Health & Wellness
Manitoba Metis Federation

Metis Health Knowledge Authority in Manitoba

Ischemic Heart Disease (IHD) and Related Health Care Utilization in Metis in Manitoba

Winnipeg, Manitoba, Canada 2012

Manitoba Metis Federation –
Health & Wellness Department

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Disclosure

The results and conclusions in this report are those of the authors and no official endorsement by the Public Health Agency of Canada, Manitoba Health, or other parties is intended or should be inferred. The views expressed herein do not necessarily represent the views of the Public Health Agency of Canada.

In our study, data were coded to protect the identification of study participants. All data comes from an administrative database with identifying information of both patients and health care providers removed. In addition, there was no contact with patients or providers during any part of this study. The intent of these analyses was to examine patterns among groups based on Metis ethnicity and on different geographical divisions.

For the purposes of this particular study we obtained approvals from the Manitoba Metis Federation to access the Metis Population Database, the Faculty of Medicine's Research Ethics Board at the University of Manitoba for approval of our research design and activities, and the Manitoba Government's Health Information Privacy Committee to access the Population Health Research Data Repository.

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Executive Summary

This report resulted from the need to further understand findings in the Metis Health Status & Health Services Utilization Study (also known as the Metis Atlas) (Martens, Bartlett, et al., 2010). In that study, higher rates of IHD were found in Metis[1] compared to All Other Manitobans in Manitoba. The purpose of this report is to build on baseline information from the Metis Atlas to support the need of Regional Knowledge Networks for more detailed information to guide assessment of Manitoba Health programs and services.

The Research Team

The Co-Principal Investigators (PI) on this study are **Dr. Judith G. Bartlett and Dr. Julianne Sanguins**. **Dr. Bartlett** is an Associate Professor in the Department of Community Health Sciences in the Faculty of Medicine at the University of Manitoba, and an Adjunct Scientist with the Manitoba Centre for Health Policy (MCHP). Dr. Bartlett holds an MD, CCFP, and an MSc in Community Health Sciences. **Dr. Sanguins** is an Assistant Professor in the University of Manitoba's Department of Community Health Sciences, working on-site at the Manitoba Metis Federation Health & Wellness Department (MMF–HWD). She is also Research Program Manager of the MMF–HWD. **Sheila Carter** is the Director of the MMF–HWD. **Punam Mehta** is the Chronic Disease Surveillance Program Coordinator, working on-site at the MMF–HWD. **Nathan Hoeppner** is a Research Associate with the Department of Community Health Sciences. **Mena Bassily** is a Research Assistant with the MMF–HWD, working on-site. Through a contractual arrangement, the MCHP generated the aggregate data and provided mentorship for the MMF–HWD research team in our effort to successfully complete this research.

The Manitoba Metis Federation

The Manitoba Metis Federation (MMF), founded in 1967, is the "democratic and self-governing body of the Manitoba Metis community" (www.mmf.mb.ca). The MMF strives to develop and maintain its capacity to 'act collectively' to successfully promote, protect, and advance the political, social, and economic interests of Metis in Manitoba. The MMF negotiates with provincial and federal governments to access funding to provide a wide range of programs and services. Within the MMF, the MMF–HWD was established in 2005. By using a Metis culture-based holistic health framework, the MMF–HWD builds Metis health planning capacity, develops and implements a Metis health research agenda, and acts as a Metis health 'expert authority' to advise the health system.

Overview of Sections

Section 1 provides an introduction to the report and reviews methods used for data generation in this study.

Section 2 offers insight into the Metis, the Manitoba Metis Federation, and the Health & Wellness Department. The Manitoba Metis Federation–Health & Wellness Department (MMF–HWD) conceptual model, its holistic approach to knowledge development, and approach to ways of knowing are described.

[1] The Manitoba Metis Federation does not use the term 'Metis' with the accent ('Métis') as is done in some parts of Canada. In this report 'Métis' is used only when referring to sources that use the accented form.

In Section 3, age and sex characteristics of the population are identified. Metis in Manitoba have a greater proportion of people aged 19-34 years compared to All Other Manitobans, a lower proportion of people aged 40-49 years compared to All Other Manitobans, and a lower proportion of adults aged 70 years and older compared to All Other Manitobans (Martens, Bartlett et al., 2010). In this study, the proportion of Metis people aged 19-39 with IHD was similar to All Other Manitobans; the proportion of Metis people aged 40-74 with IHD was higher compared to All Other Manitobans; and the proportion of Metis aged 75 years and older with IHD was lower compared to All Other Manitobans. Premature mortality rate (PMR)—those dying before the age of 75—was calculated for each of the groups. While the *Metis Atlas* (Martens, Bartlett, et al., 2010) reported a higher PMR in Metis compared to All Other Manitobans in Manitoba, our study on individuals with IHD shows that there is no statistically significant difference in PMR between these two groups.

In Section 4, the prevalence and probability of developing IHD and other associated comorbidities are examined. In this study, both IHD prevalence and probability of developing IHD are higher for Metis compared to All Other Manitobans in Manitoba. Prevalence of diabetes, anxiety disorders, and substance abuse are higher for Metis with IHD compared to All Other Manitobans with IHD while prevalence of hypertension, congestive heart failure (CHF), depression, and stroke rate are similar for Metis with IHD compared to All Other Manitobans with IHD in Manitoba. Analysis of the comorbidities of diabetes, stroke, CHF, depression, anxiety disorders, and substance abuse for those with IHD revealed that Metis with IHD had a lower percentage of no comorbidities and a higher crude percentage of one, two, three, four, and five diagnosed comorbidities compared to All Other Manitobans.

Section 5 describes the health services use of Metis with IHD and All Other Manitobans with IHD in Manitoba. Indicators explored include ambulatory visit rate, ambulatory visit rate to a cardiologist, and ambulatory visit rate to a cardiac surgeon. Provincially, there was no difference in the rates of ambulatory visits to a cardiologist and rates of ambulatory visits to a cardiac surgeon in Metis with IHD compared to All Other Manitobans with IHD in Manitoba

In Section 6, rates of high profile cardiac surgery for Metis and All Other Manitobans are reported. Indicators in this section are cardiac catheterization, bypass graft surgery, and percutaneous coronary interventions (PCI) with or without stent insertion. In this study, rates are similar at the provincial level for Metis with IHD compared to All Other Manitobans with IHD for cardiac catheterization, bypass graft surgery, and PCI while rates for high profile cardiac surgeries remain similar for both groups This latter finding warrants further examination given that we found Metis have a higher prevalence of IHD compared to All Other Manitobans in Manitoba.

In Section 7, pharmaceutical use related to IHD is investigated through analysis of records of the drugs prescribed by physicians to treat IHD and to lower cholesterol level (Statins). Metis with IHD use less Statins and drugs to treat IHD compared to All Other Manitobans in Manitoba.

A glossary is provided to clarify terms.

A Summary of the Key Findings from Regression Modelling

There is one logistic regression presented in this study. The logistic regression examines the probability of developing IHD. After controlling for other factors (living in Winnipeg,

hypertension, diabetes, stroke, CHF, depression, age, sex, household income, major physical illness), Metis are at a higher risk of developing IHD compared to All Other Manitobans.

Conclusion

IHD and its associated complications are health issues of concern for Metis in Manitoba. Higher rates of IHD, diabetes, and selected mental disorders (anxiety disorders and substance abuse) are seen in this report. Given the younger Metis population as shown in Section 3, it can be anticipated that, due to an increasing aging population, absolute numbers of Metis with IHD and associated comorbidities may increase in the future. By working with our Metis Regions and Regional Health Authorities in a holistic manner we can promote healthy living, help reduce or prevent the development of disease, and ensure that services and programs are delivered in a way that supports healthy Metis people.

Report available online at:

http://health.mmf.mb.ca

Section 1: Introduction and Methods

1.1 Background of this Report

Until recently, little was known about ischemic heart disease (IHD) in Metis[1] in Manitoba. The purpose of this report is to provide baseline surveillance data about IHD in Metis in Manitoba. In order to support program and policy responses, health information related to IHD in Metis in Manitoba is essential. This report provides an initial examination of this important health condition.

The ability to produce Metis-specific aggregate data resulted from the building of an anonymized 'Metis population cohort' during the previous Manitoba Metis Federation (MMF) research collaboration with the Manitoba Centre for Health Policy (MCHP) at the University of Manitoba. The MMF–MCHP research team produced the 'Profile of Metis Health Status and Healthcare Utilization in Manitoba: A Population-Based Study' (Martens, Bartlett, et al., 2010)—hereafter referred to as the 'Metis Atlas'. The Metis Atlas was the first comprehensive mapping out of Metis health status in Manitoba. It is an up-to-date report of administrative data for Metis living in the province in 2006.

In the Metis Atlas, age- and sex-adjusted Metis rates for a number of chronic diseases, including IHD, were measured and compared to rates for All Other Manitobans[2] by various geographical areas—by province, by the 11 Regional Health Authorities (RHAs), and by the 12 Winnipeg Community (Winnipeg CA) areas. The Metis Atlas was a benchmark document for Metis both at the national level and in Manitoba—historically there have been no other 'whole population' studies available on the health of Metis, and very limited Metis-specific research has been conducted in Manitoba. Based on the findings from the Metis Atlas, we conducted two additional descriptive epidemiological studies to establish the baseline surveillance on diabetes and cancer in Metis in Manitoba. These studies highlighted diabetes-related health disparities and cancer-related information between Metis and All Other Manitobans. Our Knowledge Networks (see Section 2) have used this information to guide formation of Metis-specific health policy and to inform decision makers.

The Metis Atlas (Martens, Bartlett, et al., 2010) found IHD prevalence was higher for Metis compared to All Other Manitobans (12.2% vs. 8.7%–40.2% higher). The Metis Atlas reported a higher prevalence of IHD in Metis in Manitoba in 8 of the 11 Regional Health Authorities (RHAs) and in 10 of the 12 Winnipeg Community Areas (Winnipeg CAs). Among the Winnipeg CAs there was a clear Premature Mortality Rate (PMR) gradient for Metis—from Winnipeg's most healthy CAs to Winnipeg's least healthy CAs. In that study, rates of chronic and other illness events were higher for Metis compared to all other Manitobans in Manitoba including hypertension (13.0% higher), acute myocardial infarction (AMI) (26.6% higher), and stroke (24.1% higher) (Martens, Bartlett, et al., 2010).

While Metis-specific information related to IHD is very limited, there are indications that rates of IHD in Metis tend to be higher than for the rest of the population. Tjepkema et al. (2009)

[1] The Manitoba Metis Federation does not use the term 'Metis' with the accent ('Métis') as is done in some parts of Canada. In this report, 'Métis' is used only when referring to sources that use the accented form.

[2] As noted in the Metis Atlas (Martens, Bartlett, et al., 2010): "The reader should be aware that for northern regions in particular, 'All Other Manitobans' as a comparative group would be comprised of a large portion of First Nations, which is in contrast to the southern regions where First Nations would only comprise a small portion of the population. Therefore, the composition of the comparative group may differ substantially from north to south. Given that the overall health status of First Nations is worse than the Manitoba average, the health status of the comparative group of All Other Manitobans in the north is poor, so the Metis group may show similar or better health status regionally. In contrast, the overall health status of all other Manitobans in the south is generally good, so the Metis group may show poorer health status regionally" (p. XXXII).

found that among Metis men in Canada circulatory disease was the leading cause of death, accounting for 32% of the total age-standardized mortality rate by cause. Also, among Metis women circulatory disease was reported as the second leading cause of death accounting for 29% of the total age-standardized mortality rate by cause (Tjepkema et al., 2009). However, in the Tjepkema et al. (2009) report circulatory disease could include peripheral vascular disease and our study did not include that diagnosis, so comparisons should be made with caution. The Métis Nation of Ontario reported higher rates of acute coronary syndrome, which includes acute myocardial infarction (AMI) and unstable angina, compared to the general Ontario population (1.44 vs. 1.11 per 100) (Atzema et al., 2010). Again, this definition differs somewhat from our definition, thus direct comparisons are not possible.

IHD is associated with a wide range of health conditions such as hypertension, diabetes, stroke, congestive heart failure (CHF), depression, anxiety disorders, and substance abuse—all of which are explored in this study. There is a bidirectional relationship between many of these diseases and IHD; this means that they could be a precursor to or a consequence of IHD (Marrow & Boden, 2012). Rates of health services use including ambulatory visits (visits to all physicians), ambulatory visits to a cardiologist, and ambulatory visits to a cardiac surgeon are reported. Rates of high profile cardiac surgeries documented in this study include cardiac catheterization, coronary artery bypass graft surgery, and percutaneous coronary interventions (PCI) (with or without stent insertion). Pharmaceutical use, including Statins and drugs to treat IHD, is also presented. Comorbidities among those with IHD and concurrent health problems such as hypertension, diabetes, stroke, congestive heart failure, depression, anxiety disorders, and substance abuse are examined. Generally, the longer a person has the disease, the more likely they are to develop one or more of these complications (or 'comorbidities') (Broemeling, Watson, & Black, 2005). Some of these comorbidities such as diabetes, hypertension, CHF, and anxiety may act as major risk factors for IHD. Comorbidities are often associated with poorer health status and health-related complications.

Our Knowledge Networks are particularly concerned about IHD and its association with smoking rates, cholesterol levels, dietary habits, physical inactivity, and socioeconomic status in Metis communities (Kosowan, oral communication, 2011). The Knowledge Networks will use the information from this study on Ischemic Heart Disease in Metis in Manitoba to inform Metis communities about the burden of disease, co-morbidities, and health services use for Metis with IHD in Manitoba.

The existence of the anonymized Metis population cohort (housed in the MCHP under the authority of the MMF) allows for the production of more focused studies. In this study, we examine age- and sex-adjusted rates and age- and sex-specific rates of IHD. In addition, we examine IHD in relationship to other morbidities and neighbourhood incomes in Metis compared to All Other Manitobans. This report emerged as a result of the need to provide a more comprehensive measurement and understanding of IHD in Metis in Manitoba. The outcomes of this report will inform decision-making on health service delivery in our province.

1.1.1 Ischemic Heart Disease Definition

In our study, the definition of IHD is based on administrative data—that is, records of treatment in the universal health care system for individuals living in Manitoba. A description of how each disorder was measured for this report is included in Section 4: Morbidity.

Atheromatous plaques, also known as the build up of fats in the arteries, are the most common cause of ischemic heart disease (IHD) and result in an obstruction to the coronary arteries

leading to reduced blood and oxygen to the heart muscle (Marrow & Boden, 2012). The pathogenesis of atherosclerosis—the process in which fats build up in the arteries blocking blood flow to the heart muscles—involves a long pre-symptomatic period, and includes processes of initiation, inflammation, proliferation, smooth muscle cell death, angiogenesis (formation of collateral blood vessels), growth in plaques (fats), and mineralization (Libby, 2012). Types of IHD are acute myocardial infarction, angina pectoris, and unstable angina—all of which result from lack of coronary blood flow (Marrow & Boden, 2012). In IHD in Metis in Manitoba, the definition included one or more hospitalizations with diagnosis of IHD (ICD-9-CM codes 410-414, ICD-10-CA codes I20-I22, I24, I25); two or more physician visits with a diagnosis of IHD (ICD-9-CM codes as above); one physician visit with a diagnosis of IHD (ICD-9-CM codes as above); and two or more prescriptions for medications to treat IHD. In this study, cases of AMI are included in the definition used to measure IHD. This, and other limitations of our study, is discussed in sub-section 1.11.

A complete discussion of how IHD was measured in this study is included in sub-section 4.1: IHD.

1.1.2 Acronyms

In this report, several acronyms are used. In an attempt to minimize confusion the most commonly used are outlined below.

AMI	Acute Myocardial Infarction
APS	Aboriginal Peoples Survey
BMI	Body Mass Index
CA	Community Area
CABG	Coronary Artery Bybass Graft
CAD	Coronary Artery Disease
CCHS	Canadian Community Health Survey
CHD	Coronary Heart Disease
CVD	Cardiovascular Disease
ICD-9-CM	International Classification of Diseases and Related Health Problems (9th revisions) Clinical Modifications
IHD	Ischemic Heart Disease
MCHP	Manitoba Centre for Health Policy
MLPF©	Metis Life Promotion Framework©
MPDB	Metis Population Database
NPHS	National Population Health Survey
PMR	Premature Mortality Rate
RHA	Regional Health Authority
Rx	Drug or treatment

1.2 Background of the Research Team

The MMF–HWD research team was responsible for all aspects of this study with the exception of producing aggregate data. Specifically, the MMF–HWD selected all of the indicators examined in this study, prepared and analyzed the graphs, and wrote the text of the report. Experts in the field of cardiovascular disease and Indigenous peoples served as external peer reviewers to ensure quality of the report.

The Co-Principal Investigators (PIs) on this study were **Dr. Judith G. Bartlett** and **Dr. Julianne Sanguins. Dr. Judith G. Bartlett** is an Associate Professor in the Department of Community Health Sciences in the Faculty of Medicine at the University of Manitoba, and an Adjunct Scientist with the MCHP. Dr. Bartlett holds an MD, CCFP, and an MSc in Community Health Sciences. Dr. Bartlett was Co-Principal Investigator on the Metis Atlas as well as PI on several projects funded by the Canadian Institutes of Health Research. She is a part-time clinician, an academic physician, and scientific director with a strong understanding of and experience in public health administration. **Dr. Julianne Sanguins** is an Assistant Professor in the University of Manitoba's Department of Community Health Sciences. Dr. Sanguins is an RN and holds a PhD in Nursing. Dr. Sanguins is also Research Program Manager in the MMF–HWD and was a member of the Metis Atlas research team. Dr. Sanguins managed all aspects of the academic needs of the study, including directly supervising research staff.

Sheila Carter is the Director of the MMF–HWD. Ms. Carter was a member of the Metis Atlas research team, providing expertise regarding health program and policy development. In this project, Ms. Carter was community collaborator on this study and co-author of Section 2 and participated in the data interpretation, review, and editing of this report.

Punam Mehta is the Chronic Disease Surveillance Program Coordinator in the MMF–HWD. Ms. Mehta holds an MSc in Community Health Sciences from the University of Manitoba and brings a background in epidemiology to the project. She was also responsible for graph generation, data review and interpretation, and report writing.

Nathan Hoeppner is a Research Associate with the Department of Community Health Sciences in the Faculty of Medicine at the University of Manitoba, working on-site at the MMF–HWD. Mr. Hoeppner has a M.A. and assisted in data review and interpretation.

Mena Bassily is a Research Assistant with the MMF–HWD. Mr. Bassily holds a Masters Degree in Public Health and Epidemiology from Menoufiya University, Egypt with pre-doctoral training in exposure, risk, and epidemiology from the Harvard School of Public Health in Boston, U.S.A. Mr. Bassily assisted in data review, interpretation of data, and the review and editing of this report.

We continue to respect and appreciate the role of the MCHP in our research projects. For consistency in working with the health sector, our report is structured similar to the Metis Atlas and our two previous chronic disease studies (diabetes and cancer). The MCHP generated the aggregate data and provided mentorship for the MMF–HWD research team in our effort to successfully complete our first IHD baseline surveillance study report. **Dr. Patricia Martens** provided mentorship to the team, **Charles Burchill** provided database support, and **Hui Chen** provided aggregated data as a statistical programmer, as well as instruction and guidance on measurement of indicators.

1.3 Purpose of this Report and Outline of the Sections

The overall purpose of this report is to examine population-based indicators of health status and health care utilization in Metis with IHD in Manitoba and to answer the following questions about the burden of IHD, associated comorbidities, and related health services utilization. For each indicator, is there a difference between *Metis with IHD* and *All Other Manitobans with IHD*?

- At the provincial level?
- Within each of the 11 Regional Health Authorities (RHAs) of Manitoba

- Within each of the three 'aggregated' non-urban areas of Rural South, Mid, and North?"

A list of the sections included in this report is as follows:

Section 1: Introduction and Methods
Section 2: Overview of the MMF–Health & Wellness Department
Section 3: Age and Sex Characteristics of the Population
Section 4: Morbidity Profile
Section 5: Health Services Use
Section 6: High Profile Cardiac Surgery
Section 7: Pharmaceutical Drug Use
Glossary

1.4 What's in the Report: The Types of Graphs, Tables, and Analyses

Section 1 provides an introduction to the report. Section 2 offers an overview of the Manitoba Metis Federation–Health & Wellness Department (MMF–HWD). Sections 3 through 7 have consistent formatting of information and contain one or more tables, population pyramids, line graphs, and/or bar graphs. There are two types of bar graphs used in this report:

- A comparison of Metis with IHD and All Other Manitobans with IHD living in the same geographical region
- A comparison of Metis with IHD and All Other Manitobans with IHD living in the same Community Area (CA) within Winnipeg RHA

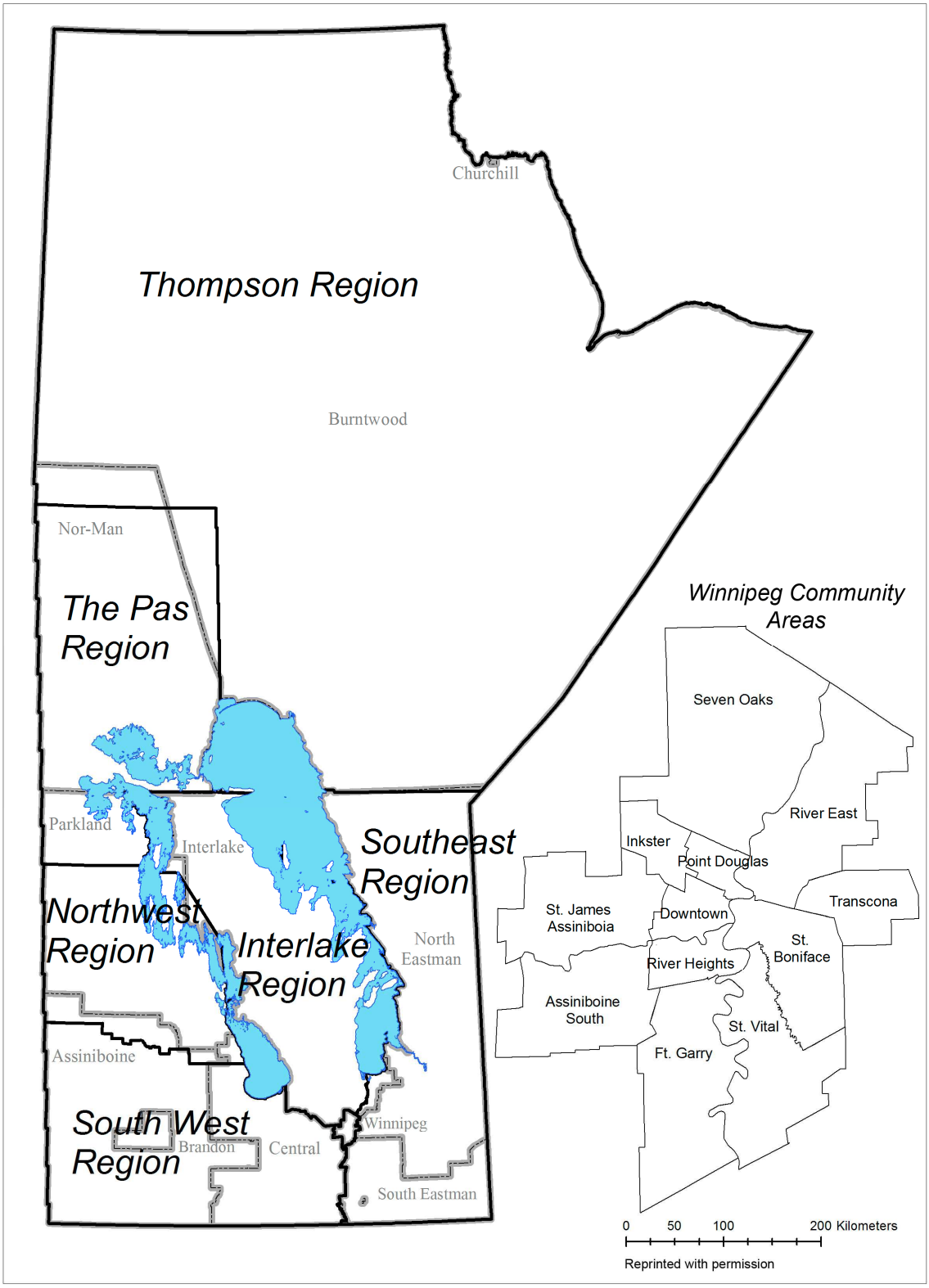
At the beginning of each section there is an 'Overall Key Findings' sub-section which summarizes the findings for Metis with IHD in table format. This is followed by a more detailed description of the graphs in each section. At the end of each indicator there are findings from the literature review that compare findings from our study with published data related to Metis health, with the results of this study in *italics*. However, you will note that for many of the indicators in our study there is little or no comparable research on the health status of Metis in Manitoba. This report will add to the growing body of Metis-specific health information.

1.5 How to Read this Report

1.5.1 Geographical Boundaries

In this report, health information for Metis with IHD and All Other Manitobans with IHD is compared across geographical areas. These include Manitoba's RHAs and sub-regions within the Winnipeg Regional Health Authority (WRHA) called Winnipeg CAs (Winnipeg CAs). Figure 1.5.1 shows the geographical distribution of the MMF Regions, RHAs, and Winnipeg CAs.

Figure 1.5.1: Geographical distribution of the MMF Regions, RHAs, and Winnipeg CAs - 2010



Source: Martens, Bartlett, et al., 2010

Regional Health Authorities and Winnipeg CAs:

In Manitoba, there are 11 RHAs: Churchill, Burntwood, Nor-Man,[1] Parkland, Interlake, North Eastman, Assiniboine, Brandon, Central, South Eastman, and Winnipeg.

Winnipeg Regional Health Authority (WRHA) encompasses the provincial capital city of Winnipeg and has a population of close to 700,000 people, or approximately 60% of Manitoba's population. (The other ten RHAs have much smaller populations, ranging from under 1,000 in Churchill RHA to over 100,000 in Central RHA). The large population in Winnipeg RHA has been divided into 12 Winnipeg CAs: Assiniboine South, Fort Garry, St. Vital, St. Boniface, River Heights, St. James–Assiniboia, Inkster, Downtown, Point Douglas, Transcona, River East, and Seven Oaks.

Aggregate Areas in the RHA graphs:

The non-urban RHAs have been grouped into three aggregate areas: 'North', 'Mid', and 'Rural South.' North aggregate area is made up of Burntwood, Churchill, and Nor-Man RHAs; Mid aggregate area includes Interlake, North Eastman, and Parkland RHAs; and Rural South aggregate area is made up of Assiniboine, Central, and South Eastman RHAs. Grouping information in this manner provides health planners with an opportunity to compare rural and remote areas.

At times, sample sizes are too small for all 12 Winnipeg CAs. In these instances the Winnipeg CAs are grouped into three Winnipeg sub-regions: 'Winnipeg Most Healthy', 'Winnipeg Average Health', and 'Winnipeg Least Healthy'. *Winnipeg Most Healthy* consists of grouped 'neighbourhood clusters' with a PMR lower than the Winnipeg average PMR: Assiniboine South, Fort Garry North, Fort Garry South, Inkster West, River East North, River East East, River East West, River Heights West, St. Boniface East, St. James–Assiniboia West, and St.Vital South. *Winnipeg Average Health* is comprised of grouped 'neighbourhood clusters' with a PMR similar to the average PMR in Winnipeg: River Heights East, Seven Oaks North, Seven Oaks East, Seven Oaks West, St. Vital North, and Transcona. *Winnipeg Least Healthy* is a group of 'neighbourhood clusters' with a PMR higher than the average PMR in Winnipeg: Downtown East, Downtown West, Inkster East, Point Douglas North, Point Douglas South, River East South, St. Boniface West, and St. James–Assiniboia East.

Throughout this report, the RHAs and Winnipeg CAs in the graphs are ordered by ten-year premature mortality rate (PMR), with PMR increasing from the 'most healthy' areas at the top of the graph to the 'least healthy' areas at the bottom of the graph. This format reflects the order used in the Metis Atlas and many MCHP publications. It has been demonstrated that PMR is highly correlated with self-rated health and underlying disease burden; it is used as a general indicator of the health status of a group of people and their need for health care (Martens, Bartlett, et al., 2010). By ordering the graphs by PMR, the relationship between poorer health outcomes (which increase from top to bottom of the graph) and increased usage of health services within specific populations in a certain geographical location can be seen more clearly. See Section 3 for a more thorough explanation of PMR and relevant data for Metis with IHD and All Other Manitobans with IHD. The Glossary provides a more detailed definition of the PMR gradient (or slope) from the most healthy to least healthy areas.

[1] The correct written form of NOR-MAN RHA has capital letters throughout. However, as in the Metis Atlas, for purposes of this report NOR-MAN is indicated by Nor-Man in order to standardize naming of RHAs.

1.5.2 Making Sense of the Graphs

In this report, each indicator includes a definition based upon MCHP standard definitions and a description of the population numerator and denominator included in the analysis. In addition, an abbreviated description of the population measured is also included in the subtitle for each graph.

Below the indicator definition is a description of findings related to each of the geographical boundaries in the following order (only for age- and sex-adjusted graphs and income quintile graphs):

1) Differences between the two groups: Metis with IHD and All Other Manitobans with IHD
2) Differences between the first group and the first group's provincial average: Metis with IHD and the provincial average for Metis with IHD
3) Differences between the second group and the second group's provincial average: All Other Manitobans with IHD and the provincial average for All Other Manitobans with IHD

With the exception of the prevalence of IHD indicator, all comparisons in this report are between *Metis with IHD* and *All Other Manitobans with IHD*.

For this study, indicators are measured as crude percentages, prevalence rates, incidence rates, or odds ratios; this is similar to our other chronic disease surveillance studies and is based on standardized definitions used by the MCHP (Bartlett et al., 2010; Martens, Bartlett et al., 2010).

Statistical significance is measured by a p-value of less than 0.05 for Metis and All Other Manitobans; a p-value less than 0.01 for Metis compared to their provincial average and a p-value of less than 0.01 for All Other Manitobans compared to their provincial average. Throughout this report, unless otherwise indicated, any mention of 'lower' or 'higher' refers to results that are statistically significant.

Throughout this study comparative groups can be Metis vs. All Other Manitobans, Metis vs. their provincial average or All Other Manitobans vs. their provincial average.

While typically the age group of focus is 19 years and older, in some instances indicators may be measured by different age groupings. For example, Percutaneous Coronary Interventions (with or without stent insertion) begins at age 40 years and older because prior to this age there are either no cases or very few cases; however after this age rates begin to increase (Fransoo et al., 2009; Hassan et al., 2010).

In this report, there are three types of graphs: (1) age- and sex-adjusted bar graphs, (2) age- and sex-specific line graphs, and (3) age-adjusted income quintile bar graphs. Each of these will be described.

In this report, all the graphs immediately follow the description of findings.

Age- and Sex-Adjusted:

Below is a sample age- and sex-adjusted graph from our report (Figure 4.2.1).

The title shows the indicator measured (IHD prevalence), the geographical areas shown (RHAs), the population measured (Metis and All Other Manitobans), and the time period of measurement (fiscal year 2002/03-2006/07). The subtitle (in smaller font) describes the

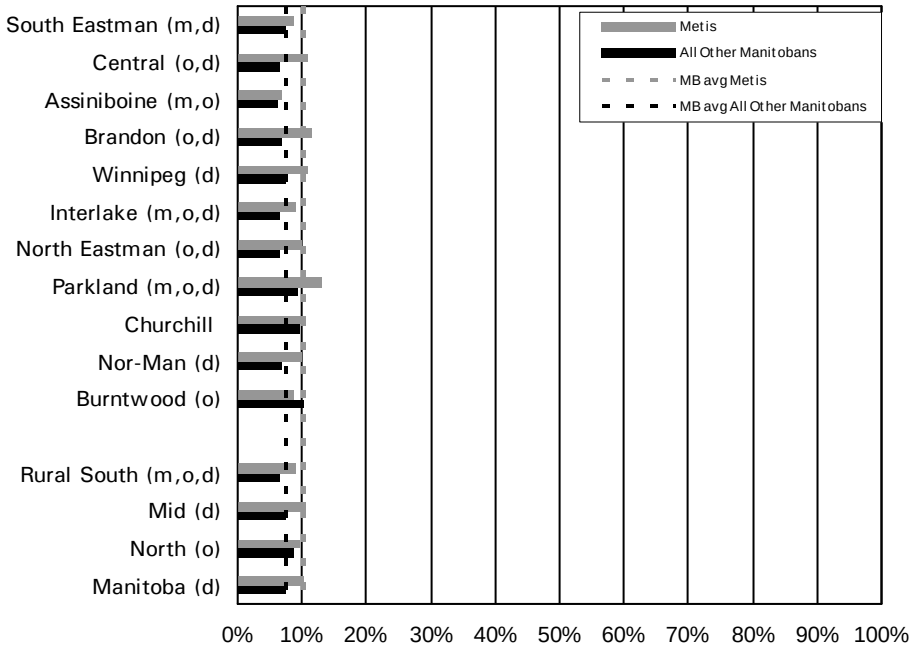
population measured (residents aged 19+) and indicates how the data were measured (e.g., prevalence) and whether the data are age- and sex-adjusted or based on crude numbers. The insert box in the top-right corner of the graph is the legend, which provides a breakdown of what the bar and dotted lines on the graph represent. The light grey horizontal bar represents the indicator rate for Metis with IHD whereas the dark grey bar represents the indicator rate for All Other Manitobans with IHD. The light grey vertical dotted line represents the Manitoba provincial average for Metis with IHD whereas the black vertical dotted line represents the provincial average for All Other Manitobans with IHD.

The letters 'm', 'o', 'd', and 's' represent a classification developed by the MCHP and are used extensively in other Atlases. The use of these letters eases interpretation of data for each graph. As the key at the bottom of each chart notes:

- 'm' indicates the area's rate for Metis with IHD was statistically different from the provincial average for Metis with IHD
- 'o' indicates the area's rate for All Other Manitobans with IHD was statistically different from the provincial average for All Other Manitobans with IHD
- 'd' indicates the area's rate for Metis with IHD was statistically different from the area's rate for All Other Manitobans with IHD
- 's' indicates the data were suppressed due to small numbers

Figure 4.2.1: Ischemic Heart Disease Prevalence by RHA for Metis with IHD and All Other Manitobans with IHD, 2002/03-2006/07

Age- & sex-adjusted percent of residents aged 19+ in a five-year period



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases)

Source: MMF, 2012

For example, as you are reading Figure 4.2.1 you can see that Assiniboine RHA has the notation (m, o) beside it on the y-axis (left side) of the graph. According to the classification system the

'm' indicates the area rate for Metis with IHD was statistically different from the Manitoba average for Metis with IHD. In this case it means that Metis with IHD in Assiniboine RHA are statistically different from the Metis average for IHD. As the line for Metis with IHD in Assiniboine is shorter than the provincial average for Metis with IHD, we can conclude that Metis with IHD in Asssinboine RHA have a lower prevalence of IHD compared to their provincial average. Similarly, the 'o' indicates the area rate for All Other Manitobans with IHD is statistically different from the Manitoba average for All Other Manitobans with IHD. There is no 'd' so we can conclude that there is no statistical difference between the prevalence of IHD between Metis and All Other Manitobans in Assiniboine RHA.

Age- and Sex-Specific:

Below is a sample age- and sex-specific line chart from our report (Figure 4.2.3). Line graphs show crude rates for an indicator. The insert text-box in the top-right corner of the graph is the legend, which provides a breakdown of what the lines on the graph represent. Each line on the graph represents one of the four following population groups:

1) Female Metis
2) Female All Other Manitobans
3) Male Metis
4) Male All Other Manitobans

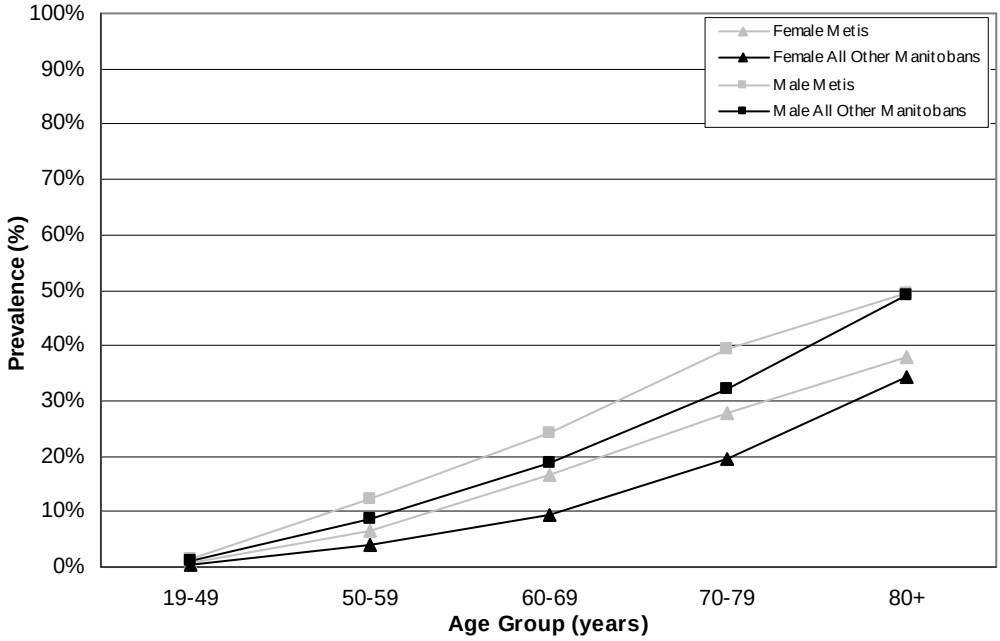
When you are reading the age- and sex-specific graph, the age group (years) distributions are presented on the x-axis (horizontal line) as follows: 19-49, 50-59, 60-69, 70-79, and 80 years and older and the indicator measurement (vertical line) is presented as the crude percent of residents with IHD.

To ensure consistency in the interpretation of age- and sex-specific data the key observations follow a logical order:

1) Overall trends for Metis males and Metis females *(e.g., Throughout their lives, for both Metis males and Metis females the crude prevalence of IHD increases with age)*
2) Metis males compared to All Other Manitoban males and Metis females compared to All Other Manitoban females *(e.g., Throughout their lives, Metis males and Metis females have a higher crude prevalence of IHD compared to All Other Manitoban males and All Other Manitoban females, respectively)*
3) Metis males compared to Metis females (sometimes All Other Manitoban males compared to All Other Manitoban females, if these comparisons are meaningful) *(e.g., Throughout their lives, Metis males have a higher crude prevalence of IHD compared to Metis females)*
4) Other important findings/trends that are unique to a specific indicator and provide useful information for health planning and/or policy *(e.g., By age 80 years and older, Metis males have the highest crude prevalence of IHD)*

Figure 4.2.3: Ischemic Heart Disease in Manitoba by Age and Sex for Metis and All Other Manitobans, 2002/03-2006/07

Crude percent of residents aged 19+ in a five-year period



Source: MMF, 2012

As you are reading Figure 4.2.3, you can see that IHD prevalence increases for all four age groups. From age 19 years and older, Metis males and Metis females have a higher crude prevalence of IHD compared to All Other Manitoban males and All Other Manitoban females, respectively. From age 19 years and older, Metis males have a higher crude prevalence of IHD compared to Metis females. Another important finding to note from this graph is that by the age of 80 years and older, half of Metis males and one-third of Metis females have IHD.

Income Quintiles:

Income quintiles are based on the average (mean) household income of census dissemination areas (Fransoo et al., 2005). These dissemination areas, which are small geographical areas of up to 400-700 people in one or more neighbourhood block, were created by Statistics Canada using census data (Martens, Bartlett, et al., 2010; Statistics Canada, 2011). Postal Code Conversion Files (PCCF) were linked with these Statistics.

Canada census dissemination areas were used in order to assign neighbourhood level area income quintiles (Martens, Bartlett, et al., 2010). All area-income quintile (level) were divided geographically as either urban (Winnipeg or Brandon) or rural (all other areas of Manitoba) with each area-income quintile (level) falling into one of five categories each representing 20% of the total population (Fransoo et al., 2005). In addition, every person within this average household income grouping is *assumed* to have the same average household income (Fransoo et al., 2005). The five urban and five rural area level neighbourhood income quintile categories are ordered from 'highest' to 'lowest' neighbourhood incomes arranged as follows: U5 (urban 5), U4, U3, U2, and U1 (urban 1) or R5 (rural 5), R4, R3, R2, and R1 (rural 1). However, not everyone falls into these income quintiles. There is a proportion of the population that falls into an 'income not found' category which includes individuals who could not be assigned an income quintile because they lived in a dissemination area not included in Statistics Canada census data

(Manitoba Centre for Health Policy [MCHP], 2006a; Martens, Bartlett, et al., 2010). Dissemination areas do not include individuals who are residents of long-term care facilities, residents of some personal care homes, residents of psychiatric facilities, inmates of federal and long-term prisons, wards of Public Trustee and Child and Family Services, residents of various areas not reporting an income, and those with no permanent address (Martens et al., 2010a).

The light grey horizontal bar represents the indicator rate for Metis whereas the dark grey bar represents the rate for All Other Manitobans. The light grey vertical dotted line represents the Manitoba provincial average for Metis whereas the black vertical dotted line represents the provincial average for All Other Manitobans. Interpretation of income quintile graphs is similar to the age- and sex-adjusted graphs as it uses the same classification system of 'm', 'o', 'd', and 's'. Directly below the graph are the results of a linear trend test to determine the presence of an increasing or decreasing trend by income quintile (MCHP, 2006b). Linear trend tests were done to determine an association between indicator values (e.g., IHD prevalence) and area-level income data (e.g., R1 [rural 1]) – lowest income quintile (Fransoo et al., 2005). A p-value of <0.01 indicates a trend is present for the specified group (Metis or All Other Manitobans) and rural or urban income quintiles (Fransoo et al., 2005). In this study, income quintiles are compared to see if there is an increasing or decreasing linear trend. A linear trend on an income quintile graph can increase or decrease depending on the sign (-/+) in front of the test result number. An increasing trend can be identified with a positive sign which means that as neighbourhood income quintiles decrease then disease rates decrease. A decreasing trend can be identified with a negative sign which means that as neighbourhood income quintiles decrease then disease rates increase.

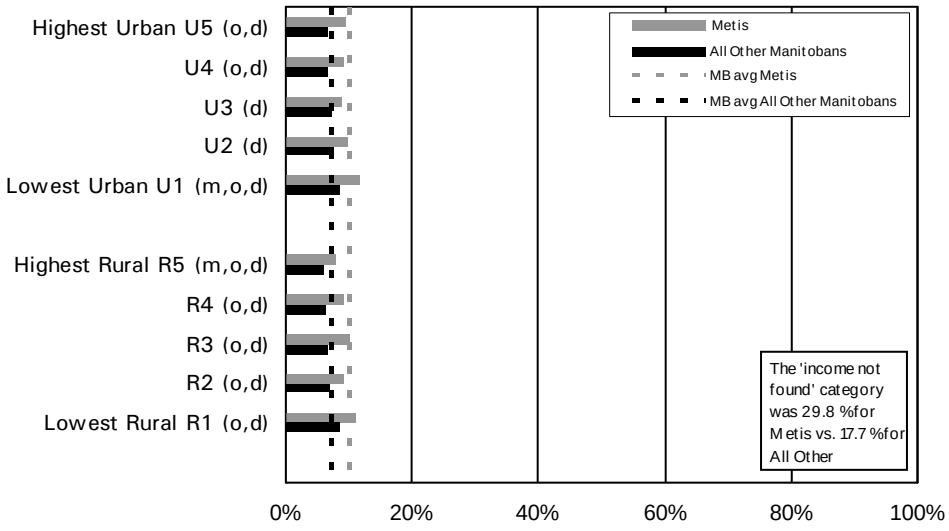
Figure 4.2.5 is an income quintile graph used in this report. The title shows the indicator measured (IHD prevalence by income quintile), the geographical areas shown (either urban or rural), the population measured (Metis and All Other Manitobans), and the time period of measurement (fiscal years 2002/03-2006/07). The subtitle (in smaller font) describes the population measured (residents aged 19+ with IHD) and indicates that the data are presented as a percentage of residents. The insert box in the top-right corner of the graph is the legend, which provides a breakdown of what the bar and dotted lines on the graph represent. The x-axis (horizontal line) shows the percentage of the population with IHD. The y-axis shows the different income quintiles within the two populations groups of urban (Winnipeg and Brandon) and rural (all other Manitoba areas).

In the graph above (Figure 4.2.3) you can see that among all five urban income quintiles, Metis have a higher IHD prevalence compared to All Other Manitobans in all groups as follows: U5 (9.4% vs. 6.5%), U4 (9.1% vs. 6.6%), U3 (9.0% vs. 7.2%), U2 (10.0% vs. 7.5%), and U1 (11.8% vs. 8.5%). Metis in urban (U1), the lowest income quintile, have a higher IHD prevalence compared to their provincial average (11.8% vs. 10.1%). Similarly, among urban income quintiles, All Other Manitobans have a higher IHD prevalence compared to their provincial average in the lowest urban income quintile (U1) (8.5% vs. 7.3%) whereas All Other Manitobans have a lower IHD prevalence compared to their provincial average in U4 (6.6% vs. 7.3%) and U5 (6.5% vs. 7.3%)—the two highest urban income quintiles.

Among the five rural income quintiles, you can see that Metis have a higher IHD prevalence compared to All Other Manitobans as follows: R5 (8.0% vs. 6.1%), R4 (9.1% vs. 6.4%), R3 (10.0% vs. 6.6%), R2 (9.1% vs. 6.8%), and R1 (11.0% vs. 8.6%). Metis in the highest rural (R5) income quintile have a lower IHD prevalence compared to their provincial average (8.0% vs. 10.1%). All Other Manitobans have a higher IHD prevalence compared to their provincial

average in the lowest rural income quintile (R1) (8.6% vs. 7.3%) whereas All Other Manitobans have a lower IHD prevalence compared to their provincial average in R5 (6.1% vs. 7.3%), R4 (6.4% vs. 7.3%), R3 (6.6% vs. 7.3%), and R2 (6.8% vs. 7.3%).

Figure 4.2.5: IHD Prevalence by Income Quintile in Manitoba, 2002/03-2006/07
Age- and sex-adjusted percentage of residents aged 19+ in a five-year period



Linear Trend Test Results

Urban Metis: Significant (p <.001) Urban All Other Manitobans: Significant (p <.001)
Rural Metis: Significant (p <.001) Rural All Other Manitobans: Significant (p <.001)

'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases)

Source: MMF, 2012

As shown in the text-box in the lower right hand corner, the 'income not found' category shows that Metis have a higher IHD prevalence compared to All Other Manitobans (29.8% vs. 17.7%) in Manitoba. Finally, there is an increasing linear trend for urban Metis, rural Metis, urban All Other Manitobans, and rural All Other Manitobans from highest neighbourhood level income quintile to lowest neighbourhood income quintile. Among the urban and rural area income quintiles, Metis in the lowest area income quintile have the highest IHD prevalence.

Unless otherwise indicated, any mention of 'lower' or 'higher' in this report refers to results that are statistically significant. Statistical significance is a term commonly used throughout this report. It means that there is 95% certainty that the difference between the two comparison groups is due to a real difference and not due to random variation in the populations (Wassertheil-Smoller, 1995).

1.6 Methods Used in This Report

Population-based health research is the cornerstone of public health. It provides information related to patterns of health and illness in a population, and is used to inform evidence-based decision making around disease treatment and service delivery (Gordis, 1996).

Our report is a population-based research study. As Martens, Bartlett, et al. (2010) note this means several things:

1) Data are based on every person living in Manitoba who had a provincial health card during the time measured, and includes all people living in Manitoba's First Nations communities.
2) Information is based on where you live and not where you go for treatment. This provides greater accuracy when comparing the health issues and health care utilization of people living in particular geographic regions.
3) Rates are not based upon smaller "samples," but rather the entire population fitting these criteria—hence they are "population-based".

It is important to note that for some indicators the data are based on a small number of individuals. For indicators where numbers resulted in suppression (five individuals or less), the aggregate data were produced by aggregate areas (e.g., Winnipeg, Brandon, Rural South, Mid, and North), or was measured over longer periods of time in order to acquire a greater number of individuals. In some cases, suppression could not be avoided due to the relative rareness of the condition or event.

1.7 Datasets used in this Research

The data sources used to conduct IHD surveillance and research are often limited to existing secondary data sources such as administrative data—that is, data that were collected for a purpose other than research (e.g., physician billing records). The Manitoba Centre for Health Policy (MCHP) stores sets of data collectively referred to as the Population Health Research Data Repository (the Repository). The data stored in the Repository is used for research-related health and social services within Manitoba. It houses a wealth of information useful to community organizations, community planners, governments, and researchers (Martens, Bartlett, et al., 2010). However, it is important to understand that each dataset has an 'owner', and approvals must be sought from each dataset owner in order to link one dataset to another.

To protect the confidentiality of citizens, all names, street addresses, and Personal Health Information Numbers (PHINs) are removed, and new encrypted identification numbers are assigned to each individual (Martens, Bartlett, et al., 2010). The anonymized data were retrieved from the following files in the Repository located at the MCHP:

- Hospital claims (records of hospital admissions)
- Medical claims (records of visits to physicians outside of those occurring to a hospital inpatient)
- Physician files to identify the type of service provided—a family physician/general practitioner or a specialist (such as a psychiatrist)
- The registry files (records of the time a person is registered as a resident of Manitoba, as well as their age, sex, and area of residence)
- Vital statistics (records of births, deaths, and causes of death)
- Pharmaceutical claims (pharmaceutical use from the Drug Program Information Network)
- The 1991, 1996, 2001, and 2006 census files (for socioeconomic information at the neighbourhood level)—used in logistic regression

Depending on the data source, prevalence and incidence rates were generated for particular fiscal years or calendar years (Martens, Bartlett, et al., 2010). Many of the variables used in this study are based on fiscal year (e.g., IHD prevalence were measured over 5 years from 2002/03-

2006/07, which represents the fiscal years April 1, 2002 to March 31, 2007) because most health care utilization information is reported by fiscal year; other indicators such as PMR are based on calendar years (e.g., 2002-2006) (Martens, Bartlett, et al., 2010). Specific periods of measurement for each indicator (e.g., five-year time period for PMR) were chosen by the MCHP to ensure adequate sample sizes, which allows for proper modelling of statistical data. For indicators in this report which were measured using more than one year of data, the graphs are generally presented using an average value for a single year—that is, an annualized rate. Exceptions are indicated in the graph subtitle when they do occur.

1.8 How was the Cohort Created?

The Metis Population Database (MPDB) was used to develop the cohort both for the Metis Atlas and for subsequent epidemiological studies. The MPDB is an anonymized dataset including health information for a total of more than 73,000 Metis of all ages in Manitoba (Martens, Bartlett, et al., 2010). The MPDB includes Manitoba Metis identified from three sources—the MMF membership list, the Canadian Community Health Survey (CCHS), and the National Population Health Survey (NPHS)—in addition to the children and both parents of these individuals (Martens, Brownell, et al., 2010). When developing the cohort for this study, however, the segment of the population identified through the CCHS and NPHS (including children and parents matched to these individuals) were not included. This segment added only about 2% to the population, half of whom would be under the age of twenty. Thus, it was determined that not including this relatively small group in the Metis cohort would have no significant effect on our analysis; they were included instead in the All Other Manitobans cohort.

1.9 Data Production and Analysis

In the following sub-section, rate generation, adjustment and statistical testing of rates, differences between prevalence and rate, as well as logistic regression modelling will be addressed. Statistical modelling and aggregate data production were performed by staff at the MCHP. A more detailed explanation of data production and analysis than what is provided below can be found in the Metis Atlas (Martens, Bartlett, et al., 2010).

1.9.1 Generation of Rates

Rates were generated through a statistical technique called a generalized linear model (GLM). GLM emerged as a way of unifying various statistical tests. In our study the MCHP used Poisson and negative binominal distribution models for count data and logistic regression to predict the influence of one variable (the dependent or explanatory variable) on a condition or event while controlling for other variables (the independent variables). MCHP determined what model to use based upon the statistical model which best fit the data.

For age- and sex-adjusted rates, both age and sex were included in the model to 'adjust' for differences in underlying regional age and sex distributions (Martens, Bartlett, et al., 2010). Adjusted rates were based on relative risks of rates rather than events for each region for both Metis and All Other Manitobans (Martens, Bartlett, et al., 2010).

