The Burden of Hypertension and Heart Disease

Amongst the Métis Nation of Alberta

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Acknowledgement

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Message from the

President

I am pleased to share our health report *The Burden of Hypertension and Heart Disease amongst the Métis Nation of Alberta.*

This report highlights the incidence and prevalence of living with hypertension and ischemic heart disease amongst Métis Albertans and will be used in the development of future research and health promotion activities. This study has shown us that our citizens are more likely to be living with hypertension and ischemic heart disease than non-Métis Albertans. Heart disease can lead to significant disability and death, and therefore, we have important work to do to assist our communities in the prevention and management of its complications.

I would like to acknowledge and thank our partner, the University of Alberta School of Public Health, for their continued support and expertise during the development of this health report.

Audrey Poitras

President,
Métis Nation of Alberta

Executive Summary

Hypertension and ischemic heart disease place a significant health burden on Canadians. However, these disorders do not affect all Canadians equally. Some research suggests Indigenous Canadians experience these conditions at higher rates when compared to non-Indigenous Canadians. While the Métis are a distinct group of Indigenous peoples in Canada, much of the previous research with Indigenous peoples in North America does not reflect the health burden experienced by the Métis specifically.

Using administrative health data from Alberta's provincial health system, this study examined the occurrence and pharmaceutical treatment of these conditions. Comparisons were made between Métis Albertans and other residents of the province and these conditions were found to be more common amongst Métis Albertans when compared to non-Métis Albertans. In line with this, drug dispensations were also higher for the Métis population. Despite this, death from these specific conditions was lower amongst the Métis; specifically, lower amongst Métis males for hypertension deaths and lower amongst Métis females for deaths due to ischemic heart disease.

It is unclear why the Métis are experiencing a higher burden of hypertension and ischemic heart disease but lower mortality. Nonetheless, the increased occurrence of these conditions within the Métis community indicates that additional resources for prevention and treatment are needed.

1. Background

1.1 Background of the Métis

The Métis population is a distinct Indigenous group of Canada with a unique history. The Métis National Council defines Métis as "a person who self-identifies as Métis, is distinct from other Aboriginal peoples, is of historic Métis Nation ancestry, and is accepted by the Métis Nation" (Métis National Council, 2010). The Métis population has been growing rapidly over the last decade. The population has increased by 51.2% between 2006 and 2016, representing the greatest growth of Indigenous peoples within Canada (Statistics Canada, 2017). This increase has been largely driven by increased identification by individuals as being Métis (Foulds, Shubair, & Warburton, 2013; Statistics Canada, 2008). Of the 587,545 individuals who identify as Métis in Canada, Alberta has the second-largest provincial population with 114,370 Métis Albertans identified in the 2016 census (Statistics Canada, 2017).

1.2 What is hypertension?

Hypertension is characterized by abnormally high blood pressure. Hypertension can be diagnosed when there is a high amount of pressure in the arteries when the heart contracts (systolic blood pressure), or when the heart is relaxed between beats (diastolic blood pressure). In Canada, the main, preventable risk factors linked to hypertension are excess weight, a high salt and low potassium diet, lack of physical activity, and drinking alcohol in excess (Hypertension Canada, 2018).

In Canada and globally, hypertension is a leading cause of disability and death, contributing to more than 50% of coronary/ischemic heart disease, congestive heart failure, stroke, and kidney disease in adults (Hypertension Canada, 2018; Nerenberg *et al*., 2018). Approximately 23-25% of Canadian adults live with diagnosed hypertension and nine out of every 10 Canadians will develop hypertension if they live a normal lifespan (Hypertension Canada, 2018; Nerenberg *et al*., 2018). Between 2000-2001 and 2011-2012, the number of Canadians living with diagnosed hypertension increased from 18.0% to 24.4% of the population (Public Health Agency of Canada, 2017). However, the number of new cases of diagnosed hypertension declined by 27.2% during this period (Public Health Agency of Canada, 2017).

The most common form of hypertension is called primary or essential hypertension. Primary hypertension accounts for more than 90% of all cases of hypertension (Oparil, Zaman, & Calhoun, 2003; Then & Rankin, 2004). The causes of primary hypertension are not well understood, but it is generally believed to result from a combination of genetic and lifestyle factors, such as poor diet, lack of physical activity, excess weight, smoking, alcohol consumption, vitamin D deficiency, diabetes, and metabolic syndrome. The likelihood of experiencing primary hypertension also increases with age.

When abnormally high blood pressure is caused by another medical condition it is called secondary hypertension. The most common causes of secondary hypertension are conditions affecting the kidneys (Then & Rankin, 2004). Other causes are endocrine disorders (e.g., diabetes, thyroid conditions), vascular disorders (e.g., arteriosclerosis, or hardening of the arteries), adrenal gland tumors, obesity, sleep apnea, medications, and birth defects affecting the circulatory system (Mayo Clinic, 2018).

