95**
First Nation	**19,458.7**	19,392.2	19,525.1	0.7	**1.27**
Non- Aboriginal	**15,335.3**	15,324.8	15,345.8	0.1	---

*Female only rates

† RSE >25 indicates uncertainty in estimates

‡ non-Aboriginal population used as comparison group

Chapter 6 Disease-related health services utilization

Chapter summary of analysis

Estimates for the age/sex-standardized rate of emergency department (ED), inpatient and ambulatory usage were obtained for the calendar year of 2009. These rates were estimated based on the structure of the ICD-10 CA and for several selected physical diseases. The relative rate of usage was calculated comparing the rate for the registered Métis and the other Aboriginal groups with that of the general population of Alberta. The rate of injury was analyzed more thoroughly using the external cause codes of the ICD-10 CA to identify the causes of the injuries that were treated in the ED and inpatient wards. Injuries were analyzed to determine the rates of unintentional and intentionally caused injuries. Further analysis was done examining the cause of unintentional injuries in particular and rates were obtained for the major causes of unintentional injuries with further analysis performed on transportation-related injuries. Usage of ambulatory care services was determined by ICD-10-CA chapter coding.

Estimates were obtained for physician usage of the Aboriginal and non-Aboriginal populations. The use of health services was determined by diagnostic code (ICD-9) for the physical and mental health diseases previously identified for analysis. The results were age/sex-standardized and compared between population groups. Graphs were created to depict the rate of physician usage for specific age-groups and populations.

Key findings

6.1 Physician claim rates by condition

The analysis of the previously identified physical and mental conditions revealed significant differences between the groups. The Métis had lower rates of cancer, dementia and schizophrenia-related claims, compared to the non-Aboriginal population, but higher rates of diabetes, heart disease, hypertension, injury, respiratory disease, stroke, alcohol and drug abuse, mood disorder and neurotic disorder-related claims. Compared to the First Nations, the Métis had lower rates of diabetes, injury, respiratory disease and, with the exception of personality disorders, all of the categories of mental disorder examined. The rate of personality disorders was approximately equal between the Métis and First Nations.

6.2 ED presentation rates by condition

When injury-related visits were analyzed it was determined that the Métis had higher rates of presentation for both unintentional injuries and intentional injuries (self-harm and assault) compared to the non-Aboriginal population; however, the Métis had considerably lower rates than the First Nations. For unintentional injuries, the highest discrepancy between the non-Aboriginals and the Métis was for transportation-related injuries and adverse surgical events. Animal-related (i.e., injuries involving animals such as horse-riding injuries) and All-Terrain Vehicle (ATV)-related injuries were particularly increased for the Métis.

For the diseases examined (cancer, heart disease, mental health, etc.), the Métis consistently were observed to have higher rates than the non-Aboriginal population. The Métis rates were consistently lower than the First Nations in all the diseases examined (though the difference was not significant for stroke presentation rates).

6.3 Inpatient admission rates by condition

Injury analysis reveals that the rates of admission for unintentional, intentional and other causes of injury are significantly different between the Métis and the non-Aboriginal population of Alberta. Intentional injury-related hospitalizations in particular occur at a higher rate for the Métis. However, the rate of unintentional and intentional injuries for the First Nations and Inuit are significantly higher than those of the Métis.

Examining the inpatient rates for the selected diseases illustrates a consistent pattern of higher inpatient usage. The sole exception is for admission due to cancer, where the Métis have a significantly lower rate of admission compared to the non-Aboriginal population. The First Nations population also has a lower rate for cancer admission compared to the non-Aboriginals. The rate for most of these diseases is also lower in the Métis population compared to the First Nations population. The rate of cancer in the Métis was not significantly higher while the rate of stroke was highest in the Métis among the four populations.

Chapter 6 Disease-specific health services utilization

Section 6.1 Physician claims by condition

Table 6.1.1 contains the age/sex-standardized rates for several physical illnesses (cancer, respiratory disease, injury, diabetes, heart disease, hypertension, and stroke) derived from the physician claims database. Compared to the non-Aboriginal population, the Métis have higher rates of service use for these diseases with the notable exception of cancer (where the Métis only use 84% as many services). The rate of service use for strokes is particularly high for the Métis (3.35 times the usage of the non-Aboriginals). The rate of service use for diabetes and heart diseases is also well above the non-Aboriginal usage (1.48 and 1.63 times the non-Aboriginal rate, respectively). Hypertension-related service usage for the Métis is 1.18 times higher and respiratory-related usage is 1.28 times higher than that of the non-Aboriginal population. There is also a small but significantly higher rate of injury-related usage with a rate 1.04 times higher than the non-Aboriginals. The rate of diabetes service use is lower in the Métis than in the First Nations population. Compared to the non-Aboriginal population, the rate of circulatory diseases is higher in the Métis population. The rates of service usage for heart disease, hypertension and stroke were also significantly higher in the Métis relative to the First Nations. Service use due to respiratory diseases is considerably lower in the Métis than in the First Nations population.

Table 6.1.1
Physical health-related physician services used (2009)
Age/sex-standardized rate per 100,000

Diagnosis	Rate	95% CI		RSE†	RR‡
Cancer					
Métis	**18,103**	17,949	18,256	1.9	**0.84**
First Nations	**16,131**	16,065	16,197	1.0	**0.75**
Inuit	**21,034**	20,658	21,409	3.0	**0.98**
Non-Aboriginal	**21,562**	21,551	21,572	0.1	---
Diabetes					
Métis	**19,609**	19,463	19,755	1.8	**1.48**
First Nations	**34,220**	34,127	34,313	0.6	**2.58**
Inuit	**18,524**	18,260	18,788	2.9	**1.40**
Non-Aboriginal	**13,246**	13,238	13,253	0.1	---
Heart Disease					
Métis	**15,018**	14,893	15,142	2.2	**1.63**
First Nations	**14,191**	14,129	14,253	1.1	**1.54**
Inuit	**11,302**	11,064	11,541	4.2	**1.23**
Non-Aboriginal	**9,221**	9,215	9,227	0.2	---
Hypertension					
Métis	**26,373**	26,200	26,546	1.6	**1.18**
First Nations	**21,319**	21,246	21,393	0.8	**0.95**
Inuit	**21,373**	21,036	21,709	3.1	**0.95**
Non-Aboriginal	**22,423**	22,413	22,433	0.1	---
Injury					
Métis	**60,418**	60,086	60,750	1.0	**1.04**
First Nations	**96,967**	96,820	97,115	0.3	**1.66**
Inuit	**66,499**	65,544	67,454	2.5	**1.14**
Non-Aboriginal	**58,309**	58,289	58,330	0.1	---
Respiratory					
Métis	**89,858**	89,434	90,282	0.9	**1.28**
First Nations	**150,193**	150,015	150,372	0.2	**2.13**
Inuit	**84,107**	83,115	85,099	2.0	**1.19**
Non-Aboriginal	**70,472**	70,449	70,494	0.1	---
Stroke					
Métis	**8,188**	8,085	8,292	4.7	**3.35**
First Nations	**3,552**	3,520	3,583	2.8	**1.45**
Inuit	**2,168**	2,088	2,248	9.2	**0.89**
Non-Aboriginal	**2,447**	2,444	2,450	0.3	---

† RSE >25 indicates uncertainty in estimates
‡ non-Aboriginal population used as comparison group

The rate of mental illness-related service usage is detailed in **Table 6.1.2.** While there is a higher rate of alcohol and drug-related services for the Métis compared to the non-Aboriginal population, this difference is relatively small. However, the rate of alcohol and drug-related service use for the First Nations is almost 4 times higher than the rate of the Métis. The rate of alcohol and drug-related service use for the Inuit is also significantly higher than that of the Métis. The rate of dementia and schizophrenia are particularly low for the Métis. The rate of service use for mood and neurotic -related disorders is slightly higher in the Métis compared to the non-Aboriginals. The rate of these disorders is lower in the Métis compared to the First Nations. The rate of personality disorders is not significantly different between the non-Aboriginals, First Nations and Métis.