To determine differences by region and by Metis and All Other Manitobans, covariates described geography (using Manitoba as the reference population) and ethnicity, as well as geography by ethnicity interactions (Martens, Bartlett, et al., 2010). A list of all covariates can be obtained from the MCHP website at:

http://umanitoba.ca/faculties/medicine/units/mchp/projects/project-metis_health_status.html

1.9.2 Crude and Adjusted Rates

In this study, each indicator is presented as either a crude or adjusted rate. While most indicators in this study are age- and sex-adjusted, they are also represented using crude data. *Crude (i.e., not adjusted)* rates are determined by simply dividing the total count of a condition or event by the total population. They are helpful in figuring out how many people are 'walking through the door' for treatment and for determining trends in disease distribution between different populations. In this report, population pyramids and comorbidities among specified illnesses are represented by crude rates, as the actual percentage of individuals is most important for these indicators.

Age- and sex-adjusted rates have been statistically adjusted in order to compare different populations. The adjusted rates for different populations represent what the populations' rates would be if the populations all had the same age and sex distribution (Gordis, 1996). This is particularly important when comparing Metis with IHD to All Other Manitobans with IHD, as we know from Section 3: Age and Sex Characteristics of the Population that Metis with IHD have a similar proportion of adults (19-39 years) and a higher proportion of adults (40-74 years) and a lower proportion of adults (75 years and older) compared to All Other Manitobans with IHD (See Figure 3.1.2). In addition, Metis males with IHD have a higher proportion of adults (19-69 years) and a lower proportion of adults (70 years and older) compared to All Other Manitoban males. Given that some CVDs affect older men more, adjusting the data for age and sex accounts for this difference, allowing for true comparability between Metis with IHD and All Other Manitobans with IHD.

Age- and sex-specific rates are also crude percentages. However, these data are further broken down into males and females, then into specific age groups, in order to see exactly which sub-groups in the population have the greatest burden of disease (Gordis, 1996). In this study, age- and sex-specific rates are presented for every indicator in order to provide information on how these conditions affect Metis men and Metis women of different ages in Manitoba; this is information that was specifically requested by our Knowledge Networks.

1.9.3 Prevalence and Incidence Rates

Prevalence is defined as the total number of cases with certain disease in specific area and period per the total number of population in the same area and period (Bhopal, 2002). In other words, it is the frequency of occurrence of an event (disease) per unit of time and number of population. Prevalence is concerned with the number of all cases of certain disease (whether they are newly diagnosed or old cases). For example, if the prevalence of IHD is 10.0% this tells us that one in ten people have been diagnosed with IHD over the period of measurement. Prevalence is an important indicator because it measures the burden of disease in a community. This can be helpful for health planning.

Incidence rate refers to the number of new cases or incidents in a population over a specific time period. For some indicators an individual can contribute more than once to the rate. For example, one person could have more than one hospitalization contributing to the overall rate of hospitalizations in a given period of time.

1.9.4 Logistic Regression Modelling

Logistic regression is a statistical tool that allows us to adjust for confounding factors while estimating the sole effect of a certain factor on the occurrence of the disease under study. Examples of these confounding factors are age, sex, geography, annual income, marital status, and comorbidities. For specific indicators (selected based on their previous use in the Metis Atlas and in our diabetes study), the use of logistic regression enables us to determine the unique contribution of a single factor while controlling for factors in addition to age and sex differences in the population. However, it is important to remember that logistic regression does not indicate causation—only factors associated with a specific outcome (Martens, Bartlett, et al., 2010). In this report the probability of IHD was explored using logistic regression. Selected covariates such as average household income and mental/physical comorbidity were included in the model (Martens, Bartlett, et al., 2010).

The 'adjusted Odds Ratio' (aOR) indicates a higher or lower likelihood of a specific outcome after taking into account other factors (Martens, Bartlett, et al., 2010). If this number is bolded in our logistic regression tables, then increased or decreased likelihood is statistically significant. Statistical significance is also indicated by a 'p-value' less than 0.05 and a '95% Confidence Interval' that does not include 1. A confidence interval provides the range in which the probability of the population mean lies (Wassertheil-Smoller, 1995). For example, in Table 4.3.1 the aOR is 1.351 and the lower and upper limits of the p=0.001 confidence interval are 1.296 and 1.409, respectively. Then you can conclude that there is a 99.9 % probability that the population mean is greater than 1.296 and lower than 1.409. A significantly higher likelihood is indicated by an aOR of greater than 1 together with a p-value less than 0.05 and 95% Confidence Limits both above 1 (Martens, Bartlett, et al., 2010). A significantly lower likelihood is indicated by an aOR of less than 1 together with a p-value of less than 0.05 and 95% Confidence Limits both below 1 (Martens, Bartlett, et al., 2010).

In the logistic regression table (Table 4.3.1) you can see that for the 'Metis' factor the aOR is 1.351. The p-value for this factor is less than 0.05 and the 95% Confidence Interval does not include 1, which means that the aOR is statistically significant. Therefore we can say that, in this study, Metis are likely to be more at risk for IHD compared to All Other Manitobans after adjusting for the other factors indicated in the table 4.3.1: Logistic Regression Modelling of the Risk of Ischemic Heart Disease (IHD). It is important to emphasize that in the logistic regression tables, the first factor—Metis (vs. All Other Manitobans)—compares Metis and All Other Manitobans. Each of the other factors applies to *all* Manitobans, Metis, and All Other Manitobans combined.

Information in the logistic regression model in this report may provide valuable insights into factors at both the individual and regional level that may influence the likelihood of a good outcome (in some indicators, this may mean decreasing the likelihood and in some cases increasing the likelihood). After controlling for variations in individual characteristics, those regions of the province that still have a greater likelihood of a good outcome could be examined for particularly effective programs or policies. Once again, it is important to remember that a regression model does not indicate causation. However, it may highlight factors to consider when planners are exploring specific programs or polices related to IHD in Metis in Manitoba.

Table 4.3.1: Logistic Regression: Probability of Ischemic Heart Disease (IHD)
Probability of IHD by Aggregate Region, 2002/03 – 2006/07 for Residents Aged 19+ Years and older

Covariates	Adjusted Odds Ratio (95%Confidence Interval)	p-value
Metis (vs. All Other Manitobans)	**1.351 (1.296-1.409)**	**<0.001**
Aggregate Regions (ref=Manitoba)		
South	**0.900 (0.879-0.921)**	**<0.001**
Mid	0.990 (0.976-1.015)	0.439
North	0.976 (0.927-1.008)	0.116
Brandon	1.029 (0.989-1.071)	0.157
Winnipeg	**1.128 (1.107-1.149)**	**<0.001**
Hypertension	**2.509 (2.456-2.563)**	**<0.001**
Diabetes	**1.691 (1.654-1.730)**	**<0.001**
Stroke	**1.336 (1.261-1.415)**	**<0.001**
Congestive Heart Failure	**5.125 (4.997-5.256)**	**<0.001**
Depression	**1.305 (1.276-1.335)**	**<0.001**
Age, linear	**1.265 (1.258-1.272)**	**<0.001**
Age, quadratic	**0.999 (0.999-0.999)**	**<0.001**
Sex (Males vs. Females)	**2.057 (2.016-2.098)**	**<0.001**
Average Household Income of Neighbourhood (per $10,000)	**0.984 (0.980-0.989)**	**<0.001**
Major Physical Illness ADGs	**1.366 (1.339-1.393)**	**<0.001**

Bold = statistically significant results
Note: Please see Glossary for definition of all variables. Source: MMF, 2012

1.10 Data Interpretation

The MMF–HWD research team members engaged in a systematic collaborative process for reviewing every graph for each indicator used in the study. The review process involved three steps: reviewing for scientific integrity (data processing), ensuring the context of the data was captured, and describing each graph in point form.

1.11 Limitations

There are some limitations to this study. First, the information in this report is based on analyses of administrative data—that is, claims data from the universal health care system in Manitoba. With the minor exception of possibly incomplete 'shadow billing' (see sub-section 5.1), administrative data are very effective indicators of health services utilization in this province; however, the data may be less effective indicators of the prevalence of chronic disease (Lix, et al., 2006). One alternative method that has been proposed is the combination of administrative data and annual person-level summary files for measurement of chronic disease (James et al., 2004).

This study measured the treatment prevalence of IHD which is not the actual number of people with the disease but only those who receive treatment (MCHP, 2006b). The under-diagnosis of IHD and other IHD-related healthcare utilization indicators should be considered in the interpretation of results as it could represent a major public health burden. Falagas, Vardakas, & Vergidis (2007) conducted a systematic review to determine the under-diagnosis of different chronic diseases in the developed world (including Canada). The prevalence of IHD in several developed countries (including Canada) ranged from 6%–25% whereas the prevalence of under-diagnosis of IHD ranged from 35%–50%; possible reasons for undiagnosed of IHD were attributable to AMI, silent myocardial ischemia[1], and diabetes (Falagas, Vardakas, & Vergidis, 2007).

In this study it was not possible to measure AMIs separate from IHD. This was because our IHD study definition included AMI as it is often the end result of the disease being studied (in this case IHD) (see section 4.2). Therefore, AMI is not measured independently.

In this study the drugs to treat IHD indicator (see Section 7: pharmaceutical use) are included in our study definition to measure IHD. However, we still measured this indicator independently because prescription of drugs to treat IHD may occur after a diagnosis of disease, and cost of IHD to Metis citizens is of particular interest to Knowledge Networks.

The time periods chosen for indicator measurement can have significant limitations. This is because there have been, and continue to be, changes to IHD treatment over time, such as the introduction of new diagnostic tests and/or treatments, that affect data linkage study outcomes. For example, an increase in PCI from 85.6 to 186.7 per 100,000 between the years 1994–2005 will impact the study data (Hassan et al., 2010).

Urban income quintiles (e.g., dissemination areas) may represent a more homogenous population while rural income quintiles may represent a more heterogeneous population (Martens, Bartlett, et al., 2010). This is an important limitation because neighbourhood income quintile groupings in rural areas may reflect a more diverse range of incomes (Martens, Bartlett, et al., 2010). However, if it were possible to examine person-level income rather than aggregate area level income then a more accurate comparison can be made (Martens, Bartlett, et al., 2010). In addition, another limitation of income quintile data is that by categorizing individuals in institutionalized facilities and/or in jails into the 'income not found' category we are not getting a true picture of health differences due to socioeconomic status (Martens, Bartlett, et al., 2010).

In this study, different reference populations are used to compare populations. The different reference populations used were either All Other Manitobans without IHD or All Other Manitobans with IHD. This was because some indicators measured were specific to a unique

[1] Silent Myocardial Ischemia occurs when an individual has a documented myocardial ischemia without angina (Cohn & Fox, 2003).

population of people living with IHD therefore comparisons could only be made between Metis with IHD and All Other Manitobans with IHD. For some indicators four comparison groups (Metis with IHD, Metis without IHD, All Other Manitobans with IHD, and All Other Manitobans without IHD) were used. The following indicators used All Other Manitobans without IHD as the reference population: PMR, IHD, hypertension, diabetes, stroke, CHF, depression, anxiety disorders, substance abuse, ambulatory visit rate, drugs to treat IHD, and Statin use. Indicators that used only two comparison groups (Metis with IHD and All Other Manitobans with IHD) with All Other Manitobans with IHD as the reference population were ambulatory visit rate to cardiologist, ambulatory visit rate to cardiac surgeon, cardiac catheterization, coronary artery bypass graft surgery, and percutaneous coronary intervention.

In addition, the rate of drug prescription (drugs used to treat IHD) was measured individually for each of the drugs that are commonly used to treat IHD. This indicator is based on the prescription rate of each drug, not the actual drug use rate. A limitation of this indicator is that we assumed that each patient who was prescribed a drug for treatment of IHD regularly uses the drug as prescribed by his/her physician.

Premature mortality rate (PMR) was calculated based on a life expectancy of 75 years for Canadians. However, life expectancy is a dynamic figure that changes over time on an annual basis and may differ according to the sex and ethnic subgroup of individuals within the same population. In most instances, the life expectancy for females is longer than in males by 3-5 years on average, so calculating PMR at age 75 for both sexes may be considered a limitation.

1.12 Summary

Until recently, the health and social concerns of Metis have been largely invisible. Metis concerns have often been absent from health program and policy planning—in no small part due to the lack of data on the health of Metis in Manitoba. This study provides a reliable source of information of the burden of disease for Metis with IHD in this province. Moreover, 'IHD in Metis in Manitoba' offers information additional to that included in the Metis Atlas for MMF Regions wanting to make specific IHD-related health concerns visible. Working together, health planners, policy makers, and Metis community members can begin to change the picture of Metis health in Manitoba.

References

Atzema, C.L., Kapral, M., Klein-Geltink, J., Asllani, E., Gravelle, M.R., Pigeau, L., …& Lyons, D. (2010). *Cardiovascular disease in the Metis Nation of Ontario.* Retrieved from http://www.metisnation.org/media/135527/mno%20cv%20disease%20lay%20report,%20final.pdf

Bhopal, R.S. (2002). *Concepts of Epidemiology*. New York, NY: Oxford University Press Inc.

Broemeling A., Watson D., & Black, C. (2005). Chronic conditions and co-morbidity among residents of British Columbia. Vancouver, B.C: UBC Centre for Health Service & Policy Research. Retrieved from http://www.chspr.ubc.ca/files/publications/2005/chspr05-08.pdf

Canadian Cardiovascular Society (1997). *1997: Canadian conference on the evaluation and management of chronic ischemic heart disease.* Retrieved from http://www.ccs.ca/download/consensus_conference/consensus_conference_archives/1997_CC_Evaluation_and_Management_CIHD.pdf

Falagas, M.E., Vardakas, K. Z., & Vergidis, P.I. (2007). Under-diagnosis of common chronic diseases: Prevalence and impact on human health. *International Journal of Clinical Practice, 61*(9), 1569-1579.

Fransoo, R., Martens, P., The Need to Know Team (funded through CIHR), Burland, E., Prior, H., Burchill, C., … & Wallad, R. (2005). *Sex differences in health status, health care use and quality of care: A population-based analysis for Manitoba's Regional Health Authorities.* Winnipeg, MB: Manitoba Centre for Health Policy. Retrieved from http://mchp-appserv.cpe.umanitoba.ca/reference/sexdiff.pdf

Fransoo, R., Martens, P., Burland, R., the Need to Know Team, Prior, H., & Burchill, C. (2009). *RHA Indicator Atlas.* Winnipeg, MB: Manitoba Centre for Health Policy.

Gordis, L. (1996). *Epidemiology*. Toronto, ON: W.B. Saunders Company.

Hassan, A. Newman, A., Ko, D.T., Rinfret, S., Hirsch, G., Ghali, W.A., & Tu, J.V. (2010). Increasing rates of angioplasty versus bypass surgery in Canada, 1994-2005. *American Heart Journal, 160*(5), 958-965.

James, C.R., Blanchard, F.J., Campbell, D., Clottey, C., Osei, W., Svenson, W.L., & Noseworthy, W.T. (2004). A model for non-communicable disease surveillance in Canada: The Prairie Pilot Diabetes Surveillance System. *Chronic Diseases in Canada, 25*(1), 7-12.

Libby, P. (2012). Chapter 43: The vascular biology of atherosclerosis. In R.O. Bonow., D.L. Mann, D.P. Zipes, & P. Libby (Eds.), *Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine* (pp. 897-913). Philadelphia, PA: Elsevier Saunders.

Lix, L., Yogendran, M., Burchill, C., Metge, C., McKeen, N., Moore, D., & Bond, R. (2006). *Defining and validating chronic diseases: An administrative data approach.* Winnipeg, MB: Manitoba Centre for Health Policy.

Manitoba Centre for Health Policy. (2006a). *Term definition: Income not found.* Retrieved from http://mchp-appserv.cpe.umanitoba.ca/viewDefinition.php?printer=Y&definitionID=102883

Manitoba Centre for Health Policy. (2006b). *Glossary definition: Linear trend test*. Retrieved from http://mchp-appserv.cpe.umanitoba.ca/viewDefinition.php?printer=Y&definitionID=102973

Manitoba Centre for Health Policy. (2006c). *Glossary definition: Treatment prevalence*. Retrieved from http://mchp-appserv.cpe.umanitoba.ca/viewDefinition.php?definitionID=103681

Martens, P.J., Bartlett, J., Burland, E., Prior, H., Burchill, C., Huq, S., Romphf, L., Sanguins, J., Carter, S., & Bailly, A. (2010). *Profile of Metis health status and healthcare utilization in Manitoba: A population-based study*. Winnipeg, MB: Manitoba Centre for Health Policy.

Martens, P.J., Brownell, M., Au, W., MacWilliam, L., Prior, H., Schultz, J., ...& Seronka, K. (2010). *Health Inequities in Manitoba: Is the socioeconomic gap widening or narrowing over time?* Winnipeg, MB: Manitoba Centre for Health Policy.

Marrow, A.D., & Boden, E.E. (2012). Chapter 57: Stable Ischemic Heart Disease. In R.O. Bonow., D.L. Mann, D.P. Zipes, & P. Libby (Eds.), *Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine* (pp.1210-1258). Philadelphia, PA: Elsevier Saunders.

Public Health Agency of Canada. (2009). *Tracking Heart Disease and Stroke in Canada*. Retrieved from http://www.phac-aspc.gc.ca/publicat/2009/cvd-avc/pdf/cvd-avs-2009-eng.pdf

Statistics Canada. (2011). *Geographic units: Dissemination area (DA)*. Retrieved from http://www12.statcan.ca/english/census01/Products/Reference/dict/geo021.htm

Tjepkema, M., Wilkins, R., Senecal, S., Guimond, E., & Penney, C. (2009). Mortality of Metis and Registered Indian adults in Canada: An 11 year follow-up study. *Health Reports*, *20*(4), 31-51.

Wassertheil-Smoller, S. (1995). *Biostatistics and epidemiology: A primer for health professionals* (2nd ed.). New York, NY: Springer-Verlag.

Section 2: Overview of the MMF–Health & Wellness Department

Authors: Dr. J. G. Bartlett and Ms. S. Carter

2.1 Introduction

The Manitoba Metis Federation–Health & Wellness Department (MMF–HWD) undertakes Metis-specific health research along with a province-wide process to enhance the use of this research. This section provides an overview of the Metis, the Manitoba Metis Federation (MMF), highlights of the MMF–HWD's use of a Metis-specific lens, and Knowledge Networks. A more complete discussion of the details touched upon in this section can be found in Chapter 2 of the Metis Atlas (Martens, Bartlett, et. al., 2010).

2.2 The Metis

The Metis are descendants of early 17th-century relationships between North American Indians and Europeans (Sprague & Frye, 1983). The Metis coalesced into a distinct nation in Manitoba in the late 18th century. After the 1885 fall of Batoche, "Metis were denied a separate identity and ignored for a century" (McMillan, 1995, pp. 312-313). By 1967, with the formation of the Manitoba Metis Federation, the Metis in Manitoba were again asserting their capacity to advocate and function once more in a collective manner. In the 1982 amendment to the Canadian Constitution Metis were named as one of the three Aboriginal peoples of Canada (Government of Canada, 1982).

2.3 The Manitoba Metis Federation

The Manitoba Metis Federation website (2010) documents that to be an Individual Member or Child Member [6] of the Manitoba Metis Federation you must:

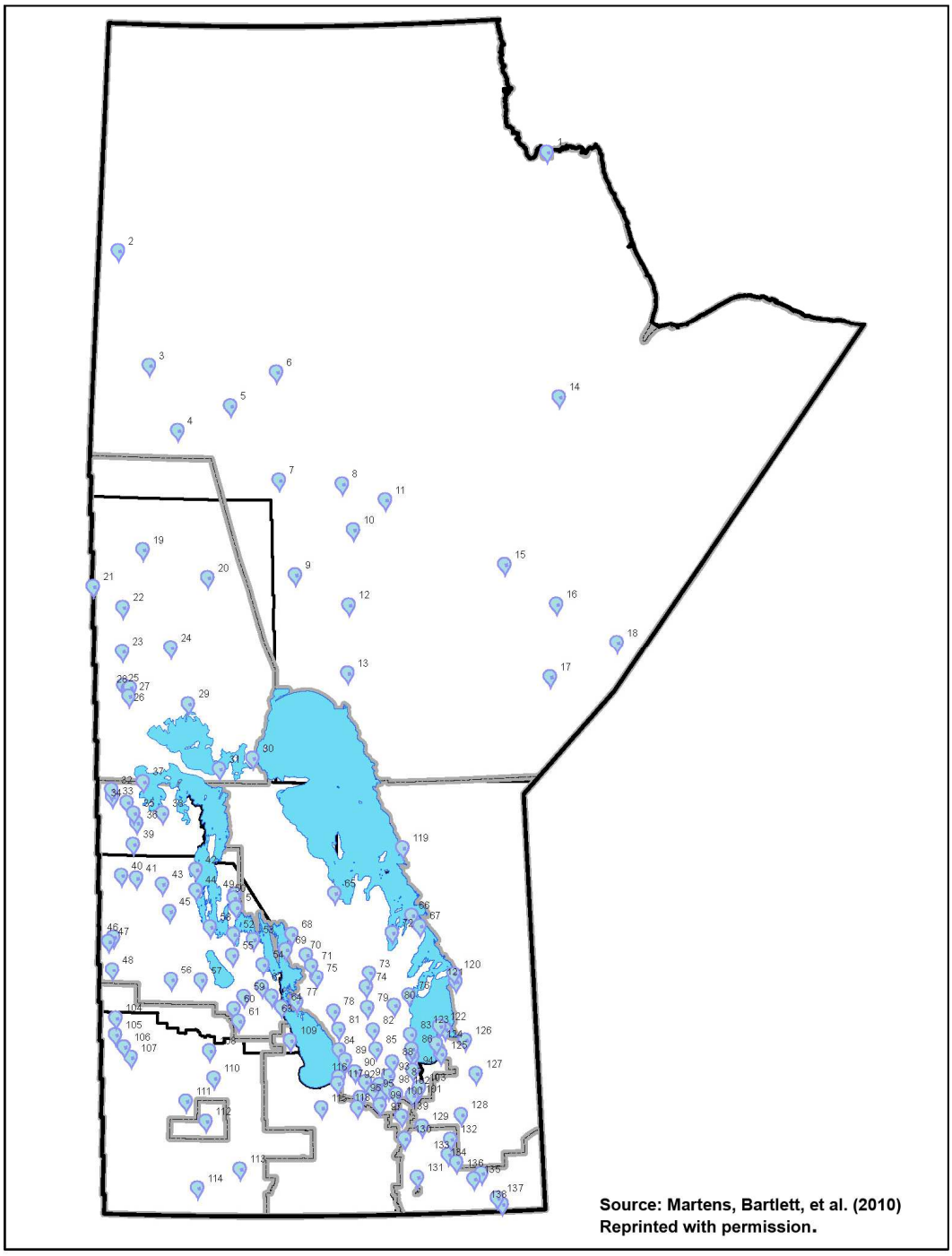
1) Self-identify as Metis
2) Show an ancestral connection to the Historic Metis Community
3) Be accepted by the contemporary Metis Community

For 43 years, the MMF has acted collectively to promote, protect, and advance the political, social, and economic interests of Metis citizens in Manitoba. The MMF negotiates with governments to access funding for programs and services that are better able to meet Metis citizens' cultural norms. Metis citizens live in 139 villages, towns, cities and unorganized territories across Manitoba (See Figure 2.3.1).

Twenty-one Representatives and a President are elected as the MMF Governing Body every four years. The MMF has seven Regions and a Home Office, along with a number of associated subsidiaries and affiliations. The MMF Governing Body leads, manages, and guides the strategic direction, objectives, and policies of the Federation and its subsidiaries. The President is the Chief Executive Officer, leader, and MMF spokesperson. The MMF has an Executive Director responsible for overseeing the day-to-day operations of the Federation. Each Region is administered by an elected Vice President and two elected Directors.

[6] 'Child Member' is a new addition by majority vote on a Resolution at the 2009 MMF Annual Assembly.

Figure 2.3.1: Villages, Towns, Cities, and Unorganized Territories Where Metis Live in Manitoba, 2009



Note: In Figure 2.3.1 (above) the black lines represent the MMF Regions and the grey lines represent the RHAs.

Code Key for Villages, Towns, Cities, and Unorganized Territories: In Regional Order

Thompson Region	
Churchill	1
Brochet	2
Lynn Lake	3
Granville Lake	4
Leaf Rapids	5
South Indian Lake	6
Nelson House	7
Thompson	8
Wabowden	9
Thicket Portage	10
Pikwitonei	11
Cross Lake	12
Norway House	13
Gillam	14
Oxford House	15
Gods Lake Narrows	16
Garden Hill	17
Red Sucker Lake	18
The Pas Region	
Sherridon	19
Snow Lake	20
Flin Flon	21
Cranberry Portage	22
Wanless	23
Cormorant	24
Umpherville	25
Big Eddy Settlement	26
Young Point	27
The Pas	28
Moose Lake	29
Grand Rapids	30
Easterville	31
Red Deer Lake	32
Barrows	33
Baden	34
Mafeking	35
Bellsite	36
Dawson Bay	37
Pelican Rapids	38
Northwest Region	
Birch River	39
Swan River	40
Minitonas	41
Duck Bay	42
Cowan	43
Camperville	44
Pine River	45
Boggy Creek	46
San Clara	47
Roblin	48
Mallard	49
Rock Ridge	50
Waterhen	51
Spence Lake	52
Crane River	53
Cayer	54
Rorketon	55
Gilbert Plains	56
Dauphin	57
Winnipegosis	58
Ste. Rose	59
Laurier	60
McCreary	61
Eddystone	62
Bacon Ridge	63
Kinosota	64
Interlake Region	
Dauphin River	65
Matheson Island	66
Pine Dock	67
Fairford	68
Steep Rock	69
Grahamdale	70
Moosehorn	71
Fisher Bay	72
Hodgson	73
Fisher Branch	74
Ashern	75
Riverton	76
Vogar	77
Eriksdale	78
Poplarfield	79
Arborg	80
Lundar	81
Narcisse	82
Gimli	83
Oak Point	84
Inwood	85
Winnipeg Beach	86
Matlock	87
Teulon	88
St. Laurent	89
Lake Francis	90
Woodlands	91
Argyle	92
Balmoral	93
Petersfield	94
Warren	95
Marquette	96
Grosse Isle	97
Stonewall	98
Rosser	99
Stony Mountain	100
Lockport	101
St. Andrews	102
Selkirk	103
Southwest Region	
Russell	104
Binscarth	105
St. Lazare	106
Birtle	107
Erickson	108
Amaranth	109
Minnedosa	110
Rivers	111
Brandon	112
Belmont	113
Boissevain	114
Portage la Prairie	115
St. Ambroise	116
St. Marks	117
St. Eustache	118
Southeast Region	
Berens River	119
Seymourville	120
Manigotagan	121
Victoria Beach	122
Traverse Bay	123
Grand Marais	124
Beaconia	125
Powerview	126
Lac du Bonnet	127
Ste. Rita	128
Lorette	129
St. Adolphe	130
St. Malo	131
Richer	132
La Broquerie	133
Marchand	134
Woodridge	135
St. Labre	136
Vassar	137
South Junction	138
Winnipeg Region	
Winnipeg	139

2.4 Manitoba Metis Federation–Health & Wellness Department

The MMF–Health & Wellness Department (MMF–HWD) was created in July 2005 as a Metis-specific 'health knowledge authority.' Over time it has solidified a vision of 'a well Metis community' with its mission of 'creating and facilitating the use of knowledge' to contribute to improving Metis health status. The MMF–HWD is focused on four main strategies intended to move department activity toward its vision. These include:

- Using a Metis culture-based holistic wellness framework
- Building Metis health planning capacity
- Implementing a Metis health research agenda
- Developing as a Metis 'Health Knowledge Authority' to advise the health system

For the MMF–HWD, the Metis Atlas was the base research setting the stage for a range of new research and related activities intended to positively impact the health and well-being of Metis citizens in Manitoba. The anonymized (no names) Metis Population Database (MPDB), created during production of the Metis Atlas is housed in the Manitoba Centre for Health Policy (MCHP) under a data sharing agreement that ensures MMF Ownership, Control, Access, and Stewardship (OCAS). This maximizes privacy protection for Metis citizens. As well, the MMF has developed a stringent process for use of the MPDB in new projects, whether by its own MMF–HWD researchers or other university-situated researchers. The MPDB enabled aggregated data for this 'IHD in Metis in Manitoba' study to be generated.

2.5 Description of a Culturally Coherent Metis 'Methodology' or Lens for Wellness

2.5.1 Ways of Knowing

The MMF–HWD approaches all departmental activities from a Metis-specific Methodology (that is, a Metis perspective or lens). This Metis lens is rooted in the integration of our historic Indigenous and European ancestries to become a uniquely Metis 'way of knowing'. Adapted from work by Burton-Jones (1999), the MMF–HWD considers the inclusion of both 'ways of knowing' as appropriate for Metis. This Metis 'way of knowing' is holistic, including: Narrative (our story, spiritual); Experience (our experience, emotional); Data (our research, physical); and Information (our synthesis of the first three, intellectual). This simple approach is used to demystify research (See Figure 2.5.1), and to envelop our strategies (See Figure 2.5.2).

Figure 2.5.1: Holistic Research Process

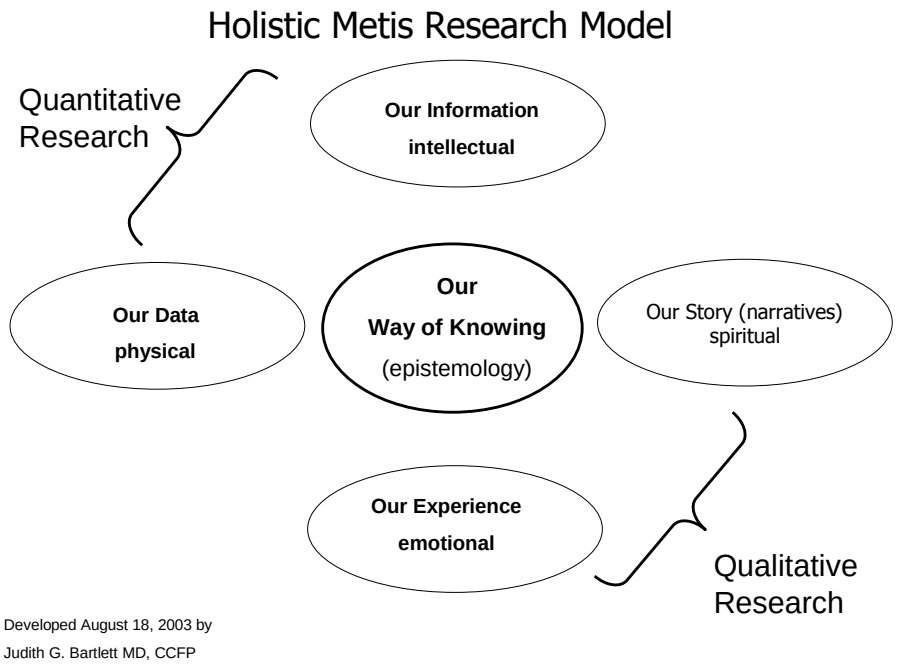
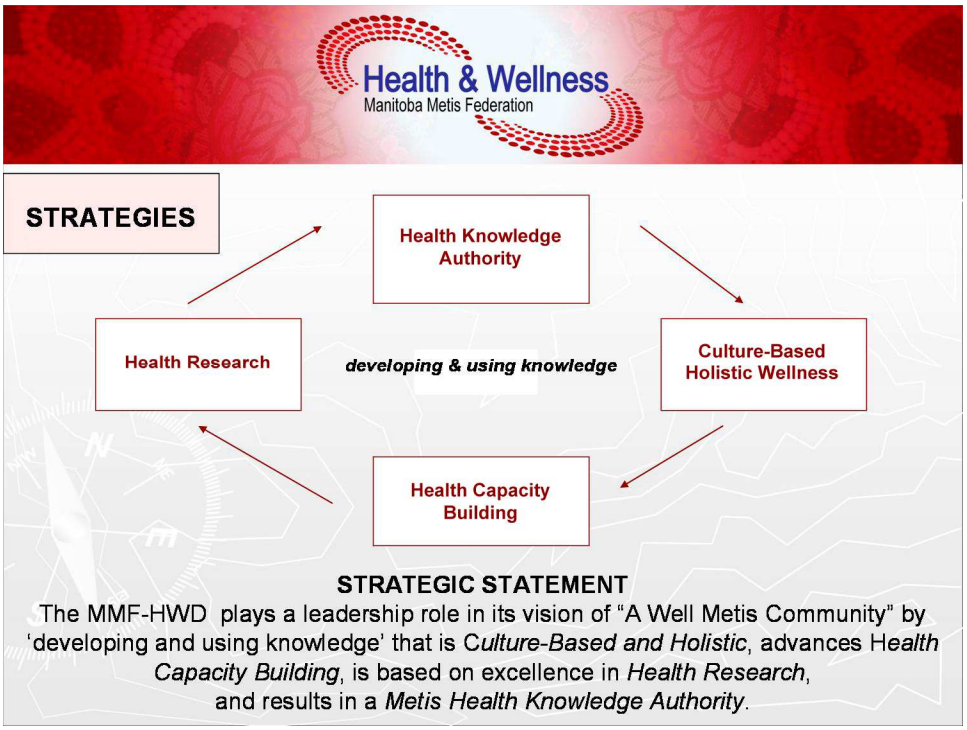


Figure 2.5.2: MMF–HWD Strategies



The MMF–HWD adapted a holistic framework originally developed for use in a community-requested holistic urban Aboriginal community health centre (Bartlett, 1995). For use with Metis, the framework was renamed the Metis Life Promotion Framework© (MLPF©). It is critical to keep in mind that the MLPF© is a tool for holistically organizing thoughts and information—it does not 'represent' Metis culture. The MLPF© includes finding 'balance' among 16 important areas that help to 'determine how our life unfolds' (*spiritual*, *emotional*, *physical*, and *intellectual; child*, *youth*, *adult*, and *elder (senior); individual, family*, *community*, *and nation; cultural, social, economical, and political)* (i.e., 16 Determinants of Life [Figure 2.5.3].

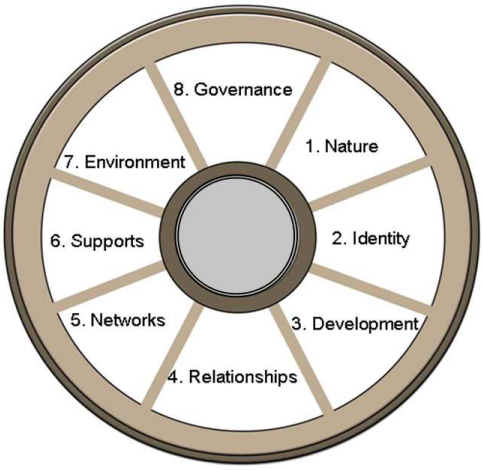
Figure 2.5.3: Metis Life Promotion Framework© Determinants of Life©

Health can be considered a balance of:

Developed by Judith G. Bartlett MD, MSc, CCFP

In 1996, the framework was adapted to consider 'Wellness' (Bartlett, 2004). The 16 'Determinants of Life' were grouped as eight Wellness Areas©, which made it easier to think about the determinants for health planning and interpretation of research findings. MLPF© Wellness Areas© naturally flow around the spokes of a Red River cart, representing constant motion and change (See Figure 2.5.4).

Figure 2.5.4: Wellness Areas©

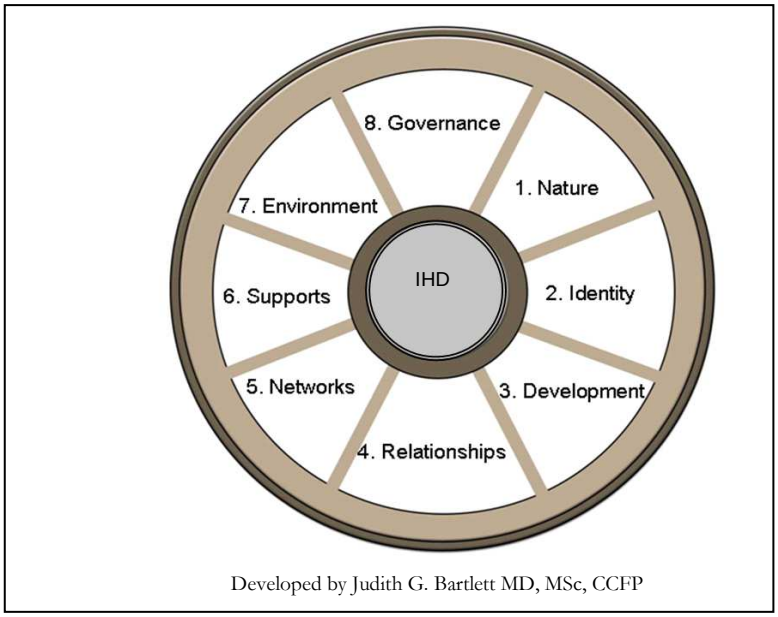


Developed by Judith G. Bartlett MD, MSc, CCFP

Although not explicitly an accepted Metis lens, this tool allows every person engaged in Metis-related health planning to undertake a process where they learn 'how to create' Wellness Areas

based on their own life experience. The Wellness areas can be used for individuals, families, or groups as well as distinct diseases. Figure 2.5.5 illustrates the use of the Wellness Model for those with IHD. Following this model, Table 2.5.1 demonstrates the types of questions individuals would be asked about their own experiences.

Figure 2.5.5: Wellness Model for Examining IHD



- Approaching diseases from a wellness prospective
- Needs to occur at both policy & program levels

Table 2.5.1: Wellness Areas© Question Type

WELLNESS AREA©	**QUESTION:** How does IHD affect my:
Nature	Sense of who I really am as a person?
Identity	Experience of how others see me or how I want others to see me?
Development	Sense of age/ability to express the child, youth, adult, and elder parts of me?
Relationships	Ability to respect and care for others?
Networks	Ability to interact with others?
Supports	Body, ability to work and be involved in community?
Environment	Cultural, social, economic, and political influence?
Governance	Ability to choose my destiny and future?

2.6 Knowledge Translation

Knowledge Translation (KT) essentially means using *'what we know'* from research to influence '*what gets done'* in health/social programs/services in order to improve health (Masching, 2006). Using KT for the 'IHD in Metis in Manitoba' project maximizes benefit for Manitoba Metis citizens. The MMF–HWD's existing Knowledge Network (KN) 'discussion tables' (Table 2.6.1) will examine the Metis health information in this report. For a more detailed description of this process see Chapter 2 in the Metis Atlas (Martens, Bartlett, et al., 2010).

Table 2.6.1: Knowledge Networks–MMF Regions with RHAs

Region Knowledge Networks	
MMF Region	**RHA**
Thompson	Burntwood
	Churchill
Southeast	North Eastman
	South Eastman
Southwest	Brandon
	Assiniboine
	Central
The Pas	Nor-Man
Northwest	Parkland
Interlake	Interlake
Winnipeg	Winnipeg

Each Knowledge Network carefully examines the study results and documents *what it now knows*, which can result in practical *changes to what is done* in the health system and MMF program planning.

References

Bartlett, J.G. (2004, November). Leadership environment. Paper presented at the 2004 *CMA Leaders Forum: Leaders Developing Leaders*, Ottawa, ON.

Bartlett, J.G. (1995). Medicine Wheel Framework for Health. *Theory, reality, hope: Proceedings of the Third International Conference on Diabetes and Indigenous Peoples*. Winnipeg, MB.

Burton-Jones, A. (1999). *Knowledge capitalism: Business, work, and learning in the new economy*. Oxford, UK: Oxford University Press.

Government of Canada. (1982). *Constitution Act: Section 35*. Retrieved June 17, 2011 from http://laws.justice.gc.ca/eng/Const/page-12.html#anchorsc:7-bo-ga:l_II

Manitoba Metis Federation. (2010). *Membership application and confirmation package*. Retrieved Sept 30, 2010 from http://mmf.mb.ca/images/pdf/membership/mmf_membership_package.pdf

Martens, P.J., Bartlett, J., Burland, E., Prior, H., Burchill, C., Huq, S., Romphf, L., Sanguins, J., Carter, S., & Bailly, A. (2010). *Profile of Metis health status and healthcare utilization in Manitoba: A population-based study*. Winnipeg, MB: Manitoba Centre for Health Policy.

Masching, R. (2006). *The essentials of knowledge translation: Fact sheet*. Ottawa, ON: Canadian Aboriginal AIDS Network. Retrieved from http://caan.ca/new/wp-content/uploads/2010/06/KT.pdf

McMillan, A.D. (1995). *Native peoples and cultures of Canada*. Toronto, ON: Douglas & McIntyre.

Sprague, D.N., & Frye, R.P. (1983). *The genealogy of the first Métis nation: The development and dispersal of the Red River Settlement, 1820-1900*. Winnipeg, MB: Pemmican Publications.

Section 3: Demographics of the Study Population

Population health is an approach to thinking about health differences across populations and asking why some populations are healthier than others (Young, 2004). By doing so, population health researchers seek to improve the health of the entire population and reduce inequalities between groups within the population (Young, 2004). This section focuses on the 'demographics' (age and sex-characteristics) of the Metis population with ischemic heart disease (IHD) in Manitoba.

Population pyramids are used to draw an age- and sex-specific picture of people with IHD in this province. Premature mortality rates (PMR), which measure the number of people dying before the expected age of 75, are also presented. Mortality statistics such as PMR are frequently used as overall indicators of population health (Gordis, 1996).

It is important to understand the age and sex characteristics of the Metis population so that health programs and services for Metis in Manitoba can be adapted to best meet their unique needs. This is especially true when there may be inequalities in health status, access to health care services, and public health programs between Metis and All Other Manitobans.

All definitions used in this section have been developed by the Manitoba Centre for Health Policy (MCHP) for the Metis Atlas (Martens, Bartlett, et al., 2010) unless otherwise cited.

Indicators in this section include:

- Age profile of Manitoba
- Age profile of Manitobans with IHD
- Premature mortality rate

3.1 Age Profile of Manitoba

One of the most effective ways to describe the age and sex distribution of a population is to use population pyramids, which provide important information on the health status of a population in a specific geographical location (Young, 2004). A population pyramid is a graphical depiction of a population showing males on the left side, females on the right side, the youngest age group at the bottom, and the oldest age group on the top.

As explained by Merrill & Timmreck (2006), populations across the world are differently affected by birth rates, mortality rates (numbers of people dying), migration rates, and other factors, all of which contribute to the shape of a population pyramid. On one hand, many developing countries will have a population pyramid which is triangular in shape, indicating a higher birth rate (i.e., faster growing population) and a lower proportion of older people (i.e., population is not living to an older age). On the other hand, developed countries such as Canada will tend to have a population pyramid that looks more rectangular, which indicates a population that has a lower birth rate and higher proportion of older people. However, population pyramids may not reflect the age and sex distribution of different sub-groups within a population. For example, the population pyramids illustrating the entire population of Manitoba do not directly reflect the unique 'shape' of the Metis population with IHD in this province.

In this study, we were able to 'pull out' information on this subset of the Metis population using the Metis Population Database, highlighting crucial differences between the Metis and All Other Manitoban populations with IHD. It is important to remember that, unlike the Metis Atlas, the segment of the Metis population identified through the Canadian Community Health Survey

and National Population Health Survey (including children and parents matched to these individuals) was not included. In our study, population pyramids included individuals aged 19 years and older in order to be consistent with the methods used to measure IHD prevalence by the Manitoba Centre for Health Policy.

The first population pyramid (Figure 3.1.1) shows the age and sex distribution of the overall Metis and All Other Manitoban populations.

The second population pyramid (Figure 3.1.2) shows the age and sex distribution of Metis with IHD and All Other Manitobans with IHD—that is, *only* Metis with IHD and All Other Manitobans with IHD are included.

For both pyramids, the percentages of the population aged 19years and older within each age category are grouped as follows: 19-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, and 85 years of age and older. All of the Metis 'bars' add up to 100%, as do all of the All Other Manitobans 'bars'; this means that all Metis or All Other Manitobans are represented by these two groupings, respectively (Martens, Bartlett, et al., 2010).

The percentages in these pyramids are based on data from the Population Registry located at the Manitoba Centre for Health Policy. Population totals are given immediately below the pyramid title.

Key observations:
Metis overall and All Other Manitobans overall

Both sexes:

- The Metis population has a greater proportion of young people aged 19-34 (33.9% vs. 27.9%), a lower proportion of mid-aged people aged 40-49 (18.5% vs. 20.7%), and a lower proportion of older adults aged 70+ (8.6% vs. 13.7%) compared to All Other Manitobans

Key observations:
Metis with IHD and All Other Manitobans with IHD

Both sexes:

- Both Metis and All Other Manitobans have a very low proportion of young people aged 19-39 (1.4% vs. 1.0%), while Metis have a higher proportion of mid-aged and older adults aged 40-74 (75.0% vs. 55.7%) and a lower proportion of individuals aged 75+ (23.6% vs. 43.2%) compared to the All Other Manitoban population
- Both Metis (56.9% vs. 43.1%) and All Other Manitobans (57.8% vs. 42.2%) have a greater proportion of males than females—this trend is consistent across all age groups until age 80+
- The largest difference between males and females for both groups is in the 55-64 age range (18.0% vs. 10.5% for Metis; 13.6% vs. 6.3% for All Other Manitobans)

Males:

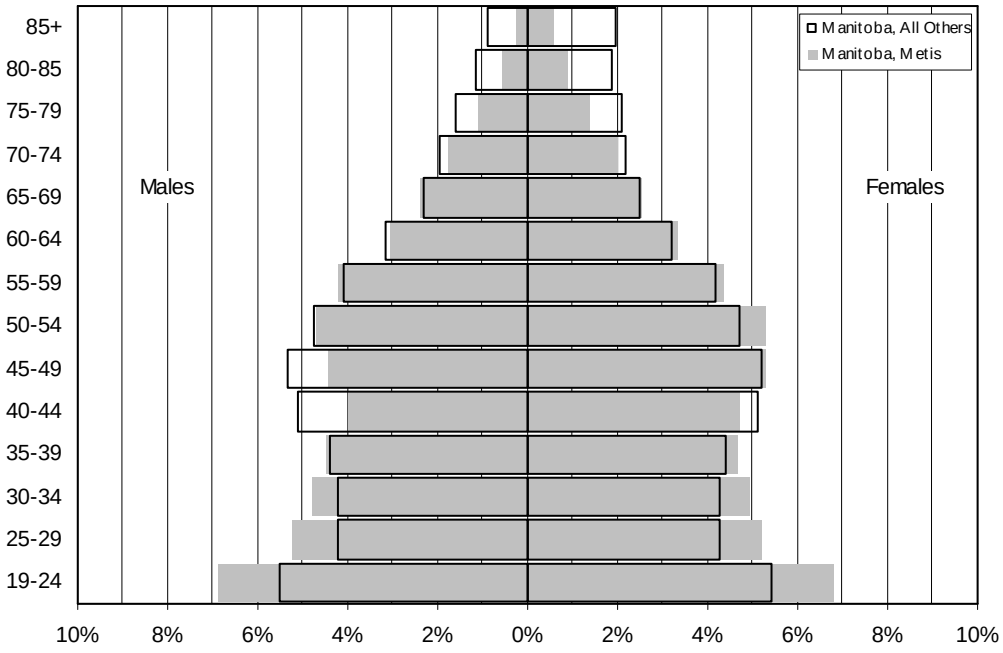
- Metis males have a larger proportion aged 40-74 (78.2% vs. 63.6%), and a smaller proportion aged 75+ (19.7% vs. 35.1%) compared to All Other Manitoban males

Females:

- Metis females have a larger proportion aged 40-74 (70.7% vs. 44.9%), and a smaller proportion aged 75+ (28.7% vs. 54.4%) compared to All Other Manitoban females

Figure 3.1.1: Age Profile of Metis and All Other Manitobans, 2006

Metis Population Aged 19+: 48,903
All Other Manitobans Population Aged 19+: 829,164

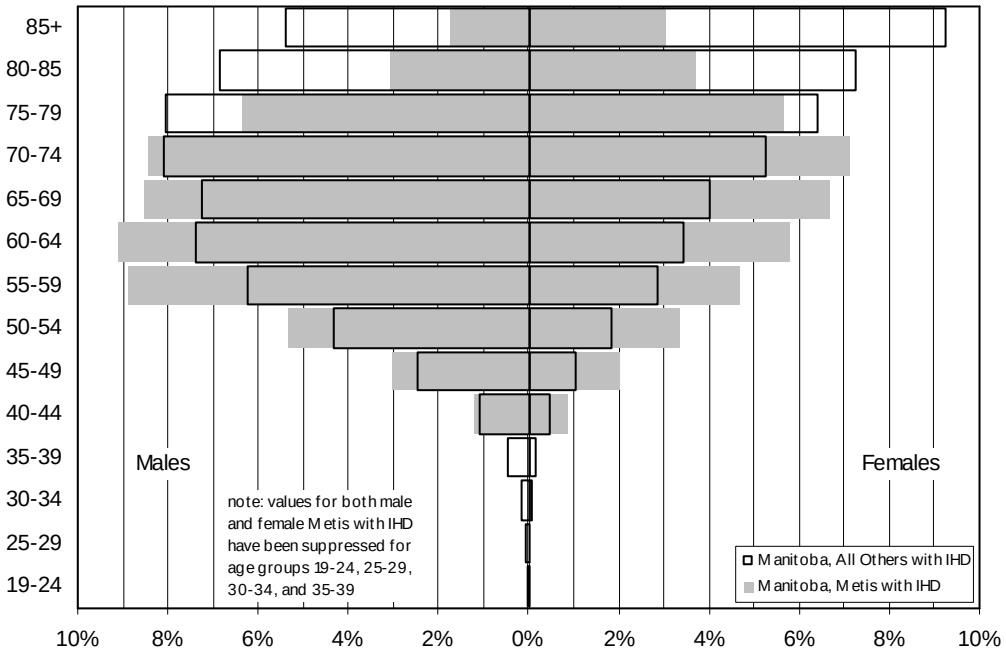


Source: MMF, 2012

Figure 3.1.2: Age Profile of Metis with IHD and All Other Manitobans with IHD, 2006

Male Metis Population Aged 19+ with IHD: 1,708
Female Metis Population Aged 19+ with IHD: 1,292

Male All Other Manitobans Population Aged 19+ with IHD: 26,798
Female All Other Manitobans Population Aged 19+ with IHD: 19,549



Source: MMF, 2012

Findings from Literature Review

(Compared to the results in this study—*in italics*)

Metis make up 33.2% of Aboriginal people in Canada, numbering 389,785 in 2006 (Janz, Seto, & Turner, 2009). Metis are also the fastest growing Aboriginal group in Canada, with an increase in the period 1996–2006 from 204,115 to 389,785, representing an increase of 91.0% (Statistics Canada, 2008). Increased rates of self-identification for Metis across Canada are partially responsible for these higher numbers (Statistics Canada, 2008). Between 1996 and 2006, the number of self-identified Metis in Manitoba increased from 40,720 to 71,805, representing an increase of 76.3% (Martens, Bartlett, et al., 2010).

In the Metis Atlas, it was reported that 25.4% of Metis in Manitoba were less than 15 years of age compared to 19.1% of All Other Manitobans. Only 9.1% of the Metis population was 65 years of age or older compared to 13.9% of All Other Manitobans (Martens, Bartlett, et al., 2010). The information in that study was not specific to Metis living with ischemic heart disease.

There are no comparative studies of the population distribution for Metis with IHD reported in the literature. In our study, Metis with IHD have a similar proportion of younger adults aged 19-39 compared to All Other Manitobans with IHD (1.4% vs. 1.0%), a higher proportion of mid-aged adults aged 40-74 (75.0% vs. 55.7%), and a lower proportion of older adults aged 75+ (23.6% vs. 43.2%).

In examining Metis adults with IHD, we observed a similar proportion of younger adults (19-39), a higher proportion of mid-aged and older adults (40-74), and a lower proportion of individuals aged 75+ compared to All Other Manitobans with IHD.

3.2 Premature Mortality Rate

Premature mortality rate (PMR) is an internationally used measure, which reflects the health status of a population. It is defined as the rate of deaths occurring before age 75, and is usually described as the age-adjusted number of deaths per 1,000 persons under the age of 75. Premature mortality rate is often used as an overall indicator of population health, with higher premature mortality rates indicating poorer health (Eyles & Birch, 1993). However, PMR does not reveal specific reasons why deaths at an earlier age might be high or low in a particular geographical location.

PMR is a standard measure for the overall 'healthiness' of a group of people, since it is easy to measure using vital statistics files. In our study, PMR is described in two ways: first as an age- and sex- adjusted rate and second as an age-adjusted but sex-specific annual rate of death per 1,000 residents with IHD aged 19 to 74 for calendar years 2002-2006.

The denominator includes all Manitoba residents with IHD aged 19 to 74 years as of December 31 of each year (2002 to 2006).

As noted in Section 1, unless otherwise indicated any mention of 'lower' or 'higher' refers to results that are statistically significant.