If left untreated, hypertension can cause severe and potentially life-threatening damage to organs, including the heart, kidneys, and eyes. Furthermore, short periods of very high blood pressure can occur, which are referred to as hypertensive crises (Johnson, Nguyen, & Patel, 2012). These crises are very serious as the chance of dying after 1-year of untreated hypertensive crises causing organ damage is 80% (Johnson *et al*., 2012). However, modern management methods have reduced this mortality to 10% (Johnson et al., 2012). Despite its high prevalence and serious complications, many individuals

are unaware they have hypertension, and in those who are aware, many are untreated or undertreated (Hypertension Canada, 2018). Both primary and secondary hypertension present no obvious signs or symptoms, earning it the nickname the "silent killer." Notable improvements have been made in Canada for blood pressure treatment and control, largely related to the considerable effort placed toward promoting knowledge and awareness of hypertension through extensive education programs for health care professionals and the public. Nonetheless, continued improvement in both knowledge and awareness of hypertension and its risk factors is needed throughout Canada.

1.3 Management of hypertension

Non-pharmaceutical (lifestyle) management for hypertension includes being physically active, quitting smoking, losing weight, drinking less alcohol, dietary changes, eating less salt, stress management, and increased intake of the minerals potassium, calcium, and magnesium (Leung *et al.*, 2017; Then & Rankin, 2004). These lifestyle modifications should be encouraged for everyone as an ongoing component of management.

Pharmaceutical treatment is also commonly used alongside lifestyle changes for hypertension management. Initial treatments for hypertension include thiazide diuretics (water pills like *Tenoretic®*), angiotensin-converting enzyme (ACE) inhibitors (*Altace®*), calcium channel blockers (*Amlodipine®*), and angiotensin receptor blockers (ARBs) (*Atacand®*) (Leung *et al.*, 2017; Phillips, 2015; Wright & Musini, 2009). Beta blockers (*Lopressor®*) are also recommended as an initial therapy for individuals with certain kinds of cardiovascular disease, or those under the age of 60 (Leung *et al.*, 2017; Nerenberg *et al.*, 2018). Single pill combination treatment (*Diovan HCT®*) is also supported by Canadian guidelines. This treatment includes the combination of calcium channel blockers with an ACE inhibitor or an ARB. Combining an ACE inhibitor or an ARB with a diuretic medication is also a recommended combination (Leung *et al.*, 2017; Nerenberg *et al.*, 2018). If an individual is unable to meet their treatment goals, adding additional medications to the treatment plan is recommended. Medications need to be tailored to the individual as certain risk factors (e.g., having high cholesterol) may result in avoiding certain medications or adding additional medications.

These medications have been shown to lower the risk of serious vascular events (e.g., heart attack and stroke) and death (Wright & Musini, 2009). However, there is some debate on the effectiveness of these medications in individuals with mild hypertension (blood pressure less than 160/100 mmHg). A systematic review of hypertension medications did not find evidence that they were effective at reducing the risk of death or serious complications in individuals with mild hypertension (Diao D, Diao, Wright, Cundiff, & Gueyffier, 2012).

1.4 What is ischemic heart disease (IHD)?

Ischemic heart disease is the narrowing of the arteries supplying blood to the heart, also known as coronary artery disease (CAD). This narrowing is caused by the buildup of substances on the artery wall called plaque, which can consist of cholesterol, but also other substances in the blood such as calcium, fat, or waste products (Heart and Stroke Foundation of Canada, 2018a). IHD develops over years, and there is evidence that the buildup of plaque begins in youth (McGill, McMahan, Herderick, *et al.*, 2000; McGill, McMahan, Zieske, *et al.*, 2000). Factors that increase the risk of developing IHD include having high cholesterol, smoking, hypertension, diabetes, abdominal obesity, and lack of regular physical activity (Public Health Agency of Canada, 2018b).

The prevalence of IHD in Canada is increasing (Public Health Agency of Canada, 2018b). An estimated 8.1% of Canadians were living with IHD in Canada during 2012-2013 compared to 7.1% in 2000-2001. However, the prevalence appeared to stabilize after 2004-2005 (Public Health Agency of Canada, 2018b). In Alberta, the prevalence was 7.3% in 2012-2013 (Public Health Agency of Canada, 2018b). The incidence of new cases of IHD in Canada decreased from 12.3 to 6.8 cases per 1,000 individuals during this period.

IHD is a major cause of health service use and death, but improvements in prevention and treatment have had a significant impact. In Canada, there were approximately 750 hospitalizations per 100,000 people for IHD in 1971, and this declined to 400 per 100,000 people by 2005 (Public Health Agency of Canada, 2009). Age-adjusted deaths from IHD peaked at slightly more than 300 deaths per 100,000 in the late 1960s and early 1970s in Canada and dropped to around 100 deaths per 100,000 by 2004. Despite a growing and aging population, the death rate (the number of deaths per year per 1,000 individuals) from IHD has declined since the 1970s. Amongst those with heart disease, the death rate from all causes declined by 24% between 2000-2001 and 2012-2013 (Public Health Agency of Canada, 2018a, 2018b).