Table 6.1.2
Mental health physician services used (2009)
Age/sex-standardized rate per 100,000

Diagnosis	Rate	95% CI		RSE†	RR‡
Alcohol and drug abuse					
Métis	**4,684.3**	4,591.2	4,777.4	3.5	**1.15**
First Nations	**17,665.2**	17,598.8	17,731.6	0.7	**4.34**
Inuit	**11,684.3**	11,197.5	12,171.1	7.1	**2.87**
Non-Aboriginal	**4,066.5**	4,060.8	4,072.2	0.3	---
Dementia					
Métis	**4,156.9**	4,085.7	4,228.1	4.3	**0.41**
First Nations	**14,157.8**	14,097.2	14,218.5	1.2	**1.39**
Inuit	**12,305.3**	11,918.1	12,692.6	6.6	**1.21**
Non-Aboriginal	**10,188.3**	10,183.5	10,193.1	0.2	---
Mood disorder					
Métis	**28,353.9**	28,139.1	28,568.7	1.4	**1.06**
First Nations	**30,381.1**	30,294.8	30,467.4	0.5	**1.14**
Inuit	**24,514.0**	23,855.4	25,171.6	4.5	**0.92**
Non-Aboriginal	**26,756.6**	26,742.7	26,770.4	0.1	---
Neurotic					
Métis	**22,546.3**	22,349.7	22,742.9	1.6	**1.20**
First Nations	**30,510.9**	30,424.7	30,597.2	0.5	**1.62**
Inuit	**27,610.3**	26,938.6	28,282.1	4.03	**1.47**
Non-Aboriginal	**18,843.2**	18,831.5	18,854.9	0.1	---
Personality disorders					
Métis	**1,200.1**	1,160.8	1,239.4	6.3	**1.03**
First Nations	**1,201.2**	1,183.2	1,219.2	2.7	**1.03**
Inuit	**869.3**	737.8	1,000.8	25.8	**0.75**
Non-Aboriginal	**1,165.7**	1,162.5	1,168.8	0.5	---
Schizophrenia					
Métis	**2,789.8**	2,723.5	2,856.1	4.4	**0.46**
First Nations	**11,696.1**	11,641.7	11,750.6	0.9	**1.92**
Inuit	**9,030.7**	8,598.2	9,463.2	8.4	**1.49**
Non-Aboriginal	**6,078.6**	6,071.8	6,085.4	0.2	---

† RSE >25 indicates uncertainty in estimates
‡ non-Aboriginal population used as comparison group

Section 6.2 ED presentations by condition

The rates of ED presentation for the selected conditions identified in Chapter 2 (cancer, respiratory disease, diabetes, hypertension, heart disease, mental disorders, and stroke) are presented

in Table 6.2.1. The rates for of all of the diseases in the table are higher for the Métis than the non-Aboriginal population. Presentation rates for diabetes (576.4) and hypertension (570.2) are particularly higher for the Métis compared to the non-Aboriginal (RR: 3.21 and 2.97, respectively). The remaining diseases have a RR between 1.55 and 2.17. In comparison to the First Nations, the Métis have significantly lower rates of ED presentations for all of the identified diseases with the lone exception of stroke, were no significant difference was observed for stroke. The rates for the Inuit vary between higher than those observed for the Métis to approximately equal those observed in the non-Aboriginal population. The rate of cancer, hypertension and respiratory disease for the Inuit is lower than that experience by the Métis. Additionally, the rates of cancer, hypertension and respiratory disease in the Inuit population are lower than those observed for the Métis, while no significant differences were observed between the presentation rate for heart disease and stroke between the Métis and Inuit populations.

Table 6.2.1
Emergency department visits by selected conditions (2009)
Age/sex-standardized rate per 100,000

Intent	Rate	95% CI		RSE†	RR‡
Cancer					
Métis	**400.8**	378.1	423.5	12.9	**1.74**
Inuit	**251.6**	215.1	288.0	24.3	**1.09**
First Nations	**436.5**	426.1	447.0	5.3	**1.89**
Non-Aboriginal	**230.5**	229.4	231.6	1.1	---
Respiratory					
Métis	**13,039.5**	12,863.6	13,215.5	2.4	**2.17**
Inuit	**12,042.3**	11,634.8	12,449.7	5.6	**2.00**
First Nations	**21,567.0**	21,498.7	21,635.3	0.6	**3.59**
Non-Aboriginal	**6,012.1**	6,005.2	6,019.0	0.2	---
Diabetes					
Métis	**576.4**	551.0	601.8	10.9	**3.21**
Inuit	**779.8**	731.4	828.2	16.7	**4.35**
First Nations	**1,471.8**	1,452.0	1,491.5	3.0	**8.21**
Non-Aboriginal	**179.4**	178.3	180.4	1.2	---
Hypertension					
Métis	**570.2**	543.8	596.6	11.3	**2.97**
Inuit	**248.4**	127.8	368.9	30.2	**1.29**
First Nations	**635.2**	622.4	648.1	4.9	**3.31**
Non-Aboriginal	**192.0**	191.1	193.0	1.2	---
Heart disease					
Métis	**322.0**	303.6	340.4	15.6	**1.88**
Inuit	**293.9**	250.1	337.7	24.3	**1.71**
First Nations	**488.4**	476.9	499.9	6.1	**2.85**
Non-Aboriginal	**171.4**	170.7	172.2	1.2	---
Mental disorders					
Métis	**1,860.1**	1,803.0	1,917.3	5.5	**1.55**
Inuit	**4,769.4**	4,456.6	5,082.1	11.3	**3.97**
First Nations	**7,457.5**	7,414.6	7,500.5	1.1	**6.20**
Non-Aboriginal	**1,202.4**	1,199.3	1,205.5	0.5	---
Stroke					
Métis	**131.3**	108.8	153.9	27.7	**1.64**
Inuit	**202.8**	83.7	321.9	37.8	**2.53**
First Nations	**142.3**	136.2	148.4	10.8	**1.78**
Non-Aboriginal	**80.0**	79.5	80.5	1.8	---

† RSE >25 indicates uncertainty in estimates
‡ non-Aboriginal population used as comparison group

ED presentations with an external cause code in any of the diagnostic categories were examined in more detail. The first external code found for each record was used to determine the most common causes of injury and whether these injury causes varied significantly between the four populations. Unintentional injuries comprised the majority of injury visits. The Métis rate of unintentional injury was 1.82 times the rate for the non-Aboriginal population; however, it was significantly less than the rate for the First Nations. The rate of self-harm and assault-related presentation to the ED are both higher for the Métis compared to non-Aboriginals; although, the Métis have significantly lower rates of presentation for self-harm and assault than the First Nations and Inuit.