In this sub-section you will find an income quintile graph. Income quintile graphs show the burden of disease based on socioeconomic differences within the population (please see Section 1.5.2: Making Sense of the Graphs for further information).

Key observations:

Metis with IHD and All Other Manitobans with IHD

Manitoba (Figure 3.2.1):

- There is no difference in PMR between Metis and All Other Manitobans in Manitoba (7.9 vs. 9.4 per 1,000)

Aggregate areas (Figure 3.2.1):

- Metis have a lower PMR compared to All Other Manitobans in Mid aggregate area (5.7 vs. 7.9 per 1,000)
- All Other Manitobans have a higher PMR compared to their provincial average in North aggregate area (13.1 vs. 9.4 per 1,000) whereas All Other Manitobans have a lower PMR compared to their provincial average in Rural South aggregate area (7.5 vs. 9.4)
- There is no PMR gradient for Metis but there is a slight PMR gradient for All Other Manitobans, with PMR increasing from most healthy to least healthy aggregate areas

RHAs (Figure 3.2.1):

- Metis have a higher PMR compared to All Other Manitobans in South Eastman RHA (8.1 vs. 4.9 per 1,000) whereas Metis have a lower PMR compared to All Other Manitobans in Parkland RHA (3.4 vs. 7.2)
- Metis have a lower PMR compared to their provincial average in Parkland RHA (3.4 vs. 7.9 per 1,000)

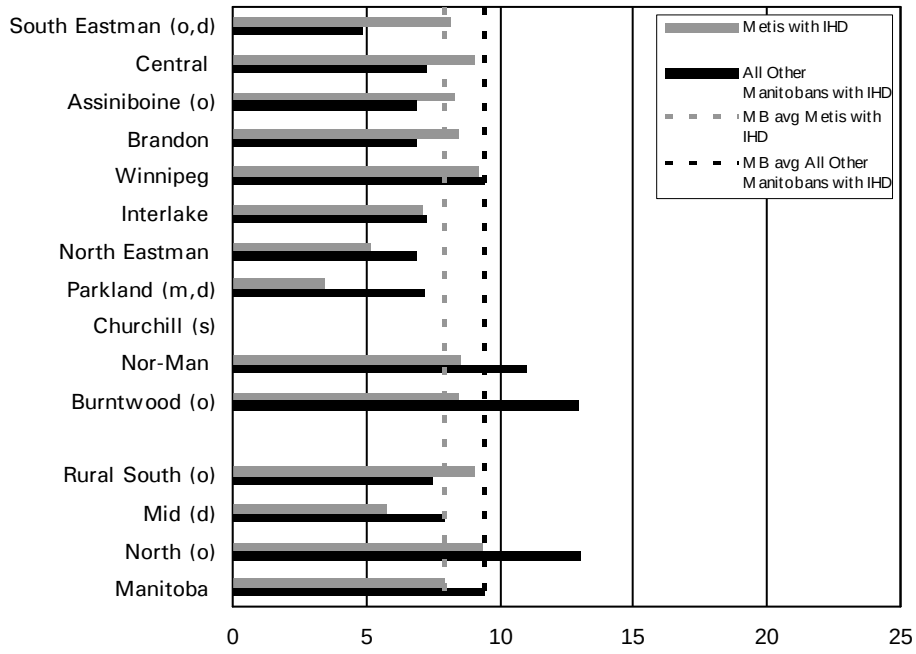
- All Other Manitobans have a higher PMR compared to their provincial average in Burntwood RHA (13.0 vs. 9.4 per 1,000) whereas All Other Manitobans have a lower PMR compared to their provincial average in South Eastman (4.9 vs. 9.4) and Assiniboine RHAs (6.9 vs. 9.4)
- There is no PMR gradient for either Metis or All Other Manitobans at the RHA level

Winnipeg CAs (Figure 3.2.2):

- There are no differences in PMR between Metis and All Other Manitobans at the CAs level
- Metis have a higher PMR compared to their provincial average in Point Douglas CA (16.0 vs. 7.9 per 1,000)
- All Other Manitobans have a higher PMR compared to their provincial average in Downtown (12.4 vs. 9.4 per 1,000) whereas they have a lower PMR compared to their provincial average in Fort Garry (6.1 vs.9.4), Assiniboine South (5.1 vs. 9.4), St. Boniface (5.5 vs. 9.4), St.Vital (5.5 vs. 9.4), River East (7.2 vs. 9.4), and St. James–Assiniboia CAs (6.4 vs. 9.4)
- There is no PMR gradient for Metis but there is a slight PMR gradient for All Other Manitobans at the CAs level

Figure 3.2.1: Premature Mortality Rate by RHA for Metis with IHD and All Other Manitobans with IHD, 2002-2006

Age- and sex-adjusted annual rate per 1,000 residents aged 19-74

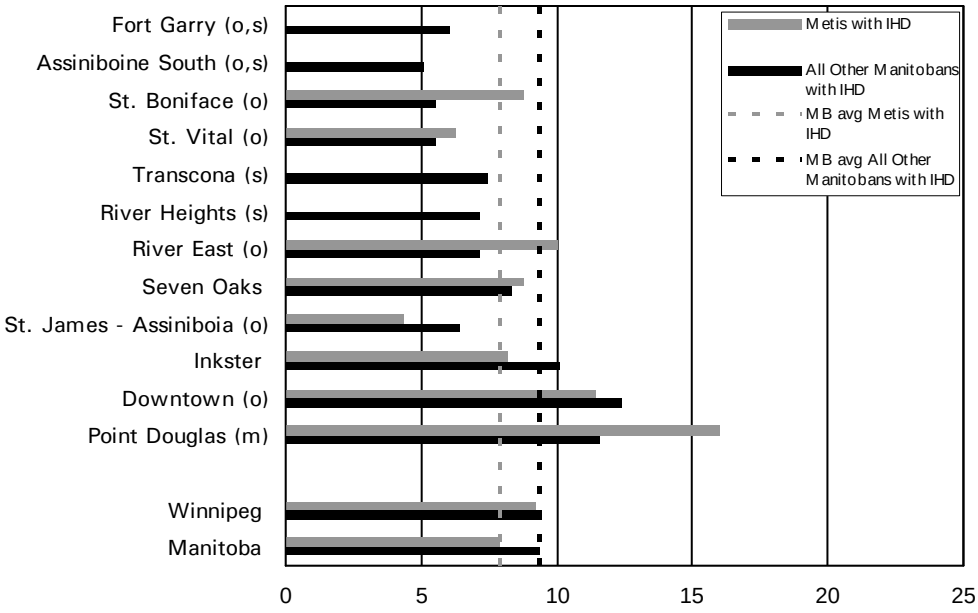


'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases)

Source: MMF, 2012

Figure 3.2.2: Premature Mortality Rate by Winnipeg Community Area for Metis with IHD and All Other Manitobans with IHD, 2002-2006

Age- and sex-adjusted annual rate per 1,000 residents aged 19-74



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases)

Source: MMF, 2012

Sex-Specific:

PMR by sex (Table 3.2.1):

- Metis females have a higher sex-specific PMR compared to All Other Manitobans (5.6 vs. 4.9 per 1,000)
- Metis males have a higher PMR compared to All Other Manitobans (8.6 vs. 8.0 per 1,000)
- Metis females with IHD have a lower sex-specific PMR compared to All Other Manitobans (17.5 vs. 24.7 per 1,000)
- Metis males with IHD have a lower sex-specific PMR compared to All Other Manitobans (15.3 vs. 19.6 per 1,000)

Table 3.2.1: Premature Mortality Rate in Manitoba by Sex for Metis and All Other Manitobans, 2002-2006

Cohort of individuals aged 19+		Premature Mortality Rate (99% CI)	
		All Individuals	Individuals with IHD
Males	Metis	8.6* per 1,000	15.3 per 1,000
	All Other Manitobans	8.0 per 1,000	19.6* per 1,000
Females	Metis	5.6* per 1,000	17.5 per 1,000
	All Other Manitobans	4.9 per 1,000	24.7* per 1,000

* Statistically different than All Other Manitobans of the same sex for that column

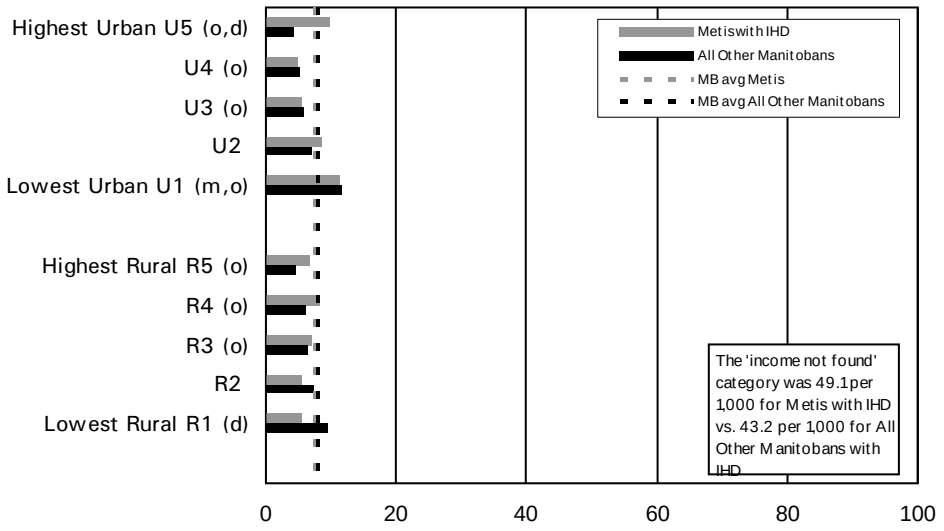
Age- and Sex-Adjusted:

PMR by income quintile (Figure 3.2.3):

- Urban: Metis have a higher PMR compared to All Other Manitobans in U5 (9.7 vs. 4.4 per 1,000)
- Metis have a higher PMR compared to their provincial average in U1 (11.4 vs. 7.7 per 1,000)
- All Other Manitobans have a higher PMR compared to their provincial average in U1 (11.5 vs. 8.0 per 1,000) whereas All Other Manitobans have a lower PMR compared to their provincial average in U5 (4.4 vs. 8.0), U4 (5.1 vs. 8.0), and U3 (5.8 vs. 8.0)
- Rural: Metis have a lower PMR compared to All Other Manitobans in R1 (5.5 vs. 9.4 per 1,000)
- All Other Manitobans have a lower PMR compared to their provincial average in R5 (4.7 vs. 8.0 per 1,000), R4 (6.1 vs. 8.0 per 1,000), and R3 (6.4 vs. 8.0 per 1,000)
- Income not found: Metis have a higher PMR compared to All Other Manitobans (49.1 vs. 43.2 per 1,000)
- Linear Trend Analysis: Among the urban areas there is no linear trend for urban Metis or urban All Other Manitobans. Among the rural areas there is no relationship among rural Metis but in the rural area there is an increasing linear trend for PMR for All Other Manitobans

Figure 3.2.3: Premature Mortality Rate by Income Quintile for Metis with IHD and All Other Manitobans with IHD in Manitoba, 2002/03-2006/07

Age- and sex-adjusted percentage of residents aged 19+ in a five-year period



Linear Trend Test Results

Urban Metis: Not Significant Urban All Other Manitobans: Not Significant
Rural Metis: Not Significant Rural All Other Manitobans: Significant ($p < .001$)

'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases)

Source: MMF, 2012

Findings from Literature Review

(Compared to the results in this study—*in italics*)

There is limited literature on premature mortality in Metis with IHD. The Canadian census mortality follow-up study found that Metis men were 1.4 times more likely to die from IHD compared to non-Aboriginal men and that Metis women were 1.7 times more likely to die from IHD compared to non-Aboriginal women (Tjepkema, Wilkins, Senécal, Guimond, & Penney, 2009).

Metis in Manitoba have a shorter life expectancy than All Other Manitobans. In the 2006 Canadian Census, the proportion of Metis 65 years of age or older in Manitoba was 5% compared to 13% of All Other Manitobans (Statistics Canada, 2008). In a 15-year follow-up study of mortality rates for Metis and First Nations in Canada, remaining life expectancy at age 25 years was shorter for both Metis men and women compared to the remaining life expectancy of non-Aboriginal individuals (Tjepkema et al., 2011). The gap between remaining life expectancies for Metis males and non-Aboriginal males was 4.1 years (48.5 vs. 52.6 years), while the gap between Metis females and non-Aboriginal females was even greater, at 5.4 years (52.5 vs. 57.9 years) (Tjepkema et al., 2011).

Martens, Bartlett, et al., (2010) found that Metis had a statistically higher PMR compared to All Other Manitobans (4.0 vs. 3.3 deaths per 1,000) in Manitoba. This difference was also seen in Rural South aggregate area, where Metis had a significantly higher PMR than All Other Manitobans (3.8 vs. 2.9 per 1,000). For the North aggregate area, PMR was significantly higher than the provincial average for Metis (5.3 vs. 4.0 per 1,000) but similar to the rate for All Other Manitobans in the aggregate area (5.3 vs. 5.3). The information in the Metis Atlas was not specific to those living with IHD.

There are no comparative studies of premature mortality rate in Metis with IHD in the literature. In our study, there is no statistical difference in PMR between Metis with IHD and All Other Manitobans with IHD (7.9 vs. 9.4 per 1,000). While not seen at the provincial level there is some regional variation. The PMR rate is higher for Metis compared to All Other Manitobans in South Eastman RHA (8.1 vs. 4.9 per 1,000). A significant difference is also seen in Parkland RHA, although in that case Metis have a lower PMR compared to All Other Manitobans (3.4 vs. 7.2 per 1,000). A similar difference was seen in Mid aggregate area (5.7 vs. 7.9 per 1,000). There was no difference in PMR between Metis and All Other Manitobans in the Winnipeg CAs. However, Metis have a higher PMR compared to their provincial average in Point Douglas CA (16.0 vs. 7.9 per 1,000).

While provincially no differences in PMR were observed between Metis with IHD and All Other Manitobans with IHD, the rate for Metis (7.9 per 1,000) is substantially higher than the rate previously identified in the Metis in Manitoba population as a whole (4.0) (Martens, Brownell, et al., 2010). While this study found a significant difference between Metis with IHD and All Other Manitobans with IHD in South Eastman RHA (8.1 vs. 4.9 per 1,000), in the Metis Atlas it was found that there was no statistical difference between Metis and All Others in that RHA (3.1 vs. 2.6). The finding that Metis with IHD are dying younger in South Eastman requires further inquiry into health conditions for Metis with IHD in this region.

For the general population worldwide, it is clear that premature mortality rates for men are much higher than those for women (World Health Organization, 2002). In this study it was found that Metis males and Metis females with IHD have a lower sex-specific PMR compared to All Other Manitoban males and All Other Manitoban females, respectively.

There is substantial evidence internationally and in Manitoba that individuals suffering economic deprivation experience higher rates of premature mortality (Krieger, Rehkopf, Chen, & Waterman, 2008; Martens, Brownell, et al., 2010). In this study, it was found that Metis with IHD in the highest urban (includes Winnipeg and Brandon) income group (U5) had a higher PMR compared to All Other Manitobans with IHD (9.7 vs. 4.4 per 1,000). Among rural areas, Metis with IHD in the lowest rural income group (R1) had a lower PMR compared to All Other Manitobans with IHD (5.5 vs. 9.4). There is no linear trend for rural Metis.

While there is no difference at the provincial level, some regional differences do exist. Further investigation is warranted relating to higher PMR in South Eastman and differences in PMR by income quintile for urban and rural Metis.

References

Bartlett, J.G., Sanguins, J., Carter, S., Hoeppner, N., & Mehta, P. (2010). *Diabetes and related health care utilization in the Metis population in Manitoba.* Winnipeg, MB: Manitoban Metis Federation. Retrieved from http://health.mmf.mb.ca/

Eyles, J., & Birch, S. (1993). A population needs-based approach to health-care resource allocation and planning in Ontario: A link between policy goals and practice? *Canadian Journal of Public Health, 84*(2), 112-117.

Gordis, L. (1996). *Epidemiology.* Toronto, ON: W.B. Saunders Company.

Janz, T., Seto, J., & Turner, A. (2009). *Aboriginal Peoples Survey, 2006: An overview of the health of the Métis population.* Ottawa, ON: Minister of Industry. Retrieved from http://dsp-psd.pwgsc.gc.ca/collection_2009/statcan/89-637-X/89-637-x2009004-eng.pdf

Krieger, N., Rehkopf, D.H., Chen, J.T., Waterman, P.D., Marcelli, E., & Kennedy, M. (2008). The fall and rise of US inequities in premature mortality: 1960-2002. *PLoS Medicine, 5*(2), 227-241.

Manitoba Centre for Health Policy (2006a). *Term definition: Income not found.* Retrieved from http://mchp-appserv.cpe.umanitoba.ca/viewDefinition.php?printer=Y&definitionID=102883

Manitoba Centre for Health Policy. (2006b). *Glossary definition: Linear trend test.* Retrieved from http://mchp-appserv.cpe.umanitoba.ca/viewDefinition.php?printer=Y&definitionID=102973

Martens, P.J., Bartlett, J., Burland, E., Prior, H., Burchill, C., Huq, S., Romphf, L., …& Bailly, A. (2010). *Profile of Metis health status and healthcare utilization in Manitoba: A population-based study.* Winnipeg, MB: Manitoba Centre for Health Policy.

Martens, P.J., Brownell, M., Au, W., MacWilliam, L., Prior, H., Schultz, J, Guenette, W... & Serwonka, K. (2010). *Health inequities in Manitoba: Is the socioeconomic gap widening or narrowing over time?* Winnipeg, MB: Manitoba Centre for Health Policy.

Merrill, R.M., & Timmreck, T.C. (2006). *Introduction to Epidemiology* (4th ed.). Mississauga, ON: Jones & Bartlett.

Statistics Canada. (2008). *Aboriginal Peoples in Canada in 2006: Inuit, Métis and First Nations, 2006 Census.* Ottawa, ON: Statistics Canada. Retrieved from http://www12.statcan.ca/census-recensement/2006/as-sa/97-558/pdf/97-558-XIE2006001.pdf

Tjepkema, M., & Wilkins, R. (2011). Remaining life expectancy at age 25 and probability of survival to age 75, by socioeconomic status and Aboriginal ancestry. *Health Reports, 22*(4), 1-6.

World Health Organization. (2002). *Global burden of disease 2001: YLLs ('000) by age, sex and cause for the year 2001.* Retrieved from http://www.who.int/healthinfo/statistics/gbdwhosubregionyll2001.xls

Young, T.K. (2004). *Population Health.* Toronto, ON: Oxford University Press.

Section 4: Morbidity Profile

4.1: Ischemic Heart Disease

This section focuses on morbidity (illness) associated with ischemic heart disease (IHD). IHD is also known as Coronary Heart Disease (CHD), Coronary Artery Disease (CAD), and less commonly as atherosclerotic heart disease (Manitoba Centre for Health Policy [MCHP], 2011a). IHD is caused by damage to the heart muscle or build up of fat (cholesterol, lipids, and lipophages) in the arteries through the process of atherosclerosis which prevents the heart from functioning effectively (Mitchell & Sidaway, 1998).

In each of the graphs in this section, the Regional Health Authorities (RHAs) and Winnipeg Community Areas (CAs) are ordered by ten-year Premature Mortality Rate (PMR). More information on the ordering of graphs by PMR is found in Section 1. Most of the indicators in this report are presented as 'age- and sex-adjusted' rates and as 'age- and sex-specific' rates. There is also a logistic regression and co-morbidity table included in this section. Data are presented in different ways to illustrate the distribution of IHD and related health indicators by geography, age, sex, and income to provide more in-depth information for our Knowledge Networks and because of their policy implications for future use of health services.

All the definitions used in this section were developed by the Manitoba Centre for Health Policy for the Metis Atlas (Martens, Bartlett, et al., 2010) unless otherwise noted. In this section, all indicators compare Metis with IHD to All Other Manitobans with IHD, except for IHD prevalence, which simply compares Metis with All Other Manitobans. As noted in Section 1, unless otherwise indicated any mention of 'lower' or 'higher' refers to results that are statistically significant.

Indicators in this section include:

- Ischemic Heart Disease Prevalence (age- and sex-adjusted)
- Ischemic Heart Disease Prevalence (age- and sex-specific)
- Ischemic Heart Disease Prevalence (sex-specific)
- Ischemic Heart Disease Prevalence by Income Quintile (age- and sex-adjusted)
- Hypertension Prevalence (age- and sex-adjusted)
- Hypertension Prevalence (age- and sex-specific)
- Diabetes Prevalence (age- and sex-adjusted)
- Diabetes Prevalence (age- and sex-specific)
- Stroke Incidence Rate (age- and sex-adjusted)
- Stroke Incidence Rate (age- and sex-specific)
- Congestive Heart Failure Prevalence (age- and sex-adjusted)
- Congestive Heart Failure Prevalence (age- and sex-specific)
- Depression Prevalence (age- and sex-adjusted)
- Depression Prevalence (age- and sex-specific)
- Anxiety Disorders Prevalence (age- and sex-adjusted)
- Anxiety Disorders Prevalence (age- and sex-specific)
- Substance Abuse Prevalence (age- and sex-adjusted)
- Substance Abuse Prevalence (age- and sex-specific)

- Comorbidities among specific illnesses (IHD, diabetes, stroke, congestive heart failure, depression, anxiety disorders, and substance abuse)

Overall Key Findings (Table 4.1):

- IHD and its associated complications are health issues of concern for Metis in Manitoba
- There is considerable variation in rates of IHD and associated comorbidities among Metis between RHAs
- In this study, IHD prevalence (10.3% vs. 7.3%) and the probability of developing IHD (1.35 adjusted odds ratio) are higher for Metis than for All Other Manitobans
- At the provincial level, prevalence of diabetes (20.0% vs. 16.5%), anxiety disorders prevalence (14.9% vs. 12.8%), and substance abuse prevalence (10.7% vs. 8.6%) are higher for Metis compared to All Other Manitobans whereas hypertension prevalence (21.6% vs. 21.0%), stroke rate (9.3 vs. 9.6 per 1,000), CHF prevalence (10.8% vs. 10.8%), and depression prevalence (31.7% vs. 31.3%) are similar for Metis compared to All Other Manitobans

Table 4.1: Overall Key Findings of Morbidity Indicators

Indicator	Provincial difference between Metis with IHD and All Other Manitobans with IHD (age- and sex-adjusted prevalence in %, unless otherwise stated), with RR (relative risk) for Metis	Statistically better off regions for Metis with IHD compared to provincial average for Metis with IHD (unless otherwise noted)	Statistically worse off regions for Metis with IHD compared to provincial average for Metis with IHD (unless otherwise noted)
IHD Prevalence, 19+	10.3% vs. 7.3% RR=1.41	Rural South aggregate area; South Eastman RHA; Assiniboine RHA; Interlake RHA	Parkland RHA
Hypertension Prevalence, 19+	21.6% vs. 21.0% RR=1.03, NS	None	None
Diabetes Prevalence, 19+	20.0% vs. 16.5% RR=1.21	South Eastman RHA	None
Stroke Rate, 40+	9.3 vs. 9.6 (per 1,000) RR=0.97, NS	None	None
Congestive Heart Failure Prevalence, 19+	10.8% vs. 10.8% RR=1.00, NS	None	Inkster Winnipeg CA
Prevalence of Depression, 19+	31.7% vs. 31.3% RR=1.01, NS	None	Downtown Winnipeg CA
Prevalence of Anxiety Disorders, 19+	14.9% vs. 12.8% RR=1.16	None	Brandon RHA; Nor-Man RHA
Prevalence of Substance Abuse, 19+	10.7% vs. 8.6% RR=1.24	None	Burntwood RHA; Downtown Winnipeg CA

NS = Not statistically different between Metis and All Other Manitobans

4.2 Ischemic Heart Disease (IHD) Prevalence

IHD is a progressive chronic disease that occurs due to decrease or loss of blood supply to the heart muscle. IHD can lead to an acute myocardial infarction (AMI), also known as a heart attack, which refers to the death of cardiac (heart) cells due to prolonged lack of blood to the heart (Boersma et al., 2003).

Both the age- and sex-adjusted and the age- and sex-specific prevalence of IHD were measured for residents aged 19 years and older over five fiscal years: 2002/03-2006/07. Residents were considered to have IHD if they met any one of the following conditions:

- one or more hospitalizations with a diagnosis of IHD: ICD-9-CM codes 410-414; ICD-10-CA codes I20-I22, I24, I25
- two or more physician visits with a diagnosis of IHD (ICD-9-CM codes as above)
- one physician visit with a diagnosis of IHD (ICD-9-CM codes as above) and two or more prescriptions for medications to treat IHD (see Glossary for complete list)

The denominator includes all Manitoba residents aged 19 years and older in the five-year time period who were continuously registered with Manitoba Health for at least one year in that five-year time period.

In this sub-section you will find an income quintile graph. Income quintile graphs show the burden of disease based on socioeconomic differences within the population (see Section 1.5.2: Making Sense of the Graphs for further information).

Key observations:

Metis and All Other Manitobans

Manitoba (Figure 4.2.1):

- Metis have a higher prevalence of IHD compared to All Other Manitobans in Manitoba (10.3% vs. 7.3%)

Aggregate areas (Figure 4.2.1):

- Metis have a higher prevalence of IHD compared to All Other Manitobans in Rural South (9.0% vs. 6.5%) and Mid (10.5% vs. 7.5%) aggregate areas
- Metis have a lower rate of IHD compared to their provincial average in Rural South aggregate area (9.0 % vs. 10.3%)
- All Other Manitobans have a higher prevalence of IHD compared to their provincial average in North aggregate area (8.8% vs. 7.3%) and All Other Manitobans have a lower prevalence of IHD compared to their provincial average in Rural South aggregate area (6.5% vs. 7.3%)
- There is no IHD prevalence gradient for either Metis or All Other Manitobans at the aggregate level, considering that the aggregate areas are ordered form the most healthy area (on top) to the lowest healthy area (on bottom) according to their PMR rate.

RHA (Figure 4.2.1):

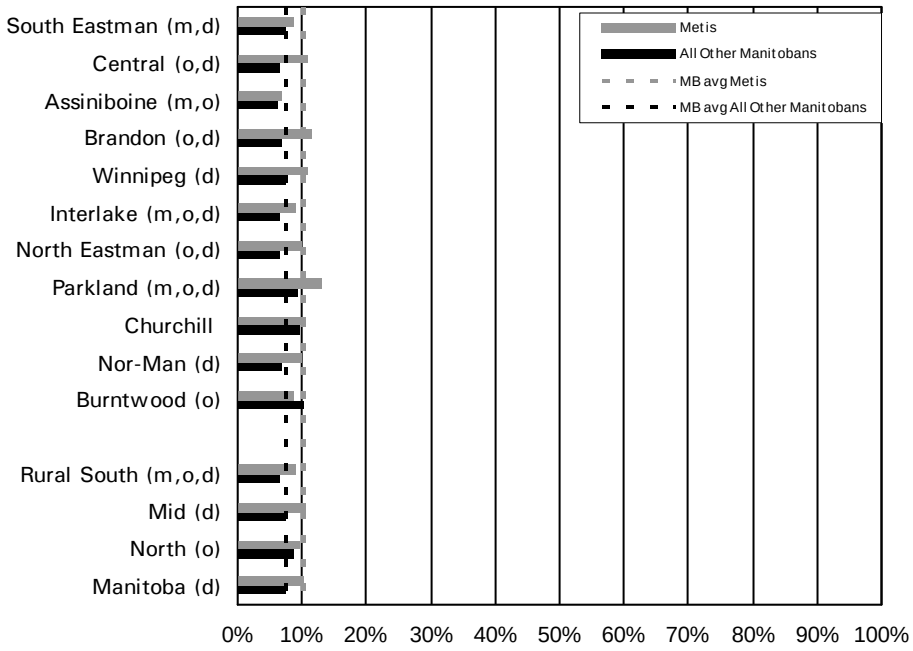
- Metis have a higher prevalence of IHD compared to All Other Manitobans in South Eastman (8.6% vs. 7.5%), Central (10.8% vs. 6.5%), Brandon (11.6% vs. 6.9%), Winnipeg (10.7% vs. 7.6%), Interlake (8.9% vs. 6.6%), North Eastman (10.0% vs. 6.5%), Parkland (13.1% vs. 9.2%), and Nor-Man (10.1% vs. 7.0%) RHAs
- Metis have a higher prevalence of IHD compared to the provincial average in Parkland RHA (13.1% vs. 10.3%) whereas Metis have a lower prevalence of IHD compared to their provincial average in South Eastman (8.6% vs. 10.3%), Assiniboine (6.7% vs. 10.3%), and Interlake (8.9% vs. 10.3%) RHAs
- All Other Manitobans have a higher prevalence of IHD compared to their provincial average in Parkland (9.2% vs. 7.3%), and Burntwood (10.4% vs. 7.3%) RHAs
- All Other Manitobans have a lower prevalence of IHD compared to their provincial average in Central (6.5% vs. 7.3%), Assiniboine (6.1% vs. 7.3%), Brandon (6.9% vs. 7.3%), Interlake (6.6% vs. 7.3%), and North Eastman (6.5% vs. 7.3%) RHAs
- There is no IHD prevalence gradient for either Metis or All Other Manitobans at the RHA level

Winnipeg CAs (Figure 4.2.2):

- Metis have a higher prevalence of IHD compared to All Other Manitobans in Fort Garry (9.9% vs. 7.1%), Assiniboine South (10.3% vs. 7.3%), St. Boniface (9.2 vs. 7.7), St. Vital (10.2% vs. 7.5%), River Heights (10.7% vs. 7.6%), River East (10.9% vs. 7.5%), Seven Oaks (10.6% vs. 8.1%), St. James–Assiniboia (11.3% vs. 8.1%), Inkster (12.8% vs. 7.0%), Downtown (12.2% vs. 7.1%), and Point Douglas (12.2% vs. 8.6%) CAs
- All Other Manitobans have a higher prevalence of IHD compared to their provincial average in Transcona (8.0% vs. 7.3%), Seven Oaks (8.1% vs. 7.3%), St. James–Assiniboia (8.1% vs. 7.3%), and Point Douglas (8.6% vs. 7.3%) CAs
- There is no IHD prevalence gradient for either Metis or All Other Manitobans at the CA level

Figure 4.2.1: Ischemic Heart Disease Prevalence by RHA for Metis and All Other Manitobans with IHD, 2002/03-2006/07

Age- & sex-adjusted percent of residents aged 19+ in a five-year period

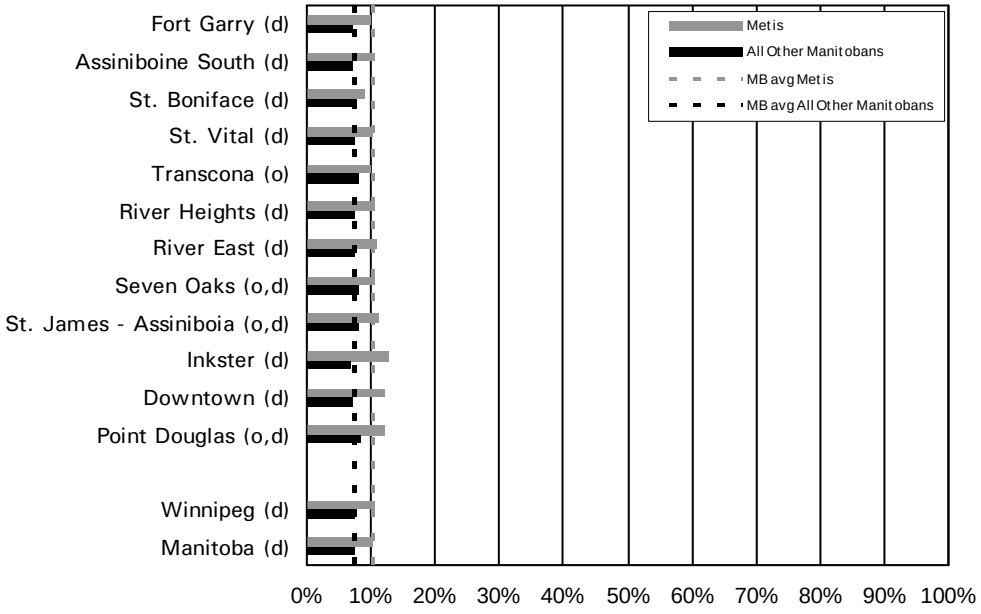


'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases)

Source: MMF, 2012

Figure 4.2.2: Ischemic Heart Disease Prevalence by Winnipeg Community Area for Metis and All Other Manitobans, 2002/03-2006/07

Age- & sex-adjusted percent of residents aged 19+ in a five-year period



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases)

Source: MMF, 2012

Age- and Sex-Specific:

Manitoba (Figure 4.2.3):

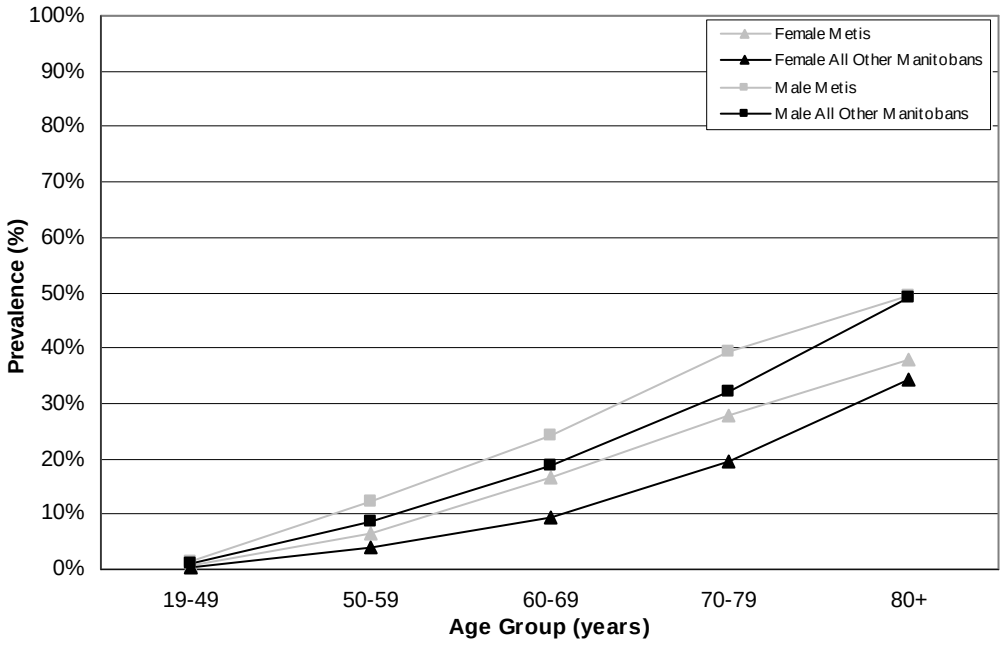
- Throughout their lives, for both Metis males and Metis females the crude prevalence of IHD increases with age
- Throughout their lives, Metis males and Metis females have a higher crude prevalence of IHD compared to All Other Manitoban males and All Other Manitoban females, respectively
- Throughout their lives, Metis males have a higher crude prevalence of IHD compared to Metis females
- By age 80 years and older, half of Metis males and one-third of Metis females have IHD

Winnipeg (Figure 4.2.4):

- As in Figure 4.2.3, the crude prevalence of IHD is similar for Metis and All Other Manitobans with IHD in Manitoba

Figure 4.2.3: Ischemic Heart Disease Prevalence in Manitoba by Age and Sex for Metis and All Other Manitobans, 2002/03-2006/07

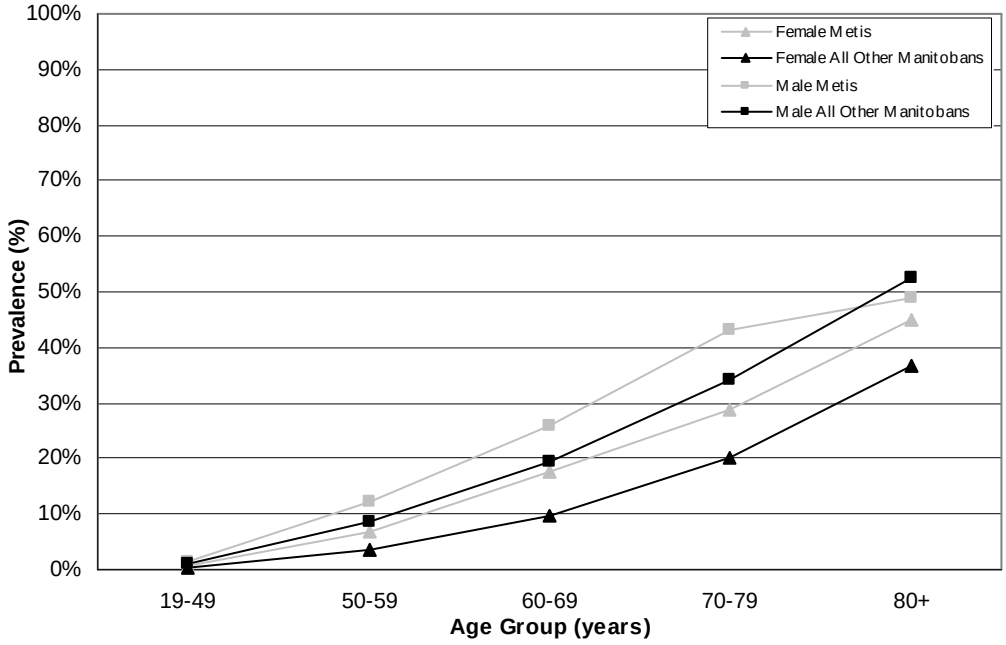
Crude percent of residents aged 19+ in a five-year period



Source: MMF, 2012

Figure 4.2.4: Ischemic Heart Disease Prevalence in Winnipeg by Age and Sex for Metis and All Other Manitobans, 2002/03-2006/07

Crude percent of residents aged 19+ in a five-year period



Source: MMF, 2012

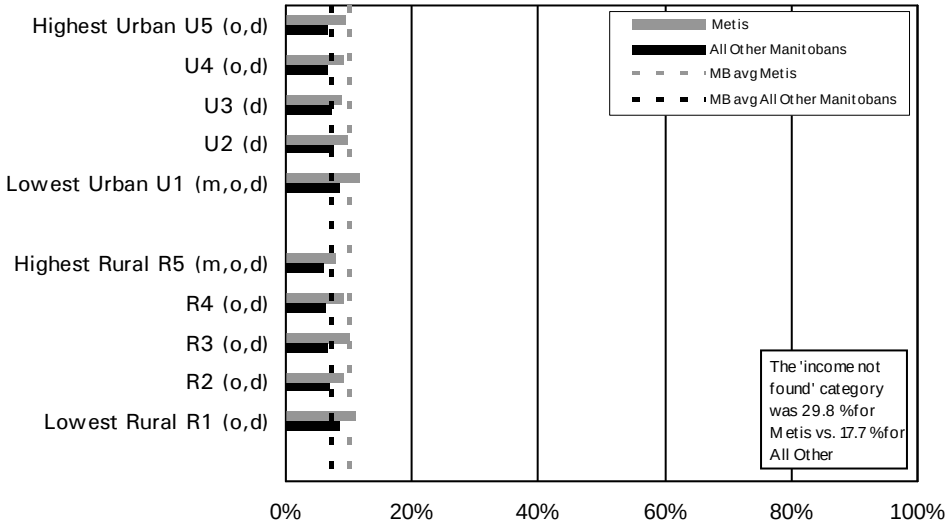
Age- and Sex-Adjusted:

Income Quintile (Figure 4.2.5)

- Urban: Metis have a higher IHD prevalence compared to All Other Manitobans in all income quintiles [U5 (9.4% vs. 6.5%), U4 (9.1% vs. 6.6%), U3 (9.0% vs. 7.2%), U2 (10.0% vs. 7.5%), and U1 (11.8% vs. 8.5%)].
- Metis have a higher IHD prevalence compared to their provincial average in U1 (11.8% vs. 10.1%)
- All Other Manitobans have a higher IHD prevalence compared to their provincial average in U1 (8.5% vs. 7.3%) whereas they have a lower IHD prevalence compared to their provincial average in U5 (6.5% vs. 7.3%) and U4 (6.6% vs. 7.3%)
- Rural: Metis have a higher IHD prevalence compared to All Other Manitobans in R5 (8.0% vs. 6.1%), R4 (9.1% vs. 6.4%), R3 (10.0% vs. 6.6%), R2 (9.1% vs. 6.8%), and R1 (11.0% vs. 8.6%)
- Metis have a lower IHD prevalence compared to their provincial average in R5 (8.0% vs. 10.1%)
- All Other Manitobans have a higher IHD prevalence compared to their provincial average in R1 (8.6% vs. 7.3%) whereas they have a lower IHD prevalence compared to their provincial average in R5 (6.1% vs. 7.3%), R4 (6.4% vs. 7.3%), R3 (6.6% vs. 7.3%), and R2 (6.8% vs. 7.3%)
- Income not found: Metis in the 'income not found' category have a higher IHD prevalence compared to All Other Manitobans (29.8.1% vs. 17.7%)
- Linear Trend Analysis: In both of the urban and rural areas of Manitoba, Metis and All Other Manitobans show increasing linear trends for IHD prevalence from the highest to the lowest neighbourhood income quintile.

Figure 4.2.5: Ischemic Heart Disease Prevalence by Income Quintile in Manitoba, 2002/03-2006/07

Age- and sex-adjusted percentage of residents aged 19+ in a five-year period



Linear Trend Test Results

Urban Metis: Significant (p <.001) Urban All Other Manitobans: Significant (p <.001)
Rural Metis: Significant (p <.001) Rural All Other Manitobans: Significant (p <.001)

'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases)

Source: MMF, 2012

Logistic Regression: Probability of IHD (Table 4.3.1)

- Metis are at a greater risk of developing IHD compared to All Other Manitobans (aOR 1.35, 95% CI 1.296-1.409) after controlling for other factors
- Manitobans in Winnipeg region have a higher risk of developing IHD compared to Manitobans living elsewhere (aOR 1.128, 95% CI 1.107-1.149) after controlling for the other factors mentioned in table 4.3.1
- Many factors contribute to the occurrence of IHD among Manitobans. Manitobans with hypertension have 2.5 times greater risk for IHD than those with normal blood pressure (aOR 2.51 CI 2.46-2.56). Similarly, Manitobans with previous attacks of stroke have almost 34% greater risk of IHD as compared to those without previous stroke attacks (aOR 1.34 CI 1.26-1.42). Additionally, depression (aOR 1.31 CI 1.28-1.34), age (aOR 1.27 CI 1.26-1.27), male sex (aOR 2.06 CI 2.02-2.10), and major physical illness (aOR 1.37 CI 1.34-1.39) appeared as risk factors for IHD, after controlling for all other factors
- Congestive heart failure, followed by hypertension and male sex constituted the major risk factors for IHD among Manitobans

Table 4.3.1: Logistic Regression: Probability of Ischemic Heart Disease (IHD)
Probability of IHD by Aggregate Region, 2002/03–2006/07 for Residents Aged 19+ Years and older

Covariates	Adjusted Odds Ratio (95%Confidence Interval)	p-value
Metis (vs. All Other Manitobans)	**1.351 (1.296-1.409)**	**<0.001**
Aggregate Regions (ref=Manitoba)		
South	**0.900 (0.879-0.921)**	**<0.001**
Mid	**0.990 (0.976-1.015)**	**0.439**
North	0.976 (0.927-1.008)	0.116
Brandon	1.029 (0.989-1.071)	0.157
Winnipeg	**1.128 (1.107-1.149)**	**<0.001**
Hypertension	**2.509 (2.456-2.563)**	**<0.001**
Diabetes	**1.691 (1.654-1.730)**	**<0.001**
Stroke	**1.336 (1.261-1.415)**	**<0.001**
Congestive Heart Failure	**5.125 (4.997-5.256)**	**<0.001**
Depression	**1.305 (1.276-1.335)**	**<0.001**
Age, linear	**1.265 (1.258-1.272)**	**<0.001**
Age, quadratic	**0.999 (0.999-0.999)**	**<0.001**
Sex (Males vs. Females)	**2.057 (2.016-2.098)**	**<0.001**
Average Household Income of Neighbourhood (per $10,000)	**0.984 (0.980-0.989)**	**<0.001**
Major Physical Illness ADGs	**1.366 (1.339-1.393)**	**<0.001**

Bold = statistically significant results
Note: Please see Glossary for definition of all variables. Source: MMF, 2012

Findings from the Literature Review

(Compared to the results in this study—*in italics*)

IHD is the world's leading cause of death, accounting for 12.8% of all deaths, followed second only by stroke and other cerebrovascular diseases (WHO, 2011a). In 2004 in Canada, CVD accounted for 32.1% of deaths, 17.3% of which were caused by IHD (PHAC, 2009). Furthermore, 15.8% of hospitalizations were due to CVDs and 6.5% were due to IHD in Canada (PHAC, 2009).

Declines in the mortality rate and hospital admission rate for Canadians with AMI age 20 years and older are reported. The age- and sex-adjusted mortality rate for AMI decreased from 102.5 to 63.4 per 100,000 while age-and sex-adjusted hospital admission rate for AMI decreased from 227.0 to 206.2 per 100,000 in the period of 1994-2004 (Tu, Nardi, Fang, Liu, & Khalid, 2009).

Differences in rates of hospitalizations and mortality for IHD by age and sex are reported. Throughout their lives males have a higher IHD-related hospitalization and mortality rate compared to females (PHAC, 2009). IHD prevalence and AMI incidence increased in men between the ages of 45 and 54 years, whereas for females the increase was seen ten years later at 55-64 years of age (PHAC, 2009). It is not completely clear why men develop IHD earlier than women but pathophysiological mechanisms play an important role (Vaccarino et al., 2011). These include women having less incidence of obstructive coronary heart disease, a stronger sense of chest pain, and poorer post-infarction outcomes compared to men (Vaccarino et al., 2011). Differences between men and women with IHD are associated with different outcomes, effective treatment, and response to treatment which are fundamental for understanding of prevention efforts (Newby & Douglas, 2012). Overall age- and sex-specific differences in mortality are known for Canadians with AMI age 20 years and older. The age- and sex-specific mortality rate for AMI decreased from 125.7 to 86.7 per 100,000 for Canadian men and from 86.6 to 64.2 per 100,000 for Canadian women age 20 years and older for the period of 1994 to 2004 (Tu, Nardi, Fang, Liu, & Khalid, 2009).

While mortality rates and hospital admission rates for IHD and AMI have decreased, there remains an unequal burden of disease across geographies. In Canada, disease distribution of morbidity and mortality from IHD is not uniform across health regions. Provinces with statistically higher death rates due to IHD compared to the Canadian average for IHD included: Newfoundland and Labrador (176.6 vs. 136.4 per 100,000), Prince Edward Island (147.8 vs. 136.4), Nova Scotia (139.4 vs. 136.4), Quebec (142.9 vs. 136.4), Ontario (141.8 vs. 136.4), and Manitoba (142.4 vs. 136.4) (Filate, Johansen, Kennedy, & Tu, 2003). Regions with high IHD death rates have been correlated with increased traditional cardiac risk factors such as daily smoking, obesity, diabetes, hypertension, and physical inactivity. Social determinants of health such as unemployment, low income, income inequality, and high life stress also have an affect on disease distribution. Finally, community characteristics including population density influence rates of disease distribution (Filate, Johansen, Kennedy, & Tu, 2003). There is a wide range of environmental and host factors which contribute to IHD disease distribution which make prevention a challenge. Ethnicity[7], environmental and genetic factors, intrauterine factors, and childhood nutrition are important factors predisposing to an increased risk of IHD (Yusef, Reddy, Ounpuu, & Anand, 2001). Finally, community characteristics including population density influence rates of disease distribution (Filate, Johansen, Kennedy, & Tu, 2003). The Metis Atlas found that Metis in Manitoba compared to All Other Manitobans have a higher

[7] "Ethnicity (unlike race) is a construct that encompasses both genetic and cultural (e.g. language, religion, diet) differences" (Yusef et al., 2001).

percentage of being overweight/obese (65.1% vs. 55.1%), a lower percentage of eating five or more fruits/vegetables per day (20.9% vs. 30.6%), and a higher percentage of being current smokers (33.3% vs. 21.7%)—which may all contribute to occurrence of IHD. On the other hand, Metis have a higher level of physical activity than All Other Manitobans that could be a preventive factor for IHD (Martens, Bartlett, et al., 2010).

In the Aboriginal Peoples Survey (APS), 7% of Metis males and females reported heart problems (Janz et al., 2009). The Métis Nation of British Columbia found that 27.2% of Métis respondents identified themselves or a family member as living with heart disease (Hutchinson, Evans, & Reid, 2007). Atzema et al. (2010) found that the Métis Nation of Ontario had a higher age- and sex-adjusted rate of acute coronary syndromes compared to the general Ontario population (1.44 vs. 1.11 per 100). In the Metis Atlas, the age- and sex-adjusted rate of IHD was found to be significantly higher at the provincial level for Metis compared to All Other Manitobans (12.2% vs. 8.7%) in Manitoba (Martens, Bartlett, et al., 2010). In addition, a higher prevalence of IHD for Metis in Manitoba compared to All Other Manitobans was found in South Eastman, Central, Brandon, Winnipeg, Interlake, North Eastman, Parkland, and Nor-Man RHAs (Martens, Bartlett, et al., 2010). The information in the Metis Atlas was not specific to those living with IHD.

There are no comparative studies of Ischemic Heart Disease in Metis in Manitoba. In our study, Metis have a higher age- and sex-adjusted prevalence of IHD than All Other Manitobans (10.3% vs. 7.3%) in Manitoba. There are regional variations among aggregate areas with higher rates among Metis in Rural South (9.0% vs. 6.5%) and Mid (10.5% vs. 7.5%). Among the RHAs, the age- and sex-adjusted rates were found to be higher in South Eastman (8.6% vs. 7.5%), Central (10.8% vs. 6.5%), Brandon (11.6% vs. 6.9%), Winnipeg (10.7% vs. 7.6%), Interlake (8.9% vs. 6.6%), Parkland (13.1% vs. 9.2%), and Nor-Man (10.1% vs. 7.0%) RHAs.

Throughout their lives in Manitoba, male Metis have higher age- and sex-specific rates of IHD compared to Metis females, All Other Manitoban males, and All Other Manitoban females. In every urban and rural area income quintile, Metis have a higher IHD prevalence compared to All Other Manitobans. Furthermore, for Metis in both urban and rural income quintiles there is a linear trend with IHD prevalence increasing from highest to lowest income quintile. Finally, findings from the logistic regression indicate that Metis are at a greater risk of developing IHD compared to All Other Manitobans (aOR 1.265 (CI 1.258-1.272), $p<0.001$).

This report confirms that not only do Metis have a higher prevalence of IHD than All Other Manitobans in the province; but they also have a higher probability of developing IHD in their lifetime, even after controlling for other factors. Moreover, we found differences in rates between sexes and urban/rural incomes quintiles which merit further investigation.

4.3: Hypertension Prevalence

Hypertension occurs when there is repeated blood pressure above 140/90 mmHg and is often referred to as a 'silent killer' (Quinn et al., 2010). Hypertension increases one's risk of IHD as well as other chronic diseases such as stroke and heart failure (PHAC, 2009; PHAC, 2010b; Victor, 2012). The Canadian Hypertension Society recommends that all individuals have an annual blood pressure check with an increased frequency if they have a chronic disease (PHAC, 2009). Hypertension can be prevented or reduced through engaging in modifiable risk factor reduction such as maintaining a healthy diet, decreasing salt consumption, avoiding excessive alcohol, managing stress, and regular exercise (Whelton et al., 2002). Geography, age, ethnicity, and income all can influence an individual's ability to engage in health promoting behaviours and practices (Mensah, 2005).

Both the age- and sex-adjusted and the age- and sex-specific prevalence of hypertension were measured for residents aged 19 years and older over one fiscal year: 2006/07. Residents were considered to have hypertension if they met one of the following conditions:

- one or more hospitalizations with a diagnosis of hypertension: ICD-9-CM codes 401-405; ICD-10-CA codes I10-I13, I15
- one or more physician visits with a diagnosis of hypertension (ICD-9-CM codes as above)
- two or more prescriptions for medication to treat hypertension (see glossary for listing of medications)

The denominator includes all Manitoba residents aged 19 years and older in a one-year time period who were continuously registered with Manitoba Health for at least one year in a one-year time period.