1.5 Management of IHD

As with many other major health conditions, IHD can be treated through improvements in diet and exercise (Heart and Stroke Foundation of Canada, 2018b). Maintaining a healthy body weight, not smoking, and reducing the amount of salt and saturated fat in the diet have been recommendations for both prevention and treatment of IHD for several decades. More recently, there is increased awareness that excess sugar intake is also a significant factor in developing and worsening IHD (Huang, Huang, Tian, Yang, & Gu, 2014).

Medications used to treat IHD are like those used to treat hypertension. Beta blockers and ACE inhibitors are used to decrease blood pressure, which improves blood flow to the heart and can slow the progression of IHD (PubMed Health, 2017).

In addition to these medications, people with IHD may also be prescribed antiplatelet medication to prevent blood clots from forming (PubMed Health, 2017). This prescription is normally acetylsalicylic acid (e.g., *Aspirin*®), but clopidogrel (*Plavix*®) can also be used (PubMed Health, 2017). Statin medications may also be prescribed to reduce cholesterol or to protect the arteries by reducing inflammation (PubMed Health, 2017). In addition, calcium channel blockers can be prescribed to help reduce chest pain (PubMed Health, 2017).

1.6 Hypertension and IHD amongst the Métis

Hypertension and IHD are understudied in Métis populations. Research has shown First Nations populations more commonly experience these disorders compared with non-First Nations. There are a few studies combining Métis and other Indigenous groups together in their analyses, however, each group is distinct and has their own unique health challenges.

The Aboriginal Peoples' Survey from 2006 examined Métis specifically, and found that approximately 7% of Métis respondents aged 15 and older reported heart problems and 16% reported having high blood pressure (Janz, Seto, & Turner, 2009). This survey also found that high blood pressure was more common amongst Métis individuals between the ages of 45 and 54 compared with non-Métis Canadians (Janz et al., 2009). Another study estimated that 12.7% of Métis had high blood pressure, which was lower than the 16.4% found in non-Indigenous Canadians (Reading & Wien, 2009). Research with Manitoba Métis found that 12.2% had ischemic heart disease (versus 8.7% for other Manitobans), 5.4 heart attacks occurred per 1000 Métis (versus 4.3 for other Manitobans), and 27.9% had hypertension (versus 24.8% for other Manitobans) (Martens et al., 2011). Tjepkema et al. found that Métis women experienced approximately twice the rate of death due to IHD and Métis men experienced 1.6 times the rate of death due to IHD when compared to non-Indigenous Canadians (Tjepkema, Wilkins, Senécal, Guimond, & Penney, 2011).

Prior research with Alberta Métis found that 3.2% of Métis were diagnosed with heart disease and 13% were diagnosed with hypertension during 2009. Both rates were higher than those found amongst First Nations and non-Indigenous individuals (Randall, Harris, Svenson, Voaklander, & Hassen Parker, 2012).

2 Methods

2.1 Data sources

People included in this study were individuals registered in the Alberta Health Care Insurance Plan (AHCIP) Population Registry files. Age and sex information is included in the AHCIP registry files. Information on physician interactions was obtained from medical claims records, which are available for all physician claims in the province. These claims are coded using the International Statistical Classification of Diseases and Related Health Conditions version 9 clinical modification (ICD-9-CM). All discharges from inpatient units are recorded in the Alberta Hospital Discharge Abstract files including up to 25 diagnoses as well as codes related to the reason for hospitalization. Reasons for hospitalization are recorded using the Canadian enhancement of the 10th edition of the International Statistical Classification of Disease and Related Health Conditions (ICD-10-CA). The Pharmaceutical Information Network contains records for all medications dispensed from community pharmacies in the province starting April 1, 2008. Vital Statistics records were used to identify deaths.

2.2 Identification of the Métis Nation of Alberta (MNA) population

Registered citizens of the MNA formed the Métis cohort in this study. All individuals who self-identify as Métis but were not registered citizens of the MNA during the study period were not included in the MNA cohort. Therefore, any mention of "Métis" in subsequent sections of this report are solely referring to the MNA cohort. Almost all citizens of the MNA (33,796 out of 34,235 registered citizens as of September 2016 or 98.7%) were linked by their personal health numbers as individuals registered in AHCIP. An additional 27,175 non-spousal dependents (e.g., children) were included after being identified using household accounts within the AHCIP registry, however, 834 individuals were missing date of birth information and were removed from the cohort. Dependents included: (i) persons under 21, (ii) students, or (iii) permanent dependents due to mental/physical disabilities. A total of 60,137 individuals were classified as part of the MNA population for this project. Figures 1 and 2 provide information on the age distribution of registered Métis and dependents included in the study.