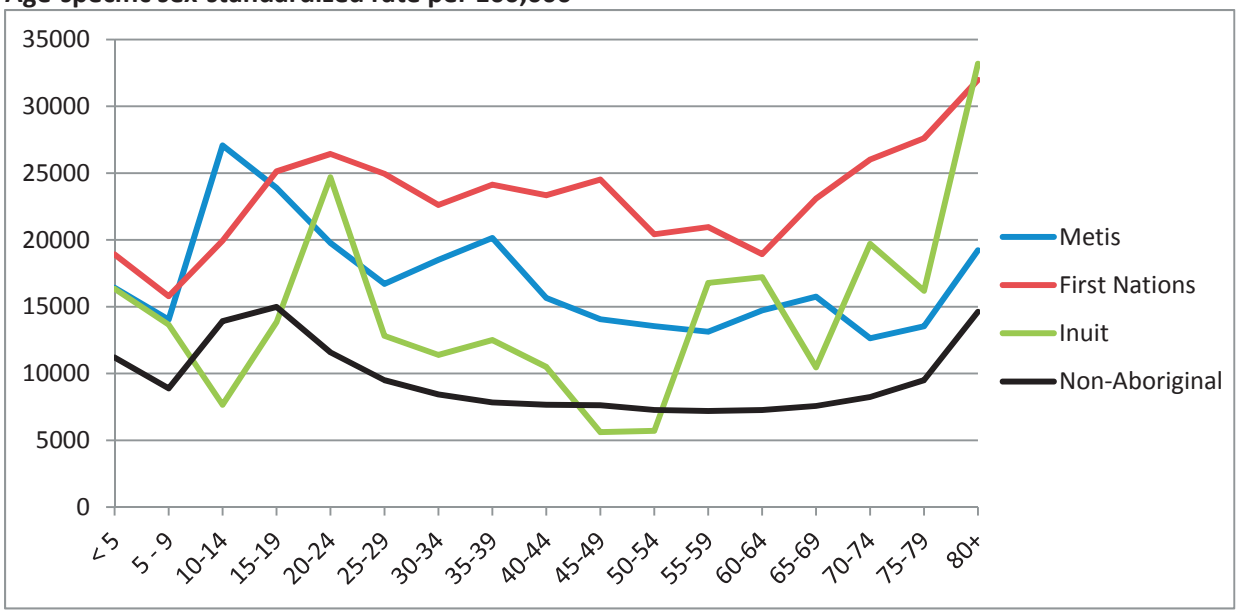
Table 6.2.2
Emergency department injury visits by intent (2009)
Age/sex-standardized rate per 100,000

Intent	Rate	95% CI		RSE†	RR‡
Unintentional					
Métis	**17,539.3**	17,347.6	17,731.1	1.9	**1.82**
Inuit	**14,133.0**	13,681.0	14,585.0	5.6	**1.47**
First Nations	**22,783.7**	22,711.9	22,855.6	0.6	**2.37**
Non-Aboriginal	**9,616.8**	9,608.2	9,625.5	0.2	---
Self-harm					
Métis	**182.6**	164.5	200.7	17.4	**1.59**
Inuit	**880.7**	733.4	1,103.6	30.2	**7.64**
First Nations	**628.8**	616.43	641.2	3.5	**5.46**
Non-Aboriginal	**115.2**	114.2	116.2	1.6	---
Assault					
Métis	**805.9**	767.0	844.9	8.5	**1.92**
Inuit	**1,648.1**	1,464.1	1,832.2	20	**5.15**
First Nations	**3,993.7**	3,962.1	4,025.2	1.4	**12.5**
Non-Aboriginal	**320.3**	318.6	322.0	1.0	---
Other*					
Métis	**70.2**	53.1	87.2	30.2	**1.81**
Inuit	**88.7**	1.8	175.5	70.7	**2.29**
First Nations	**359.3**	350.0	368.6	4.7	**9.26**
Non-Aboriginal	**38.8**	38.2	39.3	2.7	---

*OTHER includes Undetermined intent and Legal Intervention
† RSE >25 indicates uncertainty in estimates
‡ non-Aboriginal population used as comparison group

Graph 6.2.1 shows the rate of injury presentation by 5-year age-groups for the four populations. The graph indicates that the injury rate of the Métis is higher than the non-Aboriginal population in all age-groups. By age-group, the rate of injury for the Métis is consistently lower than the rate observed for the First Nations with the notable exception of those aged 10-14. The injury rate for the Inuit is generally lower than the Métis, except for the older age-groups which are roughly equal with the exception of the older age-group (85+). The First Nations population has the highest rate of injury in all but two age-groups—those where there is a relatively small population of Métis and Inuit which may be responsible for this discrepancy due to increased variation in age-specific rates.

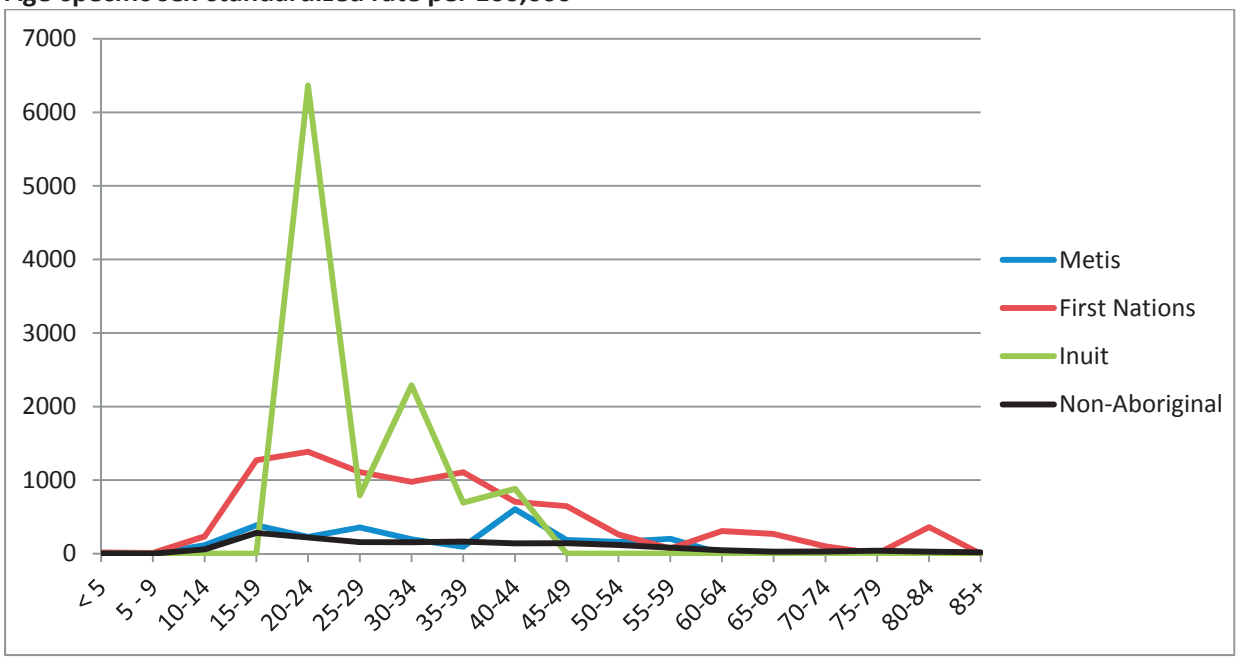
Graph 6.2.1
Unintentional injuries emergency department presentations (2009)
Age-specific sex-standardized rate per 100,000



The rate of presentation for self-harm, by age-group, is presented in **Graph 6.2.2** below. This graphs shows that the Métis and non-Aboriginal populations have similar rates of self-harm throughout the lifespan (the two spikes in Métis rate at 25-29 and 40-44 are likely due to random fluctuations) and that these rates are consistently lower than those observed for the First Nations and Inuit (with the