Key observations:

Metis with IHD and All Other Manitobans with IHD

Manitoba (Figure 4.3.1):

- There is no difference in prevalence of hypertension between Metis in Manitoba and All Other Manitobans in Manitoba (21.6% vs. 21.0%)

Aggregate areas (Figure 4.3.1):

- Metis in Mid aggregate area have a higher prevalence of hypertension compared to All Other Manitobans (24.8% vs. 22.0%)
- All Other Manitobans have a higher prevalence of hypertension compared to their provincial average in North aggregate area (25.3% vs. 21.0%) whereas they have a lower prevalence of hypertension compared to their provincial average in Rural South aggregate area (20.0% vs. 21.0%)
- At the aggregate level there is no hypertension prevalence gradient for Metis but there is a hypertension prevalence gradient for All Other Manitobans increasing from most healthy to least healthy aggregate areas as ordered by PMR

RHAs (Figure 4.3.1):

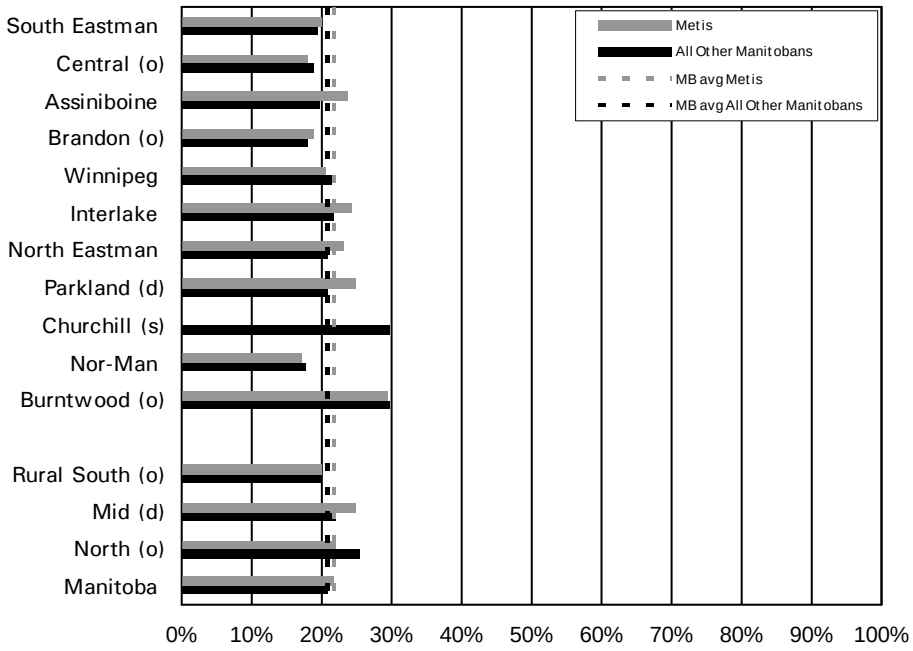
- Metis in Parkland have a higher prevalence of hypertension compared to All Other Manitobans (24.9% vs. 20.8%)
- All Other Manitobans have a higher prevalence of hypertension compared to their provincial average in Burntwood RHA (29.8% vs. 21.0%) whereas they have a lower prevalence of hypertension compared to their provincial average in Central (19.0% vs. 21.0%) and Brandon (17.9% vs. 21.0%) RHAs
- There is no hypertension prevalence gradient for either Metis or All Other Manitobans at the RHA level

Winnipeg CAs (Figure 4.3.2):

- There is no difference in prevalence of hypertension between Metis and All Other Manitobans in any CAs
- All Other Manitobans have a lower prevalence of hypertension compared to their provincial average in St. James–Assiniboia CA (18.6% vs. 21.0%)
- There is no hypertension prevalence gradient for either Metis or All Other Manitobans at the CAs level

Figure 4.3.1: Hypertension Prevalence by RHA for Metis with IHD and All Other Manitobans with IHD, 2006/07

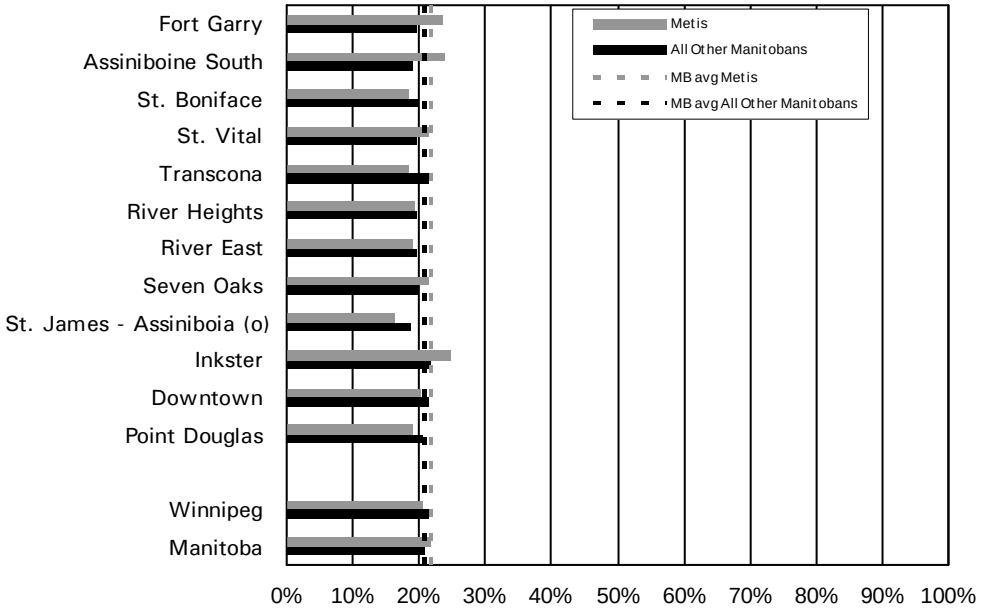
Age- and sex-adjusted percent of residents aged 19+ treated for high blood pressure



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases) Source: MMF, 2012

Figure 4.3.2: Hypertension Prevalence by Winnipeg Community Area for Metis with IHD and All Other Manitobans with IHD, 2006/07

Age- and sex-adjusted percent of residents aged 19+ treated for high blood pressure



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases) Source: MMF, 2012

Age- and Sex-Specific:

Manitoba (Figure 4.3.3):

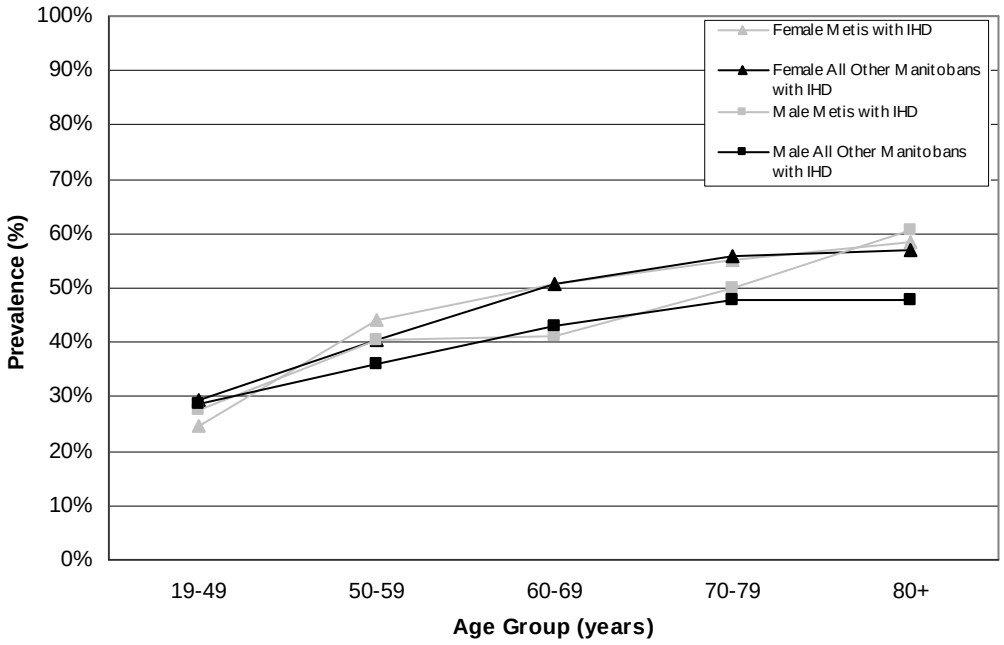
- Throughout their lives, for both Metis males and Metis females the crude prevalence of hypertension increases with age
- Throughout most of their lives, for both Metis males and Metis females the crude prevalence of hypertension is similar to All Other Manitoban males and females, respectively—except at age 80 years and older, where Metis males have a higher crude prevalence of hypertension compared to All Other Manitoban males
- Throughout their lives, Metis males have a similar crude prevalence of hypertension compared to Metis females

Winnipeg (Figure 4.3.4):

- As in Figure 4.3.3, the crude prevalence of hypertension in Winnipeg followed the same age and sex pattern as in Manitoba

Figure 4.3.3: Hypertension Prevalence in Manitoba by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2006/07

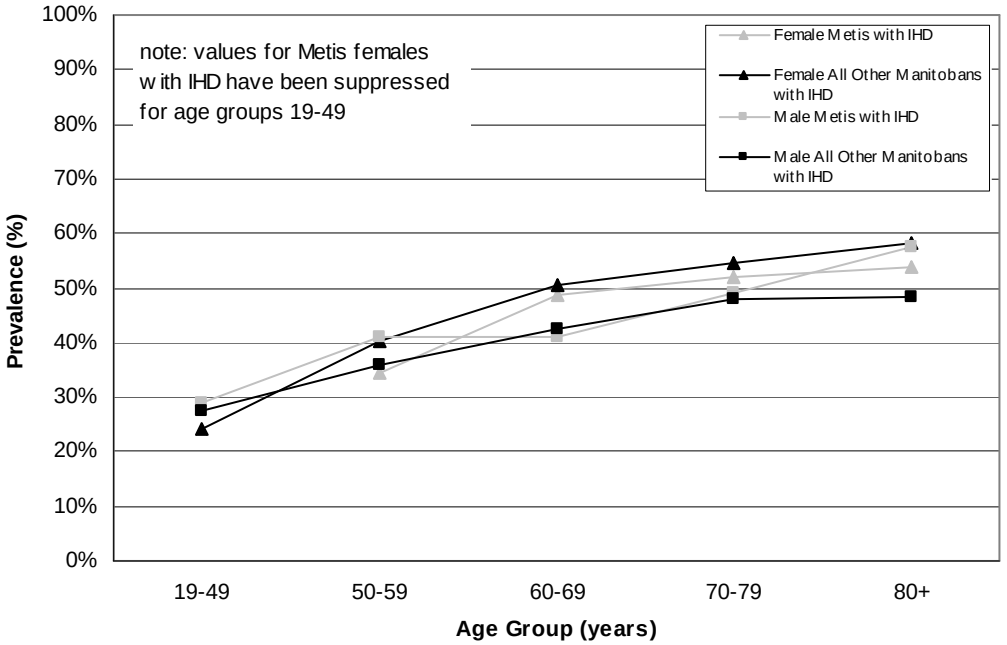
Crude percent of residents aged 19+ treated for high blood pressure



Source: MMF, 2012

Figure 4.3.4: Hypertension Prevalence in Winnipeg by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2006/07

Crude percent of residents aged 19+ treated for high blood pressure



Source: MMF, 2012

Findings from Literature Review

(Compared to the results in this study—*in italics*)

In 2000, the global prevalence of hypertension was estimated to be 26.4% or nearly 1 billion people. Rates are expected to continue to increase until the year 2025 when 29.2% (1.6 billion people) will be diagnosed with hypertension (Kearney, Whelton, Reynolds, Muntner, & He, 2005). In Canada, the age- and sex-standardized prevalence diagnosis of hypertension increased between the years 1998/99 and 2006/07 from 12.9% to 19.6% of the population. Moreover, it is estimated that 90% of Canadians will develop hypertension over their lifetime (PHAC, 2010a). In Manitoba, hypertension prevalence rose from 20.6% to 23.7% for the period of 2000/01–2005/06 (Fransoo et al., 2009). Compounding the public health issue are high rates of under-diagnosis of hypertension recorded in several countries including Canada (Falagas, Vardakas, & Vergidis, 2007). Undiagnosed and untreated hypertension can lead to increased likelihood of suffering from an undiagnosed chronic condition (Wilper et al., 2009)

In the Metis Atlas, the age- and sex-adjusted prevalence of hypertension in Metis in Manitoba was higher compared to All Other Manitobans (27.9% vs. 24.8%) with higher rates in all RHAs with the exception of Brandon RHA (Martens, Bartlett, et al., 2010). In the Diabetes in Metis in Manitoba study Metis with diabetes had a lower age- and sex-adjusted prevalence of hypertension compared to All Other Manitobans with diabetes (46.9% vs. 51.5%) in Manitoba (Bartlett, Sanguins, Carter, Hoeppner, & Mehta 2010).

There are no comparative studies examining the prevalence of hypertension for Metis with IHD in the literature. In our study, Metis in Manitoba have similar age- and sex-adjusted hypertension prevalence as All Other Manitobans (21.6% vs. 21.0%) in Manitoba. In Mid aggregate area, Metis have a higher rate of hypertension compared to All Other Manitobans (24.8% vs. 22.0%), which is similar to our findings in the Metis Atlas. Among the RHAs, Metis with IHD in Parkland RHA have a higher rate of hypertension compared to All Other Manitobans (24.9% vs. 20.8%). There are no differences between Metis with IHD and All Other Manitobans with IHD among the Winnipeg CAs.

While no provincial difference was found for hypertension there are significantly higher rates for Metis in some geographical areas in Manitoba. However, we would expect to see higher rates of hypertension overall for those with Ischemic Heart Disease—these inconsistent findings suggest the need for ongoing surveillance.

4.4 Diabetes Prevalence

Diabetes is a chronic disease caused by either an inherited or acquired deficiency of insulin production by the pancreas or by the ineffectiveness of the insulin produced by the pancreas (Lin & Sun, 2010; PHAC, 2010c). Diabetes is a major risk factor for high blood pressure, heart disease, and vascular disease (Gaede et al., 2003). Although the exact mechanism is not known, it is believed that diabetes enhances atherosclerosis (fat deposition in arterial walls) that leads to ischemic heart attacks due to arterial narrowing and lack of blood supply to the heart muscle. The risk of having CVD increases with time, so the longer you have diabetes the greater the chance of having CVD (PHAC, 2009; PHAC, 2011; Timmis, 2001).

Both the age- and sex-adjusted and the age- and sex-specific crude prevalence of diabetes were measured for residents aged 19 years and older over three fiscal years: 2004/05-2006/07. Residents were considered to have diabetes if they met one of the following conditions:

- one or more hospitalizations with a diagnosis of diabetes: ICD-9-CM code 250, ICD-10-CA codes E10-E14
- two or more physician visits with a diagnosis of diabetes (ICD-9-CM codes as above)
- one or more prescriptions for medications to treat diabetes

The denominator includes all Manitoba residents aged 19 years or older in the three-year time period who were continuously registered with Manitoba Health for at least one year in the three-year time period.

Key observations:

Metis with IHD and All Other Manitobans with IHD

Manitoba (Figure 4.4.1):

- Metis have a higher prevalence of diabetes compared to All Other Manitobans in Manitoba (20.0% vs. 16.5%)

Aggregate areas (Figure 4.4.1):

- Metis have a higher prevalence of diabetes compared to All Other Manitobans in Rural South (17.7% vs. 14.8%) and Mid (21.0% vs. 17.4%) aggregate area
- All Other Manitobans have a higher prevalence of diabetes compared to their provincial average in North aggregate area (28.3% vs. 16.5%) whereas they have a lower prevalence of diabetes compared to their provincial average in Rural South aggregate area (14.8% vs. 16.5%)
- There is a clear diabetes prevalence gradient for both Metis and All Other Manitobans which increases from the most healthy to the least healthy aggregate areas as ordered by PMR

RHAs (Figure 4.4.1):

- Metis have a higher prevalence of diabetes compared to All Other Manitobans in Central (19.6% vs. 13.8%), Brandon (23.9% vs. 14.9%), Winnipeg (19.6% vs. 15.8%), Interlake (21.8% vs. 16.5%), and Parkland (21.4% vs. 15.8%) RHAs

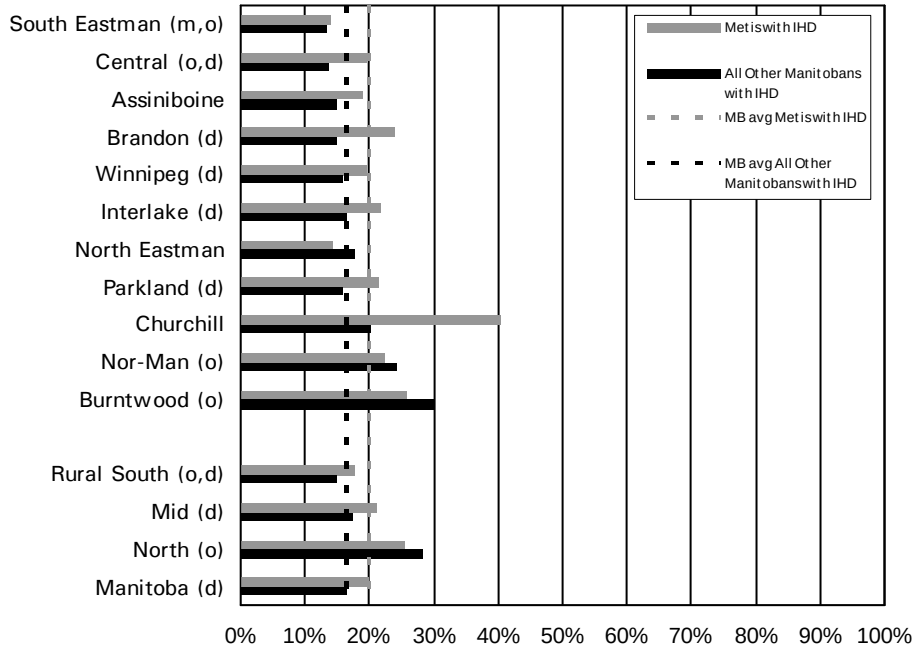
- Metis have a lower prevalence of diabetes compared to their provincial average in South Eastman RHA (13.9% vs. 20.0%)
- All Other Manitobans have a higher prevalence of diabetes compared to their provincial average in Nor-Man (24.4% vs. 16.5%) and Burntwood (30.0% vs. 16.5%) RHAs whereas they have a lower prevalence of diabetes compared to their provincial average in South Eastman (13.3% vs. 16.5%) and Central (13.8% vs. 16.5%) RHAs
- There is no diabetes prevalence gradient for either Metis or All Other Manitobans among the RHAs

Winnipeg CAs (Figure 4.4.2):

- Metis have a higher prevalence of diabetes compared to All Other Manitobans in Fort Garry (20.1% vs. 12.9%), St. Boniface (18.7% vs. 13.1%), River Heights (21.1% vs. 13.4%), and River East (18.9% vs. 14.4%) CAs
- All Other Manitobans have a higher prevalence of diabetes compared to their provincial average in Downtown (19.2% vs. 16.5%) and Point Douglas (19.6% vs. 16.5%) Winnipeg CAs whereas All Other Manitobans have a lower prevalence of diabetes compared to their provincial average in Fort Garry (12.9% vs. 16.5%), Assiniboine South (11.5% vs. 16.5%), St. Boniface (13.1% vs. 16.5%), St.Vital (13.0% vs. 16.5%), River Heights (13.4% vs. 16.5%), River East (14.4% vs. 16.5%) and St. James–Assiniboia (12.8% vs. 16.5%) CAs
- There is no clear diabetes prevalence gradient for Metis and All Other Manitobans at the CAs level

Figure 4.4.1: Diabetes Prevalence by RHA for Metis with IHD and All Other Manitobans with IHD by RHA, 2004/05-2006/07

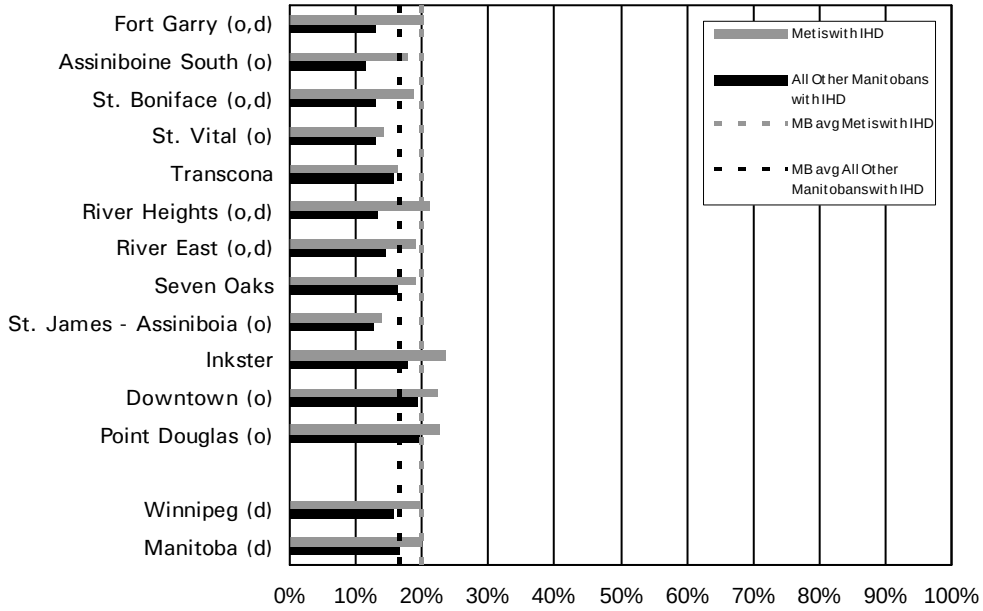
Age- and sex-adjusted percent of residents aged 19+ in a three-year period



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases) Source: MMF, 2012

Figure 4.4.2: Diabetes Prevalence by Winnipeg Community Area for Metis with IHD and All Other Manitobans with IHD, 2004/05-2006/07

Age- and sex-adjusted percent of residents aged 19+ in a three-year period



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases) Source: MMF, 2012

Age- and Sex-Specific:

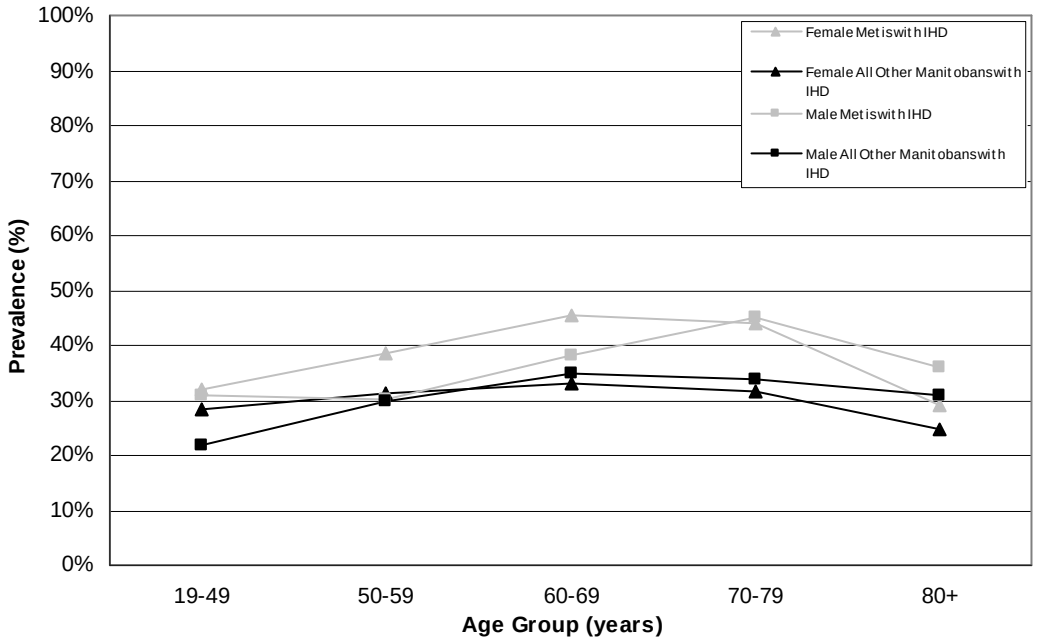
Manitoba (Figure 4.4.3):

- Throughout their lives, the crude prevalence of diabetes in Metis males and Metis females increases with age until it decreases for Metis males at the age of 80 years and older and decreases for Metis females by the age of 70 years
- Throughout their lives, Metis males and Metis females have a higher crude prevalence of diabetes compared to All Other Manitoban males and All Other Manitoban females, respectively
- Between the ages of 19 and 69 years, Metis males have a lower crude prevalence of diabetes compared to Metis females but by the age of 70-79 years Metis males have a similar crude prevalence of diabetes to Metis females (45.1% vs. 44.0%), and by age 80 years and older Metis males have a much higher crude prevalence of diabetes compared to Metis females (36.1% vs. 29.0%)

Winnipeg (Figure 4.4.4):

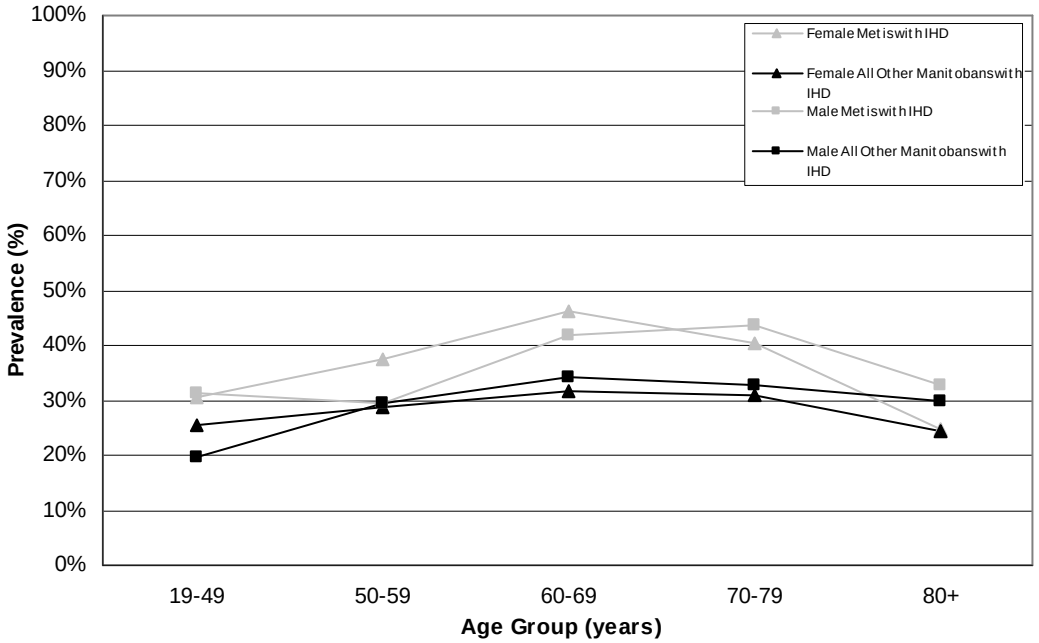
- As in Figure 4.4.3, the crude prevalence of diabetes in Winnipeg followed the same age and sex pattern as in Manitoba, with the following exceptions:
- Throughout their lives Metis males have a much higher crude prevalence of diabetes compared to All Other Manitobans except between age 50 and 59 years when they have a similar prevalence
- Throughout their lives Metis females have a higher crude prevalence of diabetes compared to Metis males until age 70 years when the prevalence of diabetes in males becomes higher than that of females

Figure 4.4.3: Diabetes Prevalence in Manitoba by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2004/05-2006/07
Crude percent of residents aged 19+ in a three-year period



Source: MMF, 2012

Figure 4.4.4: Diabetes Prevalence in Winnipeg by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2004/05-2006/07
Crude percent of residents aged 19+ in a three-year period



Source: MMF, 2012

Findings from the Literature Review

(Compared to the results in this study—*in italics*)

In 2000 there were more than 171 million people living with diabetes worldwide, and it is predicted that the global prevalence will increase to 366 million by 2030 (WHO, 2006). Slightly over 6% of the Canadian population aged one year and older has been diagnosed with either Type 1 or Type 2 diabetes (Loukine, Waters, Choi, & Ellison, 2010). In Manitoba, the overall age-adjusted diabetes prevalence rate among those over the age of 19 doubled from 6.7% to 8.7% between the years 1998/99 and 2005/06 (Fransoo et al., 2009).

Diabetes is a health concern within the Metis population. In the Aboriginal Peoples Survey, 7% of Metis self-reported having been diagnosed with diabetes compared to 4% of the total Canadian population (Janz, Seto, & Turner, 2009). In B.C. 34% of the Métis Nation of B.C. reported having diabetes or having a family member with diabetes (Hutchinson, Evans, & Reid, 2007). In the Métis Nation of Ontario, a higher age- and sex-adjusted rate for diabetes was found in the Métis compared to the general Ontario population (8.1 vs. 6.4 per 100). In the Metis Atlas, Metis had a higher age- and sex-adjusted prevalence of diabetes compared to All Other Manitobans (11.8% vs. 8.8%) at the provincial level and a higher prevalence for Metis compared to All Other Manitobans in the Rural South (10.0% vs. 7.8%) and Mid (12.3% vs. 9.7%) aggregate areas (Martens, Bartlett, et al., 2010). In the Diabetes in Metis in Manitoba study, the age- and sex-adjusted prevalence of diabetes at the provincial level was similar to the Metis Atlas (12.0% vs. 8.9%) as were the higher levels in the Rural South (10.1% vs. 7.9%) and Mid aggregate geographic areas (Bartlett, Sanguins, Carter, Hoeppner, & Mehta, 2010). Information in those studies was not specific to persons living with IHD.

Ischemic heart disease is a serious preventable complication of diabetes that leads to substantial disease burden, increased health services use, and premature mortality (Zeber & Parchman, 2010). An observational study of 313 participants receiving care at 20 different health care clinics for type 2 diabetes showed that the overall level of current IHD risk was dangerously elevated (Zeber & Parchman, 2010). The absolute risk for IHD was 16.2% (Zeber & Parchman, 2010). Individuals with diabetes are at a greater risk of developing coronary heart disease (Conner-Barrett et al., 2003) with four times as many Canadians with diabetes reported having heart disease (PHAC, 2011). In a recent report by the Métis Nation of Ontario there was a higher age- and sex-adjusted rate of a hospital visit for a heart attack among those with diabetes compared to the general Ontario population with diabetes (1.36 vs. 0.73 per 100) (Shah et al., 2010). Aside from that study there is no Metis-specific health information related to rates of IHD or coronary artery disease (CAD) in Metis with diabetes.

There are known differences between men and women with diabetes. A meta-analysis study exploring the sex differences in coronary heart disease mortality among patients with type 2 diabetes mellitus found that men had a lower odds ratio of coronary heart disease mortality due to diabetes (OR=2.3, 95% confidence internal, 1.9-2.8) compared to women (OR=2.9, 95% confidence interval, 2.2-3.8) (Kanaya, Grady, & Barrett-Connor, 2002). A woman with type 2 diabetes has an 8-fold greater risk of heart disease than a woman without diabetes (Lassko, 1995). There is no Metis-specific age- and sex-specific health information related to rates of IHD or CAD in Metis with diabetes.

In the literature, there are no comparative studies examining the prevalence of diabetes for Metis with IHD in Manitoba. In our study, Metis with IHD have a higher prevalence of diabetes compared to All Other Manitobans with IHD (20.0% vs. 16.5%) at the provincial level. Among the aggregate areas Metis have a

higher prevalence of diabetes compared to All Other Manitobans in Rural South (17.7% vs. 14.8%) and Mid (21.0% vs. 17.4%) aggregate areas. This is similar to the findings in the Metis Atlas and in the Diabetes in Metis in Manitoba study in which Metis had higher prevalence of diabetes compared to All Other Manitobans in Rural South and Mid aggregate areas.

In Ischemic Heart Disease in Metis in Manitoba , there is an increasing PMR gradient for aggregate areas, which illustrates Metis with IHD in the least healthy aggregate areas have the highest prevalence of diabetes. Throughout most of their lives the crude prevalence of diabetes increases with age for Metis males and Metis females and is higher in Metis males compared to All Other Manitoban males and for Metis females compared to All Other Manitoban females.

The information contained in this report confirms that Metis with IHD have a higher prevalence of diabetes than do All Other Manitobans with IHD in the province. It is important to note that Metis with IHD in Manitoba have a prevalence of diabetes that is higher than that seen in the Metis Atlas (11.8% vs. 8.8%) and in the Manitoba study (12.0% vs. 8.9%), indicating the importance of diabetes as a co-morbid condition of IHD among Metis (Bartlett et al., 2010; Martens, Bartlett et al., 2010).

4.5 Stroke Incidence Rate

Stroke results from the interruption of blood in the brain caused by a blood clot (ischemic stroke) or bleeding in the brain (intra-cerebral or subarachnoid hemorrhage stroke). Eighty percent of strokes are classified as ischemic (Canadian Stroke Network, 2011). Currently in Canada there are 300,000 people living with the effects of stroke and receiving care from health care workers, family, and friends (PHAC, 2009).

Both the age- and sex-adjusted and the age- and sex-specific incidence rate of stroke for residents with IHD aged 40 years and older were measured over five fiscal years: 2002/03-2006/07. Residents were considered to have a stroke if they met one of the following criteria:

- an inpatient hospitalization with the most responsible diagnosis of stroke and a length of stay of one or more days (unless the patient deceased in hospital)
- a death with stroke listed as the cause of death on the deceased individual's vital statistics death record

Diagnosis codes used to identify strokes include ICD-9-CM codes 431, 434, 436, and ICD-10-CA codes I61, I63, I64. Transfers between hospitals were tracked and only hospital episodes were counted (not individual separations) to avoid double-counting.

The denominator includes all Manitoba residents aged 40 years and older in a five-year time period who were continuously registered with Manitoba Health for at least one-year in the five-year time period.

Key observations:

Metis with IHD and All Other Manitobans with IHD

Manitoba (Figure 4.5.1)

- There is no difference in incidence of stroke between Metis and All Other Manitobans in Manitoba (9.3 vs. 9.6 per 1,000)

Aggregate areas (Figure 4.5.1):

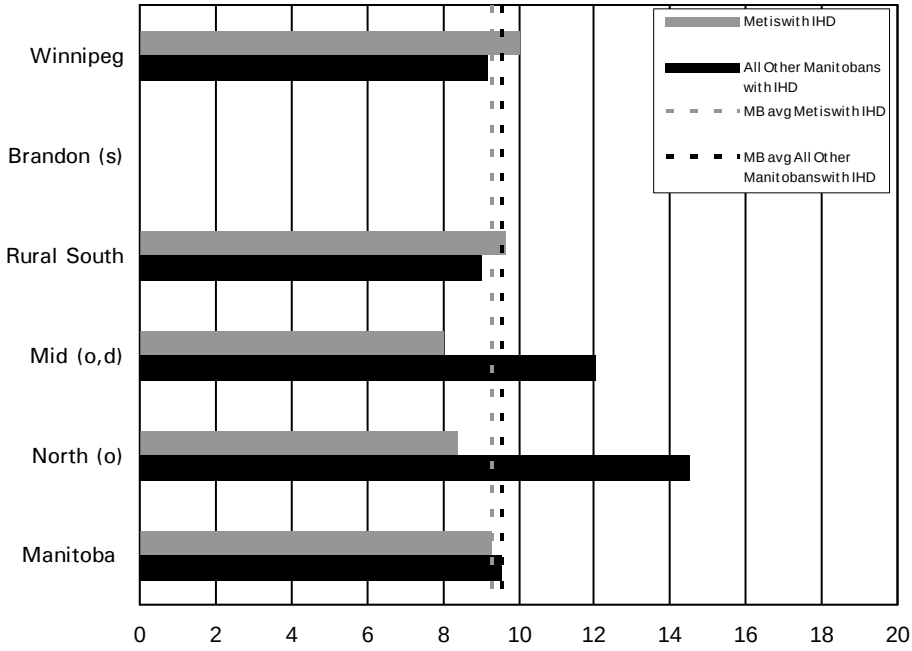
- Metis have a lower incidence of stroke compared to All Other Manitobans in Mid (8.0 vs. 12.0 per 1,000) aggregate area
- All Other Manitobans have a higher incidence of stroke compared to their provincial average in Mid (12.0 vs. 9.6 per 1,000) and North (14.5 vs. 9.6) aggregate areas
- There is no stroke incidence gradient for Metis but there is a gradient for All Other Manitobans from most healthy to least healthy at the aggregate level as ordered by PMR

RHAs (Figure 4.5.1):

- There is no difference in incidence of stroke between Metis and All Other Manitobans in Winnipeg RHA (10.0 vs. 9.2 per 1,000)

Figure 4.5.1: Stroke Rate by Aggregate Areas for Metis with IHD and All Other Manitobans with IHD, 2002/03-2006/07

Age- & sex-adjusted annual rate of death or hospitalization for stroke, per 1,000 residents aged 40+ years



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis with IHD
'o' indicates the area's rate for All Other Manitobans with IHD was statistically different from the Manitoba average for All Other Manitobans with IHD
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers

Source: MMF, 2012

Due to small numbers we were unable to produce stroke incidence data for each individual RHA or for Winnipeg CAs.

Age- and Sex-Specific:

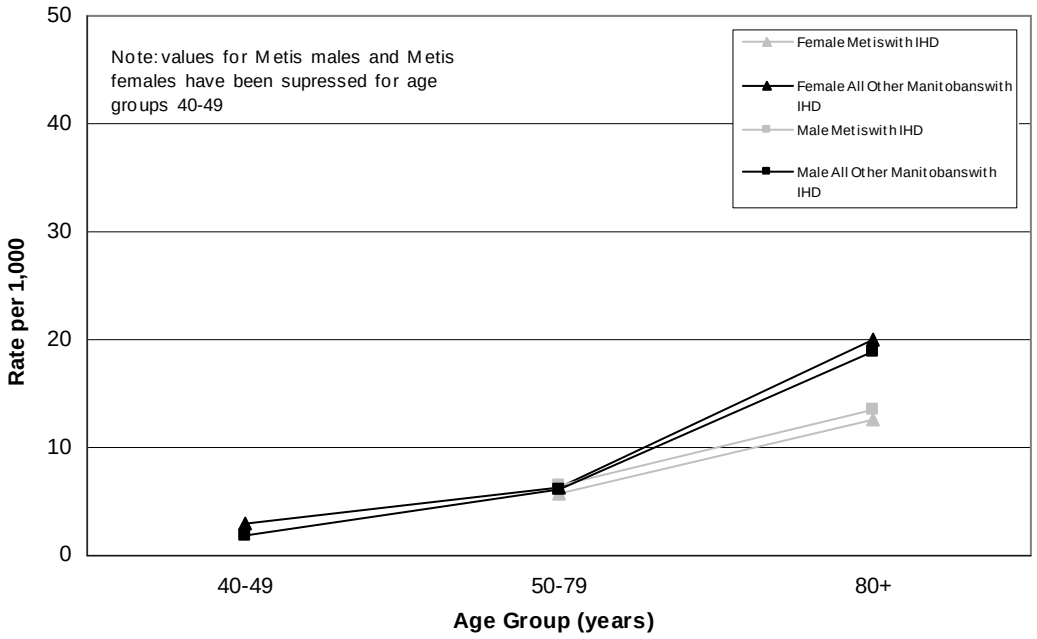
Manitoba (Figure 4.5.2):

- Throughout their lives, for both Metis males and Metis females crude stroke incidence increases with age
- Metis males have similar crude stroke incidence as All Other Manitoban males between ages of 40 and 79 years but Metis males have a lower crude stroke incidence at age 80 years and older
- Metis females have a similar crude stroke incidence between the ages of 40 and 79 years compared with All Other Manitoban females but by age 80 years and older Metis females have a much lower crude stroke incidence compared to All Other Manitoban females (12.7 vs. 20.1)
- Throughout their lives Metis males and Metis females have a similar crude stroke incidence

Winnipeg (Figure 4.5.3):

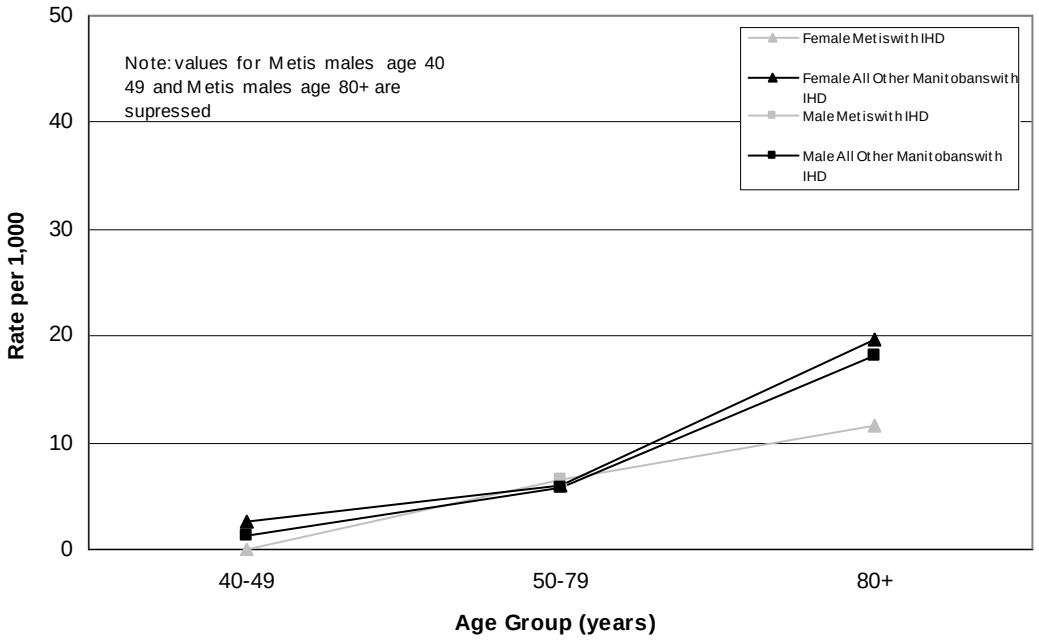
- Throughout their lives, for both Metis males and Metis females the crude stroke incidence increases with age
- Metis males and Metis females have similar crude stroke incidence compared to All Other Manitoban males and All Other Manitoban females between the ages of 40 and 79 years; from the age of 80 years and older Metis females have a lower crude stroke incidence compared to All Other Manitoban females (11.6 vs. 19.7)
- Throughout their lives, Metis males and Metis females have a similar crude stroke incidence

Figure 4.5.2: Stroke Rate in Manitoba by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2002/03-2006/07
Crude rate of residents per 1,000 aged 40+ in a five-year period



Source: MMF, 2012

Figure 4.5.3: Stroke Rate in Winnipeg by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2002/03-2006/07
Crude rate of residents per 1,000 aged 40+ in a five-year period



Source: MMF, 2012

Findings from the Literature Review
(Compared to the results in this study—*in italics*)

Stroke is the leading cause of disability and the second leading cause of death in the world (Canadian Stroke Network, 2011; O'Donnell et al., 2010). Between the ages of 65 and 74 years, 7.1% of Canadians were living with the effects of stroke (Canadian Stroke Network, 2011). While there are multiple causes of stroke, increased blood pressure is the greatest risk factor in the general population (Kuller et al., 1985). It is believed that over the next 20 years, stroke rates in Canada will increase due to our aging population, obesity, and diabetes (Canadian Stroke Network, 2011).

Transient ischemic attacks (TIAs) are a strong predictor of future stroke: one-third of people who have had stroke have had a TIA; and 50%–60% of TIAs are thought to be undiagnosed or under-diagnosed (Canadian Stroke Network, 2011; Falagas, Vardakas, & Vergidis et al., 2007; PHAC, 2009). Primary prevention of stroke involves identifying risk factors for stroke such as screening for hypertension and management of diabetes, while secondary prevention occurs in hopes to prevent recurrent stroke or TIA with a focus on lifestyle modifications (Lindsay et al., 2010).

Among the Metis in British Columbia, 8.1% of respondents identified themselves or a family member as having had a stroke (Hutchinson, Evans, & Reid, 2007). The Metis Atlas reported a higher incidence rate of stroke in Metis compared to All Other Manitobans at the provincial level (3.6 vs. 2.9 per 1,000), and Assiniboine (4.7 vs. 2.8 per 1,000), Brandon (5.3 vs. 2.0), and Winnipeg (3.5 vs. 2.7) RHAs (Martens, Bartlett, et al., 2010). In the 'Diabetes in Metis in Manitoba' study, provincially there was no difference in the stroke rate between Metis with diabetes and All Other Manitobans with diabetes (6.4 vs. 3.6 per 1,000) but rates were higher overall than in the Metis Atlas. Information in those studies was not specific to persons living with IHD.

There are no comparative studies examining the incidence rates of stroke for Metis with IHD in the literature. In our study, there is no statistical difference in incidence rates of stroke between Metis with IHD and All Other Manitobans with IHD in Manitoba (9.3 vs. 9.6 per 1,000). Metis with IHD in Mid aggregate areas have a higher stroke incidence rate (8.0 vs. 12.0 per 1,000) compared to All Other Manitobans with IHD. In Winnipeg RHA there is no difference between Metis with IHD compared to All Others Manitobans with IHD (10.0 vs. 9.2 per 1,000). Throughout their lives, crude stroke incidence increases with age for both Metis males and Metis females in Manitoba. Throughout their lives, stroke incidence is similar for Metis males and Metis females to All Other Manitoban males and All Other Manitoban females, respectively but by age 80 years and older Metis males and Metis females have a lower stroke incidence rate compared to All Other Manitoban males and All Other Manitoban females in Manitoba, respectively.

Stroke is a condition significantly affecting quality of life for individuals and families. Although not statistically significant, the rate of stroke in Metis in Manitoba with IHD is higher than in the Metis Atlas (3.6 vs. 2.9 per 1,000) and in the Diabetes in Metis in Manitoba studies (6.4 vs. 3.6 per 1,000) at a provincial level. The rates of stroke seen in each of these studies suggest that concerted primary and secondary prevention efforts would benefit our population.

4.6 Congestive Heart Failure Prevalence

Congestive Heart Failure (CHF), also known as congestive cardiac failure, or simply heart failure, is a progressive disorder which occurs after there is damage to the muscles of the heart that prevent its ability to pump effectively (Mann, 2011).

Both the age- and sex-adjusted and the age- and sex-specific prevalence of CHF for residents with IHD aged 19 years and older were measured over three fiscal years: 2004/05-2006/07. Residents were considered to have CHF if they met one of the following criteria:

- one or more hospitalizations with the following diagnosis codes: ICD-9-CM: 428 or ICD-10-CA: I50.0, I50.1, I50.9, I13.0, I13.2 in any diagnosis field over a three-year period OR
- one or more physician claims with ICD-9-CM diagnosis code 428 over a three-year period

The denominator includes all Manitoba residents aged 40 years and older in a three-year time period who were continuously registered with Manitoba Health for at least one year in a three-year time period.