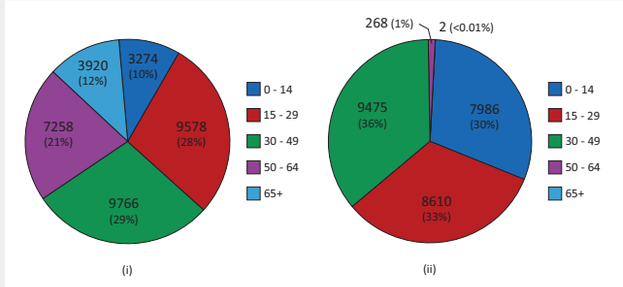

Figure 1.
Age distribution of (i) initial registrants (left) and (ii) dependents (right) estimated from January 1, 2017

2.3 Identifying IHD

In this study, a person is said to have ischemic heart disease if he or she meets any of the following conditions:

- Two physician billings within a 1-year period with at least one of the billings being from a physician (GP or Specialist) in a hospital or emergency department setting with an ICD 9 diagnosis between 410 and 414 in any of the three diagnosis positions;
- Hospital discharge with a diagnosis of IHD (ICD-9 = 410 to 414 or ICD-10 = I20 to I25) in any diagnosis position; or

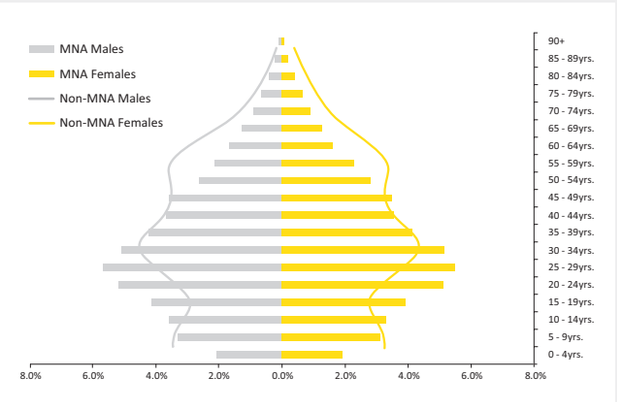

Figure 2.
Percent of Alberta population by 5-year age group, sex, and Métis Nation of Alberta (MNA) classification, 2017

- Procedure/Intervention code for or percutaneous coronary intervention (PCI) or coronary artery bypass grafting (CABG). (ICD-9 procedure codes = 36.01, 36.02, 36.05, 36.10-36.19) / CCI Intervention codes are used after 2002; 1IJ50, 1IJ57QG, 1IJ54, 1IJ76

2.4 Identifying hypertension

To be identified as having hypertension, individuals required one of the following:

- One hospitalization with an ICD-9 code of 401.x – 405.x, selected from all available diagnostic codes in the Hospital Discharge Abstract for the years 1993 to 2001, or equivalent ICD-10 codes (I10.x, I11.x, I12.x, I13.x, I15.x) for years after 2001/2002; or
- Two physician claims with an ICD-9 code of 401.x-405.x within three years. Physician claims files going back to 1983 were used to determine cases.

Records within 5 months of a pregnancy visit (codes 650.x-669.x, O13, O14, O29, O47, O48, O60-O75, O80-O84) were assumed to be pregnancy-related hypertension and were excluded from this study.

2.5 Identifying hypertension medications

Specific medications related to hypertension were identified using their Anatomical Therapeutic Chemical classification system code (ATC). The codes used included C02, C03, C07, C08, and C09 as well as the sub-codes within them. The following codes were excluded, as they are not primarily used for the treatment of hypertension: C07AA07, C07AG02, C03BA08, C03CA01, and C02KX01.

2.6 Identifying deaths

Vital statistics records were used to identify deaths based on the main cause of death coded using ICD-10. IHD deaths were identified using the codes I20-I25, and hypertension deaths were identified using codes I10-I15.

Only deaths in which IHD or hypertension were listed as the main cause of death were used in this study and codes listing IHD or hypertension as contributing factors were not included.

2.7 Analysis

This study estimated the incidence of new cases, as well as prevalence of hypertension, and IHD. Age standardization was used to better compare results between MNA citizens and non-MNA Albertans. Standardization was done using the direct method with five-year age groups using the 2011 Canadian population as the population standard. Estimates were calculated for the years 2006 to 2016. Incidence and prevalence were also examined by sex group. The results were graphed to show the rates over time and by sex. Differences between the MNA and non-MNA groups were expressed as percentages calculated using the following formula:

$$\left(\frac{\text{standardized rate}_{MNA}}{\text{standardized rate}_{non\text{-}MNA}} - 1\right) \times 100\%$$

3 Prevalence and incidence

3.1 Ischemic heart disease (IHD)

3.1.1 IHD prevalence

The prevalence of IHD was consistently higher amongst the MNA population compared to the non-MNA population. In 2016, IHD was 29% more common amongst the MNA population compared to non-MNA Albertans. There were 61.3 and 43.4 cases of IHD per 1,000 amongst the MNA and non-MNA, respectively (Figure 3). Prevalence of IHD in the non-MNA population experienced a steady decline over the 10-year period 2006-2016, while the MNA population only appeared to experience a decline during the last few years. Of note, the wider confidence intervals observed in the MNA population may have partially obscured the trend.