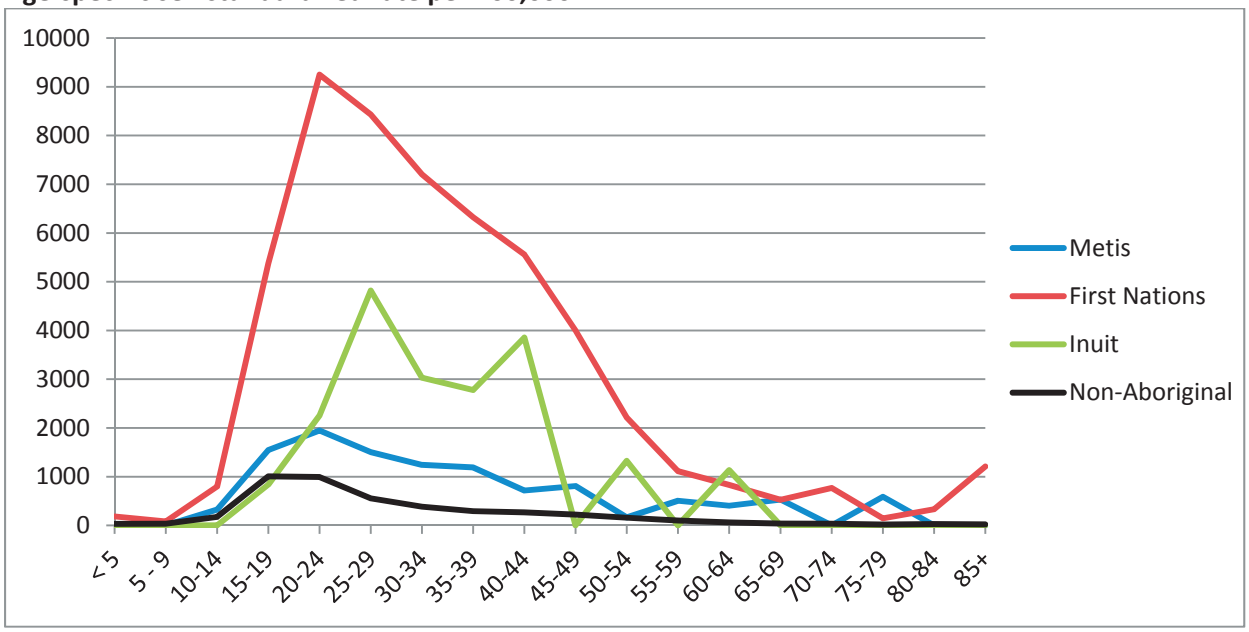
exception of the older age-groups where the Inuit begin to exhibit rates of self-harm similar to the non-Aboriginals and Métis). The First Nations and Inuit have a significantly increased risk of self-harm starting in the teenage years and extending into the 45-49 year age-group. This graph illustrates that the increased risk detected for the First Nations and Inuit is almost entirely due to those within the 15-49 age range.

Graph 6.2.2
Self-harm injury emergency department presentations (2009)
Age-specific sex-standardized rate per 100,000



Presentations rates for assault-related injuries are depicted by age-group and population group in **Graph 6.2.3**. Starting in the teenage years and extending into the 45-49 year age-group, the Aboriginal population consistently has higher rates of assault-related presentations compared to the non-Aboriginal group; however, the difference is much smaller for the Métis group. However, the rate for the First Nations population is considerably higher than all other groups during this age range and maintains a slight elevation into the older ages, compared to the other three groups.

Graph 6.2.3
Assault injury emergency department presentations (2009)
Age-specific sex-standardized rate per 100,000



Several major forms of unintentional injuries were analyzed to determine their rates and the rate ratios of the Aboriginal populations compared to the non-Aboriginal population. The injury subtypes analyzed were adverse medication events, transportation, falls, poisoning, surgical adverse events and all other unintentional causes. Of the injury subtypes assessed, the most common cause of injury presentation was falls which had a rate of 3,778 for the Métis. Compared to the Non-Aboriginals, the Métis experience higher rates of injury for all of these injury subtypes. Of the injury subtypes analyzed, the largest increase in risk was for transportation injuries (RR: 2.16) and adverse surgical events (RR: 2.18).

Table 6.2.3
Emergency department visits for unintentional injuries (2009)
Age/sex-standardized rate per 100,000

Intent	Rate	95% CI		RSE†	RR‡
Adverse medication effects					
Métis	**567.5**	534.5	600.4	11.1	**1.99**
Inuit	**269.7**	238.8	300.6	28.9	**0.95**
First Nations	**660.9**	648.2	673.6	3.9	**2.32**
Non-Aboriginal	**285.2**	283.8	286.5	1.0	---
Transportation					
Métis	**2,003.0**	1,940.6	2,065.5	5.5	**2.16**
Inuit	**1,206.4**	1,072.3	1,340.5	19.6	**1.30**
First Nations	**2,200.8**	2,178.4	2,200.8	1.9	**2.37**
Non-Aboriginal	**927.6**	924.8	930.4	0.6	---
Falls					
Métis	**3,777.8**	3,682.4	3,873.2	4.4	**1.47**
Inuit	**4,449.9**	4,225.3	4,674.5	10.0	**1.73**
First Nations	**6,684.2**	6,644.9	6,723.5	1.1	**2.60**
Non-Aboriginal	**2,575.5**	2,571.3	2,579.8	0.3	---
Poisoning					
Métis	**309.8**	284.8	334.9	13.9	**1.32**
Inuit	**430.8**	338.9	522.7	37.8	**1.83**
First Nations	**995.4**	980.1	1,010.7	2.9	**4.23**
Non-Aboriginal	**235.4**	234.0	236.8	1.1	---
Surgery adverse events					
Métis	**1,103.1**	1,063.0	1,143.2	7.6	**2.18**
Inuit	**666.9**	595.8	738.0	18.3	**1.32**
First Nations	**1,324.4**	1,306.3	1,342.6	2.7	**2.61**
Non-Aboriginal	**506.9**	505.1	508.8	0.7	---
All other unintentional					
Métis	**9,752.1**	9,608.2	9,896.0	2.6	**1.79**
Inuit	**7,214.0**	6,861.4	7,566.7	8.1	**1.33**
First Nations	**11,310.7**	11,260.3	11,361.07	0.8	**2.08**
Non-Aboriginal	**5,441.8**	5,435.1	5,448.5	0.2	---

† RSE >25 indicates uncertainty in estimates
‡ non-Aboriginal population used as comparison group

Transportation-related injuries were broken down into further subgroups: cycling, animal-related, ATV/OHV, and motor vehicle collisions (MVC). The results of the transportation subgroup analysis are located in **Table 6.2.4**. MVC was the most common cause of injury for all of the groups. The rate of MVC was 928 for the Métis compared to 1,023 for First Nations and 437 for non-Aboriginals. The

rate of injury for the Métis was also higher for the injury categories of animal-related and ATV/OHV. The increased rate of injury is particularly large for these two subtypes of transport injuries (animal-related RR: 3.10; ATV/OHV RR: 2.98). The cycling-related injury rate is similar for the Métis and non-Aboriginals. The injury rates of the Métis are lower than the rates of the First Nations population for cycling and MVC related injuries. ATV/OHV related-injuries occur more frequently in the Métis compared to the First Nations, and animal-related injuries have similar rates.

Table 6.2.4
Emergency department rates for transportation injuries (2009)
Age/sex-standardized rate per 100,000

Intent	Rate	95% CI		RSE†	RR‡
Cycling					
Métis	**190.1**	171.2	208.9	19	**1.09**
Inuit	**409.1**	276.3	541.8	38	**2.34**
First Nations	**367.3**	358.9	375.8	4.2	**2.10**
Non-Aboriginal	**175.0**	173.8	176.3	1.3	---
Animal-related					
Métis	**184.0**	166.1	202.0	17	**3.10**
Inuit	**0.0**	0.0	124.2	N/A	*
First Nations	**172.6**	166.4	178.9	6.6	**2.91**
Non-Aboriginal	**59.4**	58.7	60.1	2.2	---
ATV/OHV					
Métis	**450.9**	420.5	481.2	11.8	**2.98**
Inuit	**230.5**	106.0	354.9	57.7	**1.52**
First Nations	**328.6**	320.1	337.0	4.6	**2.17**
Non-Aboriginal	**151.2**	150.0	152.4	1.4	---
MVC					
Métis	**928.4**	885.0	971.9	8.1	**2.13**
Inuit	**413.7**	284.5	542.8	30.2	**0.95**
First Nations	**1,022.9**	1,007.3	1,038.6	3.2	**2.34**
Non-Aboriginal	**436.6**	434.7	438.5	0.8	---

† RSE >25 indicates uncertainty in estimates
‡ non-Aboriginal population used as comparison group

Section 6.3 Inpatient admissions by condition

The rates of admission for the selected conditions identified in Chapter 2 are located in **Table 6.3.1.** The rate of cancer-related admission is significantly lower for the Métis (416) and First Nations (429) compared to the non-Aboriginal population (441). For the remaining conditions (respiratory disease, diabetes, hypertension, heart disease, mental disorders and stroke) the Métis had higher rates of admission compared to the non-Aboriginal population. In comparison with the First Nations population, **t**he Métis had lower rates of admission for the selected conditions with the exception of cancer and hypertension, where the rates were roughly equal, and stroke, where the Métis had a significantly higher rate of admission.