Key observations:

Metis with IHD and All Other Manitobans with IHD

Manitoba (Figure 4.6.1):

- There is no difference in prevalence of CHF between Metis and All Other Manitobans in Manitoba (10.8% vs. 10.8%)

Aggregate areas (Figure 4.6.1):

- There is no difference in prevalence of CHF between Metis and All Other Manitobans in aggregate areas
- All Other Manitobans have a higher prevalence of CHF compared to their provincial average in North aggregate area (15.9% vs. 10.8%) whereas All Other Manitobans have a lower prevalence of CHF compared to their provincial average in Rural South (9.0% vs. 10.8%)
- There is a CHF prevalence gradient for both Metis and All Other Manitobans with CHF increasing from the most healthy to the least healthy aggregate areas as ordered by PMR

RHAs (Figure 4.6.1):

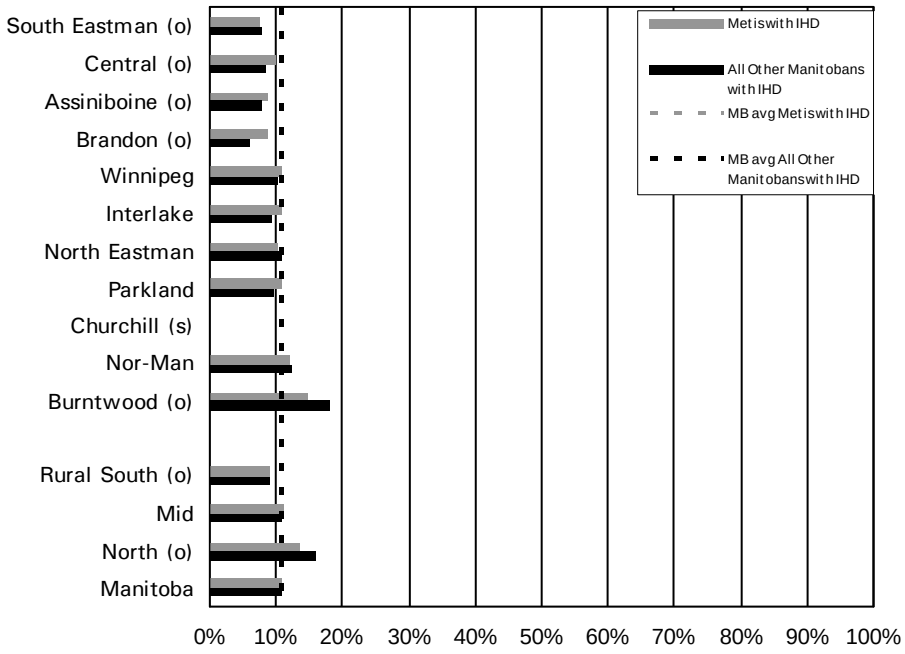
- There is no difference in prevalence of CHF between Metis and All Other Manitobans in RHAs
- All Other Manitobans have a higher prevalence of CHF compared to their provincial average in Burntwood RHA (18.0% vs. 10.8%) whereas All Other Manitobans have a lower prevalence of CHF compared to their provincial average in South Eastman (8.0% vs. 10.8%), Central (8.5% vs. 10.8%), Assiniboine (7.8% vs. 10.8%), and Brandon (6.0% vs. 10.8%) RHAs
- There is no CHF prevalence gradient for either Metis or All Other Manitobans at the RHA level

Winnipeg CAs (Figure 4.6.2):

- Metis have a higher prevalence of CHF compared to All Other Manitobans in St. Boniface (10.2% vs. 7.2%) and Inkster (18.2% vs. 9.7%) CAs
- Metis have a higher prevalence of CHF compared to their provincial average in Inkster CA (18.2% vs. 10.8%)
- All Other Manitobans have a lower prevalence of CHF compared to their provincial average in Fort Garry (6.5% vs. 10.8%), Assiniboine South (6.2% vs. 10.8%), St. Boniface (7.2% vs. 10.8%), St. Vital (7.4% vs. 10.8%), River Heights (7.2% vs. 10.8%), River East (8.4% vs. 10.8%), Seven Oaks (8.5% vs. 10.8%), and St. James–Assiniboia (7.6% vs. 10.8%) CAs
- There is no CHF prevalence gradient for either Metis or All Other Manitobans from most healthy to least healthy CAs

Figure 4.6.1: Congestive Heart Failure Prevalence by RHA for Metis with IHD and All Other Manitobans with IHD, 2004/05-2006/07

Age- & sex-adjusted percent of residents aged 19+ in a three-year period

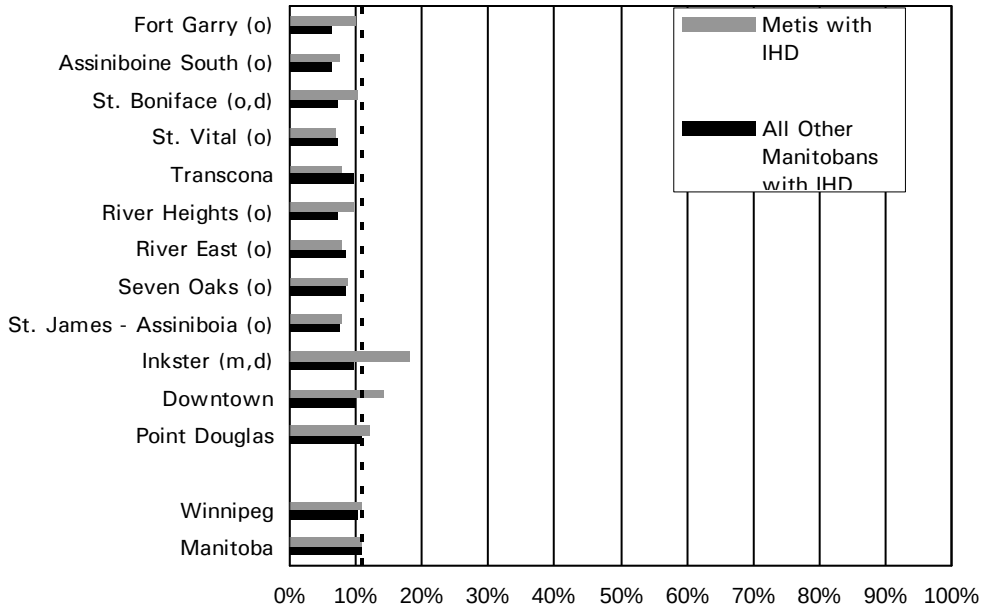


'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases)

Source: MMF, 2012

Figure 4.6.2: Congestive Heart Failure Prevalence by Winnipeg Community Area for Metis with IHD and All Other Manitobans with IHD, 2004/05-2006/07

Age- & sex-adjusted percent of residents aged 19+ in a three-year period



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases)

Source: MMF, 2012

Age- and Sex-Specific:

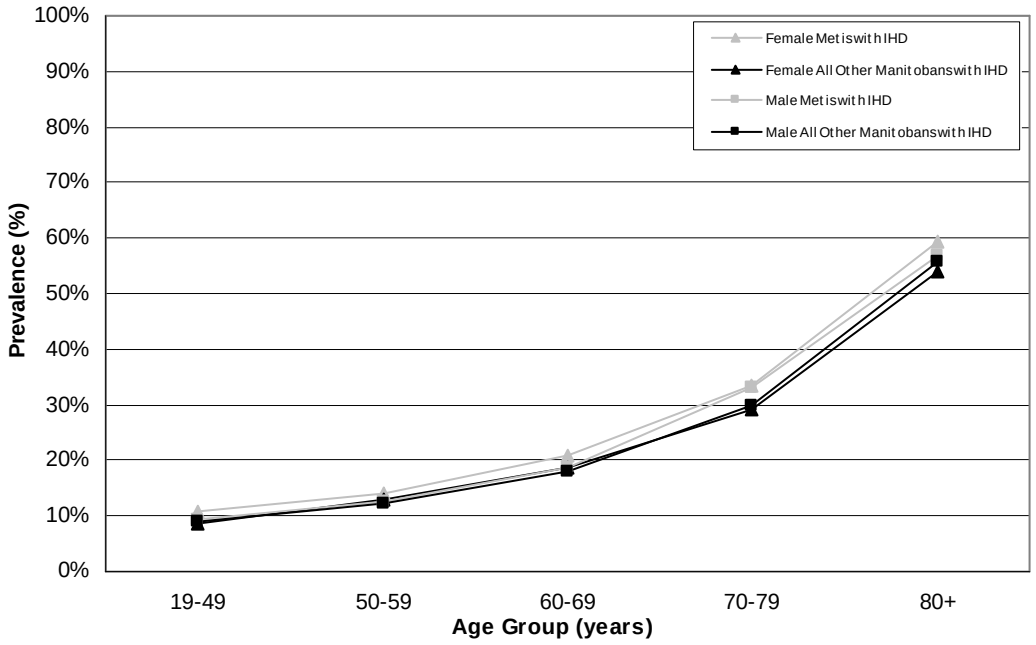
Manitoba (Figure 4.6.3):

- Throughout their lives, for both Metis males and Metis females the prevalence of CHF increases with age
- Throughout their lives, Metis males and Metis females have a similar crude prevalence of CHF compared to All Other Manitobans
- Throughout their lives, Metis males have a similar crude prevalence of CHF compared to Metis females

Winnipeg (Figure 4.6.4):

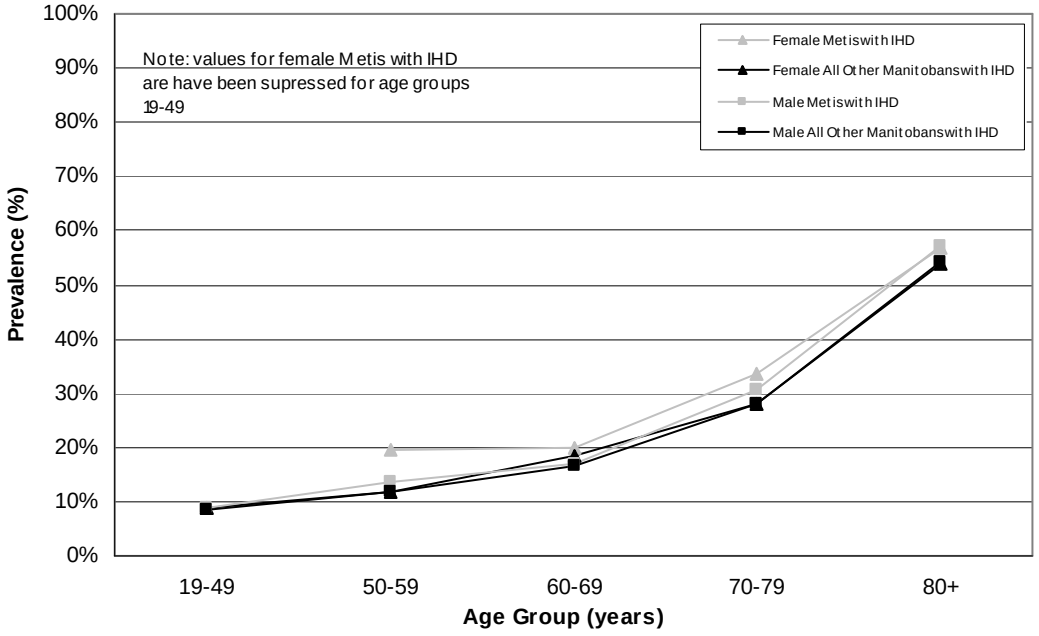
- As in Figure 4.6.3, the crude prevalence of CHF in Winnipeg follows the same age and sex pattern as in Manitoba

Figure 4.6.3: Congestive Heart Failure Prevalence in Manitoba by Age and Sex for Metis with IHD with and All Other Manitobans with IHD, 2004/05-2006/07
Crude percent of residents aged 19+ in a three-year period



Source: MMF, 2012

Figure 4.6.4: Congestive Heart Failure Prevalence in Winnipeg by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2004/05-2006/07
Crude percent of residents aged 19+ in a three-year period



Source: MMF, 2012

Findings from Literature Review

(Compared to the results in this study—*in italics*)

The prevalence of Congestive Heart Failure (CHF) has risen over time due to increased rates of diabetes, obesity, hypertension, and an aging population (Greenberg & Kahn, 2011). However, due to better management and improved medical treatment of CHF in Canada, the hospitalization rates for CHF have decreased over time; similarly the age- and sex-standardized mortality rate has decreased slightly (PHAC, 2009; Tu et al., 2009).

There are differences between men and women based on pathophysiology, diagnosis, and treatment of CHF (Shin, Hamad, Murthy, & Pinã, 2012). Fewer men develop and are diagnosed with CHF after age 79 years compared to women. Women who develop CHF are more likely to have hypertension and diabetes compared to men in whom the development of CHF is mostly secondary to heart disease (Shin, Hamad, Murthy, & Pinã, 2012).

Hypertension is a major predisposing risk factor for CHF (Kannel, 2000). Independent lifestyle risk factors for CHF are physical inactivity, cigarette smoking, hypertension, and obesity (He, Ogden, Bazzano, Vupputuri, Loria, & Whelton, 2001).

There are no comparative studies examining the prevalence of CHF for Metis with IHD in the literature. In our study, we found that there is no difference in the prevalence of CHF for Metis with IHD compared to All Other Manitobans with IHD (10.8% vs. 10.8%) at the provincial level. There are no differences in aggregate areas or in RHAs between Metis and All Other Manitobans. Metis with IHD have a higher prevalence of CHF compared with All Other Manitobans with IHD in St. Boniface (10.2% vs. 7.2%) and Inkster (18.2% vs. 9.7%) CAs. Throughout their lives, for both Metis males and Metis females; the crude prevalence of CHF increases over time in Manitoba. Both Metis males and Metis females have similar crude prevalence of CHF compared to All Other Manitoban males and All Other Manitoban females, respectively.

While provincially Metis with IHD have similar CHF prevalence compared to All Other Manitobans with IHD, findings still suggest that one-tenth of those with IHD are also living with congestive heart failure. Further investigation is warranted for Metis in St. Boniface and Inkster CAs in whom a higher prevalence of CHF compared to All Other Manitobans was found. Half of Metis men and women aged 80 and older living with IHD are diagnosed with CHF. This finding suggests a need for increased screening and secondary prevention services.

4.7 Prevalence of Depression

Depression is a common mood disorder with symptoms that include depressed mood or sadness, anger, frustration, loss of interest or pleasure in activities that were once enjoyable, sleep and appetite disturbances, feelings of worthlessness, helplessness, and guilt (Patten & Juby, 2008). While in many cases these symptoms are a natural response to life circumstances, they are generally categorized as part of a clinical disorder when they significantly impair daily functioning for an extended period of time (Parikh, Lam, & the CANMAT Depression Work Group, 2001).

Both the age- and sex-adjusted and age- and sex-specific prevalence of depression for residents with IHD aged 19 years and older were measured over five fiscal years: 2002/03-2006/07. Residents were considered to have depression if they met one of the following conditions:

- one or more hospitalizations with a diagnosis for depressive disorder, affective psychoses, neurotic depression or adjustment reaction: ICD-9-CM codes 296.2-296.8, 300.4, 309 or 311; ICD-10-CA codes F31, F32, F33, F341, F38.0, F38.1, F41.2, F43.1, F43.2, F43.8, F53.0, F93.0
- one or more physician visits with a diagnosis for depressive disorder, affective psychoses or adjustment reaction: ICD-9-CM codes 296, 309 or 311
- one or more hospitalizations with a diagnosis for anxiety disorders: ICD-9-CM code 300; ICD-10-CA codes F32.0, F34.1, F40, F41, F42, F44, F45.0, F451, F452, F48, F68.0, or F99 AND one or more prescriptions for an antidepressant or mood stabilizer: ATC codes N03AB02, N03AB52, N03AF01, N05AN01, N06A
- one or more physician visits with a diagnosis for anxiety disorders: ICD-9-CM code 300, AND one or more prescriptions for an antidepressant or mood stabilizer: ATC codes N03AB02, N03AB52, N03AF01, N05AN01, N06A

The denominator includes all Manitoba residents aged 19 years and older in the five-year time period who were continuously registered with Manitoba Health for at least one year in the five-year time period.

Key observations:

Metis with IHD and All Other Manitobans with IHD

Manitoba (Figure 4.7.1):

- There is no difference in prevalence of depression between Metis and All Other Manitobans in Manitoba (31.7% vs. 31.3%)

Aggregate areas (Figure 4.7.1):

- There is no difference in the prevalence of depression between Metis and All Other Manitobans by aggregate areas
- All Other Manitobans have a lower prevalence of depression compared to their provincial average in Mid (27.3% vs. 31.3%), and North (22.4% vs. 31.3%) aggregate areas

- There is no depression prevalence gradient for either Metis or All Other Manitobans at the aggregate level as ordered by PMR

RHA (Figure 4.7.1):

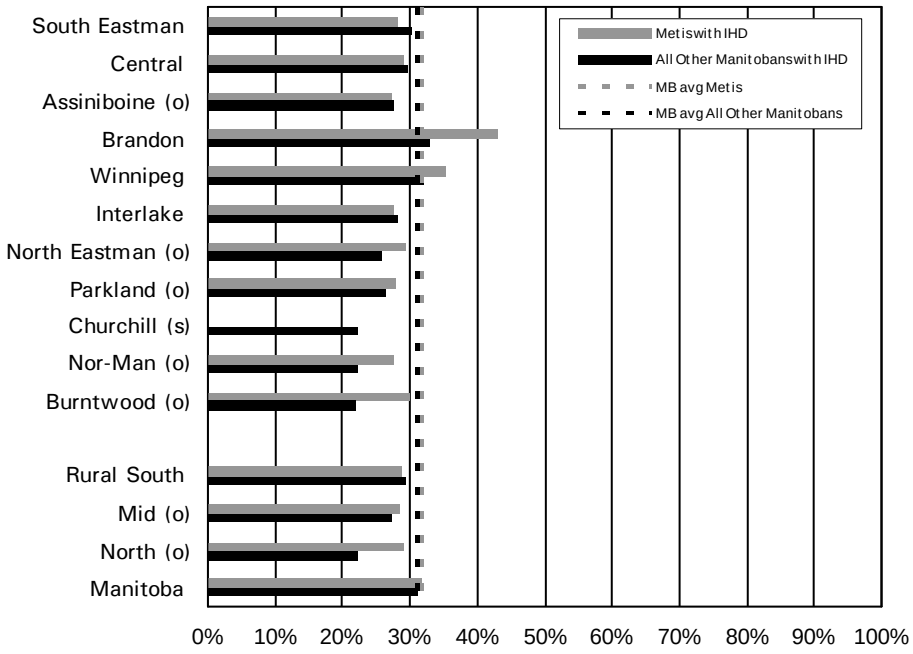
- There is no difference in the prevalence of depression between Metis and All Other Manitobans by RHAs
- All Other Manitobans have a lower prevalence of depression compared to their provincial average in Assiniboine (27.6% vs. 31.3%), North Eastman (25.8% vs. 31.3%), Parkland (26.3% vs. 31.3%), Nor-Man (22.2% vs. 31.3%), and Burntwood (22.0% vs. 31.3%) RHAs
- There is no prevalence gradient for either Metis or All Other Manitobans at the RHA level

Winnipeg CA (Figure 4.7.2):

- Metis have a higher prevalence of depression compared to All Other Manitobans in River East (37.3% vs. 28.6%) and Downtown (45.1% vs. 33.7%) CAs
- Metis have a higher prevalence compared to their provincial average in Downtown CA (45.1% vs. 31.7%)
- All Other Manitobans have a lower prevalence compared to their provincial average in River East CA (28.6% vs. 31.3%)
- There is no prevalence gradient for either Metis or All Other Manitobans at the CAs level

Figure 4.7.1: Prevalence of Depression by RHA for Metis with IHD and All Other Manitobans with IHD, 2002/03-2006/07

Age- & sex-adjusted percent of residents aged 19+ in a five-year period

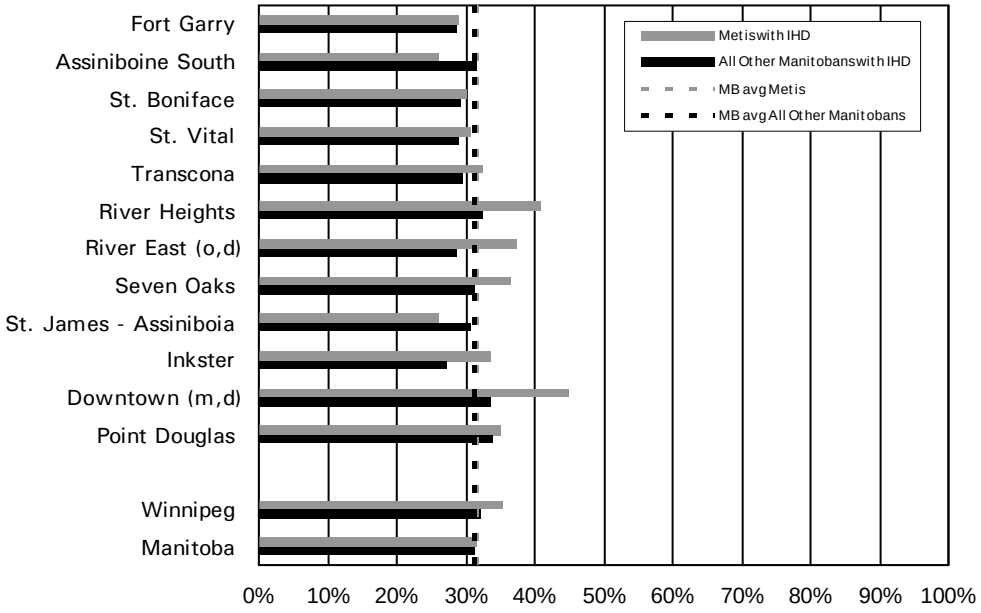


'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases)

Source: MMF, 2012

Figure 4.7.2: Prevalence of Depression by Winnipeg Community Area for Metis with IHD and All Other Manitobans with IHD, 2002/03-2006/07

Age- & sex-adjusted percent of residents aged 19+ in a five-year period



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases)

Source: MMF, 2012

Age- and Sex-Specific:

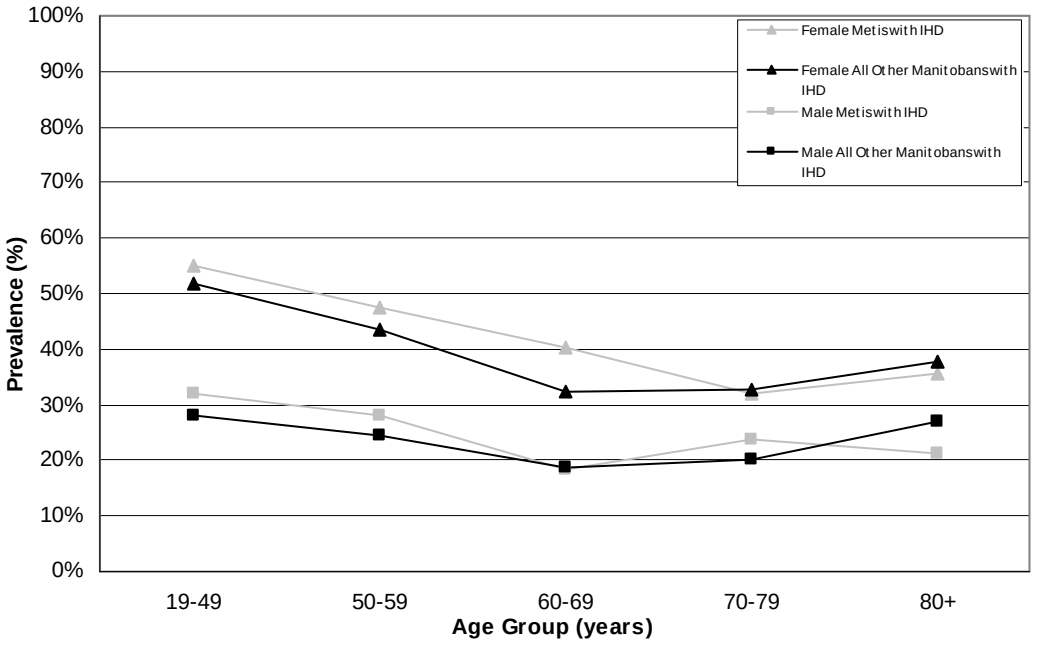
Manitoba (Figure 4.7.3):

- Throughout most of their lives, for both Metis males and Metis females crude depression prevalence decreases with age
- Between the ages of 19 and 59 years, Metis males have a higher crude prevalence of depression compared to All Other Manitoban males, between the ages of 60 and 69 years Metis males have a similar crude prevalence of depression compared to All Manitoban males (18.4% vs. 18.7%) but then at age 80 years and older Metis males have a lower crude prevalence of depression compared to All Other Manitoban males
- Between the ages of 19 and 69 years, Metis females have a higher crude prevalence of depression compared to All Other Manitoban females. Between the ages of 70 and 79 years Metis females and All Other Manitoban females have a similar crude prevalence of depression (32.0% vs. 32.9%) and remained as such for the rest of their lives
- Between the ages of 19 and 49 years, Metis males have a lower crude prevalence of depression compared to Metis females (31.9% vs. 55.1%)

Winnipeg (Figure 4.7.4):

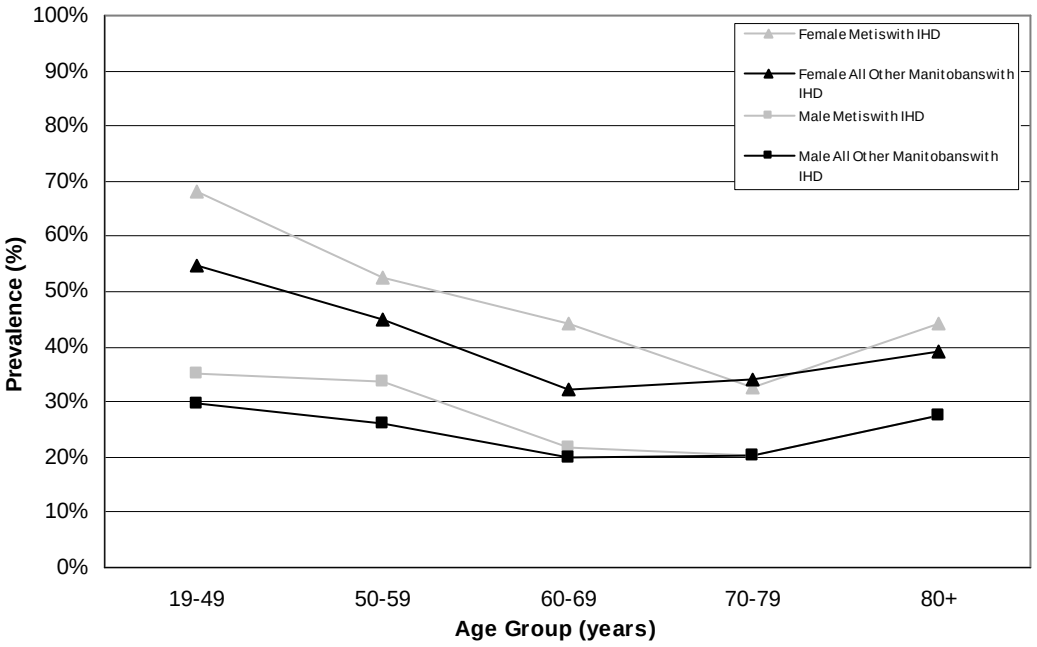
- As in Figure 4.7.3, the crude prevalence of depression in Winnipeg followed the same age and sex patterns as in Manitoba

Figure 4.7.3: Prevalence of Depression in Manitoba by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2002/03-2006/07
Crude percent for residents aged 19+ in a five-year period



Source: MMF, 2012

Figure 4.7.4: Prevalence of Depression in Winnipeg by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2002/03-2006/07
Crude percent for residents aged 19+ in a five-year period



Source: MMF, 2012

Findings from the Literature Review

(Compared to the results in this study—*in italics*)

Depression is one of the most prevalent mental disorders in the world and in Canada (Kirby, 2008; WHO, 2008). Mental health is a key component to everyday life and may influence one's behaviour choices such as the ability to take medications or quit smoking or drinking (PHAC, 2009). The INTERHEART study reported that 32.5% of first heart attacks could be attributed to psychosocial factors (depression, stress at work or home, financial stress, significant life events, and lack of control) (Yusef et al., 2004).

One in five people with IHD develop clinical depression (PHAC, 2009). It is hypothesized that coronary atherosclerosis, an underlying cause of IHD, begins early and progresses throughout one's life, and that depression may contribute to the worsening of this effect; however, depression has yet to be established as an independent risk factor for IHD (Nicholson, Kuper, & Hemingway, 2006). Nevertheless, depression has been shown to increase after a coronary event. In one study 20%–25% of people reported depressive symptoms following acute coronary syndrome (Williams & Steptoe, 2007). This finding was supported in work by Rivelli & Jang (2007), in which 18% of post-AMI patients met the major diagnostic criteria for depression while a further 45% had 'significant' depressive symptoms.

There is some information published on depression and Metis. In a 2006 British Columbia survey, 32.2% of Métis individuals identified themselves or a family member as having depression compared with 14.8% with 'anxiety attacks' and 2.5% with schizophrenia (Hutchinson et al., 2007). In the Metis Atlas the prevalence of depression in Manitoba was similar between Metis and All Other Manitobans (22.0% vs. 20.4%) (Martens, Bartlett, et al., 2010). Higher rates of depression were documented for Metis compared to All Other Manitobans in the urban areas of Winnipeg (25.5% vs. 21.7%) and Brandon (28.9% vs. 22.9%). In the 'Diabetes in Metis in Manitoba' study there was a higher prevalence of depression between Metis and All Other Manitobans (28.2% vs. 25.7%) (Bartlett, Sanguins, Carter, Hoeppner, & Mehta, 2010). However, these studies were not specific to those living with IHD.

There is very little information related to the influence of age and sex on the prevalence of depression in the Metis population. According to results from the 2001 APS, Métis women experienced higher rates of depression compared to Métis men (30% vs. 19%) (Women of the Metis Nations, 2007). There is no information of sex and age differences in Metis with depression and ischemic heart disease.

There is no comparable literature on the prevalence of depression in Metis with IHD. In our study, there is no difference in depression prevalence between Metis with IHD compared to All Other Manitobans with IHD in Manitoba (31.7% vs. 31.3%).

Given the higher rates of depression in Metis, this may have implications for self management for Metis individuals living with IHD. Further investigation is warranted.

4.8 Prevalence of Anxiety Disorders

Anxiety disorders are a group of common mental disorders with symptoms that include excessive anxiety, worry, avoidance, apprehension, and fear (Canadian Psychiatric Association [CPA], 2006; MCHP, 2008). While in many cases these symptoms are a natural response to life events, they are generally considered as part of a clinical illness when they impair function and reduce quality of life significantly over an extended period of time (CPA, 2006). Anxiety disorders in the general population have shown an increase risk associated with coronary heart disease (Barger & Snyderman, 2005).

Both the age- and sex-adjusted and the age- and sex-specific prevalence of anxiety disorders were measured for residents with IHD aged 19 and older over five fiscal years: 2002/03-2006/07. Residents were considered to have an anxiety disorder if they met one of the following conditions:

- one or more hospitalizations with a diagnosis for anxiety states, phobic disorders, or obsessive-compulsive disorders: ICD-9-CM codes 300.0, 300.2, 300.3; ICD-10-CA codes F40, F41.0, F41.1, F41.3, F41.8, F41.9, F42
- three or more physician visits with a diagnosis for anxiety disorders: ICD-9-CM code 300

The denominator includes all Manitoba residents with IHD aged 19 and older in the five-year time period who were continuously registered with Manitoba Health for at least one year in the five-year time period.

Key observations:

Metis with IHD compared to All Other Manitobans with IHD

Manitoba (Figure 4.8.1):

- Metis have a higher prevalence of anxiety disorders compared to All Other Manitobans in Manitoba (14.9% vs. 12.8%)

Aggregate areas (Figure 4.8.1):

- Metis have a higher prevalence of anxiety disorders compared to All Other Manitobans in Mid (13.9% vs. 11.0%) and North (20.0% vs. 9.9%) aggregate areas
- All Other Manitobans have a lower prevalence of anxiety disorders compared to their provincial average in Mid (11.0% vs. 12.8%) and North (9.9% vs. 12.8%) aggregate areas
- There is an increasing anxiety disorders prevalence gradient for Metis but not for All Other Manitobans from the most healthy to the least healthy at the aggregate areas as ordered by PMR

RHA (Figure 4.8.1):

- Metis have a higher prevalence of anxiety disorders compared to All Other Manitobans in Brandon (27.7% vs. 16.9%), Parkland (18.0% vs. 12.6%), and Nor-Man (26.4% vs. 13.1%) RHAs
- Metis have a higher prevalence of anxiety disorders compared to their provincial average in Brandon (27.7% vs. 14.9%) and Nor-Man (26.4% vs. 14.9%) RHAs

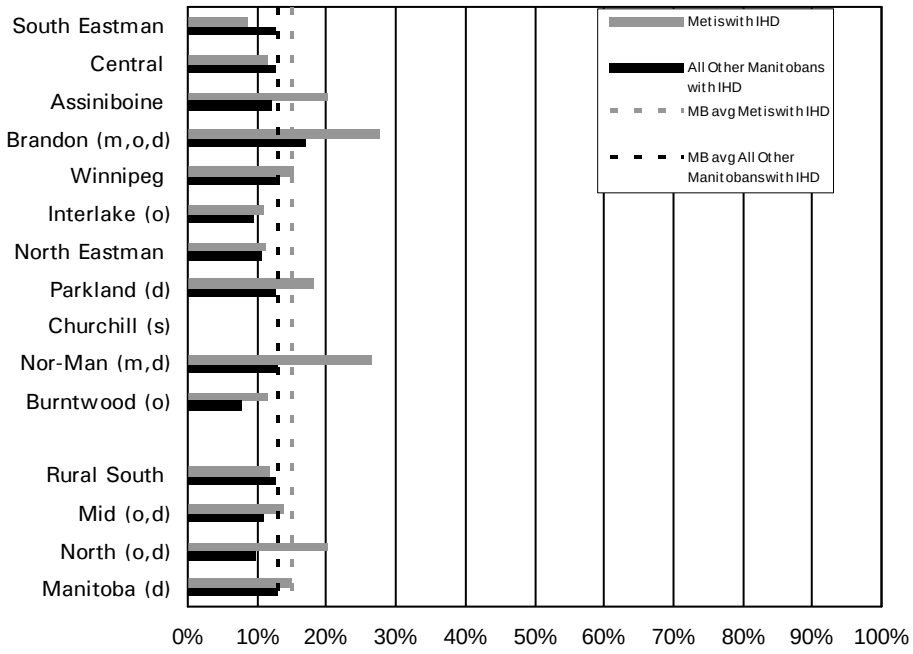
- All Other Manitobans have a higher prevalence of anxiety disorders compared to their provincial average in Brandon RHA (16.9% vs. 12.8%) whereas they have a lower prevalence of anxiety disorders compared to their provincial average in Interlake (9.5% vs. 12.8%) and Burntwood (7.8% vs. 12.8%) RHAs
- There is no prevalence gradient for either Metis or All Other Manitobans at the RHA level

Winnipeg CAs (Figure 4.8.2):

- There is no difference for Metis and All Other Manitobans in prevalence of anxiety disorders at the CAs level
- All Other Manitobans have a higher prevalence of anxiety disorders compared to their provincial average in Transcona CA (18.3% vs. 12.8%)
- There is no prevalence gradient for either Metis or All Other Manitobans at the CAs level

Figure 4.8.1: Prevalence of Anxiety Disorders by RHA for Metis with IHD and All Other Manitobans with IHD, 2002/03- 2006/07

Age- & sex-adjusted percent of residents aged 19+ years in a five-year period

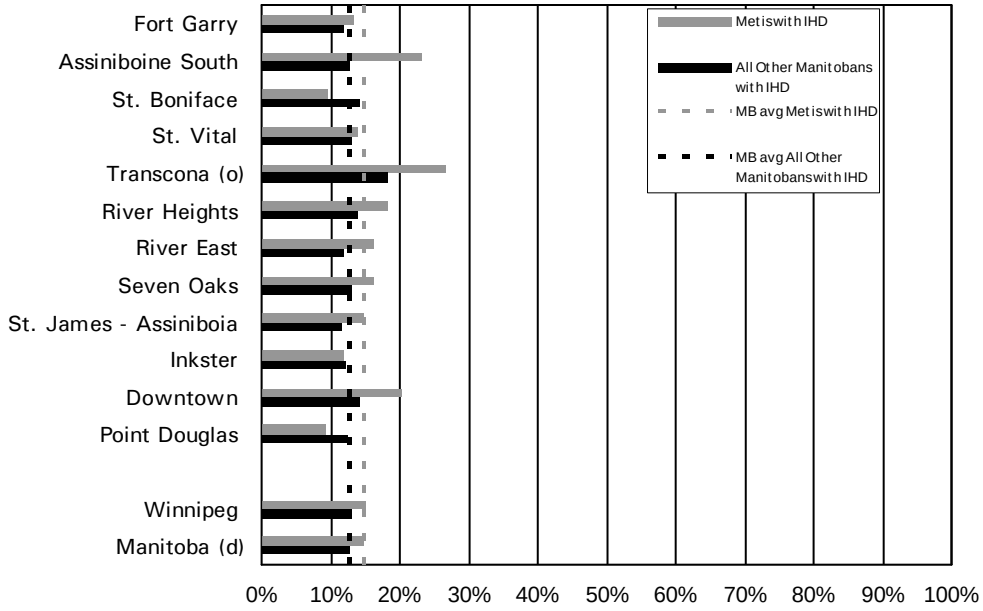


'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases)

Source: MMF, 2012

Figure 4.8.2: Prevalence of Anxiety Disorders by Winnipeg Community Area for Metis with IHD and All Other Manitobans with IHD, 2002/03- 2006/07

Age- & sex-adjusted percent of residents aged 19+ years in a five-year period



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases)

Source: MMF, 2012

Age- and Sex-Specific:

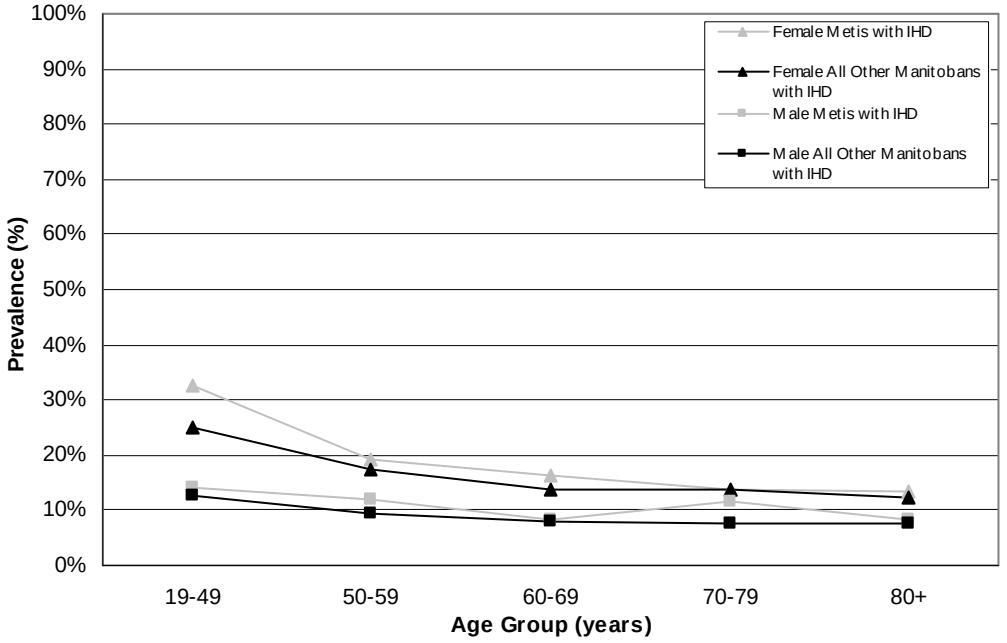
Manitoba (Figure 4.8.3):

- Throughout most of their lives, for both Metis males and Metis females the crude prevalence of anxiety disorders decreases over time
- Metis males and Metis females consistently show similar crude prevalence of anxiety disorders to All Other Manitoban males and females, respectively, except for the age group of 19-49 years when Metis females demonstrate a slightly higher prevalence of anxiety disorders than All Other Manitoban females (32.6% vs. 24.9%)
- Throughout most of their lives, Metis males have a lower crude prevalence of anxiety disorders compared to Metis females

Winnipeg (Figure 4.8.4):

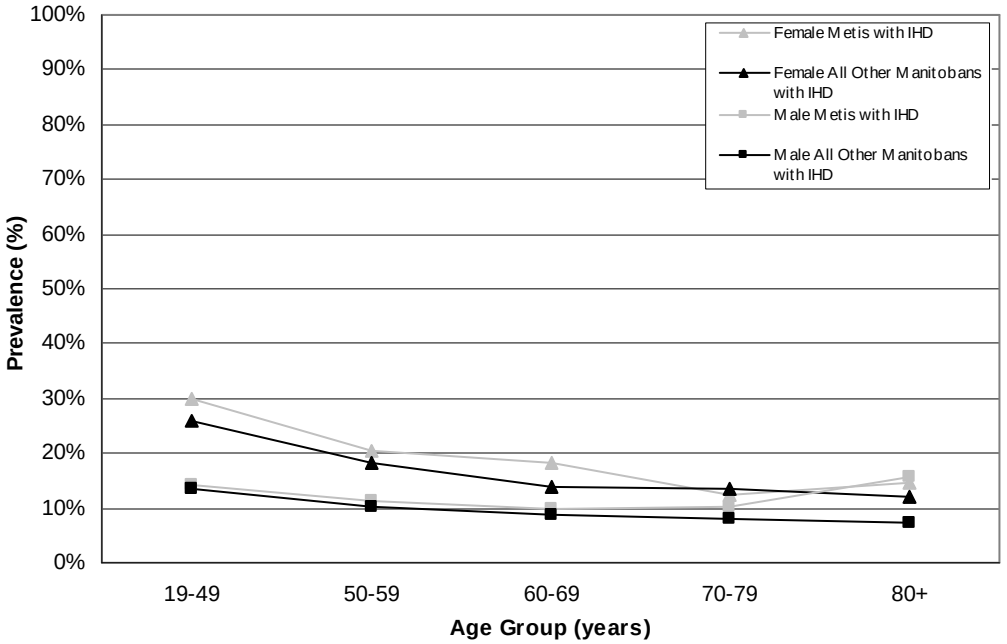
- As in Figure 4.8.3, the crude prevalence of anxiety disorders in Winnipeg followed the same age and sex prevalence as in Manitoba

Figure 4.8.3: Prevalence of Anxiety Disorders in Manitoba by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2002/03-2006/07
Crude percent for residents aged 19+ in a five-year period



Source: MMF, 2012

Figure 4.8.4: Prevalence of Anxiety Disorders in Winnipeg by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2002/03-2006/07
Crude percent for residents aged 19+ in a five-year period



Source: MMF, 2012

Findings from Literature Review

(Compared to the results in this study—*in italics*)

Anxiety disorders are one of the most common psychiatric diagnoses internationally and the single most prevalent mental illness in Canada (CPA, 2006; Kessler et al., 2005; WHO, 2004). It is estimated that 10.6% of adults worldwide have an anxiety disorder (Somers, Goldner, Waraich, & Hsu, 2006). The ability to cope with the day-to-day stresses of living with IHD is challenging for individuals who are predisposed to or have developed anxiety disorders (PHAC, 2009).

Anxiety disorders have been identified as a comorbidity accompanying heart disease. In one study a prevalence of 36.0% of one current anxiety disorder (most common were social phobia and generalized anxiety disorder) among individuals with established coronary heart disease was reported (Todaro, Shen, Raffa, Tilkemeier, & Niaura, 2007). Differences between men and women with ischemic heart disease and anxiety disorders have been identified. Women with phobic anxiety were at an increased risk of fatal coronary heart disease found through a prospective study design with a cohort from the Nurses Health Study (Albert, Chae, Rexrode, Manson, & Kawachi, 2005).

The Metis Atlas reported a higher rate of anxiety disorders in Metis compared to All Other Manitobans (9.4% vs. 8.0%) (Martens, Bartlett, et al., 2010). In the Diabetes in Metis in Manitoba study a higher prevalence of anxiety disorders in Metis with diabetes compared to All Other Manitobans with diabetes (10.4% vs. 8.8%) was found (Bartlett, Sanguins, Carter, Hoeppner, & Mehta, 2010). The information in that study was not specific to those living with IHD.

There is no comparable literature on the prevalence of anxiety disorders in Metis with IHD. In our study, Metis have a higher age- and sex-adjusted prevalence of anxiety disorders compared to All Other Manitobans with anxiety disorders (14.9% vs. 12.8%) in Manitoba. Metis have a higher prevalence of anxiety disorders in Mid (13.9% vs. 11.0%) and North (20.0% vs. 9.9%) aggregate areas. Among aggregate areas there is an increasing PMR for Metis from Rural South to North. Among the RHAs Metis have a higher prevalence of anxiety disorders compared to All Other Manitobans in Brandon (27.7% vs. 16.9%), Parkland (18.0% vs. 12.6%), and Nor-Man (26.4% vs. 13.1%). Among the Winnipeg CAs there is no difference between Metis and All Other Manitobans. Throughout most of their lives Metis males and Metis females have almost similar crude prevalence of anxiety disorders compared to All Other Manitoban males and All Other Manitoban females, respectively, in Manitoba. In addition, Metis males have a lower crude prevalence of anxiety disorders compared to Metis females in Manitoba.

The higher rates of anxiety disorders documented in Metis indicate this as an important area of focus for future policy and service delivery programming.

4.9 Prevalence of Substance Abuse

Substances such as psychoactive drugs are used by many individuals for their ability to enhance moods, to assist in coping with stress and anxiety, or to satisfy a dependency that has developed (Health Officers Council of British Columbia, 2005). The use of tobacco, alcohol, and illegal substances contribute to a population's health status and are a result of genetic, psychological, and epidemiological factors (Galea, Nandi, & Vlahov, 2004). The association between cardiovascular diseases and substance abuse has been well-established (Frishman, Vecchio, Sanal, & Ismail, 2003).

For this indicator, abuse of prescription drugs is not included.

Both the age- and sex-adjusted and the age- and sex-specific prevalence of substance abuse were measured for residents with IHD aged 19 and older over five fiscal years: 2002/03-2006/07. Residents were considered to have substance abuse if they met one of the following conditions:

- one or more hospitalizations with a diagnosis for alcoholic or drug psychoses, alcohol or drug dependence, or nondependent abuse of drugs: ICD-9-CM codes 291, 292, 303, 304 or 305; ICD-10-CA codes F10-F19, F55
- one or more physician visits with a diagnosis for alcoholic or drug psychoses, alcohol or drug dependence, or nondependent abuse of drugs (ICD-9-CM codes as above)

The denominator includes all Manitoba residents with IHD aged 19 and older in the five-year time period who were continuously registered with Manitoba Health for at least one year in the five-year time period.

Key observations:

Metis with IHD and All Other Manitobans with IHD

Manitoba (Figure 4.9.1):

- Metis have a higher prevalence of substance abuse compared to All Other Manitobans in Manitoba (10.7% vs. 8.6%)

Aggregate areas (Figure 4.9.1):

- All Other Manitobans have a higher prevalence of substance abuse compared to their provincial average in North aggregate area (18.5% vs. 8.6%) whereas All Other Manitobans have a lower prevalence of substance abuse in Rural South (7.4% vs. 8.6%) and Mid (7.1% vs. 8.6%) aggregate areas
- There is no substance abuse prevalence gradient for either Metis or All Other Manitobans at the aggregate level as ordered by PMR

RHAs (Figure 4.9.1):

- Metis have a higher prevalence of substance abuse compared to All Other Manitobans in Winnipeg RHA (12.1% vs. 8.7%)
- Metis have a higher prevalence of substance abuse compared to their provincial average in Burntwood RHA (22.9% vs. 10.7%)

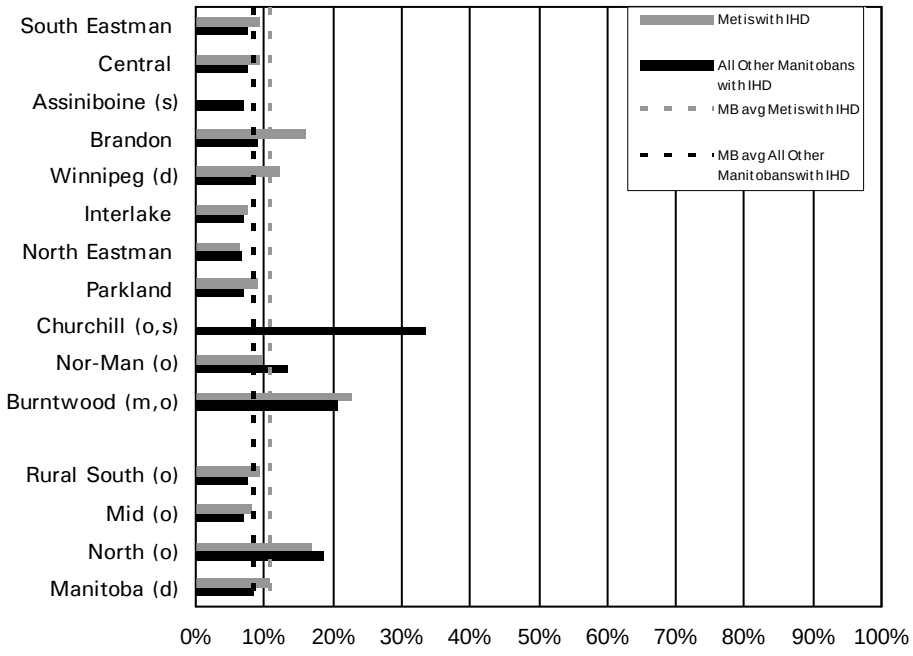
- All Other Manitobans have a higher prevalence of substance abuse compared to their provincial average in Churchill (33.6% vs. 8.6%), Nor-Man (13.3% vs. 8.6%), and Burntwood (20.6% vs. 8.6%) RHAs
- There is no substance abuse prevalence gradient for either Metis or All Other Manitobans at the RHA level

Winnipeg CAs (Figure 4.9.2):

- Metis have a higher prevalence of substance abuse compared to All Other Manitobans in Transcona (18.9% vs. 7.9%) and Downtown (27.5% vs. 16.3%) CAs
- Metis have a higher prevalence of substance abuse compared to their provincial average in Downtown CA (27.5% vs. 10.7%)
- All Other Manitobans have a higher prevalence of substance abuse compared to their provincial average in Downtown (16.3% vs. 8.6%) and Point Douglas (13.2% vs. 8.6%) CAs whereas All Other Manitobans have a lower prevalence of substance abuse compared to their provincial average in Fort Garry (6.5% vs. 8.6%), Assiniboine South (6.2% vs. 8.6%), St.Vital (6.5 % vs. 8.6%), and St. James–Assiniboia (6.1% vs. 8.6%) CAs
- There is no substance abuse prevalence gradient for either Metis or All Other Manitobans at the CAs level

Figure 4.9.1: Prevalence of Substance Abuse by RHA for Metis with IHD and All Other Manitobans with IHD, 2002/03- 2006/07

Age- & sex-adjusted percent of residents aged 19+ years in a five-year period

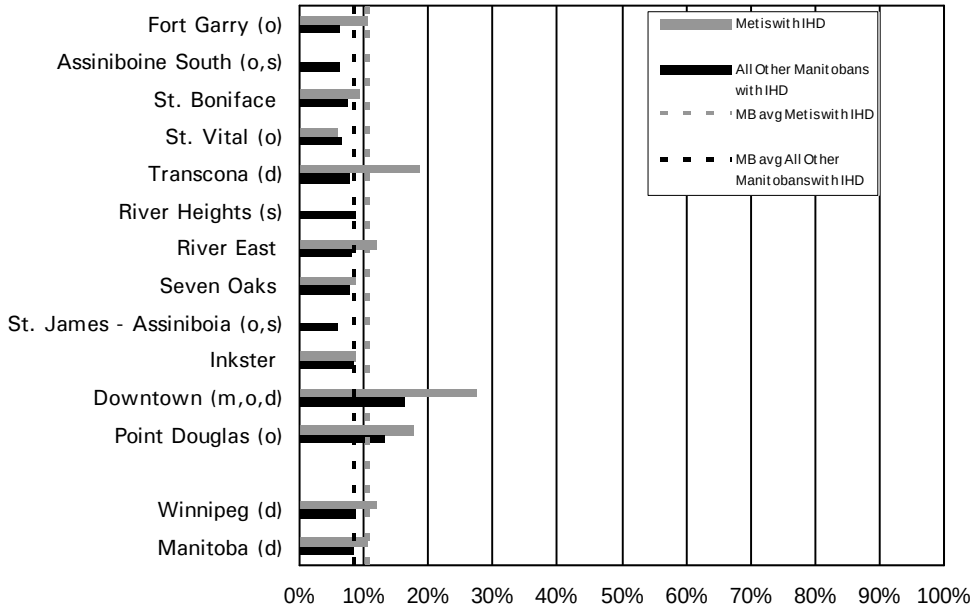


'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases)

Source: MMF, 2012

Figure 4.9.2: Prevalence of Substance Abuse by Winnipeg Community Area for Metis with IHD and All Other Manitobans with IHD, 2002/03- 2006/07

Age- & sex-adjusted percent of residents aged 19+ years in a five-year period



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases)

Source: MMF, 2012

Age- and Sex-Specific:

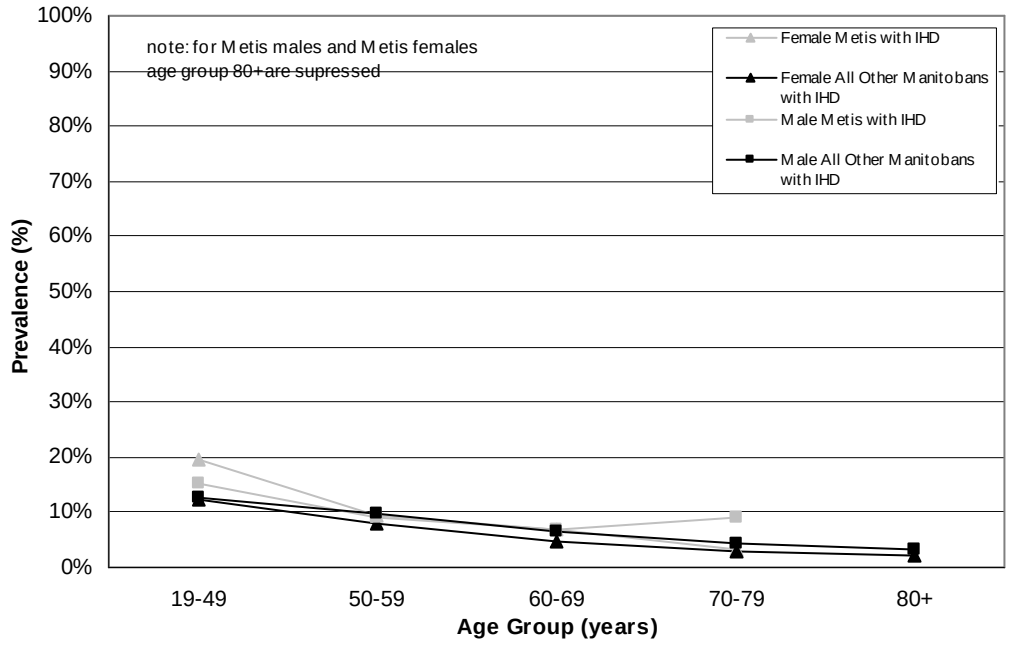
Manitoba (Figure: 4.9.3):

- Throughout most of their lives, Metis males and Metis females have a decreasing crude prevalence of substance abuse, except for Metis males who experience an increase after the age of 70
- Throughout their lives, Metis males have a higher crude prevalence of substance abuse compared to All Other Manitoban males, except between the ages of 50 and 69 years when crude prevalence of substance abuse is similar
- Throughout their lives, Metis females have a higher crude prevalence of substance abuse compared to All Other Manitoban females
- Throughout their lives, Metis males have a lower crude prevalence of substance abuse compared to Metis females

Winnipeg (Figure: 4.9.4):

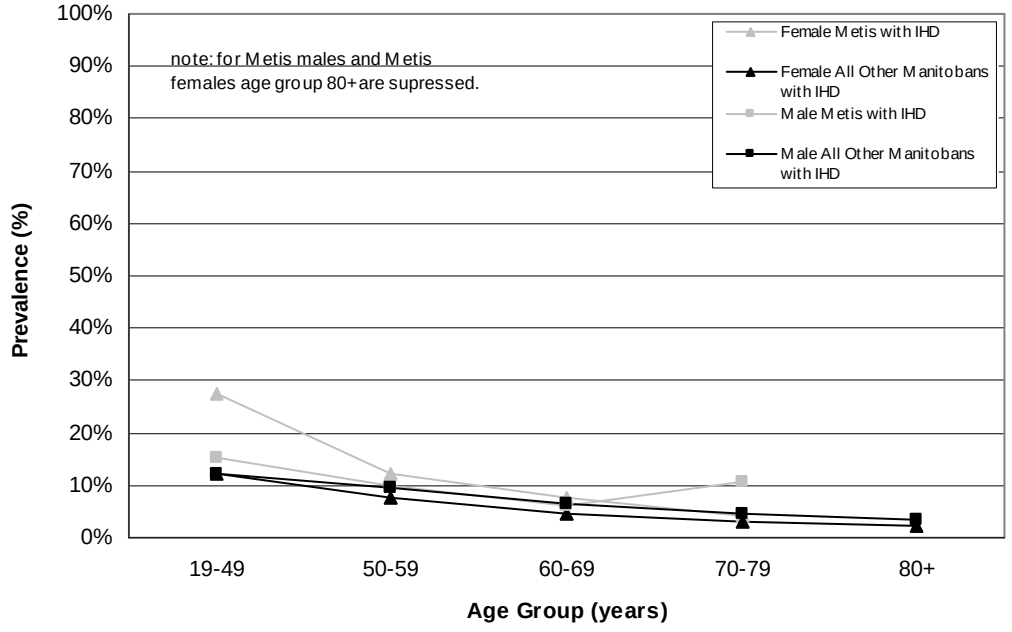
- As in Figure 4.9.3, the crude prevalence of substance abuse in Winnipeg followed the same age and sex pattern as in Manitoba except;
- At age 19-49 years Metis females have a higher crude prevalence of substance abuse in Winnipeg compared to All Other Manitoban females

Figure 4.9.3: Prevalence of Substance Abuse in Manitoba by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2002/03-2006/07
Crude percent for residents aged 19+ in a five-year period



Source: MMF, 2012

Figure 4.9.4: Prevalence of Substance Abuse in Winnipeg by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2002/03-2006/07
Crude percent for residents aged 19+ in a five-year period



Source: MMF, 2012

Findings from Literature Review

(Compared to the results in this study—*in italics*)

Alcohol and illicit drugs account for 5.4% of the global annual disease burden while tobacco accounts for 3.7% (WHO, 2010). In Manitoba, the prevalence of substance abuse has decreased from 5.4% to 4.9% between the years 1996/97 and 2005/06 (Fransoo et al., 2009). In one survey in British Columbia, 49.7% of Metis respondents identified themselves or a family member as having used alcohol in the previous year (amount unspecified), 30.6% identified one family member who used tobacco in the past 12 months, and 19.7% reported that they or a family member had used illegal drugs in the previous year (Hutchinson et al., 2007). In the Metis Atlas, it was found that 7.2% of Metis had a diagnosis of substance abuse (Martens, Bartlett, et al., 2010). In that study, the prevalence of substance abuse was found to be significantly higher in Metis compared to All Other Manitobans in Manitoba (7.2% vs. 4.9%) and in Winnipeg RHA (8.1% vs. 4.8%). The information in these studies is not specific to those living with IHD.