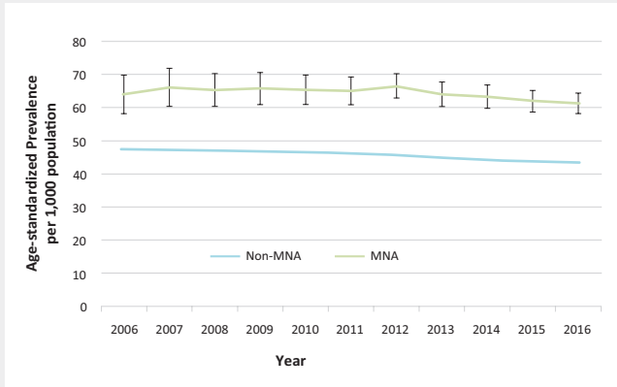

Figure 3.
Age-standardized prevalence of IHD by MNA status, 2006 to 2016

Men were more likely to experience IHD in both groups. In 2016, MNA citizens had an excess of 17.3 cases per 1,000 females and 18.4 cases per 1,000 males. This represented 37% more cases amongst female Métis and 24% more cases amongst male Métis as compared to other Albertans (Figure 4).

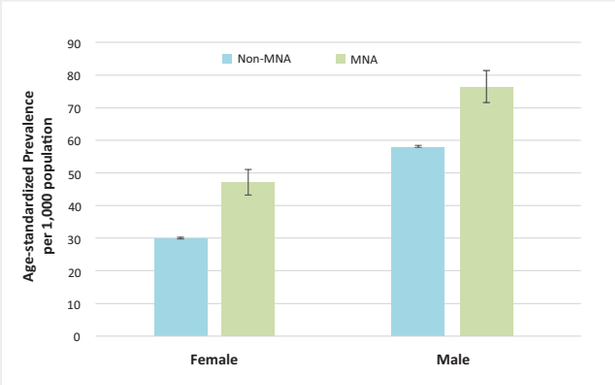

Figure 4.
Age-standardized prevalence of IHD by MNA status and sex, 2006 to 2016

3.1.2 IHD incidence

The incidence of IHD was higher amongst Métis Albertans during every year of the 10-year period, except for 2006 (Figure 5). In 2016, the incidence was 4.0 cases per 1,000 amongst non-MNA Albertans and 5.3 cases per 1,000 for MNA citizens, representing 25% more diagnoses of IHD for MNA citizens compared to non-MNA Albertans.

The difference in new cases of IHD between the MNA and non-MNA populations was similar across males and females, with 1.0 additional case per 1,000 for females and 2.8 additional cases per 1,000 for males in 2016 (Figure 6). However, this difference in new diagnoses translated to approximately 26% more cases in MNA females compared to 34% more cases in MNA males (as compared to non-Métis Albertans).

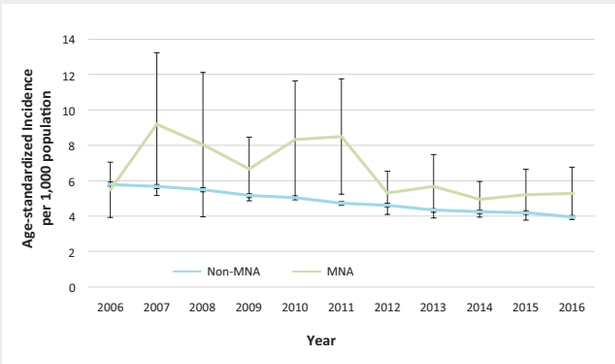

Figure 5.
Age-standardized incidence of IHD by MNA status, 2006 to 2016

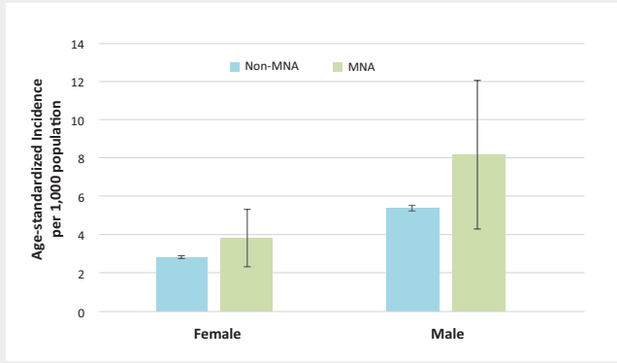

Figure 6.
Age-standardized incidence of IHD by MNA status and sex, 2006 to 2016

3.2 Hypertension

3.2.1 Hypertension prevalence

The prevalence of hypertension was consistently higher amongst the MNA population between 2006 and 2016 (Figure 7). All Albertans saw the number of people living with hypertension grow by approximately 25 cases per 1,000 people over the 10-year period. In 2016, there was a 11.8% difference in the prevalence of hypertension between the MNA and non-MNA populations. Prevalence was 234.9 cases per 1,000 in the MNA population compared to 207.0 cases per 1,000 for non-MNA Albertans.

The prevalence of hypertension by sex is shown in Figure 8. Females in the MNA group experienced an additional 23 cases per 1,000 people, while males in the MNA group experienced an additional 34 cases. This corresponded to an overall increase in prevalence of 11% and 13% respectively, compared with the non-MNA group.