Table 6.3.1
Inpatient admissions by selected conditions (2009)
Age/sex-standardized rate per 100,000

	Rate	95% CI		RSE†	RR‡
Cancer					
Métis	**415.5**	392.9	438.1	12.3	**0.94**
Inuit	**469.3**	396.5	542.1	23.6	**1.06**
First Nations	**429.3**	418.7	440.0	5.7	**0.97**
Non-Aboriginal	**441.5**	440.1	443.0	0.8	---
Respiratory disease					
Métis	**889.6**	854.7	924.5	9.3	**1.68**
Inuit	**1,411.3**	1,288.9	1,533.7	14.3	**2.67**
First Nations	**2,536.6**	2,511.9	2,561.4	2.2	**4.80**
Non-Aboriginal	**528.5**	526.9	530.2	0.7	---
Diabetes					
Métis	**165.1**	151.2	179.0	22.4	**1.95**
Inuit	**282.3**	262.5	302.1	22.4	**3.34**
First Nations	**633.3**	620.3	646.3	4.7	**7.50**
Non-Aboriginal	**84.5**	83.8	85.2	1.8	---
Hypertension					
Métis	**45.9**	24.8	67.0	37.8	**2.48**
Inuit	**28.3**	0.0	146.1	100.0	**1.53**
First Nations	**55.5**	51.7	59.3	16.7	**2.99**
Non-Aboriginal	**18.5**	18.2	18.8	3.8	---
Heart disease					
Métis	**327.5**	309.6	345.3	13.9	**1.60**
Inuit	**270.4**	148.7	392.1	27.7	**1.32**
First Nations	**407.5**	397.0	417.9	6.6	**2.00**
Non-Aboriginal	**204.2**	203.4	205.1	1.1	---
Mental disorders					
Métis	**502.2**	474.1	530.3	10.8	**1.18**
Inuit	**977.1**	834.6	1,119.7	24.3	**2.30**
First Nations	**1,320.9**	1,302.7	1,339.1	2.6	**3.11**
Non-Aboriginal	**425.0**	423.2	426.7	0.8	---
Stroke					
Métis	**113.2**	90.8	135.5	31.6	**1.87**
Inuit	**37.8**	0.0	155.3	57.7	**0.63**
First Nations	**72.5**	68.0	77.0	15.4	**1.20**
Non-Aboriginal	**60.5**	60.0	60.9	2.1	---

† RSE >25 indicates uncertainty in estimates
‡ non-Aboriginal population used as comparison group

Admission records were also scanned for the relevant external cause of injury code and analyzed based on intentionality and specific cause. The age/sex-standardized rate of injury, by intent, is shown in **Table 6.3.2**. The rate of unintentional injury was higher for the Métis compared to the non-Aboriginal population (1,447 versus 1,168). The rate of unintentional injury admission was significantly higher in the First Nations (2,421) and Inuit populations (2,003), compared to Métis. The rate of intentional injuries (self-harm and assault) was higher for the Métis (123) compared to the non-Aboriginal population (72), whereas the rate of intentional injuries was found to be significantly higher in the Inuit and First Nations populations compared to the Métis. The First Nations in particular had a high rate of self-harm and assault-related hospitalizations (577).

Table 6.3.2
Hospitalization rate by injury intent (2009)
Age/sex-standardized rate per 100,000

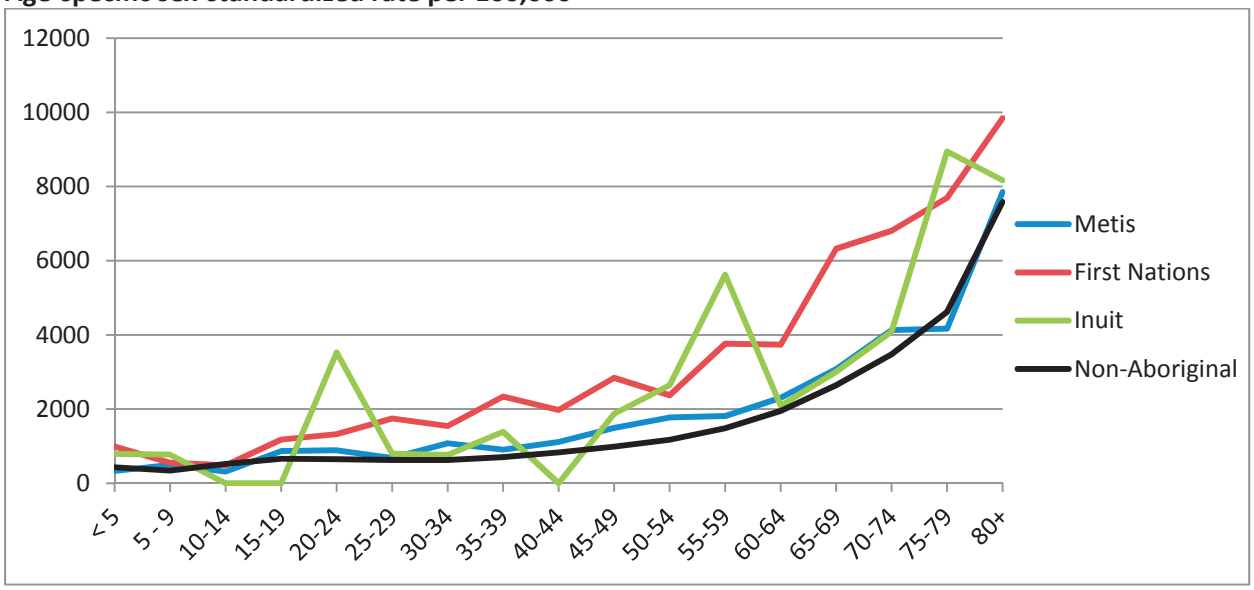
Intent	Rate	95% CI		RSE †	RR
Unintentional					
Métis	**1,447**	1,400	1,493	7.0	**1.24**
Inuit	**2,003**	1,862	2,145	13.4	**1.71**
First Nations	**2,421**	2,397	2,446	2.1	**2.07**
Non-Aboriginal	**1,168**	1,166	1,171	0.5	**---**
Self-Harm & Assault					
Métis	**123**	108	138	21.3	**1.70**
Inuit	**333**	196	470	44.7	**4.62**
First Nations	**577**	565	589	3.8	**8.01**
Non-Aboriginal	**72**	71	73	2.0	**---**
Other*					
Métis	**22**	1	43	50	**2.00**
Inuit	**0**	0	124	---	**---**
First Nations	**96**	91	101	10.1	**8.73**
Non-Aboriginal	**11**	11	12	4.9	**---**

*OTHER includes Undetermined intent and Legal Intervention
† RSE >25 indicates uncertainty in estimates
‡ non-Aboriginal population used as comparison group

The rate of admission for unintentional injury by age and population group is shown in **Graph 6.3.1**. The Métis and non-Aboriginal populations have similar rates of unintentional injury admission

throughout all age-groups though the Métis rates are slightly higher. The Inuit also appear to have similar admission rates; however, due to the small Inuit population, the rates for the Inuit are more variability. The rate of admission for the First Nations population is consistently higher than the rates experienced by the Métis and non-Aboriginals. The admission rate for injury increases with age, with the sharpest increase in admission rate occurring in the older ages. This contrasts with the unintentional injury rates seen in EDs, where the pattern was more U-shaped. This indicates that a significantly larger portion of older patients are admitted for unintentional injuries after presenting to the ED.