There are no comparable studies of substance abuse among Metis in the literature. In our study, Metis have a higher prevalence of substance abuse compared to All Other Manitobans in Manitoba (10.7% vs. 8.6%). Metis have a higher prevalence of substance abuse in Winnipeg RHA (12.1% vs. 8.7%). Among the Winnipeg CAs, Metis have a higher prevalence of substance abuse compared to All Other Manitobans in Transcona (18.9% vs. 7.9%) and Downtown (27.5% vs. 16.3%). Throughout most of their lives Metis males and Metis females have a decreasing crude prevalence of substance abuse in Manitoba. Throughout their lives, Metis males have a lower crude prevalence of substance abuse compared to Metis females in Manitoba.

The higher rates of substance abuse for Metis with IHD at the provincial level and in Winnipeg RHA highlight the need for increased targeted primary and secondary prevention initiatives.

4.10 Comorbidities among Specified Illnesses

Comorbidity is defined as the occurrence of one or more chronic conditions (e.g., diabetes) in addition to the primary disease (e.g., IHD).

Following is the crude prevalence of comorbidities for IHD for Metis compared to All Other Manitobans. Please refer to Appendix 1 (Tables 4.10.1–4.10.6) for the crude prevalence and incidence rates of Metis with IHD in Manitoba who have a certain combination of other disorders (diabetes, congestive heart failure, stroke, depression, anxiety disorders, and/or substance abuse). If there is check-mark (√), it indicates the presence of the morbidity indicator. The column 'Count of Metis with IHD' indicates the number of Metis with IHD who had that specific grouping of comorbidities; however, if there were 5 or fewer Metis with IHD who had that specific grouping of comorbidities the data were suppressed, as indicated as 's' in Table 4.10.5. These numbers are not age- or sex-adjusted, but are observed counts.

Key observations (Table 4.10.1- 4.10.6 – refer to Appendix 1):

Metis with IHD and All Other Manitobans with IHD

- Using crude prevalence, nearly one-third of Metis in Manitoba (30.2%)(compared to 34.7% of All Other Manitobans) aged 19+ had no diagnosis of either diabetes, stroke, CHF, depression, anxiety disorders, or substance abuse
- 34.4% of Metis (compared to 35.3% of All Other Manitobans) aged 19+ had a single diagnosed comorbidity. Comparing Metis with IHD to All Other Manitobans with IHD, the most frequent combinations of diagnosis were: diabetes (14.4% vs. 11.21%); CHF (8.7 vs. 13.3); depression (7.7 vs. 7.4%); anxiety disorders (1.6% vs. 1.5%); or substance abuse (1.5% vs. 1.1%)
- 24.2% of Metis (compared to 21.6% All Other Manitobans) aged 19+ had two diagnosed comorbidities. Comparing Metis with IHD to All Other Manitobans with IHD, the most frequent combinations of diagnosis were: diabetes & CHF (9.5% vs. 8.0%); diabetes & depression (4.0 vs. 2.7%); depression & anxiety disorders (3.8% vs. 3.0%); or CHF & depression (2.3% vs. 3.8%)
- 7.9% of Metis (compared to 6.9% of All Other Manitobans) aged 19+ had three diagnosed comorbidities. Comparing Metis with IHD to All Other Manitobans with IHD, the most frequent combinations of diagnosis were: diabetes, CHF & depression (2.9% vs. 2.8%); diabetes, depression & anxiety disorders (1.7% vs. 0.8%); or CHF, depression, and anxiety disorders (1.0% vs. 1.3%)
- 1.7% of Metis (compared to 1.4% of All Other Manitobans) aged 19+ had four diagnosed comorbidities. Comparing Metis with IHD to All Other Manitobans with IHD the most frequent combinations of diagnosis were: diabetes, CHF, depression & anxiety disorders (0.9 % vs. 0.7%); diabetes, CHF, depression & substance abuse (0.4% vs. 0.2%); or diabetes, depression, anxiety disorders & substance abuse (0.3% vs. 0.1%)
- 0.2% of Metis (compared to 0.1% of All Other Manitobans) aged 19+ had five diagnosed comorbidities. Comparing Metis with IHD to All Other Manitobans with IHD, the most frequent combinations of diagnosis were: diabetes, CHF, depression, anxiety disorders & substance abuse (0.2% vs. 0.1%).

- No Metis (suppressed for All Other Manitobans) aged 19+ had six diagnosed comorbidities

Findings from Literature Review

(Compared to the results in this study—*in italics*)

The Aboriginal Peoples Survey (2006) found that just over half (54%) of all Metis aged 15 and over reported being diagnosed with a chronic condition; more than half of these (28% of all Metis) had two or more chronic conditions (Janz et al., 2009). The most commonly reported chronic conditions were arthritis and/or rheumatism (21% Metis vs. 13% total Canadian population), high blood pressure (16% vs. 12%), asthma (14%vs. 8%), and diabetes (7% vs. 4%). Metis women were more likely than Metis men to report having more than one chronic condition (Janz et al., 2009).

In our diabetes study, a larger proportion of Metis with diabetes had two (28.10% vs. 25.76%), three (10.11% vs. 7.94%), four (2.70% vs. 1.88%), and five (0.30% vs. 0.17%) physical and mental comorbidities compared to All Other Manitobans with diabetes, which suggested a higher burden of illness in Metis in that study. While this information was not specific to IHD it does provide some insight into the overall burden of comorbidity reported in Metis in Manitoba.

There is no comparable literature on prevalence of physical and mental comorbidities in Metis with IHD. In our study we found that 30.2% of Metis with IHD and 34.1% of All Other Manitobans with IHD did not have any of the six identified comorbidities (diabetes, congestive heart failure, stroke, depression, anxiety disorders, and substance abuse). A smaller proportion of Metis had one comorbidity compared to All Other Manitobans (34.4% vs. 35.3%). However, a larger proportion of Metis had two comorbidities (24.2% vs. 21.6%), three comorbidities (7.9% vs. 6.8%), four comorbidities (1.7% vs. 1.4%), or five comorbidities (0.2% % vs. 0.1%) compared to All Other Manitobans with IHD. There were no (zero) Metis with IHD with six comorbidities.

These higher proportions show a trend towards more comorbidities in Metis with IHD compared to All Other Manitobans with IHD in Manitoba and suggest a higher burden of illness in Metis overall in this study.

References

Albert, C.M., Chae, C.U., Rexrode, K.M., Manson, J., & Kawachi, I. (2005). Phobic anxiety and risk of coronary heart disease and sudden cardiac death among women. *Circulation, 111*(4), 480-487.

Atzema, C.L., Kapral, M., Klein-Geltink, J., Asllani, E., Gravelle, M.R., Pigeau, L., … & Lyons, D. (2010). *Cardiovascular Disease in the Metis Nation of Ontario.* Retrieved from http://www.metisnation.org/media/135527/mno%20cv%20disease%20lay%20report,%20final.pdf

Barger, S.D., & Snyderman, S.J. (2005). Does generalized anxiety disorder predict coronary heart disease risk factors independently of major depressive disorder? *Journal of Affective Disorders*, *88* (1), 87–91.

Bartlett, J.G., Sanguins, J., Carter, S., Hoeppner, N., & Mehta, P. (2010). *Diabetes and related health care utilization in the Manitoba Metis population*. Winnipeg, MB: Manitoba Metis Federation.

Boersma, E., Mercado, N., Poldermans, D., Gardien, M., Vos, J., & Simons, L.M. (2003). Acute myocardial infarction. *Lancet, 361*(9374), 847-858.

Canadian Stroke Network. (2011). *The quality of stroke care in Canada*. Retrieved from http://www.canadianstrokenetwork.ca/wp-content/uploads/2011/06/QoSC-EN1.pdf

Canadian Psychiatric Association. (2006). Clinical practice guidelines for the management of anxiety disorders: 2: Principles of diagnosis and management of anxiety disorders. *Canadian Journal of Psychiatry, 51*(Suppl. 2), 7S-8S.

Conner-Barrett, E. (2003). Diabetes and Heart Disease. *Diabetes Care, 26*(10), 2947-2948.

Cormier, R.A., Dell, A.C., & Poole, N. (2004). Women and substance abuse problems. *BMC Women's Health, 4*(Suppl 1), S1-S8.

Falagas, M.E., Vardaskas, K.Z., & Vergidis, P.I. (2007). Under-diagnosis of common chronic diseases: Prevalence and impact on human health. *International Journal of Clinical Practice, 61*(9), 1569–1579.

Filate, W.A., Johansen, H.L., Kennedy, C.C., & Tu, V.J. (2003). Regional variations in cardiovascular mortality in Canada. *Canadian Journal of Mortality, 19*(11), 1241-1248.

Frishman, W.H., Vecchio, D., Sanal, S., & Ismail, A. (2003). Cardiovascular manifestations of substance abuse: Part 2: alcohol, amphetamines, heroin, cannabis, and caffeine. *Heart Disease, 5*(4), 253-271.

Fransoo, R., Martens, P., Burland, E., the Need to Know Team, Prior, H., & Burchill, C. (2009). *Manitoba RHA Indicator Atlas*. Winnipeg, MB: Manitoba Centre for Health Policy.

Fransoo, R., Martens, P., The Need to Know Team, Burland, E., Prior, H., Burchill, C., … & Wallad, R. (2005). *Sex differences in health status, health care use and quality of care: A population-based analysis for Manitoban's Regional Health Authorities*. Winnipeg, MB: Manitoba Centre for Health Policy. Retrieved from http://mchp-appserv.cpe.umanitoba.ca/reference/sexdiff.pdf

Galea, S., Nandi, A., & Vlahov, D. (2004). The social epidemiology of substance abuse. *Epidemiological Review, 26*(1), 36-52.

Gæde, P., Vedel, P., Larsen, N., Jensen, V.H. G., Parvin, H., & Pedersen, O. (2003). Multifactorial intervention and cardiovascular disease in patient with type 2 diabetes. *The New England Journal of Medicine, 348*(5), 383-393.

Government of Canada. (2006). *The human face of mental health and mental illness in Canada, 2006*. Ottawa, ON: Minister of Public Works and Government Services Canada.

Greenberg, B., & Kahn, M.A. (2012).Chapter 26: Clinical assessment of heart failure. In R.O. Bonow, D.L. Mann, D.P. Zipes, & P. Libby (Eds.), *Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine* (pp.1757-1767). Philadelphia, PA: Elsevier Saunders.

Health Officers Council of British Columbia. (2005). *A public health approach to drug control in Canada: Discussion paper*. Retrieved from http://www.keepingthedooropen.com/Portals/0/hoc_paper_media_backgrounder.pdf

He, J., Ogden, L.G., Bazzona, L.A., Vupputuri, S., Loria, C., & Whelton, P.K. (2001). Risk factors for congestive heart failure in U.S. men and women, NHANES epidemiologic follow-up study. *Archives of Internal Medicine, 161*(7), 996-1002.

Hutchinson, P., Evans, M., & Reid, C. (2007). *Report on the statistical description and analysis of the 2006 Métis Nation of British Columbia Provincial Survey*. Retrieved from http://www.mpcbc.bc.ca/health/pdf/mnbc_survey_results.pdf

Janz, T., Seto, J., & Turner, A. (2009). *Aboriginal Peoples Survey, 2006: An overview of the health of the the Metis population*. Ottawa, ON: Minister of Industry. Retrieved from http://dsp=psd.pwgsc.gc.ca/collection_2009/statcan/89-637-X/89-637-x2009004-eng.pdf

Kannel, W.B. (2000). Incidence and epidemiology of heart failure. *Heart Failure Reviews, 5*(2), 167-173.

Katz, A., Bogdanovic, B., & Soodeen, R. (2010). *Physician integrated network baseline valuation: Linking electronic medical records and administrative data*. Winnipeg, MB: Manitoba Centre for Health Policy, August 2010. Retrieved from http://mchp-appserv.cpe.umanitoba.ca/reference/PIN_full_report.pdf

Kearney, M.P., Whelton, M., Reynolds, K., Muntner, P., Whelton K,P., & He, J. (2005). Global burden of hypertension: Analysis of worldwide data. *The Lancet, 365*(15), 217-223.

Kessler, R.C., Berglund, P., Demler, O., Jin, R., Merikangas, K.R., & Walters, E.E. (2005). Lifetime prevalence and age-of-onset distributions of *DSM-IV* disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry, 62*(6), 593-603.

Kirby, M. (2008). Mental health in Canada: Out of the shadows forever. *Canadian Medical Association Journal, 178*(10), 1320-1322.

Kuller, L.H., Dorman, J.S., & Wolf, P.A. (1985). Cerebrovascular disease and diabetes. In M.I. Harris & R.F. Hamman (Eds.), *Diabetes in America* (pp.1468-1501). Bethesda, MD: National Institutes of Health.

Laakso, M. (1995). Does NIDDM increase the risk for coronary heart disease similarly in both low and high risk population? *Diabetologia, 39*(4), 487-493.

Leiter, L.A., Barr, A., Belanger, A., Lubin, S., Ross, S.A., Tildesley, H.D., & Fontain, N. (2001). Diabetes screening in Canada (DIASCAN) study: Prevalence of undiagnosed diabetes and glucose intolerance in family physician offices. *Diabetes Care, 24*(6), 1038-1043.

Lin, Y. & Sun, Z. (2010). Current views on type 2 diabetes. *Journal of Endocrinology*, *2004*(1), 1-11.

Lindsay, M.P., Gubitz, G., Bayley, M., Hill M.D., Davies-Schinkel, C., Singh, S., & Philips, S. (2010). *Canadian Best Practice Recommendations for Stroke Care*. Ottawa, ON: Canadian Stroke Network.

Loukine, L., Waters, C., Choi, B.C.K., & Ellison, J. (2012). Impact of diabetes mellitus on life expectancy and health-adjusted life expectancy in Canada. *Population Health Metrics, 10*(7). Retrieved from http://www.pophealthmetrics.com/content/pdf/1478-7954-10-7.pdf

Malcolm, A. (n.d). *Congestive heart failure in the elderly*. Retrieved from http://www.ccs.ca/download/consensus_conference/consensus_conference_archives/2002_05.pdf

Manitoba Centre for Health Policy. (2006a). *Income not found* (term definition). Retrieved from http://mchp-appserv.cpe.umanitoba.ca/viewDefinition.php?printer=Y&definitionID=102883

Manitoba Centre for Health Policy. (2006b). *Linear trend test* (glossary definition). Retrieved from http://mchp-appserv.cpe.umanitoba.ca/viewDefinition.php?printer=Y&definitionID=102973

Manitoba Centre for Health Policy. (2008). *Anxiety disorders* (term definition). Retrieved from http://mchp-appserv.cpe.umanitoba.ca/viewDefinition.php?printer=Y&definitionID=103879

Manitoba Centre for Health Policy. (2010). *Depression* (glossary definition). Retrieved from http://mchp-appserv.cpe.umanitoba.ca/viewDefinition.php?definitionID=102544

Manitoba Centre for Health Policy. (2011a). C*oronary heart disease measuring prevalence* (concept definition). Retrieved from http://mchp-appserv.cpe.umanitoba.ca/viewConcept.php?conceptID=1083

Manitoba Centre for Health Policy. (2011b). *Income quintiles* (glossary definition). Retrieved from http://mchp-appserv.cpe.umanitoba.ca/viewDefinition.php?definitionID=102882

Manitoba Centre for Health Policy. (2011c). *Congestive heart failure* (glossary definition). Retrieved from http://mchp-appserv.cpe.umanitoba.ca/viewDefinition.php?definitionID=102463

Manitoba Health (2009). *Diabetes Surveillance Report*. Retrieved from http://www.gov.mb.ca/health/chronicdisease/diabetes/docs/diabetes100.pdf

Mann, D.L. (2012). Chapter 25: Pathophysiology of heart failure. In R.O. Bonow., D.L. Mann, D.P. Zipes, & P. Libby (Eds.), *Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine* (pp.1757-1767). Philadelphia, PA: Elsevier Saunders.

Martens, P., Fransoo, R., McKeen, N., the Need to Know Team, Burland, E., Jebemani, L., …& Metge, C. (2004). *Patterns of regional mental illness disorder diagnoses and service use in Manitoba: A population-based study.* Winnipeg, MB: Manitoba Centre for Health Policy.

Martens, P.J., Bartlett, J., Burland, E., Prior, H., Burchill, C., Huq, S., Romphf, L.,…& Bailly, A. (2010). *Profile of Metis health status and healthcare utilization in Manitoba: A population-based study.* Winnipeg, MB: Manitoba Centre for Health Policy.

Martens, P.J., Brownell, M., Au, W., MacWilliam, L., Prioir, H., Schultz, J.,...& Seronka, K. (2010). *Health inequities in Manitoba: Is the socioeconomic gap widening or narrowing over time?* Winnipeg, MB: Manitoba Centre for Health Policy.

Newby, L.K., & Douglas, S.P. (2012). Chapter 81: Cardiovascular disease in women. In R.O. Bonow, D.L. Mann, D.P. Zipes, & P. Libby (Eds.), *Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine* (pp.1757-1767). Philadelphia, PA: Elsevier Saunders.

Nicholson, A., Kuper, H., & Hemingway, H. (2006). Depression as an aetiological and prognostic factor in coronary heart disease: A meta-analysis of 6362 events among 146,538 participants in 54 observation studies. *European Heart Journal*, *27*(23), 2763–2774.

O'Donnell, M.J., Xavier, D., Liu, L., Chin, S.L., Rao-Melacini, P., Rangarajan, S.,…& Yusef. S. (2010). Risk factors for ischemic and intracerebral hemorrhagic stroke in 22 countries (the INTERSTROKE study): A case-control study. *Lancet, 376*(9735), 112-123.

Patten, S., & Juby, H. (2008). *A profile of clinical depression in Canada.* Canadian research data centre network synthesis series: #1. Research Data Network. Retrieved from https://dspace.ucalgary.ca/bitstream/1880/46327/6/Patten_RSS1.pdf

Parikh, S.V., Lam, R.W., & the CANMAT Depression Work Group. (2001). Clinical guidelines for the treatment of depressive disorders: I. Definitions, prevalence, and health burden. *Canadian Journal of Psychiatry, 46*(Suppl. 1), 13S-20S.

Public Health Agency of Canada. (2009). *Tracking Heart Disease and Stroke in Canada.* Retrieved from http://www.phac-aspc.gc.ca/publicat/2009/cvd-avc/pdf/cvd-avs-2009-eng.pdf

Public Health Agency of Canada. (2010a). *Six types of cardiovascular disease.* Retrieved from http://www.phac-aspc.gc.ca/cd-mc/cvd-mcv/cvd-mcv-eng.php

Public Health Agency of Canada. (2010b). *Report from the Canadian Chronic Disease Surveillance System: Hypertension in Canada, 2010.* Retrieved from http://www.phac-aspc.gc.ca/cd-mc/cvd-mcv/ccdss-snsmc 2010/pdf/CCDSS_HTN_Report_FINAL_EN_20100513.pdf

Public Health Agency of Canada. (2010c). *What is diabetes?* Retrieved from http://www.atlantique.phac.gc.ca/cd-mc/diabetes-diabete/index-eng.php

Public Health Agency of Canada. (2011). *Diabetes in Canada: facts and figures from a public health perspective.* Retrieved from http://www.phac-aspc.gc.ca/cd-mc/publications/diabetes-diabete/facts-figures-faits-chiffres-2011/pdf/facts-figures-faits-chiffres-eng.pdf

Quinn, R.R., Hemmelgarn, B.R., Padwal, R.S., Myers, M.G., Cloutier, L., Bolli, P., & Mackay, D.W. (2010). The 2010 Canadian hypertension education program recommendations for the management of hypertension: Part 1 – blood pressure management, diagnosis and assessment of risk. *Canadian Journal of Cardiology, 26*(5), 241-248.

Rivelli, S. & Jiang, W. (2007). Depression and ischemic heart disease: What have we learned from clinical trials? *Current Opinion in Cardiology, 22*(4), 286-291.

Shin, J.J., Hamad, E., Murthy, S., Pinã, I. (2010). Heart failure in women. *Clinical Cardiology, 35*(3), 172-177.

Shah, B.R., Cauch-Dudek, K., Wu, F.C., Gravelle M.R., Pigeau, L., MacQuarrie, J, & Lyons, D. (2010). *Diabetes in the Metis Nation of Ontario.* Retrieved from

http://www.metisnation.org/media/135503/mno%20diabetes%20lay%20report,%20final.pdf

Somers, J.M., Goldner, E.M., Waraich, P., & Hsu, L. (2006). Prevalence and incidence studies of anxiety disorders: A systematic review of the literature. *Canadian Journal of Psychiatry, 51*(2), 100-113.

Timmis, D.V. (2001). Diabetes. *British Medical Bulletin, 59*(1), 159-172.

Todaro, F.J., Shen, B., Raffa, D.S., Tilkemeier, L.P., & Niaura, R. (2007). Prevalence of anxiety disorders in men and women with established coronary heart disease. *Journal of Cardiopulmonary Rehabilitation and Prevention, 27*(2), 86-91.

Tu, J.V., Nardi, L., Fang, J., Liu, J., Khalid, L., & Johansen H. for the Canadian Cardiovascular Outcomes Research Team (2009). National trends in rates of death and hospital admissions related to acute myocardial infarction, heart failure and stroke, 1994-2004. *Canadian Medical Association Journal, 180*(13), E118-E125.

Victor, G.R. (2012). Chapter 45: Hypertension: mechanisms and diagnosis. In R.O. Bonow., D.L. Mann, D.P. Zipes, & P. Libby (Eds.), *Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine* (pp. 935-953). Philadelphia, PA: Elsevier Saunders.

Vuccarino, V., Badimon, L., Corti, R., de Wit, C., Dorobantu, M., Hall, A., …& Bugiardini, M. (2011). Ischemic heart disease in women: Are there sex differences in pathophysiology and risk factors? *Cardiovascular Research, 90*(1), 9-17.

Wammamethee, S.G., Papacosta, O., Lawloer, D.A., Whincup, P.H., Lowe, G.D., Ebrahim, S., & Sattar, N. (2012). Do women exhibit greater differences in established and novel risk factors between diabetes and non-diabetes than men? The British Regional Heart Study and British Women's Heart Health Study? *Diabetologia*, *55,* 80-87.

Whelton, P.K., He, J., Appel, J.L., Cutler, A.J. Havas, S., Kotchen, A.T., …& Karimbakas, J. (2002). Primary prevention on hypertension: Clinical and public health advisory from the national high blood pressure education program. *Journal of the American Medical Association, 288*(15), 1882-1888.

Williams, E. D. & Steptoe, A. (2007). The role of depression in the etiology of acute coronary syndromes. *Current Psychiatry Reports, 9*(6), 486-482.

Wilper, P.A., Woodhandler, S., Lasser, E.K., McCormick, D., Bor, H.D., & Himmelstein, D.U. (2009). Health insurance and mortality in US adults. *American Journal of Public Health, 99*(12), 2289-2295.

World Health Organization. (2004). *Prevention of mental disorders: Effective interventions and policy implications.* Geneva, Switzerland: World Health Organization. Retrieved from http://www.who.int/mental_health/evidence/en/prevention_of_mental_disorders_sr.pdf

World Health Organization. (2006). *Definitions and diagnosis of diabetes mellitus and intermediate hyperglycemia.* Geneva, Switzerland: World Health Organization. Retrieved from http://www.idf.org/webdata/docs/WHO_IDF_definition_diagnosis_of_diabetes.pdf

World Health Organization. (2008). *The global burden of disease: 2004 update.* Geneva, Switzerland: World Health Organization. Retrieved from http://www.who.int/healthinfo/global_burden_disease/GBD_report_2004update_full.pdf

World Health Organization. (2010). *Atlas on substance abuse: Resources for prevention and treatment of substance use disorders.* Geneva, Switzerland: World Health Organization. Retrieved from http://www.who.int/substance_abuse/activities/msbatlasexecsum.pdf

World Health Organization. (2011a). *The top 10 causes of death.* Geneva, Switzerland: World Health Organization Retrieved from http://www.who.int/mediacentre/factsheets/fs310/en/index.html

Yusef, S., Hawken, S., Ounpuu, S., Dans, T., Avezum, A., Lanan, F., …& Lishen, L., on behalf of the INTERHEART Study Investigators. (2004). Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): Case-control study. *The Lancet, 364*(9438), 937-952.

Yusef, S., Reddy, S., Ounpuu, S., & Anand, S. (2001). Global burden of cardiovascular disease: Part 1: General considerations, the epidemiological transitions, risk factors, and impact of urbanization. *Circulation, 104*(22), 2746-2753.

Zeber, J. & Parchman, M.L. (2010). Cardiovascular risk in Type 2 diabetes; Attributable risk due to modifiable risk factors. *Canadian Family Physician, 56*(8), e302-e307.

Section 5: Health Services Use

5.1 Health Services Use

Health services use encompasses a broad range of medical health services available to individuals and populations, including routine blood pressure monitoring by a health care provider to complex medical tests and procedures such as surgeries. The ability to engage on a regular basis with a care provider is fundamental for effective prevention and treatment of IHD. Individuals who experience IHD require access to health services such as routine visits to a family physician and to specialists such as a cardiologist.

There are documented differences in health service use by sex. In Canada, 16.9% of all hospitalizations were due to cardiovascular diseases (including IHD), were higher in men compared to women (19.8% vs. 14.0%), and length of hospital stay was higher in men compared to women (17.1% vs. 15.4%) (PHAC, 2009).

In each of the graphs in this section, the Regional Health Authorities are ordered by the ten-year premature mortality rate (PMR). More information on ten-year PMR is provided in Section 1.

All the indicator criteria used in this section were developed by the Manitoba Centre for Health Policy from the Metis Atlas (Martens, Bartlett, et al., 2010) unless otherwise noted. In this section, all indicators compare Metis with IHD to All Other Manitobans with IHD. As noted in Section 1, unless otherwise indicated any mention of 'lower' or 'higher' refers to results that are 'statistically significant'.

This section includes the following indicators:

- Ambulatory visit rate (age- and sex-adjusted)
- Ambulatory visit rate (age- and sex-specific)
- Ambulatory visit rate to a cardiologist (age- and sex-adjusted)
- Ambulatory visit rate to a cardiologist (age- and sex-specific)
- Ambulatory visit rate to a cardiac surgeon (age- and sex-adjusted)
- Ambulatory visit rate to a cardiac surgeon (age- and sex-adjusted)

Overall Key Findings (Table 5.1):

- In this study, there is no difference between Metis and All Other Manitobans for ambulatory visit rate to a cardiologist and ambulatory visit rate to a cardiac surgeon
- Metis have a higher ambulatory visit rate in North aggregate area, Burntwood RHA, and Seven Oaks Winnipeg CA
- Metis have a higher ambulatory visit rate to a cardiologist in Rural South aggregate area, and South Eastman RHA whereas Metis have a lower ambulatory visit rate to a cardiologist in Assiniboine South Winnipeg CA
- Metis have a higher ambulatory visit rate to a cardiac surgeon in Inkster CA

Table 5.1: Overall Key Findings of Health Services Use

Indicator (age of inclusion for this indicator)	Provincial difference between Metis with IHD and All Other Manitobans with IHD (age- and sex-adjusted prevalence in %, unless otherwise stated), with RR (relative rate) for Metis with IHD	Statistically better off regions for Metis with IHD compared to provincial average for Metis with IHD (unless otherwise noted) Note: Although this may or may not be a correct assumption, a high rate will be considered 'better off' for this indicator (e.g., possible good access)	Statistically worse off regions for Metis with IHD compared to provincial average for Metis with IHD (unless otherwise noted) Note: Although this may or may not be a correct assumption, a high rate will be considered 'better off' for this indicator (e.g., possible good access)
Ambulatory Visit Rate, all ages	8.6 vs. 8.0 RR=1.08, NS	Brandon RHA	Churchill RHA
Ambulatory Visit Rate to a Cardiologist, all ages	256.5 vs. 299.0 (per 1,000) RR=0.86, NS	Winnipeg RHA St. Boniface Winnipeg CA St. Vital Winnipeg CA Transcona Winnipeg CA River Heights Winnipeg CA River East Winnipeg CA	Mid aggregate area North aggregate area Assiniboine RHA Brandon RHA North Eastman RHA Parkland RHA Nor-Man RHA Assiniboine South Winnipeg CA
Ambulatory Visit Rate to a Cardiac Surgeon, all ages	18.5 vs. 22.0 (per 1,000) RR=0.84, NS	None	None

NS = Not statistically different between Metis and All Other Manitobans

5.2: Ambulatory Visit Rate

Ambulatory visit rates includes almost all contacts with physicians (GP/FPs and specialists): office visits, walk-in clinic visits, home visits, personal care home (nursing home) visits, visits to outpatient departments, and some emergency room visits (where data are recorded). Excluded are services provided to patients while admitted to hospital and visits for prenatal care.

Both the age- and sex-adjusted and the age- and sex-specific ambulatory visit rate per resident aged 19 years and older was measured over five fiscal years: 2002/03-2006/07. There is a possibility that there is missing data for this indicator because of an inability to pick up nursing station visits, especially in First Nations communities. Additionally, although nurse practitioners and salaried physicians are expected to 'shadow bill', incomplete billings can result in visits to these professionals being undercounted.

The denominator includes all Manitoba residents aged 19 years and older in the five-year time period who were continuously registered with Manitoba Health for at least one year in the five-year time period.

Key observations:

Metis with IHD compared to All Other Manitobans with IHD

Manitoba (Figure 5.2.1):

- Metis have a similar ambulatory visit rate compared to All Other Manitobans in Manitoba (8.6 vs. 8.0 visits)

Aggregate Areas (Figure 5.2.1):

- Metis have a higher ambulatory visit rate compared to All Other Manitobans in North aggregate area (10.1 vs. 7.4 visits)
- There is an ambulatory visit rate gradient for Metis but not for All Other Manitobans, from the most healthy to the least healthy aggregate at the aggregate level as ordered by PMR

RHAs (Figure 5.2.1):

- Metis have a higher ambulatory visit rate compared to All Other Manitobans in Burntwood RHA (10.4 vs. 6.8 visits)
- Metis have a higher ambulatory visit rate compared to their provincial average in Brandon RHA (12.2 vs. 8.6 visits) and a lower ambulatory visit rate compared to their provincial average in Churchill RHA (4.8 vs. 8.6)
- All Other Manitobans have a lower ambulatory visit rate compared to their provincial average in Churchill RHA (3.9 vs. 8.0 visits)
- There is no ambulatory visit rate gradient for either Metis or All Other Manitobans at the RHA level

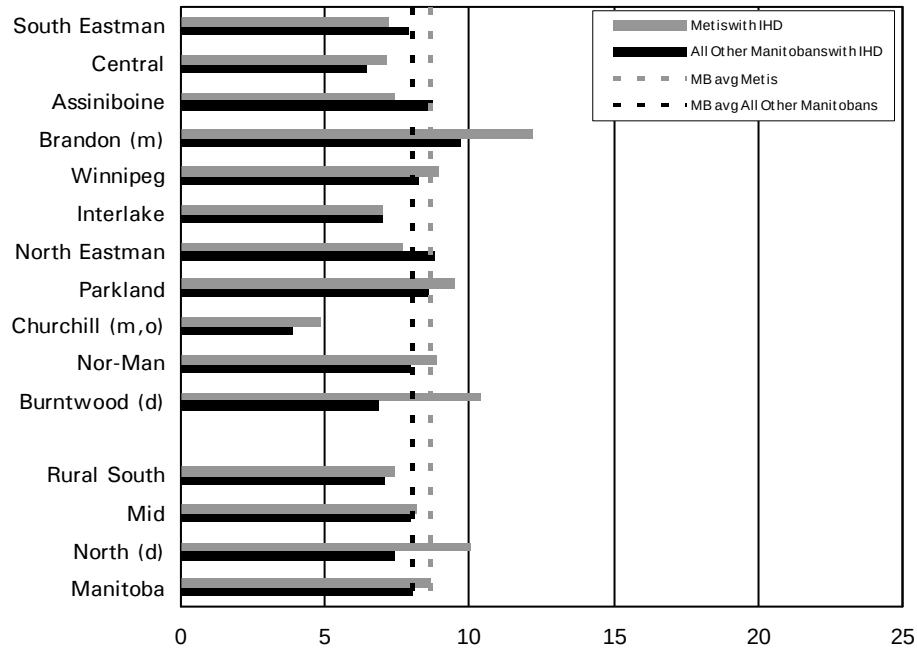
Winnipeg CAs (Figure 5.2.2):

- Metis have a higher ambulatory visit rate compared to All Other Manitobans in Seven Oaks CA (10.7 vs. 8.0 visits)

- There is no ambulatory visit rate gradient for either Metis or All Other Manitobans at the CAs level

Figure 5.2.1: Ambulatory Visit Rate by RHA for Metis with IHD and All Other Manitobans with IHD, 2002/03- 2006/07

Age- & sex-adjusted average annual rate of ambulatory visits to all physicians, per resident

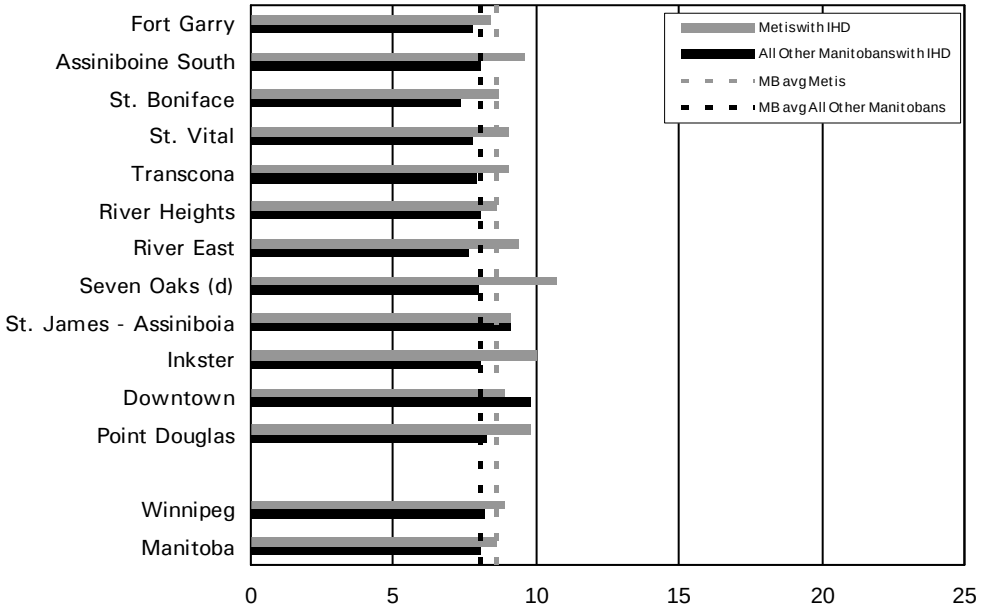


'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases)

Source: MMF, 2012

Figure 5.2.2: Ambulatory Visit Rate by Winnipeg Community Area for Metis with IHD and All Other Manitobans with IHD, 2002/03- 2006/07

Age- & sex-adjusted average annual rate of ambulatory visits to all physicians, per resident



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases)

Source: MMF, 2012

Age- and Sex-Specific:

Manitoba (Figure 5.2.3):

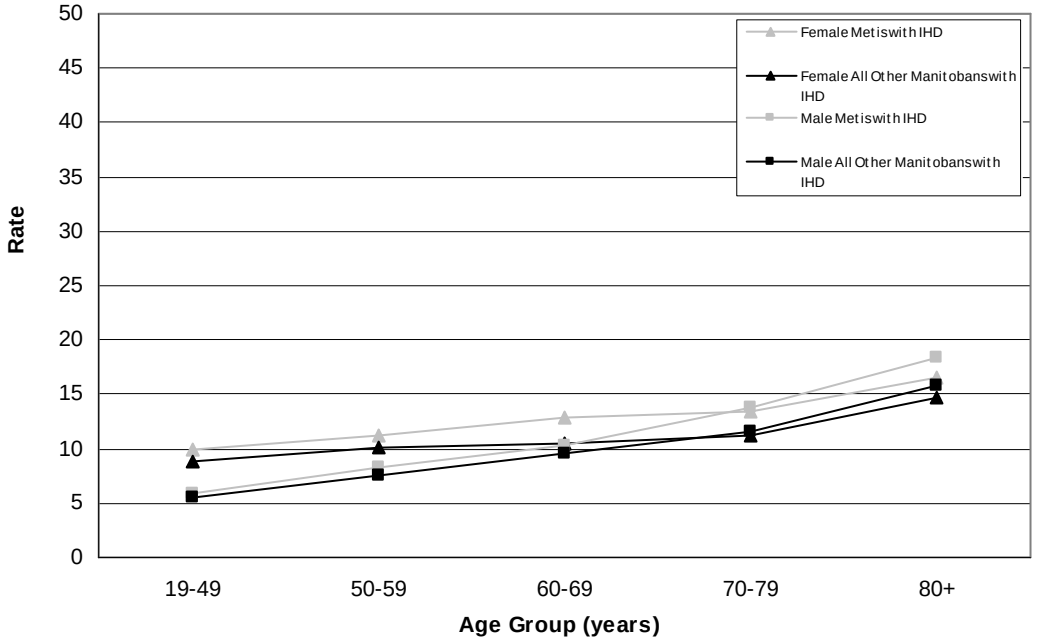
- Throughout their lives, for both Metis males and Metis females the crude ambulatory visit rate increases with age
- Throughout most of their lives, Metis males have a similar crude ambulatory visit rate compared to All Other Manitoban males with the exception of those aged 70 years and older, when Metis males have a higher crude ambulatory visit rate compared to All Other Manitoban males
- Throughout their lives, Metis females have a higher crude ambulatory visit rate compared to All Other Manitoban females
- Between the ages of 19 and 69 years, Metis males have a lower crude ambulatory visit rate compared to Metis females until the age of 70 years and older when Metis males have a slightly higher ambulatory visit rate compared to Metis females

Winnipeg (Figure 5.2.4):

- As in Figure 5.2.3, the crude prevalence of ambulatory visit rate in Winnipeg followed the same age and sex patterns as in Manitoba

Figure 5.2.3: Ambulatory Visit Rate in Manitoba by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2002/03-2006/07

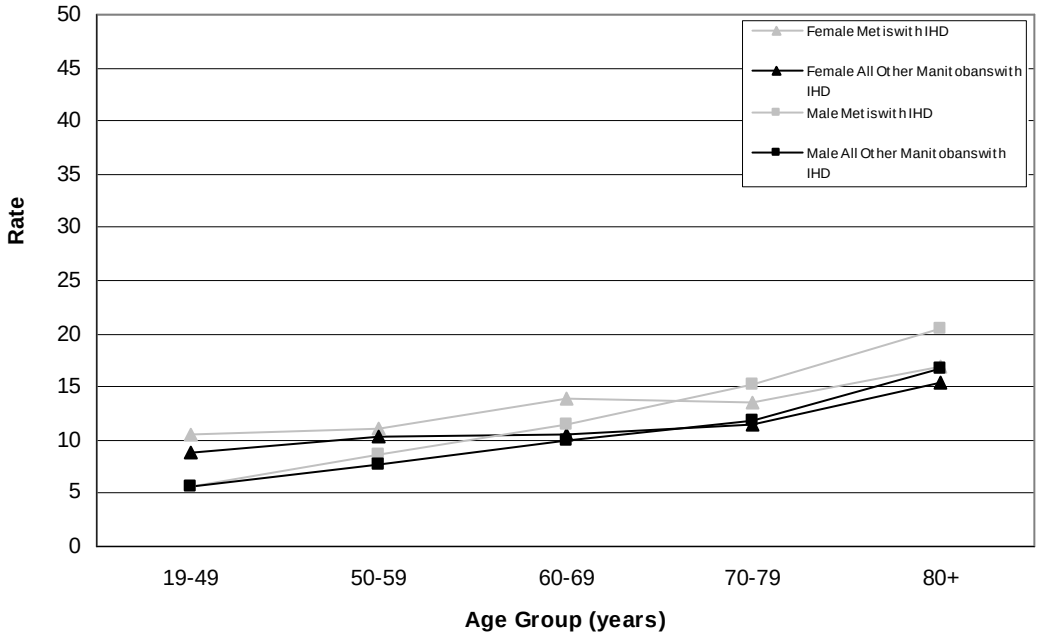
Crude average annual rate of resident aged 19+ in a five-year period



Source: MMF, 2012

Figure 5.2.4: Ambulatory Visit Rate in Winnipeg Community Area by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2002/03-2006/07

Crude average annual rate of resident aged 19+ in a five-year period



Source: MMF, 2012

Findings from the Literature Review

(Compared to the results in this study—*in italics*):

Physician visits comprise an important part of health care delivery. In Canada, in 2007, 10.3% of all visits to a community physician (physicians with an office outside a hospital) were for the management of CVDs; of these, 13.8% were specifically for IHD (PHAC, 2009). It is a well established fact that women use more health care services compared to men (Bertakis, Azari, Helms, Callahan, & Robbins, 2000). In Manitoba, for the general population the annual age- and sex-adjusted ambulatory visit rate per resident was 4.99 for fiscal year 2005/06 for the general population (Fransoo et al., 2009). At the provincial level, Metis had a higher ambulatory visit rate compared to All Other Manitobans (5.4 vs. 4.8 visits per year) (Martens, Bartlett et al., 2010). As well, the ambulatory physician visit rate for Metis in Winnipeg RHA was higher than that of all other Winnipeg residents (5.9 vs. 5.1 visits per year) (Martens, Bartlett, et al., 2010). In the Diabetes in Metis in Manitoba study it was found that Metis with diabetes have a higher age- and sex-adjusted ambulatory visit rate compared to All Other Manitobans with diabetes (8.8 vs. 8.0 visits). The information in those studies was not specific to those living with IHD.

There is no comparable literature on ambulatory visit rate for Metis with IHD. In our study, Metis with IHD have a similar age- and sex-adjusted ambulatory visit rate compared to All Other Manitobans with IHD (8.6 vs. 8.0 visits) in Manitoba. Metis have a higher ambulatory visit rate compared to All Other Manitobans in North (10.1 vs. 7.4 visits) aggregate area. There is an ambulatory visit rate gradient for Metis from the most healthy to least healthy aggregate areas. Among the RHAs, Metis have a higher ambulatory visit rate compared to All Other Manitobans in Burntwood (10.4 vs. 6.8 visits) RHA. Among Winnipeg CAs, Metis have a higher ambulatory visit rate compared to All Other Manitobans in Seven Oaks (10.7 vs. 8.0 visits). Throughout their lives, both Metis and All Other Manitobans crude ambulatory visit rates increase with age in Manitoba. Metis males have a lower crude ambulatory visit rate compared to Metis females in Manitoba.

At the provincial level the rate of physician (ambulatory) visits is similar for Metis and All Other Manitobans with IHD. There are still some regional differences which may highlight the need for further investigation in these areas.

5.3 Ambulatory Visit Rate to a Cardiologist

A cardiologist is a doctor who is trained in diagnosing and treating diseases of the heart and blood vessels. An individual needs to be referred to a cardiologist by a family physician or another type of specialist physician (e.g., internal medicine specialist).

Both the age- and sex-adjusted and the age- and sex-specific ambulatory visit rate to a cardiologist for residents aged 19 years and older were measured over five fiscal years: 2002/03-2006/07. There is a possibility of missing data for this indicator because of an inability to pick up nursing station visits, especially in First Nations communities. Although nurse practitioners and salaried physicians are expected to 'shadow bill', incomplete billings can result in visits to these professionals being undercounted.

The denominator includes all Manitoba residents aged 19 years and older in the five-year time period who were continuously registered with Manitoba Health for at least one year in the five-year time period.

Key observations

Metis with IHD compared to Metis without IHD:

Manitoba (Figure 5.3.1):

- There is no difference in ambulatory visit rate to a cardiologist between Metis and All Other Manitobans in Manitoba (256.5 vs. 299.0 per 1,000 residents)

Aggregate Areas (Figure 5.3.1):

- Metis have a higher ambulatory visit rate to a cardiologist compared to All Other Manitobans in Rural South (222.6 vs. 151.0 per 1,000 residents)
- Metis have a lower ambulatory visit rate to a cardiologist compared to their provincial average in Mid (162.6 vs. 256.5 per 1,000 per residents) and North (125.0 vs. 256.5) aggregate areas
- All Other Manitobans have a lower ambulatory visit rate to a cardiologist compared to their provincial average in Rural South (151.0 vs. 299.0 per 1,000 residents), Mid (173.4 vs. 299.0), and North (151.8 vs. 299.0) aggregate areas
- There is no gradient for ambulatory visit rate to a cardiologist for either Metis or All Other Manitobans from most healthy to least healthy at the aggregate level as ordered by PMR

RHAs (Figure 5.3.1):

- Metis have a higher ambulatory visit rate to a cardiologist compared to All Other Manitobans in South Eastman RHA (329.8 vs. 242.0 per 1,000 residents)
- Metis have a higher ambulatory visit rate to a cardiologist compared to their provincial average in Winnipeg RHA (350.7 vs. 256.5 per 1,000 residents) whereas Metis have a lower ambulatory visit rate to a cardiologist compared to their provincial average in Assiniboine South (114.3 vs. 256.5), Brandon (43.6 vs. 256.5), North Eastman (162.4 vs. 256.5), Parkland (73.3 vs. 256.5), and Nor-Man (91.3 vs. 256.5) RHAs

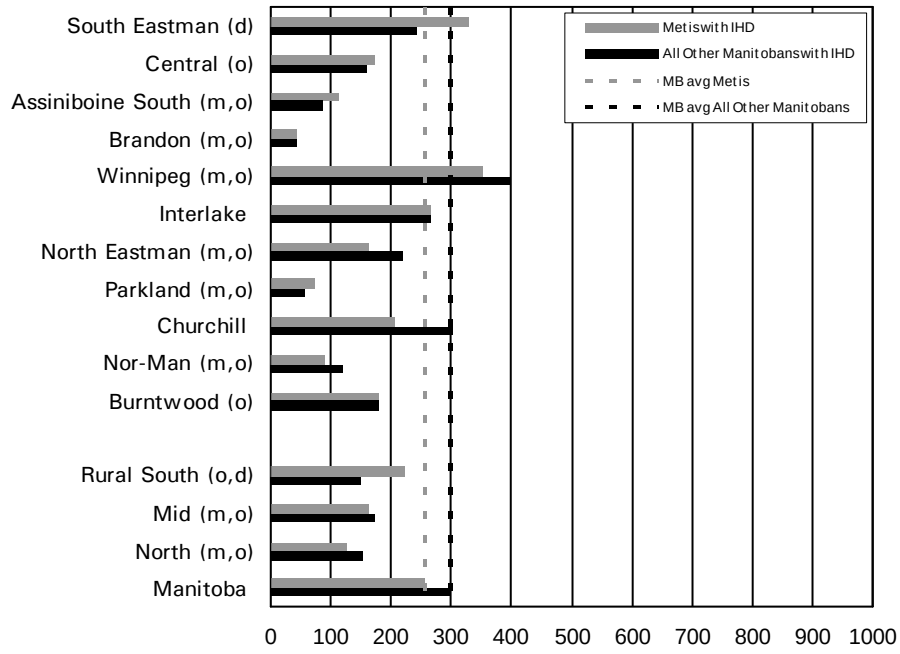
- All Other Manitobans have a higher ambulatory visit rate to a cardiologist compared to their provincial average in Winnipeg RHA (400.0 vs. 299.0 per 1,000 residents) whereas All Other Manitobans have a lower ambulatory visit rate to a cardiologist compared to their provincial average in Central (159.1 vs. 299.0), Assiniboine South (86.8 vs. 299.0), Brandon (42.5 vs. 299.0), North Eastman (218.0 vs. 299.0), Parkland (57.0 vs. 299.0), Nor-Man (121.2 vs. 299.0), and Burntwood (180.4 vs. 299.0) RHAs
- There is no gradient for ambulatory visit rate to a cardiologist for either Metis or All Other Manitobans from most healthy to least healthy at the RHA level

Winnipeg CAs (Figure 5.3.2):

- Metis have a lower ambulatory visit rate to a cardiologist compared to All Other Manitobans in Assiniboine South CA (143.5 vs. 492.9 per 1,000 residents)
- Metis have a higher ambulatory visit rate to a cardiologist compared to their provincial average in St. Boniface (388.9 vs. 256.5 per 1,000 resident), St. Vital (376.5 vs. 256.5), Transcona (408.8 vs. 256.5), River Heights (611.1 vs. 256.5), and River East (393.8 vs. 256.5) CAs whereas Metis have a lower ambulatory visit rate to a cardiologist compared to their provincial average in Assiniboine South CA (143.5 vs. 256.5)
- There is no gradient for ambulatory visit rate to a cardiologist for either Metis or All Other Manitobans from most healthy to least healthy at the CA level

Figure 5.3.1: Ambulatory Visit Rate to a Cardiologist by RHA for Metis with IHD and All Other Manitobans with IHD, 2002/03- 2006/07

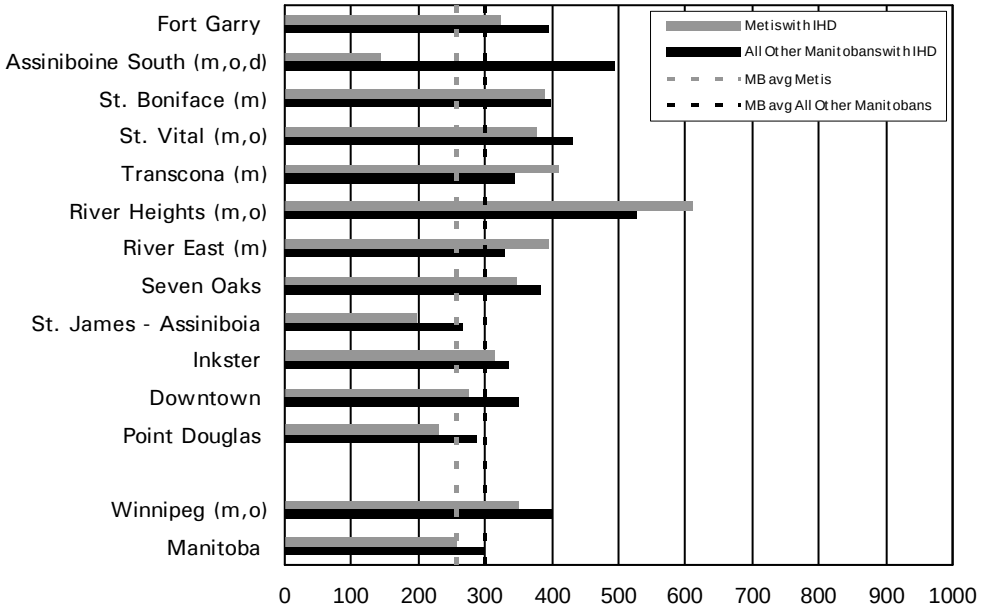
Age- & sex-adjusted annual rate of visits to a Cardiologist, per 1,000 residents



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases) Source: MMF, 2012

Figure 5.3.2: Ambulatory Visit Rate to a Cardiologist by Winnipeg Community Area for Metis with IHD and All Other Manitobans with IHD, 2002/03- 2006/07

Age- & sex-adjusted annual rate of visits to a Cardiologist, per 1,000 residents



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases) Source: MMF, 2012

Age- and Sex-Specific:

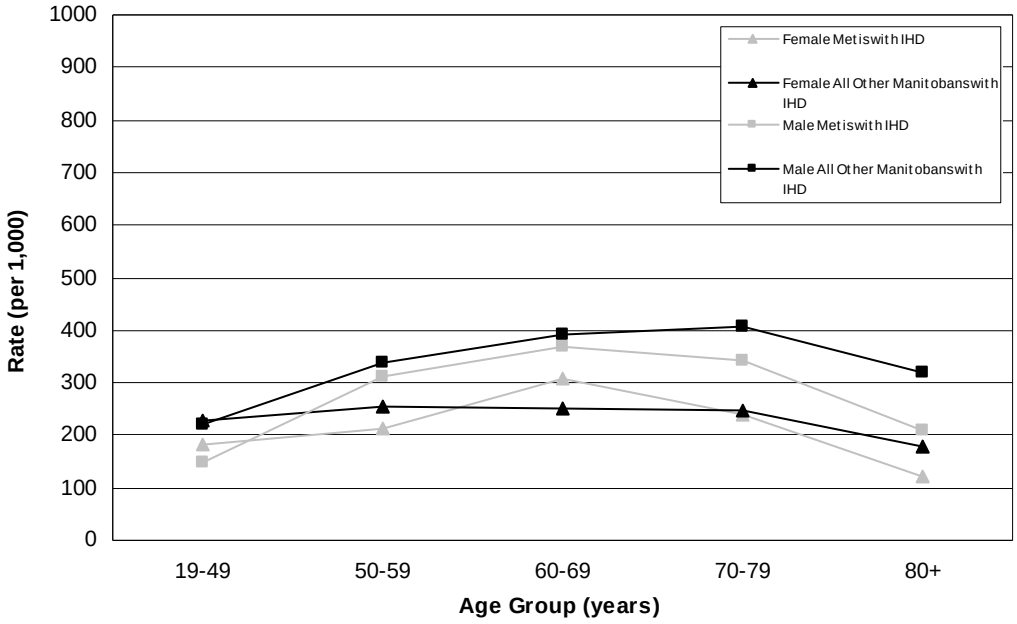
Manitoba (Figure 5.3.3):

- Throughout their lives, for Metis males and Metis females the crude ambulatory visit rate to a cardiologist increases with age until it begins to decrease after the age of 70
- Metis males have a lower crude ambulatory visit rate to a cardiologist compared to All Other Manitoban males
- Throughout most of their lives, Metis females have a lower crude ambulatory visit rate to a cardiologist compared to All Other Manitoban females except between the ages of 60 and 69 years (307.1 vs. 252.3 per 1,000)

Winnipeg (Figure 5.3.4):

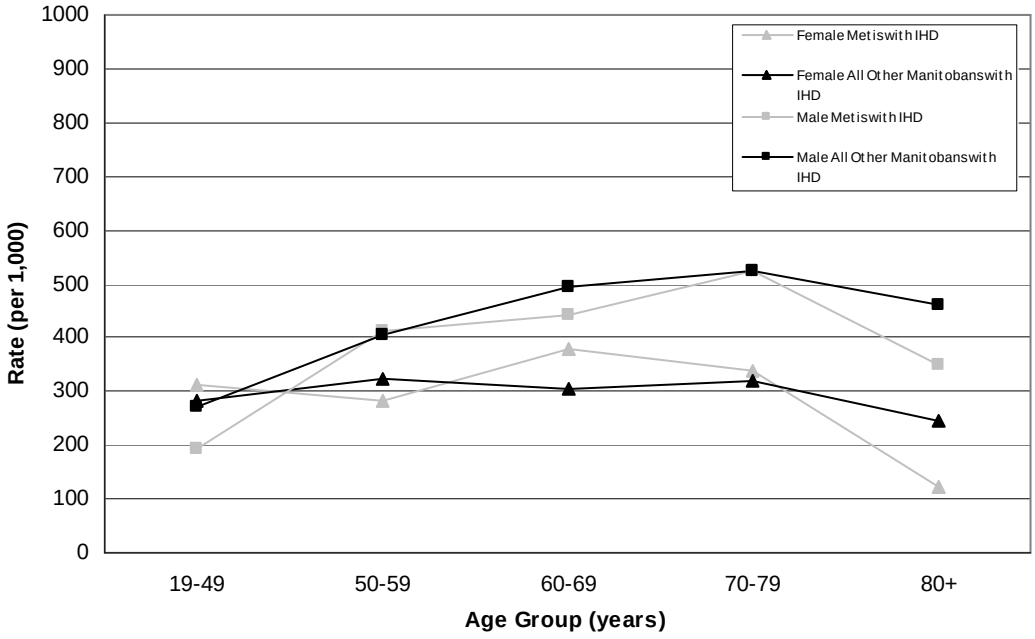
- As in Figure 5.3.3, the crude prevalence ambulatory visit rate to cardiologist in Winnipeg followed the same age and sex patterns as in Manitoba

Figure 5.3.3: Ambulatory Visit Rate to a Cardiologist in Manitoba by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2002/03-2006/07
Crude average annual rate per 1,000 resident aged 19+ in a five-year period



Source: MMF, 2012

Figure 5.3.4: Ambulatory Visit Rate to a Cardiologist in Winnipeg Community Area by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2002/03-2006/07
Crude average annual rate per 1,000 resident aged 19+ in a five-year period



Source: MMF, 2012

Findings from the Literature Review

(Compared to the results in the study—*in italics*)

In Canada, the number of cardiologists has decreased over time from 23.9 to 20.9 per 100,000 patients aged 65 years and older for the period of 1994–2008 (PHAC, 2009). In 2008, there were 1,078 cardiologists in Canada (PHAC, 2009). To ensure quality of cardiac care it is important for patients to have access to cardiologists; however, individuals with 'non-urgent' referrals can wait more than 3 months for consultations (Ross et al., 2006). Differences between sexes play a role in physician referral as men are more often referred to specialty care and invasive cardiac procedures compared to women (Bertakis, Azari, Helms, Callahan, & Robbins, 2000).