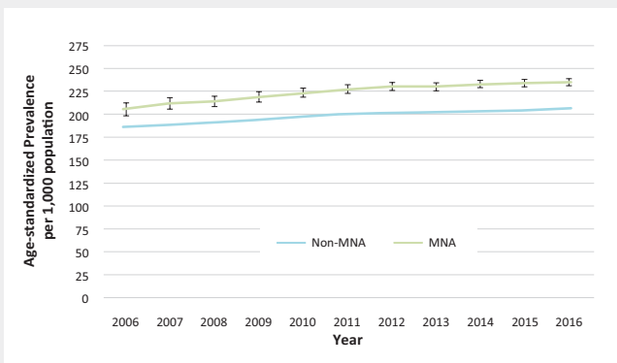

Figure 7.
Age-standardized prevalence of hypertension by MNA status, 2006 to 2016

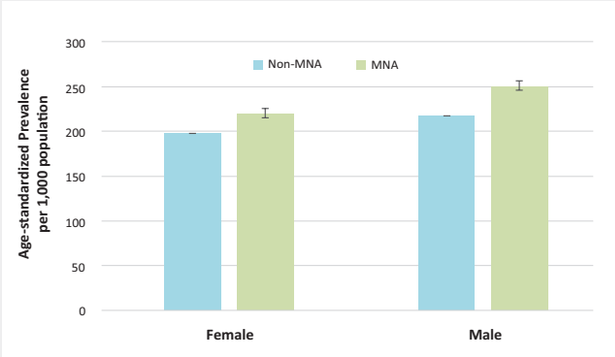

Figure 8.
Age-standardized prevalence of hypertension by MNA status and sex, 2006 to 2016

3.2.2 Hypertension incidence

The incidence of hypertension in the MNA population was either equal to, or higher than, the non-MNA incidence over the 10-year period 2006-2016 (Figure 9). In 2016, there were 4.5 additional cases of new hypertension diagnoses per 1,000 people amongst the MNA group (16% more than the non-MNA group). However, due to the small sample size for the MNA group, there is significant uncertainty in the estimates for specific years.

In 2016, there were 1.9 additional cases per 1,000 and 7.1 additional cases per 1,000 diagnosed amongst MNA females and males, respectively (Figure 10). This finding corresponded to a 9% and 22% higher incidence in the MNA population compared to the non-MNA population.

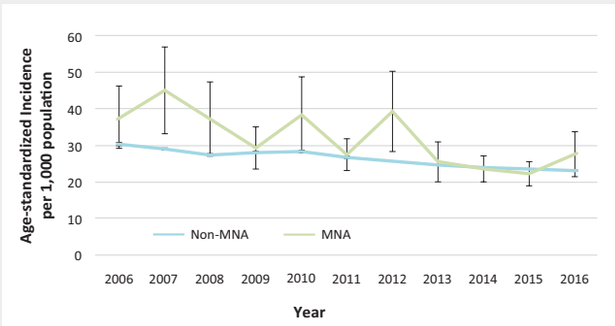

Figure 9.
Age-standardized incidence of hypertension by MNA status, 2006 to 2016

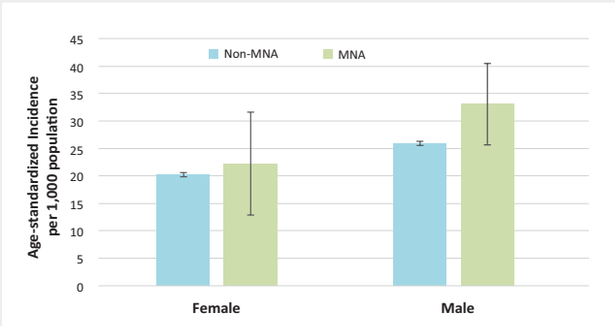

Figure 10.
Age-standardized incidence of hypertension by MNA status and sex, 2006 to 2016

4 Hypertension drug dispensations

The prevalence of hypertension drug dispensations is shown in Figure 11. MNA citizens received more medications used in the management of hypertension between 2010 and 2016 than non-MNA Albertans. The number of prescriptions filled increased slightly over the 7-year study period. The MNA group received 211.6 unique hypertension drug cases per 1,000 people, compared to 182.6 cases per 1,000 people in the non-MNA population. This difference corresponded to a 13.7% higher medication dispensation rate in the MNA group than in the non-MNA population.

The prevalence of drug dispensations by age group is shown in Figure 12. The dispensation of hypertension medications increased sharply in each age group beginning with 40 to 59 year olds for both MNA and non-MNA populations. More than half of those over the age of 60 in both groups were receiving at least one anti-hypertensive medication. Despite this, the MNA population was slightly more likely to receive anti-hypertensive medications in each age group.