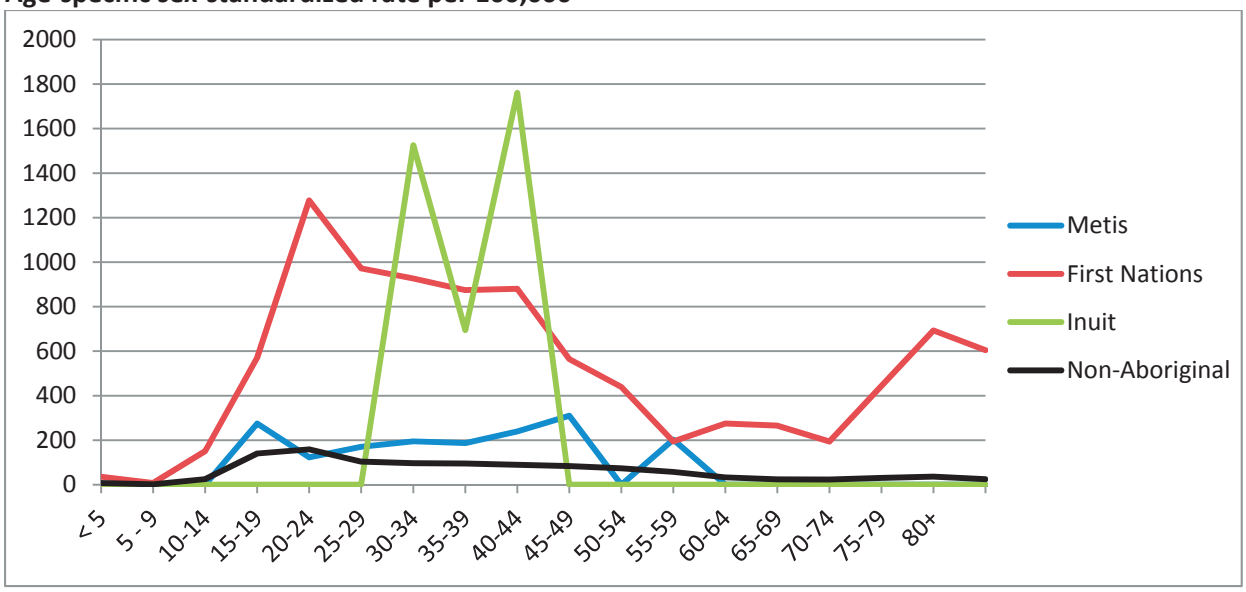
Graph 6.3.1
Unintentional injury-related inpatient admissions (2009)
Age-specific sex-standardized rate per 100,000



The rate of intentional injury-related admission by age and population group is shown in **Graph 6.3.2**. This graph indicates that the Métis have elevated rates of intentional-injury related hospitalizations in roughly the 15-60 age range compared to the Non-aboriginal population. The Inuit show a large spike in the rate of admission for those aged 30-44. The RSE for intentional injuries in the Inuit population is very high (RSE: 44.7) which indicates that there is insufficient data to obtain reliable estimates. The First Nations population has a significantly higher rate of admission for intentional

injuries in almost all age-groups, compared to the Métis and non-Aboriginal populations. The rate of admission is highest for all groups between the ages of 15- 64. The rate of admission for the First Nations population is particularly high for those aged 20-44.

Graph 6.3.2
Intentional injury-related inpatient admission (2009)
Age-specific sex-standardized rate per 100,000



As seen in **Table 6.3.3**, the rate of transportation (151 per 100,000) and surgical adverse event (558 per 100,000) injury related hospitalizations were slightly higher in the Métis compared to non-Aboriginals. Fall-related admissions were less common in the Métis. All other unintentional injuries combined obtained a very significantly higher rate for the Métis compared to the non-aboriginals. Compared to the Métis, the First Nations had higher injury admissions rates for all of the injury types examined.

Table 6.3.3
Transportation-related injury hospitalization rate (2009)
Age/sex-standardized rate per 100,000

Unintentional subtype	Rate	95% CI		RSE†	RR‡
Transportation					
Métis	**151**	135	167	20.0	**1.50**
Inuit	**217**	95	340	50.0	**2.16**
First Nations	**227**	219	234	6.0	**2.26**
Non-Aboriginal	**100**	100	101	1.7	---
Falls					
Métis	**268**	246	289	16.0	**0.87**
Inuit	**706**	631	781	22.9	**2.30**
First Nations	**742**	728	756	4.2	**2.42**
Non-Aboriginal	**307**	306	308	0.9	---
Surgery adverse events					
Métis	**558**	529	586	11.4	**1.41**
Inuit	**509**	442	576	22.9	**1.29**
First Nations	**608**	596	621	4.4	**1.54**
Non-Aboriginal	**396**	394	397	0.8	---
All other external					
Métis	**492**	466	519	12.1	**2.21**
Inuit	**571**	439	704	26.7	**2.57**
First Nations	**949**	933	965	3.3	**4.26**
Non-Aboriginal	**223**	221	224	1.1	---

† RSE >25 indicates uncertainty in estimates
‡ non-Aboriginal population used as comparison group

Chapter 7 Conclusions and recommendations

Section 7.1 Mortality

All-cause mortality

The total mortality rate for the Métis in this study was found to be lower than that of the non-Aboriginal population and far lower than of the First Nations population. The lower mortality compared to the non-Aboriginal population is an unexpected result as previous research on the Métis population had shown higher rates of mortality in the Métis (Tjepkema, Wilkins, Senecal, Guimond, & Penney, 2009). A national study of Métis mortality had estimated the mortality rate of the Métis to be 1.38 times higher for men and 1.72 times higher for women compared to non-Aboriginals (Tjepkema et al., 2009). Previous studies involving the First Nations as well as the Métis found the mortality rate of the Métis to be between the non-Aboriginal population and the First Nations population (Tjepkema, Wilkins, Senecal, Guimond, & Penney, 2011). This low rate of mortality may also be caused by the use of the Metis Nations registry list as the method of identifying Metis. There could be selection biases in place which are affecting which Metis get registered, such as the focus on adult registration, and these could be the root cause of the low detected mortality rate.

Cancer

While previous studies have reported that First Nations have significantly lower mortality rates for all-site cancer mortality, (Harrop, Brant, Ghali, & Macarthur, 2007; Louchini & Beaupre, 2008; Mahoney & Michalek, 1991; Marrett & Chaudhry, 2003; Statistics Canada, 2006; Tjepkema et al., 2009; Young & Frank, 1983; Young & Choi, 1985) our findings contrast those results. Compared to the non-Aboriginal population, we observed that the mortality rate for cancer was 25% higher for the First

Nation population while it was 9% lower in the Métis and 32% lower in the Inuit population. Tjepkema et al. 2009 reported a 6% reduction in Métis cancer mortality but this was not significant in their study (Tjepkema et al., 2009). Using the most recent data may account for the higher rates of all-site cancer mortality as cancer rates among the Inuit and American Indian populations have been reported to be increasing (Circumpolar Inuit Cancer Review Working Group et al., 2008; Mahoney, Va, Stevens, Kahn, & Michalek, 2009a; Mahoney, Va, Stevens, Kahn, & Michalek, 2009b). Therefore it is possible that the rate of cancer in First Nations is also increasing in Canada.

Cardiovascular Disease

Research has indicated that Aboriginals in the Canadian Northwest Territories and Northwestern Ontario are less likely to die from diseases of the circulatory system, (Young, Moffatt, & O'Neil, 1993) but our results indicated that mortality rates due to diseases of the circulatory system are greater for the First Nations' population. However, more recent research in Canada from 1991 – 2001 identified that mortality rates from diseases of the circulatory system are higher for First Nations males and females, who were observed to be 28% and 74% greater than non-Aboriginals, respectively (Tjepkema et al., 2009).The Métis in this study were found to have a significantly lower rate of mortality due to cardiovascular disease (RR=0.73) despite previous research suggesting that found that other Métis have higher rates of cardiovascular mortality (Tjepkema et al., 2009). Our findings also indicate that the First Nations population have significantly higher mortality rates from diseases of the circulatory system (RR = 1.61) compared to the non-Aboriginal population. This finding is also contradicted by the findings of Tjepkema et al. as they estimated that the Métis and First Nations had similar rates of circulatory system mortality.