There are no comparative studies that focused on the ambulatory visit rates to a cardiologist for Metis in the literature. In our study, there is no difference in ambulatory visit rates to a cardiologist between Metis with IHD and All Other Manitobans with IHD at a provincial level (256.5 vs. 299.0 per 1,000 residents). Metis have a higher ambulatory visit rate to a cardiologist compared to All Other Manitobans in South Eastman RHA (329.8 vs. 242.0 per 1,000 residents). In South Eastman RHA, these higher rates mirror a higher PMR for Metis with IHD compared to All Other Manitobans with IHD (8.1 vs. 4.9 per 1,000). The crude ambulatory visit rate to a cardiologist increases with age in Metis males and Metis females.

While there is no difference at the provincial level for ambulatory visit rates to a cardiologist, differences among regional rates remain important. Further investigation should focus on regional differences.

5.4 Ambulatory Visit Rate to a Cardiac Surgeon

Ambulatory visit rate to a cardiac surgeon identifies visits to specialists who perform procedures on the heart muscle and vessels such as cardiac catheterization, bypass graft surgery, and/or percutaneous coronary interventions (Novick & Stitt, 1999).

Both the age- and sex-adjusted and the age- and sex-specific ambulatory visit rates to a cardiac surgeon for residents age 19+ were measured for fiscal years: 2002/03-2006/07. There is a possibility for missing data for this indicator because of an inability to pick up nursing station visits, especially in First Nations communities. Additionally, although nurse practitioners and salaried physicians are expected to 'shadow bill', incomplete billings can result in visits to these professional being undercounted.

The denominator includes all Manitoba residents aged 19 years and older in the five-year time period who were continuously registered with Manitoba Health for at least one year in the five-year time period.

Key observations

Metis with IHD compared to Metis without IHD:

Manitoba (Figure 5.4.1):

- There is no difference in ambulatory visit rate to a cardiac surgeon between Metis and All Other Manitobans (18.5 vs. 22.0 per 1,000 residents) in Manitoba

Aggregate Areas (Figure 5.4.1):

- There is no difference in ambulatory visit rate to a cardiac surgeon between Metis and All Other Manitobans at the aggregate level
- There is no gradient for the ambulatory visit rate to a cardiac surgeon for either Metis or All Other Manitobans at the aggregate level as ordered by PMR

RHAs (Figure 5.4.1):

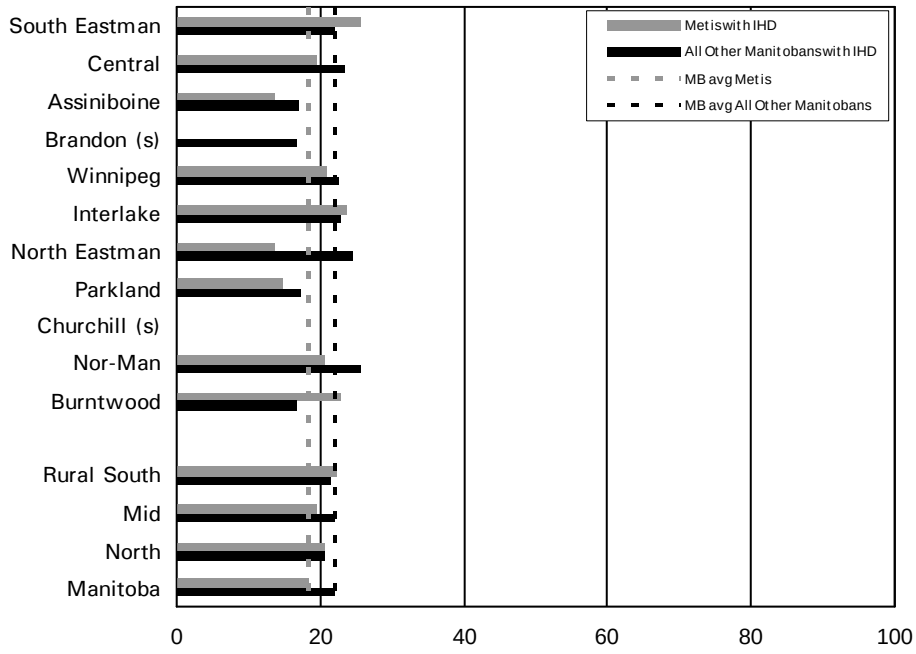
- There is no difference in ambulatory visit rate to a cardiac surgeon between Metis and All Other Manitobans at the RHA level
- There is no gradient for the ambulatory visit rate to a cardiac surgeon for either Metis or All Other Manitobans at the RHA level

Winnipeg CAs (Figure 5.4.2):

- Metis have a higher ambulatory visit rate to a cardiac surgeon compared to All Other Manitobans in Inkster CA (37.4 vs. 20.6 per 1,000 residents)
- There is no gradient for the ambulatory visit rate to a cardiac surgeon for either Metis or All Other Manitobans from most healthy to least healthy CA

Figure 5.4.1: Ambulatory Visit Rate to a Cardiac Surgeon by RHA for Metis with IHD and All Other Manitobans with IHD, 2002/03- 2006/07

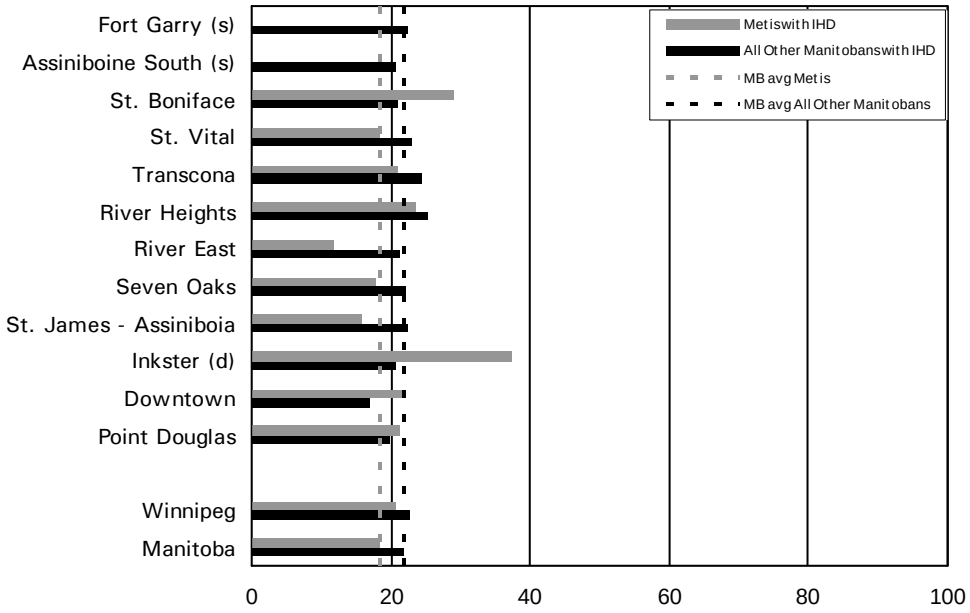
Age- & sex-adjusted annual rate of visits to a cardiac surgeon per 1,000 residents



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases) Source: MMF, 2012

Figure 5.4.2: Ambulatory Visit Rate to a Cardiac Surgeon by Winnipeg Community Area for Metis with IHD and All Other Manitobans with IHD, 2002/03- 2006/07

Age- & sex-adjusted annual rate of visits to a cardiac surgeon per 1,000 residents



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases) Source: MMF, 2012

Age- and Sex-Specific:

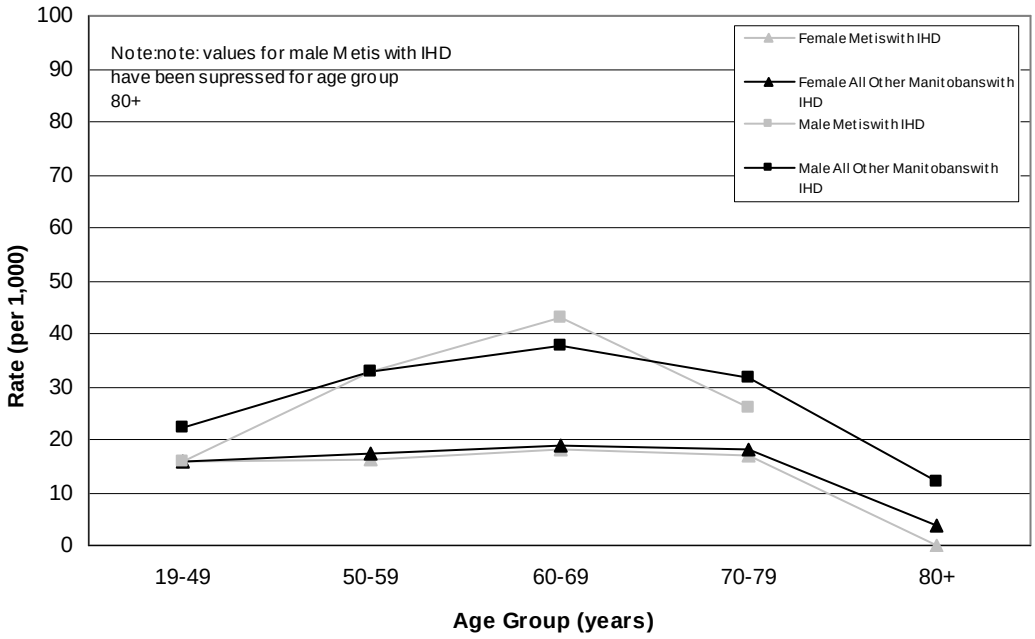
Manitoba (Figure 5.4.3)

- Throughout most of their lives, for both Metis males and Metis females the crude ambulatory visit rate to a cardiac surgeon increases until age 70 when the rate decreases
- Metis males and All Other Manitoban males have a similar crude ambulatory visit rate to a cardiac surgeon
- Metis females and All Other Manitoban females have a similar crude ambulatory visit rate to a cardiac surgeon
- Between the ages of 60 and 69 years, Metis males have a much higher crude ambulatory visit rate to a cardiac surgeon compared to Metis females (43.1 vs. 18.0 per 1,000)

Winnipeg (Figure 5.4.4):

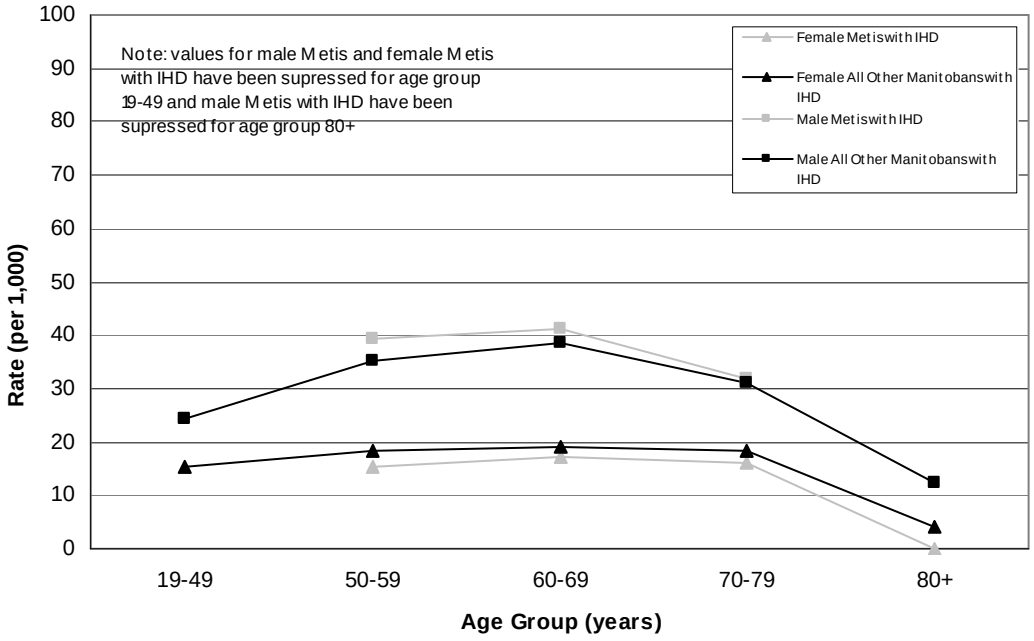
- As in Figure 5.4.3, the crude prevalence of ambulatory visit rate to a cardiac surgeon in Winnipeg followed the same age and sex pattern as in Manitoba

Figure 5.4.3: Ambulatory Visit Rate to a Cardiac Surgeon in Manitoba by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2002/03-2006/07
Crude average annual rate per 1,000 resident aged 19+ in a five-year period



Source: MMF, 2012

Figure 5.4.4: Ambulatory Visit Rate to a Cardiac Surgeon in Winnipeg Community Area by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2002/03-2006/07
Crude average annual rate per 1,000 resident aged 19+ in a five-year period



Source: MMF, 2012

Findings from the Literature Review

(Compared to the results in the study—*in italics*)

In Canada, the rate of cardiac surgeons has remained steady over time from 7.6 to 7.4 per 100,000 between 1994 and 2008 (PHAC, 2009). In 2008, there were 332 cardiac surgeons in Canada (PHAC, 2009). Increased demands for cardiac surgeons have emerged because of new procedures (e.g., angioplasty) and technologies (e.g., drug-eluting stents) (Ross et al., 2006). Care received from a cardiovascular specialist provides important health prevention services resulting in improved health outcomes (Ross et al., 2006). Rates for cardiac care procedures in Manitoba were higher for males compared to females (Fransoo et al., 2005).

There are no comparative studies on the ambulatory visit rates to a cardiac surgeon for Metis with IHD in the literature. In this study, Metis have a similar age- and sex-adjusted rate for ambulatory visit rates to a cardiac surgeon (18.5 vs. 22.0 per 1,000 residents). Metis have a higher ambulatory visit rate to a cardiac surgeon compared to All Other Manitobans in Inkster CA (37.4 vs. 20.6 per 1,000 residents). Metis males and Metis females have an increasing crude prevalence of ambulatory visit rate to a cardiac surgeon in Manitoba. Throughout most of the their lives, Metis males have a higher crude ambulatory visit rate to a cardiac surgeon in Manitoba than Metis females

Provincially, Metis with IHD visit cardiac surgeons at a rate similar to All Other Manitobans with IHD.

References

Fransoo, R., Martens, P., The Need to Know Team, Burland, E., Prior, H., Burchill, C., …& Walld, R. (2005). *Sex difference in health status, health care use and quality of care: A population-based analysis for Manitoba's Regional Health Authorities*. Retrieved from http://mchp-appserv.cpe.umanitoba.ca/reference/sexdiff.pdf

Fransoo, R., Martens, P., Burland, E., the Need to Know Team, Prior, H., & Burchill, C. (2009). *Manitoba RHA Indicator Atlas*. Retrieved from http://mchp-appserv.cpe.umanitoba.ca/reference/RHA_Atlas_Report.pdf

Martens, P. J., Bartlett, J., Burland, E., Prior, H., Burchill, C., Huq, S., …& Bailly, A. (2010). *Profile of Metis health status and healthcare utilization in Manitoba: A population-based study*. Winnipeg, MB: Manitoba Centre for Health Policy.

Novick, R.J., & Stitt, L.W. (1999). The learning curve of an academic cardiac surgeon: Use of CUSUM method. *Journal of Cardiac Surgery, 14*(5), 312-320.

Public Health Agency of Canada. (2009). *Tracking Heart Disease and Stroke in Canada*. Retrieved from http://www.phac-aspc.gc.ca/publicat/2009/cvd-avc/pdf/cvd-avs-2009-eng.pdf

Ross, H., Higginson, L.A., Ferguson, A., O'Neill, B.J., Kells, C.M., Cox, J.L., & Sholdice, M.M. (2006). Too many patients, too few cardiologists to care? *Canadian Journal of Cardiology, 22*(11), 901-99.

Section 6: High Profile Cardiac Surgery

6.1 High Profile Cardiac Surgery

This section focuses on high profile cardiac surgery which includes cardiac catheterization (also called angiography), coronary artery bypass graft surgery (also called bypass graft surgery), and percutaneous coronary interventions (PCI), with or without stent insertion (also called angioplasty). Individuals with IHD benefit from surgery as it provides relief from pain and extends life (Bakhai, Hill, Dundar, Dickson, & Walley, 2009).

In each of the graphs in this section the Regional Health Authorities are ordered by the ten-year Premature Mortality Rate (PMR). More information on ten-year PMR is provided in Section 1.

All the indicator criteria used in this section were developed by the Manitoba Centre for Health Policy from the Metis Atlas (Martens, Bartlett, et al., 2010) unless otherwise noted. In this section, all indicators compare Metis with IHD to All Other Manitobans with IHD, except for IHD prevalence, which simply compares Metis with All Other Manitobans. As noted in Section 1, unless otherwise indicated any mention of 'lower' or 'higher' refers to results that are 'statistically significant'

Indicators in this section include:

- Cardiac catheterization rate (age- and sex-adjusted)
- Cardiac catheterization rate (age- and sex-specific)
- Coronary artery bypass graft surgery (age- and sex-adjusted)
- Coronary artery bypass graft surgery (age- and sex-specific)
- Percutaneous coronary intervention rate (age- and sex-adjusted)
- Percutaneous coronary intervention rate (age- and sex-specific)

Overall Key Findings (Table 6.1):

- In this study, there are similar rates of cardiac catheterization, bypass surgery, and PCI between Metis and All Other Manitobans in Manitoba
- Metis have a higher rate of cardiac catheterization compared to All Other Manitobans in North aggregate area (83.6 vs. 63.6 per 1,000) whereas Metis in St. James–Assiniboia have a much lower rate (24.8 vs. 61.4 per 1,000) of cardiac catheterization compared to All Other Manitobans
- Metis in St. James–Assiniboia have a lower rate of cardiac catheterization compared to their provincial average (24.8 vs. 66.2 per 1,000 residents)
- For bypass surgery, Metis have a higher rate compared to All Other Manitobans (25.5 vs. 14.4 per 1,000) in South Eastman RHA

Table 6.1: Overall Key Findings of High Profile Cardiac Surgery

Indicator (age of inclusion for this indicator)	**Provincial difference between Metis with IHD and All Other Manitobans with IHD (age- and sex-adjusted prevalence in %, unless otherwise stated), with RR (relative rate) for Metis with IHD**	**Statistically better off regions for Metis with IHD compared to provincial average for Metis with IHD (unless otherwise noted)**	**Statistically worse off regions for Metis with IHD compared to provincial average for Metis with IHD (unless otherwise noted)**
Cardiac Catheterization Rate, 40+	66.2 vs. 65.2 (per 1,000) RR=1.02. NS	St. James–Assinboia CA	None
Coronary Artery Bypass Graft Surgery Rate, 40+	16.7 vs. 15.1 (per 1,000) RR=1.11, NS	None	None
Percutaneous Intervention Rate, 40+	20.3 vs. 22.1 (per 1,000) RR=0.92, NS	None	None

NS = Not statistically different between Metis and All Other Manitobans

6.2 Cardiac Catheterization Rate

Cardiac catheterization is the common medical procedure used to identify and determine severity of IHD (Davidson & Bonow, 2012).

Both the age- and sex-adjusted and the age- and sex-specific annual rate of cardiac catheterization per 1,000 Manitobans aged 40 years and older were measured over three fiscal years: 2004/05-2006/07. Residents were considered to have had a cardiac catheterization if they met the following criteria:

- Cardiac catheterization was defined by hospital separations with ICD-9-CM procedure codes 37.21 to 37.23 and 88.52 to 88.57 and CCI codes 2.Hz.28 and 3.IP.10.

The denominator includes all Manitoba residents aged 40 years and older in the three-year time period who were continuously registered with Manitoba Health for at least one year in the three-year time period.

Key observations:

Metis with IHD compared to All Other Manitobans with IHD

Manitoba (Figure 6.2.1):

- Metis have a similar rate of cardiac catheterization compared to All Other Manitobans in Manitoba (66.2 vs. 65.2 per 1,000)

Aggregate areas (Figure 6.2.1):

- Metis have a higher rate of cardiac catheterization compared to All Other Manitobans in North aggregate area (83.6 vs. 63.6 per 1,000)
- There is no cardiac catheterization rate gradient for either Metis or All Other Manitobans from Rural South aggregate area to North aggregate area as ordered by PMR

RHAs (Figure 6.2.1):

- There is no difference in the rate of cardiac catheterization between Metis and All Other Manitobans by RHAs
- All Other Manitobans in North Eastman have a higher rate of cardiac catheterization compared to their provincial average (80.5 vs. 65.2 per 1,000)
- There is no cardiac catheterization rate gradient for either Metis or All Other Manitobans

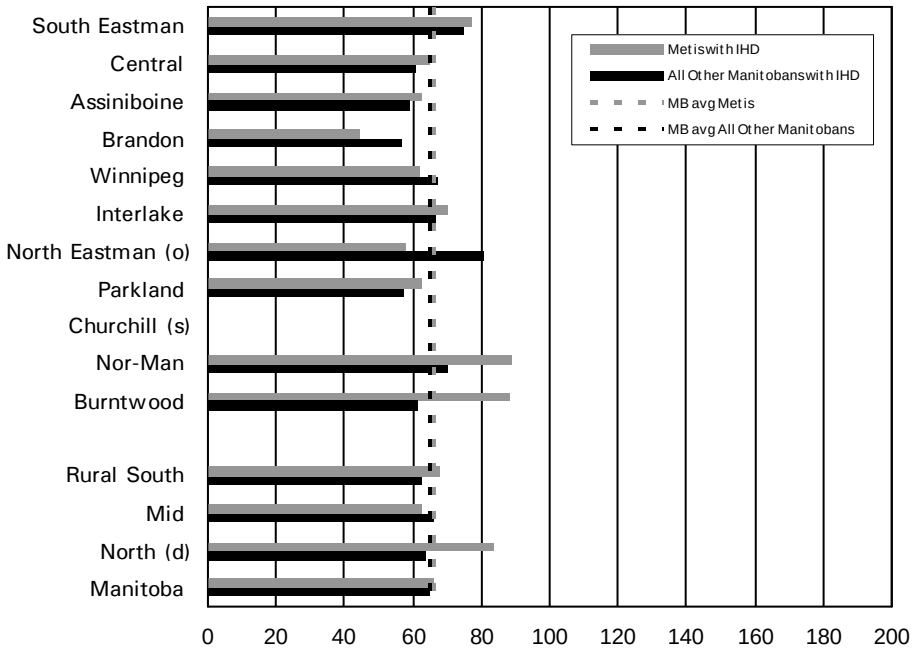
Winnipeg CAs (Figure 6.2.2):

- Metis have a lower rate of cardiac catheterization compared to All Other Manitobans in St. James–Assiniboia CA (24.8 vs. 61.4 per 1,000)
- Metis have a lower rate of cardiac catheterization compared to their provincial average in St. James–Assiniboia CA (24.8 vs. 66.2 per 1,000)
- All Other Manitobans have a higher rate of cardiac catheterization compared to their provincial average in St.Vital CA (76.4 vs. 65.2 per 1,000)

- There is no cardiac catheterization rate gradient for either Metis or All Other Manitobans

Figure 6.2.1: Cardiac Catheterization Rate by RHA for Metis with IHD and All Other Manitobans with IHD, 2004/05- 2006/07

Age- & sex-adjusted annual rate per 1,000 residents aged 40+ years

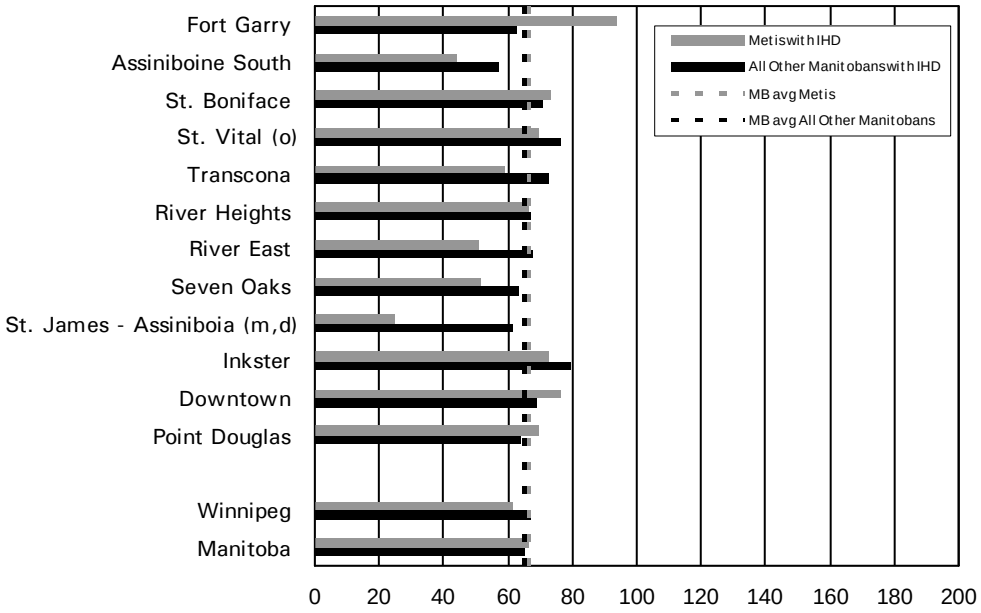


'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases)

Source: MMF, 2012

Figure 6.2.2: Cardiac Catheterization Rate by Winnipeg Community Area for Metis with IHD and All Other Manitobans with IHD, 2004/05- 2006/07

Age- & sex-adjusted annual rate per 1,000 residents aged 40+ years



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases)

Source: MMF, 2012

Age- and Sex-Specific:

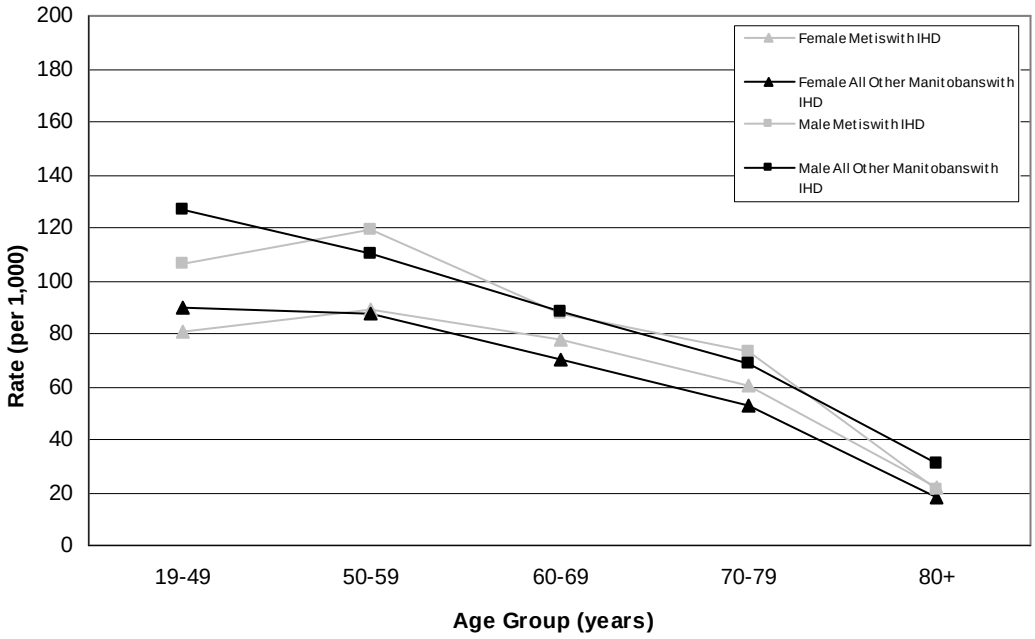
Manitoba (Figure 6.2.3):

- Between the ages of 40 and 59 years, for both Metis males and Metis females the crude rate of catheterization increases until age 60 years and older when it begins to decrease for both groups
- Between the ages of 40 and 49 years, Metis males have a lower crude rate of catheterization compared to All Other Manitoban males (106.3 vs. 127.0 per 1,000). After age 60 Metis males have a similar crude rate of catheterization compared to All Other Manitoban males
- Between the ages of 40 and 49 years, Metis females have a lower crude rate of catheterization compared to All Other Manitoban females (80.6 vs. 89.6 per 1,000). After age 50 years, Metis females have a similar crude rate of catheterization compared to All Other Manitoban females
- Throughout most of their lives, Metis males have a higher crude rate of cardiac catheterization compared to Metis females, except at age 80 years and older where they are similar (21.4 vs. 21.8 per 1,000)
- Rates of cardiac catheterization for both Metis males and females in Winnipeg are highest between the ages of 50 and 59 years (119.3, 88.7 per 1,000), respectively

Winnipeg (Figure 6.2.4):

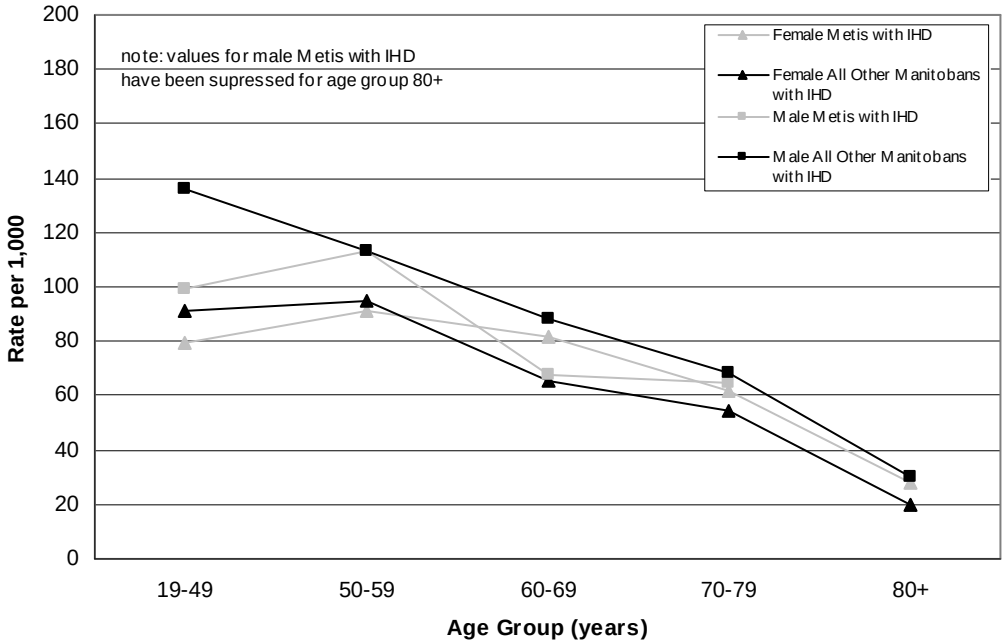
- As in Figure 6.2.3, the crude rate of cardiac catheterization in Winnipeg followed the same age and sex pattern as in Manitoba

Figure 6.2.3: Cardiac Catheterization Rate in Manitoba by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2004/05-2006/07
Crude rate of residents per 1,000 aged 40+



Source: MMF, 2012

Figure 6.2.4: Cardiac Catheterization Rate in Winnipeg by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2004/05-2006/07
Crude rate of residents per 1,000 aged 40+



Source: MMF, 2012

Findings from Literature Review

(Compared to the results in this study—*in italics)*

In Manitoba, rates of cardiac catheterizations have remained steady over time from 6.8 to 6.9 per 1,000 residents for the period of 1998/99-2000/01 (Fransoo et al., 2009). Provincially, the rates of cardiac catheterization are higher in males compared to females (9.9 vs. 4.5 per 1,000 residents 40 years and older, $p<0.001$) (Fransoo, et al., 2005).

In the Metis Atlas, it was found that Metis have a higher cardiac catheterization rate compared to All Other Manitobans (9.5 vs. 6.6 per 1,000) and in Winnipeg RHA Metis had a higher cardiac catheterization rate compared to All Other Manitobans in Winnipeg (9.2 vs. 6.8 per 1,000) (Martens, Bartlett, et al., 2010). There was no sex-specific information in the Metis Atlas. Information in either of those studies was not specific to persons living with IHD but it can be assumed that everyone undergoing cardiac catheterization had IHD.

There are no studies in the literature on the cardiac catheterization rate in Metis with IHD. In our study, Metis with IHD have a similar cardiac catheterization rate compared to All Other Manitobans (66.2 vs. 65.2 per 1,000 residents) in Manitoba. Metis with IHD in North aggregate area have a higher rate of cardiac catheterization compared to All Other Manitobans in North aggregate area (83.6 vs. 63.6 per 1,000). In Winnipeg CAs, Metis with IHD have a lower rate of cardiac catheterization compared to All Other Manitobans with IHD in St. James–Assiniboia (24.8 vs. 61.4 per 1,000) as well as a lower rate compared to their provincial average (24.8 vs. 66.2 per 1,000). Throughout their lives, Metis males have a higher crude ambulatory visit rate to a cardiac surgeon compared to Metis females in Manitoba.

The findings suggest that provincially Metis with IHD are accessing health services and receiving cardiac catheterization treatment equally. However, lower rates of cardiac catheterization among Metis with IHD in St. James–Assiniboia suggest further investigation is warranted.

6.3 Percutaneous Coronary Intervention (PCI) Rate

Percutaneous Coronary Intervention (PCI) (also referred to as angioplasty) is a common medical procedure used in revascularization which opens narrowed or blocked arteries in or near the heart. This procedure can be done with or without insertion of a stent that elute drugs (Silber et al., 2005).

Both the age- and sex-adjusted and the age-and sex- specific rate of PCI per 1,000 residents were measured over five fiscal years: 2002/03-2006/07. PCI was defined as the number of percutaneous transluminal coronary angioplasty procedures (with or without stent insertion) performed on residents aged 40 years or older. Residents were considered to have PCI if they met the following criteria:

- ICD-9-CM procedure codes 37.21-37.23, 88.52-88.57, CCI codes 1.IJ.50 and 1.IJ.57 in any procedure field in a hospital abstract (inpatient or outpatient).

In Manitoba, PCI procedures are only performed at the two tertiary hospitals (Winnipeg Health Sciences Centre and St. Boniface General Hospital), so only hospital separations from those two hospitals were included in the analysis in order to minimize the potential for double-counting of the procedure.

The denominator includes all Manitoba residents aged 40 and older in the five-year time period who were continuously registered with Manitoba Health for at least one year in the five-year time period.

Key observations:

Metis with IHD compared to All Other Manitobans with IHD

Manitoba (Figure 6.3.1):

- Metis have a similar rate of PCI compared to All Other Manitobans in Manitoba (20.3 vs. 22.1 per 1,000 residents)

Aggregate areas (Figure 6.3.1):

- There is no difference in the rate of PCI between Metis and All Other Manitobans at the aggregate level
- All Other Manitobans in North aggregate areas have a lower rate of PCI compared to their provincial average (16.4 vs. 22.1 per 1,000 residents)
- There is no PCI rate gradient for either Metis or All Other Manitobans at the aggregate level

RHAs (Figure 6.3.1):

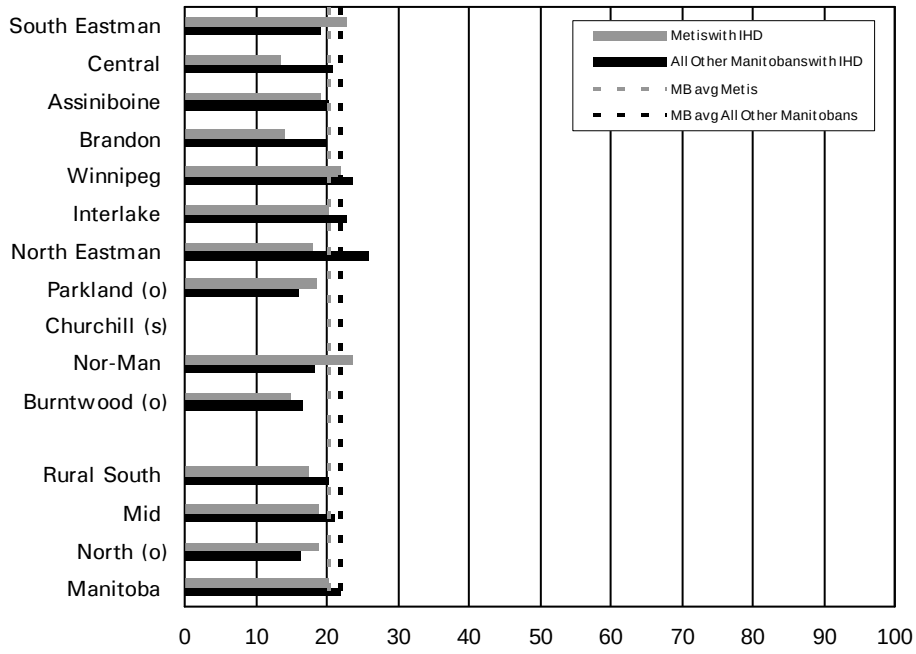
- There is no difference in the rate of PCI between Metis and All Other Manitobans at the RHA level
- All Other Manitobans have a lower rate of PCI compared to their provincial average in Parkland (16.1 vs. 22.1 per 1,000) and Burntwood (16.5 vs. 22.1 per 1,000) RHAs
- There is no PCI rate gradient for either Metis or All Other Manitobans at the RHA level

Winnipeg (Figure 6.3.2):

- There is no difference in the rate of PCI between Metis and All Other Manitobans by CAs
- All Other Manitobans have a higher rate of PCI compared to their provincial average in St. Vital CA (25.9 vs. 22.1 per 1,000)
- There is no PCI rate gradient for Metis or All Other Manitobans at the CA level

Figure 6.3.1: Percutaneous Coronary Intervention Rate by RHA for Metis with IHD and All Other Manitobans with IHD, 2004/05-2006/07

Age- & sex-adjusted annual rate per 1,000 aged 40+

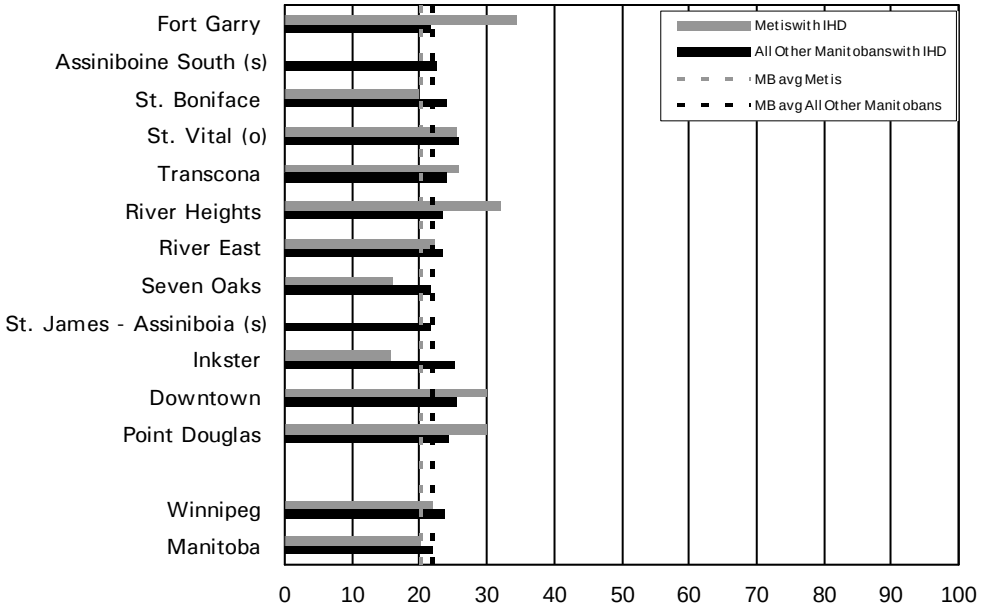


'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases)

Source: MMF, 2012

Figure 6.3.2: Percutaneous Coronary Intervention Rate by Winnipeg Community Area for Metis with IHD and All Other Manitobans with IHD, 2004/05-2006/07

Age- & sex-adjusted annual rate per 1,000 aged 40+



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases)

Source: MMF, 2012

Age- and Sex-Specific:

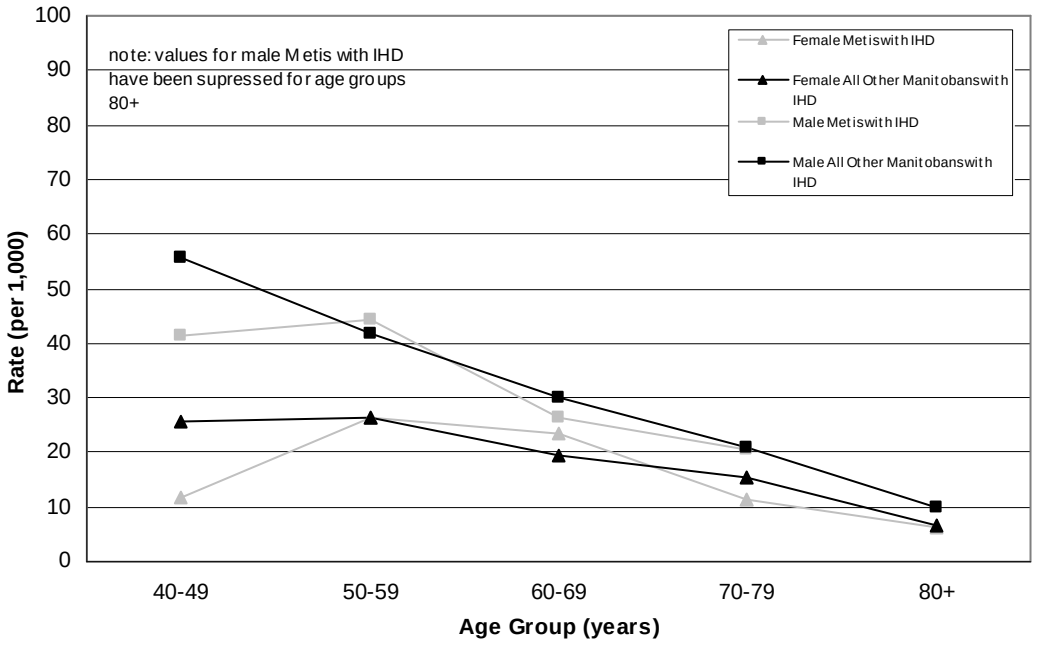
Manitoba (Figure 6.3.3):

- Throughout most of their lives, for Metis males the crude rate of PCI decreases with age except for the age group of 50-59 years when there is a slight increase. For Metis females the crude rate of PCI increases with age until it begins to decrease from age 60 years and older
- For the age group of 40-49 years, Metis males have a lower crude rate of PCI compared to All Other Manitoban males (41.3 vs. 55.5 per 1,000); then for the age group of 50-59 years, Metis males have a higher crude rate of PCI compared to All Other Manitoban males (44.4 vs. 41.6). From the age of 60 years and older Metis males have a similar crude rate of PCI compared to All Other Manitoban males for the rest of their lives
- Throughout their lives, Metis females have a similar crude rate of PCI compared to All Other Manitoba females, except at the ages of 40-49 years and 70-79 years when Metis females have a lower rate of PCI than All Other Manitoban females (11.6 vs. 25.5 and 11.4 vs. 15.5 per 1,000 population, respectively)
- Throughout most of their lives, Metis males have a higher crude rate of PCI compared to Metis females, respectively.

Winnipeg (Figure 6.3.4):

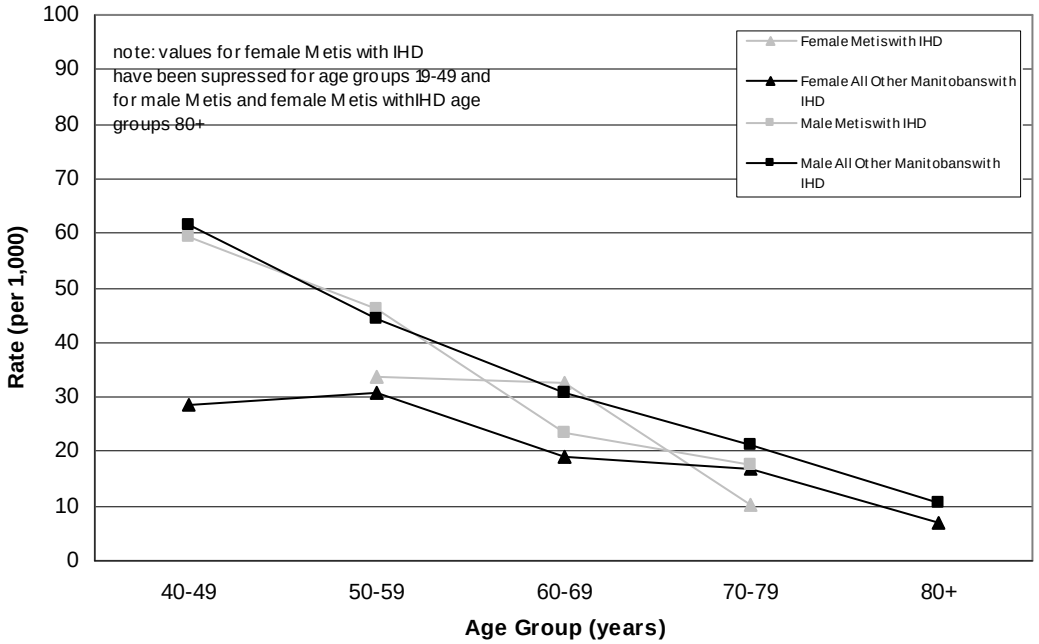
- As seen in Figure 6.3.3, the crude rate of PCI in Winnipeg followed the same age and sex patterns as in Manitoba

Figure 6.3.3: Percutaneous Coronary Intervention Rate in Manitoba by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2004/05-2006/07
Crude rate of residents per 1,000 aged 40+



Source: MMF, 2012

Figure 6.3.4: Percutaneous Coronary Intervention Rate in Winnipeg by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2004/05-2006/07
Crude rate of residents per 1,000 aged 40+



Source: MMF, 2012

Findings from Literature Review

(Compared to the results in this study—*in italics*)

Globally, PCI use has increased over time due to the introduction of drug-eluting stents, preference of patient and health care providers, service availability, and referral patterns (Canadian Institute of Health Information [CIHI], 2011; Hassan et al., 2010; van Domburg et al., 2005). In Canada, rates of PCI have more than doubled from 85.6 per 100,000 to 186.7 per 100,000 for the period of 1994–2005. In 2009–2010 the age-standardized rate of PCI in Canada was 169 per 100,000 (CI 167–171 per 100,000) (CIHI, 2011; Hassan et al., 2010).

In Manitoba, the PCI rate has increased from 1.55 to 2.77 per 1,000 residents aged 40 years and older per year for the period of 1996/97–2000/2001 to 2001/02–2005/06 (Fransoo et al., 2009). Provincially, the PCI rate (without stent insertion) was higher for males compared to females (3.0 vs. 1.2 per 1,000 residents 40 years and older, $p < 0.001$) for the period of 1999/00 2003/04 (Fransoo et al., 2005). These studies were not specific for Metis living with IHD.

There are no comparative studies examining PCI rates for Metis with IHD in the literature. In our study, Metis have a similar rate of PCI compared to All Other Manitobans with IHD in Manitoba. Throughout their lives Metis males have a higher crude PCI rate compared to Metis females in Manitoba.