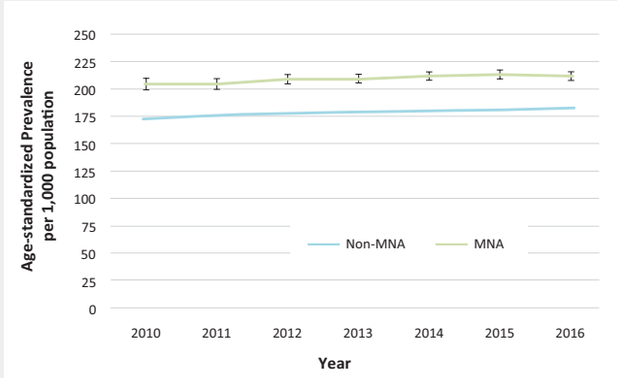

Figure 11.
Age-standardized prevalence of unique hypertension drug dispensations by MNA status, 2010 to 2016

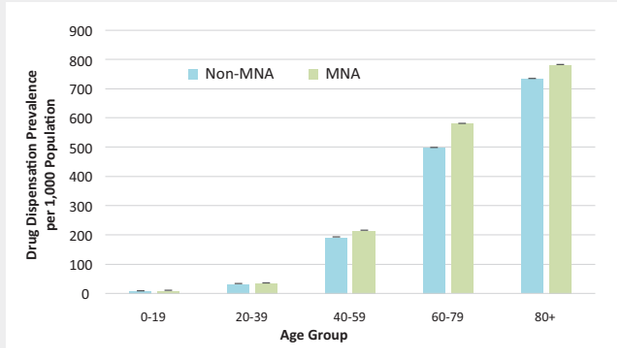

Figure 12.
Prevalence of unique hypertension drug dispensations by MNA status and age group, 2010 to 2016

5 Mortality

The analysis of mortality was limited by the small population of the MNA, thereby reducing the accuracy of estimates for this outcome. Between 2006 and 2015 (the last year mortality data was available), the age-standardized mortality rate in which hypertension was listed as the main cause of death was 5.9 deaths per 100,000 amongst MNA citizens. This rate was lower than the 11.9 deaths per 100,000 reported amongst the non-MNA population, however, the overall difference is not statistically significant.

There were significant sex-specific differences between the groups (Figure 13). Male Métis were less likely to die due to hypertension (3.2 deaths versus 12.5 deaths per 100,000), though the estimate should be interpreted with caution due to the small sample. Female Métis experienced fewer deaths due to hypertension, but the difference was not significant when compared to non-Métis females (8.8 deaths versus 11 deaths per 100,000).

The results for IHD mortality were similar. There were no significant differences between the two groups overall, although the estimates were leaning towards a lower mortality rate amongst the MNA population (107 deaths versus 132 deaths per 100,000).

Regarding mortality amongst female Métis, specifically, there were significantly fewer deaths due to IHD than amongst non-MNA females (53.2 deaths versus 92.8 deaths per 100,000). There was no difference between Métis and non-Métis males with respect to deaths from IHD (Figure 14).

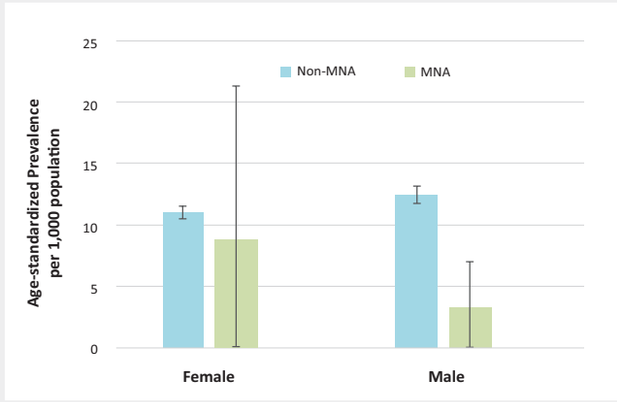

Figure 13.
Deaths due to hypertension by MNA status and sex, 2006 to 2015

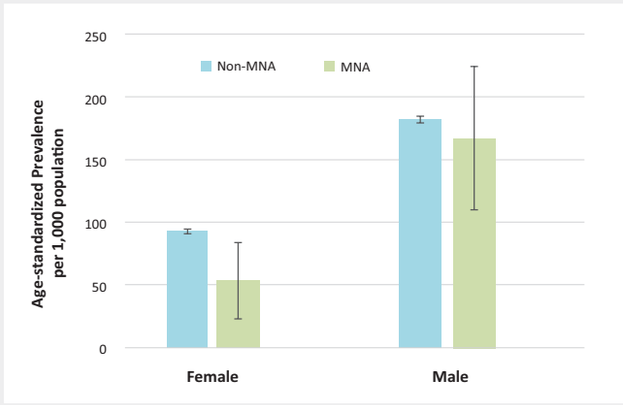

Figure 14.
Deaths due to IHD by MNA status and sex, 2006 to 2015

6 Discussion

These results show that registered citizens of the MNA and their dependents were more likely to be diagnosed with IHD and hypertension. The prevalence of medication distribution was also higher amongst the MNA population when compared to the non-MNA population of the province. These findings align with most of the prior limited research in this area – although a few previous studies have found lower occurrence of these conditions amongst the Métis population (Janz *et al.*, 2009; Martens *et al.*, 2011; Randall *et al.*, 2012; Reading & Wien, 2009).