Injury

In Canada, mortality rates for injuries, suicide, and assault are also reported to be greater for Aboriginals than non-Aboriginals (Harrop et al., 2007; Statistics Canada, 2006; Tjepkema et al., 2009). Mortality rates due to external causes for First Nations population in Canada are more than 3.5 times the rates for the non-Aboriginal population whereas the Métis were found to have a rate approximately 2.3 times that of the non-Aboriginal population (Tjepkema et al., 2009). There was insufficient data to get reliable estimates for the specific causes of injury death (e.g. suicide, homicide, motor vehicle collisions) for the Métis population in Alberta. The low rate in comparison to the non-Aboriginal population contrasts strongly with the results of the previously mentioned studies.

Section 7.2 Health service usage

The results of the analysis of health service usage were discussed in **Chapter 4** and disease-specific usage was discussed in **Chapter 6.** The rate of health service usage was higher in most categories compared to the non-Aboriginal population. Compared to the First Nations, the rates of health services used for the diseases assessed in this study were generally lower for the Métis. Rates of ED presentation and inpatient admission are particularly high for the Métis in comparison to the non-Aboriginals but still lower than the rates of the First Nations.

Compared to the differences found in the use of hospital services (ED, inpatient and ambulatory care) the overall rate of health service use as determined by physician claims was very close to that of the non-Aboriginal population. The Métis had only 2% more physician claims, after adjusting for age and sex, than the non-Aboriginal population. Due to the relatively high rates of ED presentations and inpatient admission as well as the higher disease burden found in **Chapter 5**, it may be the Métis of the province are using the ED for much of their primary health care. This may be due to a lack of access to appropriate primary care which may impact their ability to manage their health conditions.

Section 7.3 Morbidity

Previous research on the health of Métis in Canada has shown an increased rate of morbidity of disease for the Métis (Statistics Canada, 2006). The current report also found a higher rate of disease for many the conditions examined.

Physical illness morbidity

The rate of respiratory disease, ischemic heart disease, diabetes, hypertension and stroke were examined and they were all found to be more prevalent in the Métis population.. The Aboriginal peoples study reported prevalence of hypertension and diabetes that closely correspond to the results of this study as well (Statistics Canada, 2006). Others studies further corroborate the occurrence of high rates of diabetes and cardiovascular diseases in the Métis population of Alberta specifically (Oster & Toth, 2009; Ralph-Campbell et al., 2009).

Mental illness morbidity

For mental illness morbidity this study showed an increased rate of alcohol and drug abuse, depression and neurotic disorders. The remaining conditions (schizophrenia, personality disorder and dementia) were less common among the Métis in this study.

Section 7.4 General limitations of the report

There are some general limitations of the study that should be mentioned. This study did not use data linkage to extrapolate this population in an attempt to include Métis that were not registered. The demographic breakdown of the Métis population showed a lack of children which suggested that the registered Métis population was potentially biased. The small number of Métis children and elderly also limits the studies ability to comment on the rates of these specific groups.

The registry was linked to unique identifiers in the provincial database and these unique identifiers were used to determine the Métis population in each specific database. This means that anyone who is included in the registry list would be considered as a Métis for all of the databases used and for every year of the mortality analysis. This leads to the potential bias where those who survived the years used in the mortality rate analysis would be more likely to be registered as Métis compared to those who died during that period. A possible effect of this would be a decrease in the mortality rate of the Métis due to the slight bias in who gets registered as a Métis in the Métis Nation registry. Essentially those who meet the requirements of registering as a Métis but die are less likely to become registered compared to someone similar that is still alive. As an example, imagine that there are two unregistered Métis of the same age. If one of them died in 2007 without being registered while the other is still alive and eventually registers as a Métis then this would affect the mortality rate and cause it to be lower than expected as the second Métis would be registered for all years of the analysis but not the first Métis. This is because it is unlikely, or at the very least considerably less likely, that someone would be registered as a Métis after death. Therefore the probability of someone becoming a registered Métis increases the longer they are alive and, until the registry contains a near exhaustive list of the Métis in

the province, this will lower the detected mortality rate. While this may have an effect on the mortality rates it is unlikely to have a noticeable effect on the rates for health service use and disease prevalence.

Another issue is the limited data available for analysis. This is particularly of note for the mortality and morbidity sections of the report. In order to determine an accurate mortality rate for specific causes of disease it is necessary to have multiple years of data and relatively stable population from which to sample. The tracking of Métis in the health database is limited to only the most recent years and the process of registering the Métis population may affect the mortality rate detected in the data. For rates of morbidity the data for only one year were available. Due to the small population of Métis and the ability to use only one years' worth of data, the morbidity analysis was prevented from using more comprehensive methods of detecting the presence of a disease. For instance many population health reports use multiple diagnoses over several years to determine that the patient truly has the disease and it is not a diagnostic error. Due to the relatively small sample this study used less restrictive methods, which may result in slightly higher rates of disease compared to other reports that used more restrictive methods of prevalence estimation. Attempting to compare the rates determined in this study to standardized rates obtained in other studies is prone to errors due to differential methods in the standardization of rates and categorization of disease. However the relative rates of the diseases between the groups within this study are still accurate and are a more useful metric for the purpose of this study than the standardized rates.

Section 7.5 Conclusion

A broad overview of the results suggest that the Métis have better health than the First Nations of Alberta but tend to experience slightly worse health results in many areas compared to the non-Aboriginal population of the province. The Métis of Alberta appear to suffer from elevated levels of many of the diseases that are typically found to afflict the First Nations population. Diabetes is of concern in this population though it is not as heavily burdened as the First Nations people. Circulatory conditions such as stroke and heart disease also appear to be a concern for the Métis.

The Métis were found to have a significantly lower rate of mortality compared to the other groups which an unexpected result is given previous research on Métis mortality rates. This low rate could accurately reflect the mortality of the registered Métis if they have better than expected health compared to Métis nationwide or Albertans who self-identity as Métis but are not registered with the Métis Nation. Continued registration of the Métis in Alberta would help to better understand the health situation of the Métis in Alberta as well as determine if any of the unexpected results of this study are side effects of the registration process itself. Due to this report using registered Métis only caution is advised when trying to use this data to refer to all people in Alberta that self-identify as Métis as those who are not registered may not have the same health status as the group of Métis that has registered as members of the Métis Nation of Alberta.

References

Circumpolar Inuit Cancer Review Working Group, Kelly, J., Lanier, A., Santos, M., Healey, S., Louchini, R., . Ng, C. (2008). Cancer among the circumpolar Inuit, 1989-2003. II. patterns and trends. *International Journal of Circumpolar Health, 67*(5), 408-420.

Harrop, A. R., Brant, R. F., Ghali, W. A., & Macarthur, C. (2007). Injury mortality rates in native and non-native children: A population-based study. *Public Health Reports (Washington, D.C.: 1974), 122*(3), 339-346.

Louchini, R., & Beaupre, M. (2008). Cancer incidence and mortality among aboriginal people living on reserves and northern villages in Quebec, 1988-2004. *International Journal of Circumpolar Health, 67*(5), 445-451.

Mahoney, M. C., & Michalek, A. M. (1991). A meta-analysis of cancer incidence in United States and Canadian native populations. *International Journal of Epidemiology, 20*(2), 323-327.