The MNA population appeared to experience a greater burden of heart-related illness. The prevalence of hypertension was approximately 12% higher than non-Métis Albertans. The difference was greater for IHD with the number of Métis experiencing IHD being approximately 29% higher, although amongst Métis females specifically, there were 37% more cases of IHD during the study period. Interestingly, the dispensation of hypertension medications was 13.7% higher than that of non-Métis Albertans – a rate that exceeded the difference in hypertension prevalence. Treatment gaps are a concern for Indigenous populations and may result in suboptimal treatment and care. Hypertension Canada has identified a lack of information regarding the prevalence and management of hypertension in Indigenous communities as an issue (Hypertension Canada, 2018). In this study, however, hypertension medications did not appear to be under-prescribed amongst the MNA population, given the relative prevalence of hypertension between the MNA and non-MNA groups, and the overall medication use of non-MNA Albertans. While Métis Albertans appeared to be receiving medications at appropriate levels, the data does not speak to whether the received medications were sufficiently controlling blood pressure. It is possible that treatment gaps still exist if the Métis are less likely to reach their treatment goals or control their hypertension.

There appears to be an overall trend downwards for many of the outcomes measured. While the prevalence of hypertension increased between 2006 and 2016, the incidence of hypertension and both incidence and prevalence of IHD decreased during this period. Of note, the prevalence of IHD did not appear to decline prior to 2012 in the MNA population. This may have indicated a potential lag in treatment or was possibly a reflection of the reduced incidence of IHD overall in recent years. The overall decrease observed may indicate better treatment of hypertension resulting in reduced development of IHD or fewer deaths. It could also indicate that lifestyle risk factors for harmful cardiovascular outcomes not measured by

this report (e.g., diet, physical inactivity) have improved in the MNA population. However, there does not appear to be any data to support this explanation.

Prior research has not consistently found a significant increase in heart-related deaths amongst the Métis (Atzema *et al*., 2015; Tjepkema *et al*., 2011). The incidence of deaths due to hypertension and IHD are similar or lower amongst the Métis, depending on condition and sex. These data are not capable of determining why the difference exists between higher incidence and prevalence of these conditions and lower rates of death from them. It is possible that other competing causes of death amongst the MNA population is the culprit of the discrepancy. Another possible explanation for this result is the combined effect of heart disease and other chronic diseases on mortality. Additional research with the Alberta Métis found that 18.6% of Métis individuals living with diabetes also experienced IHD (Randall *et al*., 2018). As this study did not include mortality data if hypertension or IHD were determined to be contributing factors, and these health conditions do not exist in a vacuum, the actual role of heart disease mortality of the Métis may be considerably larger.

Policy implications

The citizens of the Métis Nation of Alberta and their dependents experience an excess burden of heart-related disease and therefore may benefit from additional resources to improve awareness, prevention, diagnosis, and treatment for these conditions. Given the occurrence of undiagnosed hypertension in Canada (Hypertension Canada, 2018), encouraging citizens of the MNA to have their blood pressure measured regularly should be a priority. Addressing lifestyle risk factors such as smoking, excess weight, and treating other related conditions, such as diabetes, are also important due to the high occurrence of these risk factors amongst the Métis (Foulds *et al*., 2013).

The Métis population examined in this study appeared to receive hypertension medications at a rate close to the measured prevalence of hypertension. These data suggest some promising future trends as there appears to be a decrease in the incidence of new cases of hypertension and IHD. Additional research into the effectiveness of current prevention and treatment programs with the Métis (e.g., an audit of current practices versus clinical practice guidelines) may highlight additional gaps in care and promote continuation of the positive trends found in this study.

Strengths and limitations

This study has several limitations. Firstly, it was only able to identify individuals that sought care for their conditions. Individuals who did not seek care with a physician were not identified in this study. This limitation is a potential cause of undercounting – particularly for hypertension since it can remain silent (symptom-free) and go undiagnosed amongst those who do not receive regular check-ups from their doctor. Secondly, while this study reported medication dispensations, there was no ability to determine success or adherence to treatments (e.g., whether individuals took their medication as prescribed or if the received medication/treatment resulted in adequate management of blood pressure). Thirdly, the MNA registry cannot link all individuals who identify as Métis living within Alberta. Only those who register with the MNA can be identified and linked to their dependents. It is unclear what differences may exist between registered Métis, their dependents, and unregistered Métis. Estimating yearly rates was also limited by using a static population estimate when the real underlying population is continuously changing. Lastly, the relatively small MNA population increased the uncertainty when estimating the rates of rare conditions and death.

Despite these limitations this report has considerable strengths. This study was able to link a registry of individuals with confirmed Métis ancestry to administrative data from the provincially administered health care system of Alberta. Since these data contain information on all hospitalizations, deaths, and physician claims, it provides an excellent record of care sought in the province. These data also contain all prescriptions dispensed through community pharmacies in the province and this linkage allowed for an accurate assessment of the occurrence of diagnosis and treatment for these disorders.

7 Conclusion

The MNA population was more likely to be diagnosed and living with hypertension and IHD when compared to the non-MNA population. Accordingly, greater proportions of the Métis in Alberta and their dependents received medications to treat hypertension and IHD than non-Métis. Interestingly, despite MNA citizens being more likely to experience hypertension and IHD, the MNA population had a lower rate of death as a direct result of heart-related illness when compared to the non-MNA population in Alberta.

The Métis are a distinct population with a unique experience of heart-related illness and therefore, additional resources and research into the Métis health experience is warranted.

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