Mahoney, M. C., Va, P., Stevens, A., Kahn, A. R., & Michalek, A. M. (2009a). Changes in cancer incidence patterns among a northeastern American Indian population: 1955-1969 versus 1990-2004. *The Journal of Rural Health : Official Journal of the American Rural Health Association and the National Rural Health Care Association, 25*(4), 378-383. doi:10.1111/j.1748-0361.2009.00247.x

Mahoney, M. C., Va, P., Stevens, A., Kahn, A. R., & Michalek, A. M. (2009b). Fifty years of cancer in an American Indian population. *Cancer, 115*(2), 419-427. doi:10.1002/cncr.24039

Marrett, L. D., & Chaudhry, M. (2003). Cancer incidence and mortality in Ontario first nations, 1968-1991 (Canada). *Cancer Causes & Control : CCC, 14*(3), 259-268.

Oster, R. T., & Toth, E. L. (2009). Differences in the prevalence of diabetes risk-factors among first nation, Métis and non-aboriginal adults attending screening clinics in rural Alberta, Canada. *Rural and Remote Health, 9*(2), 1170.

Ralph-Campbell, K., Oster, R. T., Connor, T., Pick, M., Pohar, S., Thompson, P., . . . Toth, E. L. (2009). Increasing rates of diabetes and cardiovascular risk in Métis settlements in northern Alberta. *International Journal of Circumpolar Health, 68*(5), 433-442.

Statistics Canada. (2006). *Aboriginal peoples survey.*

Tjepkema, M., Wilkins, R., Senecal, S., Guimond, E., & Penney, C. (2009). Mortality of Métis and registered Indian adults in Canada: An 11-year follow-up study. *Health Reports / Statistics Canada, Canadian Centre for Health Information = Rapports Sur La Sante / Statistique Canada, Centre Canadien d'Information Sur La Sante, 20*(4), 31-51.

Tjepkema, M., Wilkins, R., Senecal, S., Guimond, E., & Penney, C. (2011). Potential years of life lost at ages 25 to 74 among Métis and non-status Indians, 1991 to 2001. *Health Reports / Statistics Canada, Canadian Centre for Health Information = Rapports Sur La Sante / Statistique Canada, Centre Canadien d'Information Sur La Sante, 22*(1), 37-46.

Young, T. K., & Choi, N. W. (1985). Cancer risks among residents of Manitoba Indian reserves, 1970-79. *Canadian Medical Association Journal, 132*(11), 1269-1272.

Young, T. K., & Frank, J. W. (1983). Cancer surveillance in a remote Indian population in northwestern Ontario. *American Journal of Public Health, 73*(5), 515-520. doi:10.2105/AJPH.73.5.515

Young, T. K., Moffatt, M. E., & O'Neil, J. D. (1993). Cardiovascular diseases in a Canadian arctic population. *American Journal of Public Health, 83*(6), 881-887. doi:10.2105/AJPH.83.6.881

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Appendix

Glossary

Age/sex standardized rates

Standardized or adjusted rates provide a summary value that mathematically removes the effects of different population structures that may influence the use of health care services. The actual value of the adjusted rate is meaningless because it has been statistically constructed based on the choice of the standard population. In this report rates were adjusted for age and sex using direct method of standardization. The age groups used for standardization were <5, 5-9, 10-14 … 85+. The standard population used was the 1991 Canadian population.

Dementia

Dementia is a loss of brain function that occurs with certain diseases. Dementia can be caused by a multitude of diseases (e.g. Multiple sclerosis, Huntington's diseases, HIV infection etc.). Dementia can also be caused by medications as well as drug and alcohol abuse.

Depression

See **mood disorders**.

Diabetes

Diabetes is a condition which occurs when the body does not properly control the level of sugar in the blood. Insulin is required to control the body's blood sugar and the presence of diabetes indicates either an insufficient among of insulin is being produced by the pancreas or the body has become resistant to the effects of insulin.

Hypertension

Also known as high blood pressure. Hypertension is measured as the force of blood against the wall of your arteries. Excessive blood pressure is a risk factor for heart disease, strokes and some kidney diseases.

Incidence

Incidence is a discrete new occurrence of a disease or hospital visit. **Chapter 3, 4 and 6** measured the incidence of mortality and health system usage. **Chapter 5** in contrast measured the prevalence of disease (see **Prevalence** defined below).

Ischemic Heart disease

Ischemic heart disease refers to any condition in which the heart muscle is damaged or works inefficiently because of lack of blood supply. It includes angina pectoris (chest pain instigating by activity or stress) and acute myocardial infarction (heart attack).

Mood disorders

Mood disorders are conditions that affect the mood of the patient such as major depression and bipolar disorder.

Most responsible diagnosis

The condition that is most responsible for a patients visit to their physician or their stay in a hospital. This report used the first diagnosis field of the database file as the most responsible diagnosis.

Neurotic disorders

Neurotic disorders include such conditions as panic attacks, generalized anxiety, phobias and post-traumatic stress disorders. People with these conditions experienced excessive stress and anxiety. Some experience these conditions in very specific conditions whereas others experience increased anxiety in many or all aspects of their life.

Personality disorders

Personality disorders are pervasive and inflexible behaviours that inhibit a person's ability to function in society.

Prevalence

Prevalence is the occurrence of disease at a particular point of time or throughout a specific period of time. This study utilized 1-year period prevalence rates in chapter 5 to depict the morbidity diseases. Rather than using individual events to compute a rate, prevalence rates used the number of individuals who were diagnosed with a disease during the 1-year period to calculate the rate.

Schizophrenia

Schizophrenia is a complex mental disorder that causes disturbances in normal thought processes. These disturbances can cause various symptoms ranging from delusions and hallucination to an inability to organize thoughts and behaviours appropriately. People with schizophrenia often exhibit strange behaviours including low activity, exhibiting strange postures or expressions and they may lose the ability to perform necessary day-to-day activities. Others may suffer from incoherent speech such as an inability to continue a train of thought resulting in them transitioning unexpectedly from topic to topic.

Self-harm

Self-harm includes any injury that is both intentional and self-inflicted. This term encompasses both suicidal and non-suicidal self-inflicted injuries.

Stroke

A stroke occurs when blood flow to part of the brain is impeded. If blood flow is stopped for too long the affected brain cells will die and potentially cause permanent damage and loss of function.

Coding structure

ICD 9 CM coding

Alcohol and drug abuse	291, 292, 303, 304, 305
Cancer	140 – 239
Diabetes	250
Dementia	290, 291, 292, 294, 331, 797
Hypertension	401–405
Injury	800 – 999
Ischemic Heart Disease	410 – 414
Mental Health	290 – 319
Mood disorders	296, 300.4, 309.0 – 309.1, 311
Neurotic disorders	300, 308, 309
Personality disorders	301
Respiratory	460 – 519
Schizophrenia	295
Stroke	431, 434, 436

ICD-10-CA

Alcohol and drug abuse	F10 – F19, F55
Cancer	C00 – D48
Diabetes	E10–E14
Dementia	F00 – F05.1, F06.5 – F06.6, F06.8 – F06.9, F09- F19 (excluding F10.1, F10.2, F11.1, F11.2 ETC.), G30, G31.0, G31.1, G31.9, G32.8, G91, G93.7, G94, R54
Hypertension	I10–I13, I15
Injury	
Adverse Medical Events	Y40-Y59.9
Adverse Surgical Events	Y60-Y69.9, Y83-Y84.9
Assault	X85-Y09
Fall	W00-W19.9
Poison	X40- X49.9
Self-harm	X60-X84
Transportation	V01-V99.9
Cycling	V10-V19.9
MVC	V20-V79.9
ATV/OHV	V86
Animal	V80
Ischemic Heart Disease	I20–I22, I24, I25
Mental Health	F00 – F99
Mood disorders	F30 – F39, F41.2
Neurotic disorders	F40 - F49
Personality disorders	F34, F60 – F62, F68.1 – F68.9

Respiratory	J00 – J99
Schizophrenia	F20, F21, F23.0 – F23.2, F25
Stroke	I61, I63, I64


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