The findings suggest that provincially Metis with IHD are accessing services and receiving PCI treatment equally.

6.4: Coronary Artery Bypass Graft Surgery Rate

Coronary Artery Bypass Graft Surgery (also know as bypass surgery) is a process of inserting arterial grafts into the damaged arteries within the cardiac muscle to support the optimal blood flow to the heart muscle (Andrews & Serruys, 2006; Serruys et al., 2001). It is a medical procedure done on individuals with IHD and is often an alternative to PCI (see next section for definition of PCI) (Popma & Bhatt, 2012).

Both the age- and sex-adjusted and the age- and sex-specific annual rate of bypass surgery per 1,000 residents aged 40 years and older were measured over five fiscal years: 2002/03-2006/07. Residents were considered to have had bypass surgery if they met the following criterion:

- Bypass surgery was defined by hospital separations with ICD-9-CM procedure codes 36.10 to 36.14

The denominator includes all Manitoba residents aged 40 years and older in a five-year time period who were continuously registered with Manitoba Health for at least one year in the five-year time period.

Key observations:

Metis with IHD and All Other Manitobans with IHD

Manitoba (Figure 6.4.1):

- Metis have a similar rate of bypass surgery compared to All Other Manitobans in Manitoba (16.7 vs. 15.1 per 1,000 residents)

Aggregate areas (Figure 6.4.1):

- There is no difference in the rate of bypass surgery between Metis and All Other Manitobans by the aggregate geographical areas
- There is no gradient for the rate of CABG surgery for either Metis or All Other Manitobans by aggregate areas

RHAs (Figure 6.4.1):

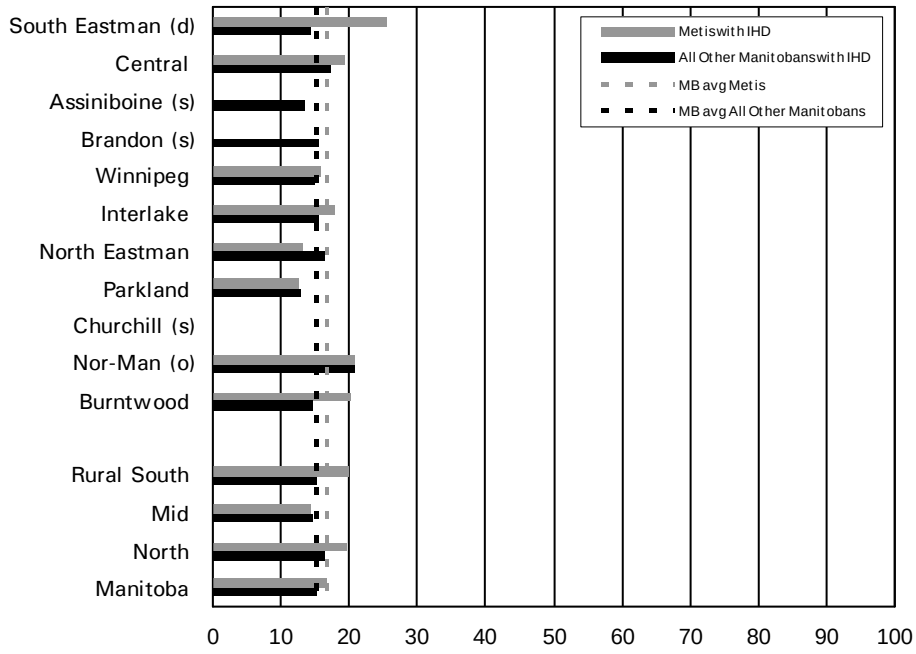
- Metis in South Eastman have a higher rate of bypass surgery compared to All Other Manitobans (25.5 vs. 14.4 per 1,000 residents)
- All Other Manitobans have a higher rate of bypass surgery compared to their provincial average in Nor-Man (20.8 vs. 15.1 per 1,000)
- There is no gradient for the rate of CABG surgery for either Metis or All Other Manitobans by RHAs

Winnipeg (Figure 6.4.2):

- There is no difference in the rate of bypass surgery between Metis compared to All Other Manitobans in all of Winnipeg CAs
- There is no gradient for the rate of CABG surgery for either Metis or All Other Manitobans by CAs

Figure 6.4.1: Coronary Artery Bypass Graft Surgery by RHA for Metis with IHD and All Other Manitobans with IHD, 2004/05-2006/07

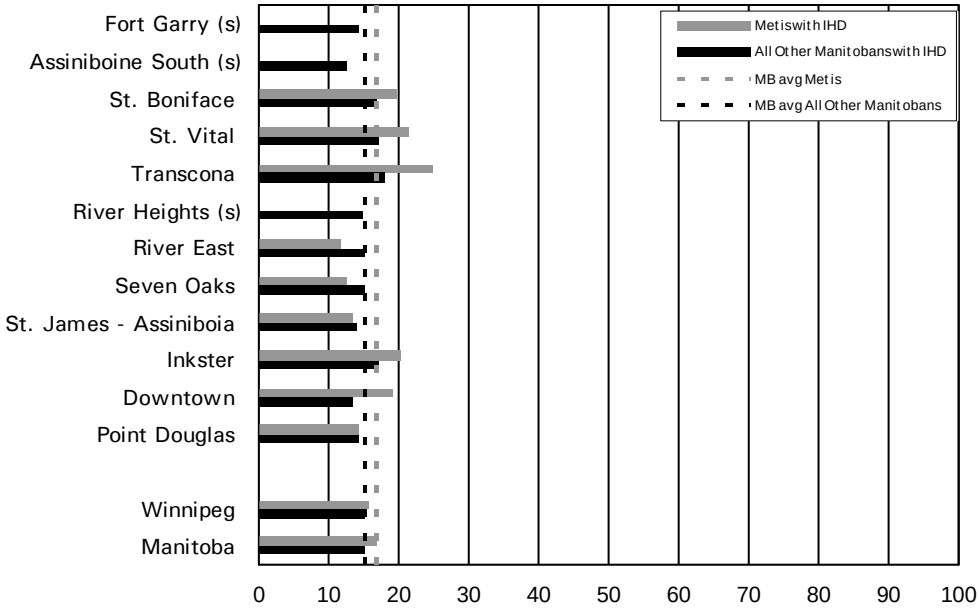
Age- & sex- adjusted annual rate, per 1,000 residents aged 40+



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases) Source: MMF, 2012

Figure 6.4.2: Coronary Artery Bypass Graft Surgery by Winnipeg Community Area for Metis with IHD and All Other Manitobans with IHD, 2004/05-2006/07

Age- & sex- adjusted annual rate, per 1,000 residents aged 40+



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases) Source: MMF, 2012

Age- and Sex-Specific:

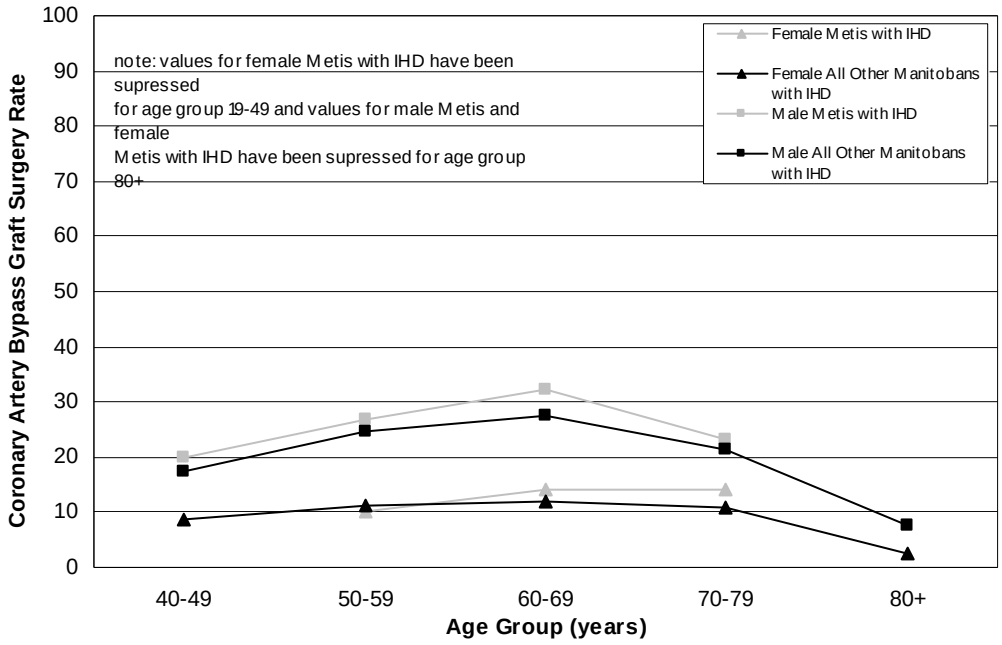
Manitoba (Figure 6.4.3):

- Throughout most of their lives, Metis males and Metis females have an increasing crude rate of bypass graft surgery until the age of 70 years and older when the rate begins to decrease for Metis males but remains constant for Metis females
- Metis males have a similar crude rate of bypass surgery compared to All Other Manitoban males
- Metis females have a similar crude rate of bypass surgery compared to All Other Manitoban females
- Throughout their lives, Metis males have a much higher crude rate of bypass graft surgery compared to Metis females
- Between the ages of 60 and 69 years Metis males have the highest crude rate of bypass graft surgery

Winnipeg (Figure 6.4.4):

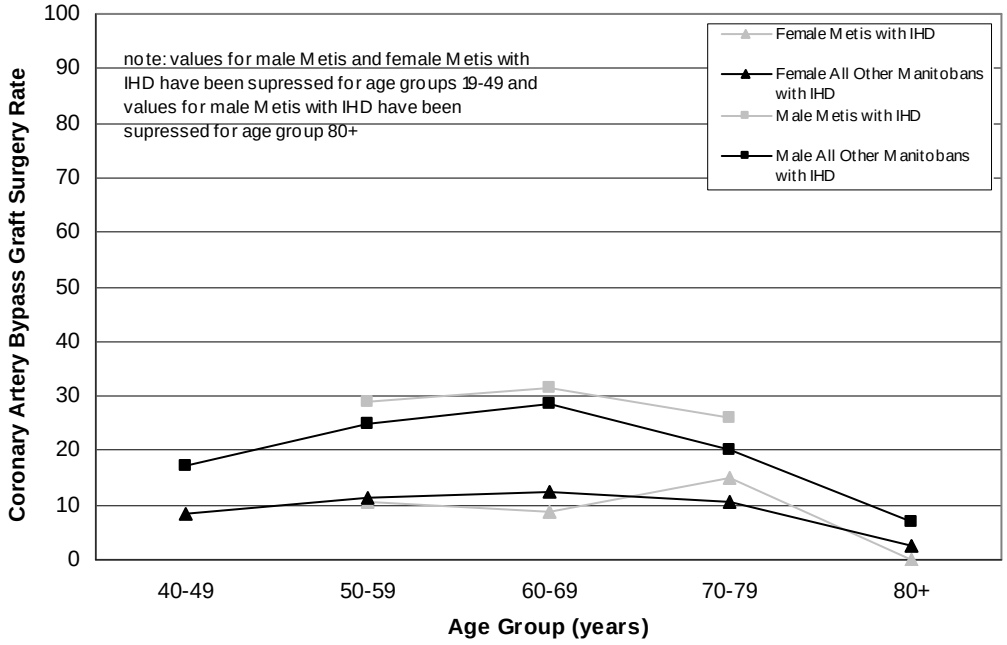
- As in Figure 6.4.3, the crude rate of bypass graft surgery in Winnipeg followed the same age and sex patterns as in Manitoba

Figure 6.4.3: Coronary Artery Bypass Graft Surgery Rate in Manitoba by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2004/05-2006/07
Crude rate of residents per 1,000 aged 40+



Source: MMF, 2012

Figure 6.4.4: Coronary Artery Bypass Graft Surgery Rate in Winnipeg by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2004/05-2006/07
Crude rate of residents per 1,000 aged 40+



Source: MMF, 2012

Findings from Literature Review

(Compared to the results in this study—*in italics*)

In Canada, rates of bypass surgery have remained steady over time at 75.6 to 70.8 per 100,000 for the period of 1994–2005 (Hassan et al., 2010). While the age-standardized rate of bypass surgery was 66 per 100,000 in Canada, in Manitoba the age-standardized rate of bypass surgery was slightly higher than the national rate at 77 per 100,000 (Canadian Institute of Health Information [CIHI], 2011).

In Canada, rates for bypass graft surgery increase with age, and are higher in males compared to females across all ages (PHAC, 2009). In Manitoba, the bypass surgery rate was higher for males compared to females (2.6 vs. 0.7 per 1,000 residents age 40 years and older) (Fransoo et al., 2005).

In the Metis Atlas, Metis had a higher rate of bypass surgery compared to All Other Manitobans (2.3 vs. 1.5 per 1,000). Additionally, Metis had higher rates of bypass surgery in Rural South (2.5 vs. 1.4 per 1,000) and Mid (2.1 vs. 1.5 per 1,000) aggregate areas as well as in South Eastman (3.0 vs. 1.5 per 1,000), Central (2.9 vs. 1.5 per 1,000), Interlake (2.2 vs. 1.5 per 1,000) and Parkland (2.4 vs. 1.6 per 1,000) RHAs. (Martens, Bartlett, et al., 2010). In Winnipeg, Metis had a higher rate compared to All Other Manitobans in St. Boniface (2.9 vs. 1.8 per 1,000), St. Vital (3.1 vs. 1.8 per 1,000), Inkster (3.5 vs. 1.5 per 1,000), and Downtown (2.6 vs. 1.3 per 1,000) CAs. Information in that study was not specific to persons living with IHD but it can be assumed that those undergoing bypass graft surgery have IHD.

There are no comparative studies examining the rates of bypass surgery for Metis with IHD in the literature. In our study, Metis have a similar rate of bypass surgery compared to All Other Manitobans (16.7 vs. 15.1 per 1,000). Similar to the findings in the Metis Atlas, Metis with IHD in South Eastman have a higher rate of bypass surgery compared to All Other Manitobans with IHD (25.5 vs. 14.4 per 1,000). Throughout their lives, Metis males have a higher crude rate of bypass graft surgery compared to Metis females in Manitoba.

The findings suggest that provincially Metis with IHD are accessing services and receiving bypass surgery treatment equally. Higher rates of bypass surgery in Metis in South Eastman are consistent with the higher rates of IHD diagnosis in Metis and the higher rates of access to cardiac surgeons in this RHA.

References

Andrew, T.L., & Serruys, P.W. (2006). Complete revascularization: Coronary artery bypass graft surgery versus percutaneous coronary intervention. *Circulation, 6*(114), 249-255.

Bakhai, A., Hill, R.A., Dundar, Y., Dickson, R.C., & Walley, T (2009). Percutaneous transluminal coronary angioplasty with stents versus coronary artery bypass grafting for people with stable angina or acute coronary syndromes. *Cochrane Database of Systematic Reviews, Issue 1.* Retrieved from http://www2.cochrane.org/reviews/en/ab004588.html

Canadian Institute of Health Information. (2011). *Health Indicators 2011.* Ottawa, ON: CIHI. Retrieved from http://secure.cihi.ca/cihiweb/products/health_indicators_2011_en.pdf

Fransoo, R., Martens, P., the Need to Know Team, Burland, E., Prior, H., Burchill, C., …& Walld, R. (2005). *Sex difference in health status, health care use and quality of care: A population-based analysis for Manitoba's Regional Health Authorities.* Retrieved from http://mchp-appserv.cpe.umanitoba.ca/reference/sexdiff.pdf

Fransoo, R., Martens, P., Burland, E., the Need to Know Team, Prior, H., & Burchill, C. (2009). *Manitoba RHA Indicator Atlas.* Winnipeg, MB: Manitoba Centre for Health Policy. Retrieved from http://mchp-appserv.cpe.umanitoba.ca/reference/RHA_Atlas_Report.pdf

Fransoo, R., Martens, P., Prior, H., Chateau, D., McDougall, C., Schultz, J.,…& Bailly, A. (2011). *Adult obesity in Manitoba: Prevalence, associations, and outcomes.* Winnipeg, MB: Manitoba Centre for Health Policy, October 2011, Retrieved from http://mchp-appserv.cpe.umanitoba.ca/reference/MCHP-Obesity_Report_WEB.pdf

Hassan, A., Newman, A., Ko, D.T., Rinfret, S., Hirsch, G., Ghali, W.A., & Tu, J. V. (2010). Increasing rates of angioplasty versus bypass surgery in Canada, 1994-2005. *American Heart Journal, 160*(5), 958-965.

Martens, P.J., Bartlett, J., Burland, E., Prior, H., Burchill, C., Huq, S., …& Bailly, A. (2010). *Profile of Metis health status and healthcare utilization in Manitoba: A population-based study.* Winnipeg, MB: Manitoba Centre for Health Policy.

Public Health Agency of Canada. (2009). *Tracking Heart Disease and Stroke in Canada.* Retrieved from http://www.phac-aspc.gc.ca/publicat/2009/cvd-avc/pdf/cvd-avs-2009-eng.pdf

Silber, S., Albertsson, P., Avilés, F.F., Camici, G.P., Colombo, A., Hamm, C.,…Wijns, W. (2005). Guidelines for percutaneous coronary interventions: the task force for percutaneous coronary interventions: the task force for percutaneous coronary interventions of European society of cardiology. *European Heart Journal, 26*(8), 804-847.

Serruys, P.W., Unger, F., Sousa, J.E., Jatene, A., Bonnier, H.J., Schönberger, J.P.,... & Arterial Revascularization Therapies Study Group. (2001). Comparison of coronary-artery bypass surgery and stenting for the treatment of multivessel disease. *New England Journal of Medicine*, *344*(15), 1117–1124.

Van Domburg, R.T., Lemos, P.A., Takeenberg, J.J.M., Liu, T.K.K., van Herwerden, L.A., Arampatzis, A.,…& Bogers, J.J.C. (2005). The impact of the introduction of drug-eluting stents on the clinical practice of surgical and percutaneous treatment of coronary artery disease. *European Heart Journal, 26*(7), 675-68

Section 7: Pharmaceutical Drug Use

7.1 Pharmaceutical Drug Use

Due to increase in the number of clinical trials in pharmaceutical drugs to treat IHD, marketing by pharmaceutical companies, and the increase in the aging population, drug utilization has become one of the fastest growing costs within the Canadian health care system (Jackevicius et al., 2003). In 2007, prescriptions for pharmaceutical drugs to treat CVDs (ACE inhibitors, calcium channel blockers, and beta blockers) accounted for 15.1% of the total number of prescriptions in Canada, while diuretics accounted for 3.8% of prescriptions dispensed and cholesterol lowering drugs such as Statins accounted for 6.1% of prescriptions dispensed (PHAC, 2009). The use of pharmaceutical drugs to treat IHD will continue to increase as our population ages and obesity epidemic continues (Brouilette et al., 2007; Marietta & Nicholas, 2012).

In each of the graphs in this section, the Regional Health Authorities are ordered by the ten-year premature mortality rate (PMR). More information on ten-year PMR is provided in Section 1.

All the indicator criteria used in this section were developed by the Manitoba Centre for Health Policy from the Metis Atlas (Martens, Bartlett, et al., 2010) unless otherwise noted. In this section, all indicators compare Metis with IHD to All Other Manitobans with IHD. As noted in Section 1, unless otherwise indicated any mention of 'lower' or 'higher' refers to results that are 'statistically significant'.

Indicators in this section include:

- Drugs to treat IHD (age- and sex-adjusted)
- Drugs to treat IHD (age- and sex-specific)
- Statin use (age- and sex-adjusted)
- Statin use (age- and sex-specific)

Table 7.1: Overall Key Findings of Pharmaceutical Use

Indicator (age of inclusion for this indicator)	Provincial difference between Metis with IHD and All Other Manitobans with IHD (age- and sex-adjusted prevalence in %, unless otherwise stated), with RR (relative rate) for Metis with IHD	Statistically better off regions for Metis with IHD compared to provincial average for Metis with IHD (unless otherwise noted)	Statistically worse off regions for Metis with IHD compared to provincial average for Metis with IHD (unless otherwise noted)
Drugs to treat IHD prevalence, age 19+	47.7% vs. 52.1% RR=0.92	None	None
Statin use prevalence, age 19+	36.0% vs. 40.2% RR=0.90	None	None

7.2: Drugs Used to Treat IHD

Drugs used to treat IHD include cardiac therapy drugs, beta blocking agents, calcium channel blockers and drugs acting on the renin-angiotensin system—*see below for list* (Martens, Bartlett, et al., 2010). Beta blocking agents (also known as beta-adrenergic blocking drugs) such as Metoprolol work by lowering the effects of epinephrine (adrenaline) and are used to treat patients with chest pain, high blood pressure, and post AMI (Frishman & Saunders, 2011). Calcium channel blockers work by disrupting calcium channel gradients of the smooth heart muscles in the blood vessels and neurons and are most commonly used in patients with hypertension (Chen et al., 2010). Drugs that act on the renin-angiotensin system (e.g., ACE inhibitors) influence this important hormonal system in the body and are used to treat hypertension, heart failure, and left-ventricular dysfunction (Unger, 2002). Diuretic drugs decrease hypertension by causing increased urination through the process of diuresis which improves sodium and water balance and decreases blood volume and arterial blood pressure (Frishman & Saunders, 2011).

Both the age- and sex-adjusted and the age- and sex-specific prevalence were measured for residents aged 19 years and older over five fiscal years: 2002/03-2006/07. The rate of drug prescription was measured individually for each of the drugs that are commonly used to treat IHD. We should note that this indicator is based on the prescription rate of each drug, not the actual drug use rate. A limitation of this indicator is that it cannot be assumed that each person who was prescribed a drug for treatment of IHD regularly uses the drug as prescribed by his/her physician.

Drugs used to treat IHD were counted if they met the following criteria:

- Two or more filled prescriptions from a physician for drugs to treat IHD which include the following drugs:

  Cardiac Therapy Drugs: Glyceryl trinitrate (C01DA02); Pentaerithrityl tetranitrate (C01DA05); Isosorbide dinitrate (C01DA14); Isosorbide mononitrate (C01DA14); Ubidecareone (C01EB09).

  Beta-Blocking Agents: Oxprenolol (C07AA02); Pindolol (C07AA03); Propranolol (C07AA05); Timolol (C07AA06); Nadolol (C07AA12); Metoprolol (C07AB02); Atenolol (C07AB03); Acebutolol (C07AB04); Bisoprolol (C07AB07); Labetalol (C07AG01); Propranolol and thiazides (C07BA05); Timolol and thiazides (C07BA06); Nadolol and thiazides (C07BA12); Pindolol and other diuretics (C07CA03); Atenolol and other diuretics (C07CB03).
  Calcium Channel Blockers: Amlodipine (C08CA01); Felodipine (C08CA02); Nicardipine (C08CA04); Nifedipine (C08CA05); Nimodipine (C08CA06); Verapamil (C08DA01); Diltiazem (C08Db01).
  Agents Acting on the Renin-Angiotensis System: Captopril (C09AA01); Enalapril (C09AA02); Lisinopril (C09AA03); Perindopril (C09AA04); Ramipril (C09AA05); Quinapril (C09AA06); Benazepril (C09AA07); Cilazapril (C09AA08); Fosinopril (C09AA09); Trandolapril (C09AA10); Enalapril and diuretics (C09BA02); Lisinopril and diuretics (C09BA03); Perindopril and diuretics (C09BA04); Quinapril and diuretics (C09BA06); Cilazapril and diuretics (C09BA08); Losartan (C09CA01); Eprosartan (C09CA02); Valsartan (C09CA03); Irbesrtan (C09CA04); Candersrtan (C09CA06); Telmisartan (C09CA07); Losartan and diuretics (C09DA01); Eprosartan and diuretics

(C09DA02); Valsartan and diuretics (C09DA03); Irbesartan and diuretics (C09DA04); Candesartan and diuretics (C09DA06); Telmisartan and diuretics (C09DA07).
Other: Reserpine and diuretics (Co2LA01); Hydrochlorothiazide (C03AA03).

The denominator includes all Manitoba residents aged 19 years and older in the five-year time period who were continuously registered with Manitoba Health for at least one year in the five-year time period.

Key observations:

Metis with IHD compared to All Other Manitobans with IHD

Manitoba (Figure 7.2.1):

- Metis have a lower rate of prescription of drugs to treat IHD compared to All Other Manitobans at the provincial level.

Aggregate Areas (Figure 7.2.1):

- All Other Manitobans have a lower rate of prescription of drugs to treat IHD compared to their provincial average in Rural South aggregate area (44.0% vs. 52.1%)
- There is a prescription rate gradient of drugs to treat IHD in both Metis and All Other Manitobans increasing from the most healthy to the least healthy at the aggregate areas as ordered by the PMR

RHAs (Figure 7.2.1):

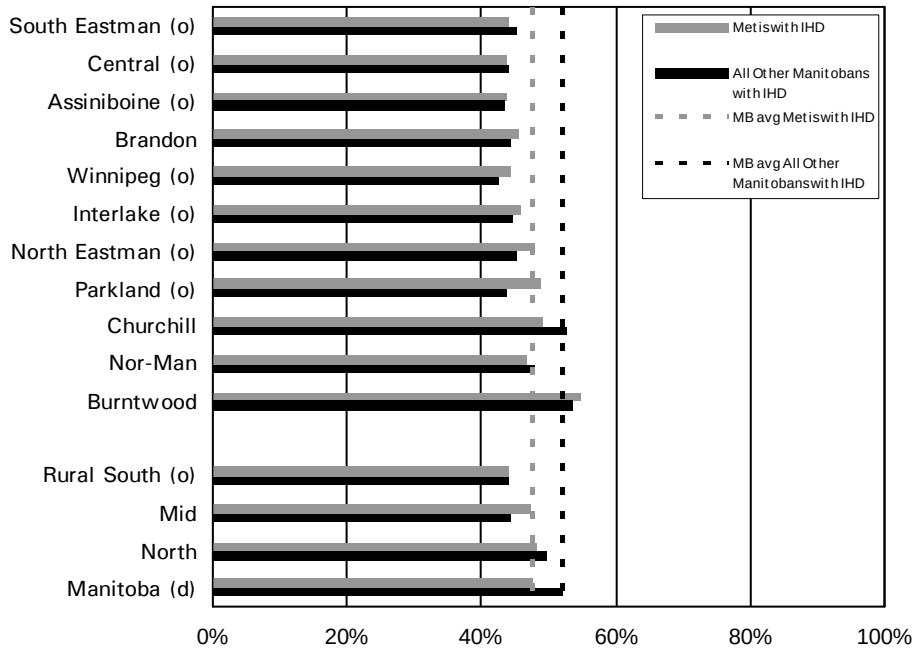
- There is no difference in the rate of prescription of drugs to treat IHD between Metis and All Other Manitobans at the RHA level
- All Other Manitobans have a lower rate of prescription of drugs to treat IHD compared to their provincial average in South Eastman (45.2% vs. 52.1%), Central (44.0% vs. 52.1%), Winnipeg (44.0% vs. 52.1%), Assiniboine (43.3% vs. 52.1%), Interlake (44.6% vs. 52.1%), North Eastman (45.3% vs. 52.1%), and Parkland (43.8% vs. 52.1%) RHAs
- There is no prescription rate gradient of drugs to treat IHD in either Metis or All Other Manitobans at the RHA level

Winnipeg CAs (7.2.2):

- There is no difference in prescription rate of drugs to treat IHD between Metis and All Other Manitobans at the CAs level
- All Other Manitobans have a lower prescription rate of drugs to treat IHD compared to their provincial average in Fort Garry (40.9% vs. 52.1%), Assiniboine South (41.2% vs. 52.1%), St. Boniface (43.1% vs. 52.1%), St.Vital (42.9% vs. 52.1%), Transcona (43.5% vs. 52.1%), River Heights (41.0% vs. 52.1%), River East (43.4% vs. 52.1%), Seven Oaks (42.6% vs. 52.1%), St. James–Assiniboia (41.7% vs. 52.1%), Inkster (44.7% vs. 52.1%), Downtown (44.0% vs. 52.1%), and Point Douglas (42.4% vs. 52.1%) CAs
- There is no prescription rate gradient of drugs to treat IHD in either Metis or All Other Manitobans at the CAs level

Figure 7.2.1: Prescription Rate of Drugs to Treat IHD by RHA for Metis with IHD and All Other Manitobans with IHD, 2002/03-2006/07

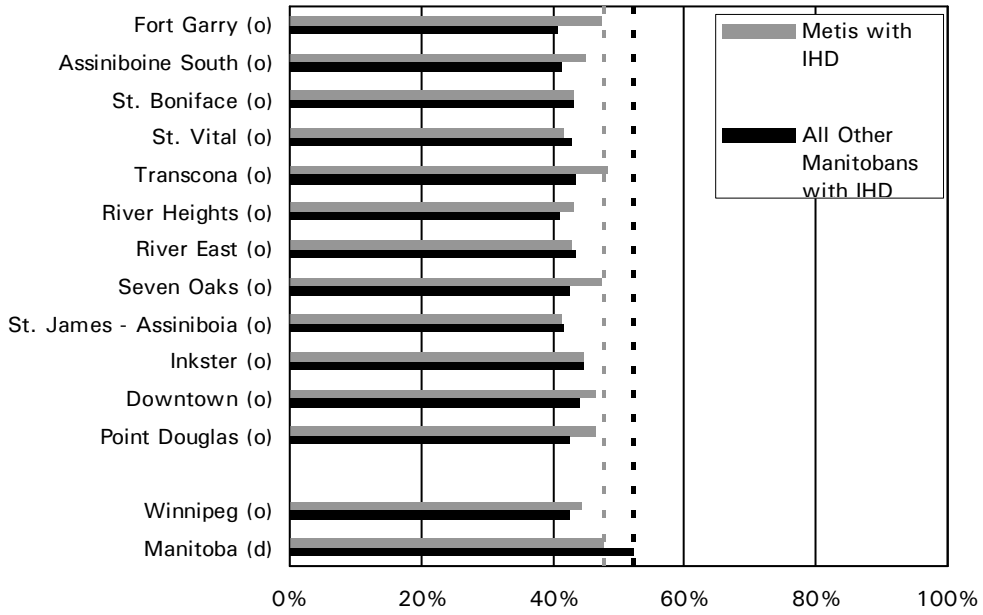
Age- & sex- adjusted percent aged 19+



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases) Source: MMF, 2012

Figure 7.2.2: Prescription Rate of Drugs to Treat IHD by Winnipeg Community Area for Metis with IHD and All Other Manitobans with IHD, 2002/03-2006/07

Age- and sex- adjusted percent aged 19+



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases) Source: MMF, 2012

Age- and Sex-Specific:

Manitoba (Figure 7.2.3):

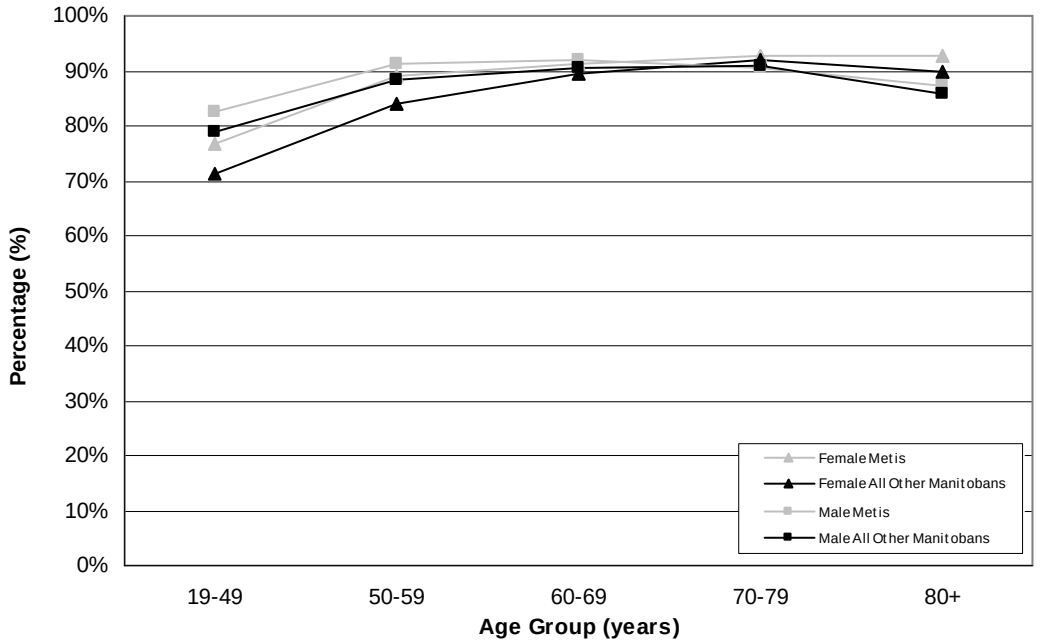
- The prescription rate of drugs to treat IHD increases in Metis males and females until the age of 80 years and older when it slightly decreases for Metis males and slightly increases for Metis females
- Between the ages of 19 and 49 years, Metis males and Metis females have a higher rate of being prescribed drugs to treat IHD compared to All Other Manitoban males and All Other Manitoban females, respectively. However, for the rest of their lives, the prescription rate of drugs to treat IHD in both Metis males and Metis females was similar to All Other Manitoban males and All Other Manitoban females, respectively
- Between the ages of 19 and 69 years, Metis males have a higher prescription rate of drugs to treat IHD compared to Metis females; after the age of 70 years Metis females have a higher percentage of prescriptions of drugs to treat IHD than that of Metis males

Winnipeg (Figure 7.2.4):

- As in Figure 7.2.3, the crude prescription rate of drugs to treat IHD in Winnipeg followed the same age and sex pattern as in Manitoba

Figure 7.2.3: Prescription Rate of Drugs to Treat IHD by Age and Sex for Metis with IHD and All Other Manitobans with IHD in Manitoba, 2002/03-2006/07

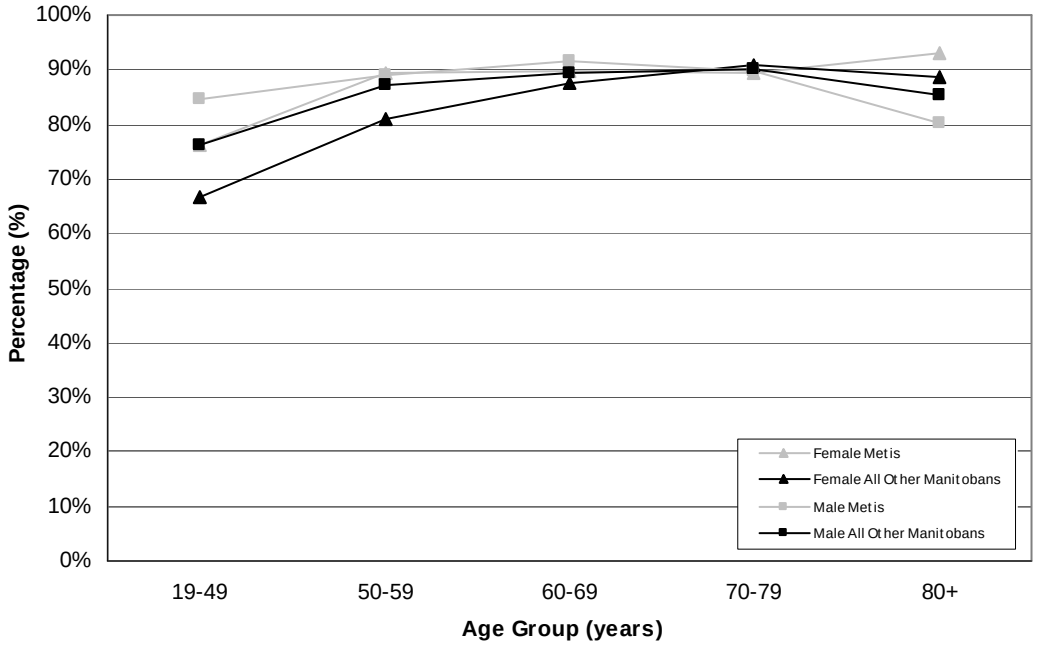
Crude percent of residents aged 19+ with at least two prescriptions for drugs to treat IHD in a five-year period



Source: MMF, 2012

Figure 7.2.4: Prescription Rate of Drugs to Treat IHD by Age and Sex for Metis with IHD and All Other Manitobans with IHD in Winnipeg, 2002/03-2006/07

Crude percent of residents aged 19+ with at least two prescriptions for drugs to treat IHD in a five-year period



Source: MMF, 2012

Findings from the Literature Review

(Compared to the results in this study—*in italics*)

In Canada, prescriptions for treatment of CVDs have increased over time (PHAC, 2009). In 2007, there were 65.7 million prescriptions for CVDs, of which 18.0 million were for ACE Inhibitors, 15.1 million were for beta-blockers, and 13.6 million were for calcium channel blockers (PHAC, 2009). In addition, there were 16.4 million prescriptions for diuretics and 26.6 million prescriptions for cholesterol agents (PHAC, 2009). Information in those studies was not specific to persons living with IHD.

There are no comparable studies that investigated the prescription rate of drugs to treat IHD for Metis with IHD in the literature. In this study, Metis have a lower prescription rate of drugs to treat IHD compared to All Other Manitobans (47.7% vs. 52.1%) in Manitoba. In addition, among aggregate areas there is an obvious prescription rate gradient for both Metis and All Other Manitobans increasing from Rural South (the most healthy aggregate area) to North (the least healthy aggregate area). Throughout most of their lives, the crude rate of being prescribed drugs to treat IHD increases with age for both Metis males and Metis females in Manitoba.

7.3 Statin Use

Increased cholesterol has been associated with risk of cardiovascular diseases. Statins are cholesterol lowering medications that are commonly prescribed after an event such as an AMI (Kozyrski et al., 2009). Statins maintain the largest share of pharmaceutical sales worldwide (Raymond, Morgan, Katz, & Kozyrski, 2007).

Both the age- and sex-adjusted and the age- and sex-specific Statin use were measured for residents aged 19 and older over five fiscal years: 2002/03-2006/07. Statin use was measured if they met the following criteria:

- Statins (C10AA)

The rate of residents who received at least one prescription for Statins (Anatomical Therapeutic Classification (ATC) (code C10AA) in a fiscal year.

The denominator includes all Manitoba residents aged 19 and older in the five-year time period who were continuously registered with Manitoba Health for at least one year in the five-year time period.

Key observations:

Metis with IHD and All Other Manitobans with IHD

Manitoba (Figure 7.3.1):

- Metis have a lower rate of prescription of Statins compared to All Other Manitobans in Manitoba (36.0% vs. 40.2%)

Aggregate Areas (Figure 7.3.1):

- There is no difference in the rate of prescription of Statins in Metis compared to All Other Manitobans at the aggregate level
- All Other Manitobans have a lower rate of prescription of Statins compared to their provincial average in Rural South (38.2% vs. 40.2%) and Mid (35.7% vs. 40.2%) aggregate areas
- There is no prescription rate gradient for Statin drugs in Metis but there is one for All Other Manitobans increasing from the most healthy to the least healthy aggregate areas as ordered by the PMR

RHAs (Figure 7.3.1):

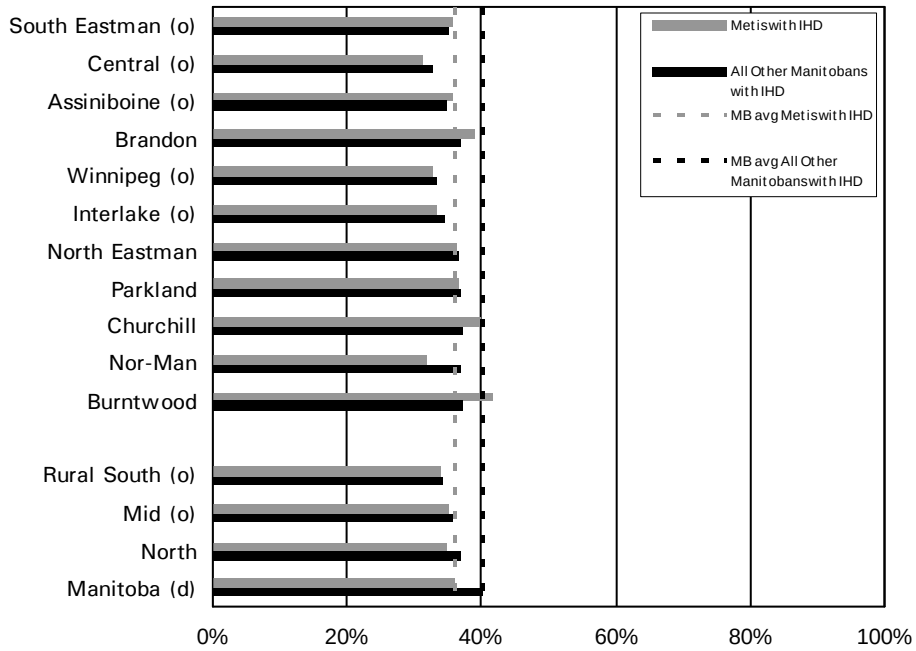
- There is no difference in the rate of prescription of Statins in Metis compared to All Other Manitobans at the RHA level
- All Other Manitobans have a lower rate of prescription of Statins compared to their provincial average in South Eastman (35.2% vs. 40.2%), Central (32.6% vs. 40.2%), Assiniboine (34.8% vs. 40.2%), Winnipeg (33.3% vs. 40.2%), and Interlake (34.4% vs. 40.2%) RHAs
- There is no prescription rate gradient for Statin drugs in either Metis or All Other Manitobans at the RHA level

Winnipeg (Figure 7.3.2):

- There is no difference in the rate of prescription of Statins in Metis compared to All Other Manitobans in CAs
- All Other Manitobans have a lower rate of prescription of Statins compared to their provincial average in Fort Garry (32.9% vs. 40.2%), Assiniboine South (31.7% vs. 40.2%), St. Boniface (33.1% vs. 40.2%), St. Vital (35.5% vs. 40.2%), Transcona (33.8% vs. 40.2%), River Heights (32.4% vs. 40.2%), River East (32.7% vs. 40.2%), Seven Oaks (34.4% vs. 40.2%), St. James–Assiniboia (33.0% vs. 40.2%), Inkster (34.5% vs. 40.2%), Downtown (32.9% vs. 40.2%), and Point Douglas (33.2% vs. 40.2%) CAs
- There is no prescription rate gradient for Statin drugs in both Metis and All Other Manitobans at the CAs level

Figure 7.3.1: Prescription Rate of Statin Drugs by RHA for Metis with IHD and All Other Manitobans with IHD, 200203-2006/07

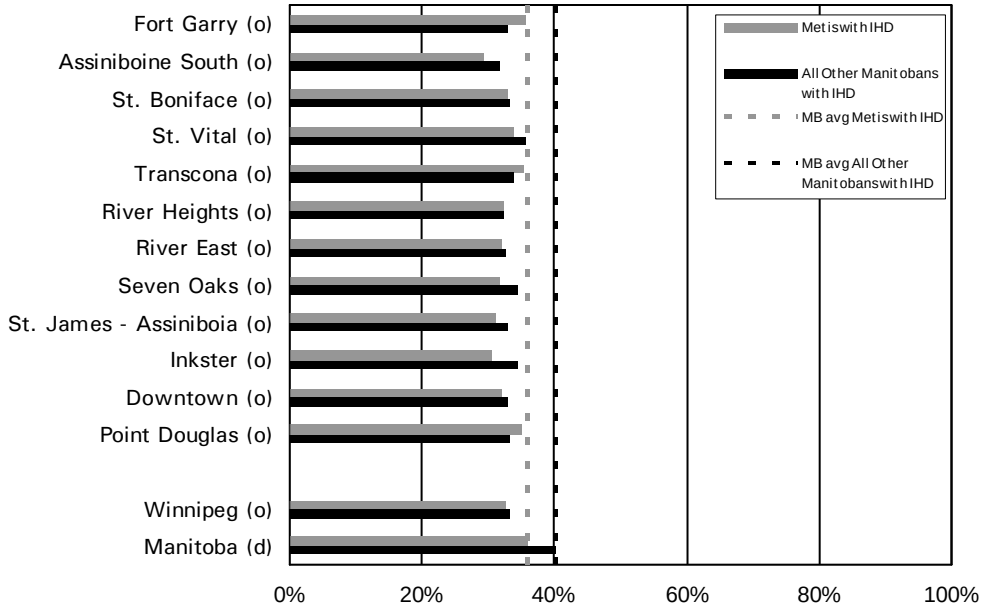
Age and sex-adjusted rate of Manitoba Residents with at least one Rx for Statins, aged 19+ years



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases) Source: MMF, 2012

Figure 7.3.2.: Prescription Rate of Statin Drugs by Winnipeg Community Areas for Metis and All Other Manitobans with IHD, 2002-03-2006/07

Age and sex-adjusted rate of Manitoba Residents with at least one Rx for Statins, aged 19+ years



'm' indicates the area's rate for Metis with IHD was statistically different from the Manitoba average for Metis
'o' indicates the area's rate for All Other Manitobans was statistically different from the Manitoba average for All Other Manitobans
'd' indicates the difference between the two groups' rates was statistically significant for this area
's' indicates data suppressed due to small numbers (five or fewer cases) Source: MMF, 2012

Age- and Sex-Specific:

Manitoba (Figure 7.3.3):

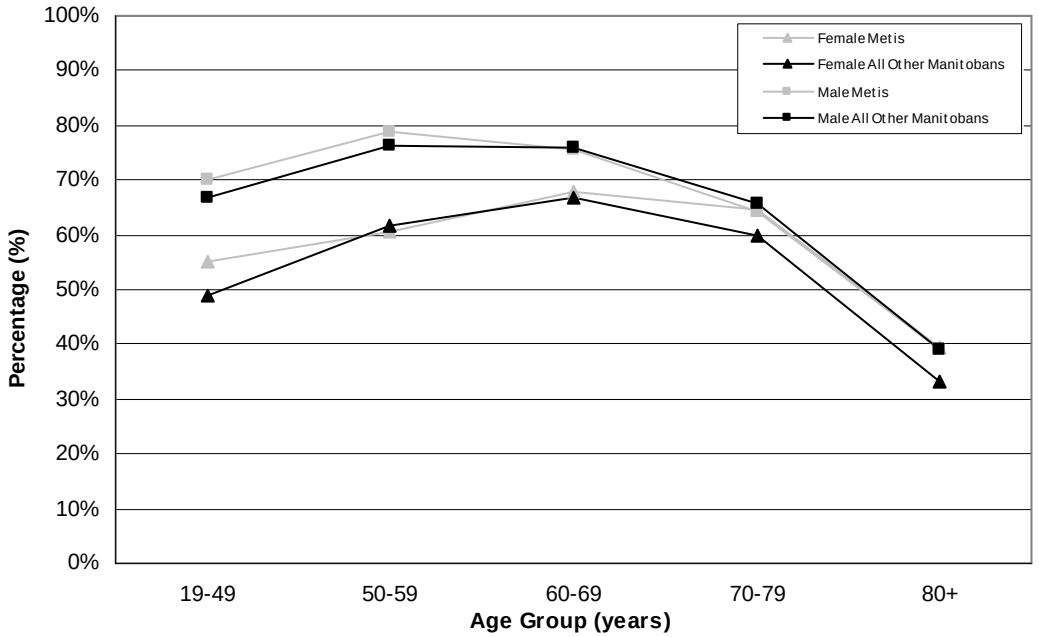
- Between the ages of 19 and 59 years, for Metis males the crude rate of prescription of Statins increases until age 60-69 years when it decreases. However, between the ages of 19 and 69 years for Metis females the rate of prescription of Statins increases until age 70 years when it begins to decrease
- Metis males and All Other Manitoban males have a similar crude rate of prescription of Statins throughout their lives. In Metis females the rate of prescription of Statins remains equivalent to that of All Other Manitoban females until the age of 70 years when it becomes higher in Metis females and remains as such for the rest of their lives
- Between the ages of 19 and 69 years, Metis males have a higher crude rate of prescription of Statins compared to Metis females; by age 70 years Metis males and Metis females have a similar crude rate of prescription of Statins

Winnipeg (Figure 7.3.4):

- As in Figure 7.3.4, the crude rate of prescription of Statins in Winnipeg follows the same age and sex patterns as in Manitoba

Figure 7.3.3: Prescription Rate of Statins in Manitoba by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2002/03-2006/07

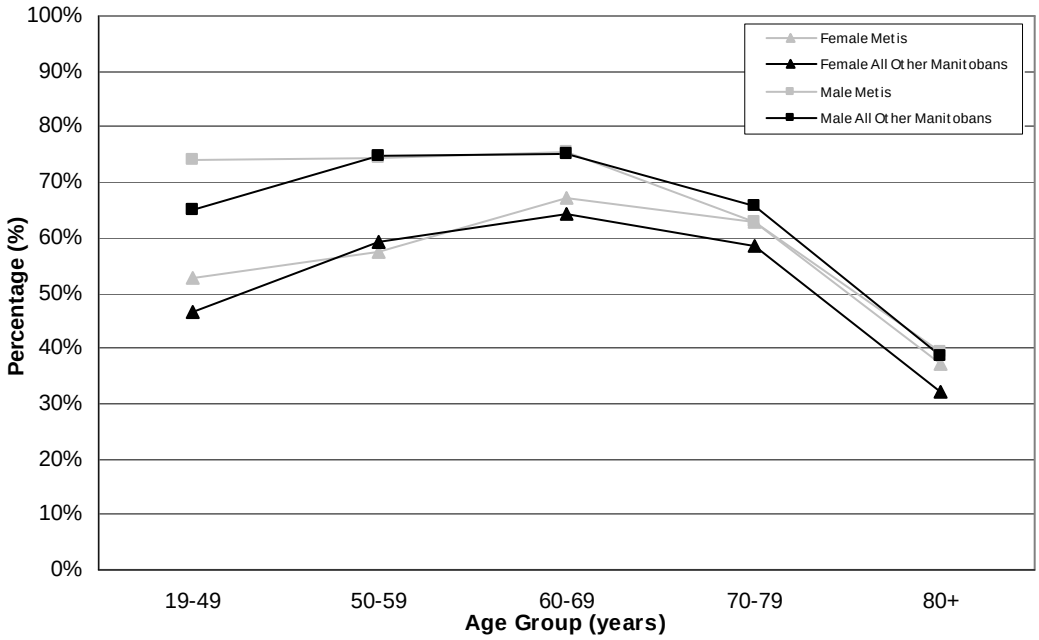
Crude percent of percent of resident with at least one Rx for Statins, aged 19+ years



Source: MMF, 2012

Figure 7.3.4: Prescription Rate of Statins in Winnipeg by Age and Sex for Metis with IHD and All Other Manitobans with IHD, 2002/03-2006/07

Crude percent of percent of resident with at least one Rx for Statins, aged 19+ years



Source: MMF, 2012

Findings from the Literature Review

(Compared to the results in this study—*in italics*)

Statins are used in the primary and secondary prevention of IHD (World Health Organization [WHO], 2007). In Canada, between the years 1994 and 2002 the age-adjusted rate of Statin use increased from 1.6% to 7.8% (Neutel, Morrison, Campbell, & de Gosh, 2007). In Manitoba, Statin use has seen a dramatic increase with 8.1% of the total adult population being treated with Statins (Kozyrskyj et al., 2009).

There are no comparable studies examining the prescription rate of Statin drugs for Metis with IHD in the literature. Despite having an increasing prescription rate of Statin drugs throughout most of their lives, Metis have a lower prescription rate of Statins compared to All Other Manitobans (36.0% vs. 40.2%) at the provincial level.

The causes of lower prescription rate of Statins in Metis with IHD at the provincial level needs to be further explored.

References

Brouilette, S.W., Moore, J.S., McMahon, A.D., Thompson, J.R., Ford, I., Shepherd, J.,…& Samani, N.J. (2007). Telomere length, risk of coronary heart disease and Statin use treatment in the west Scotland primary prevention study: A nested case-control study. *Lancet, 369* (9556), 107-114.

Chen, N., Zhou, M. Yang, M., Guo, J., Zhu, C., Yang, J., ...& He, L (2010). Calcium channel blockers versus other classes of drugs for hypertension. *The Cochrane Collaboration*. Published John Wiley & Sons Ltd. Retrieved from http://summaries.cochrane.org/CD003654/calcium-channel-blockers-versus-other-classes-of-drugs-for-hypertension

Frishman, H. W., & Saunders, E. (2011). B-adrenergic blockers. *Journal of Clinical Hypertension, 13*(9), 649-653.

Jackevicius, C.A., Tu, K., Filate, W.A., Brien, S.E., & Tu, J.V., for the Canadian Cardiovascular Outcomes Research Team (2003). Trends in cardiovascular drug utilization and drug expenditures in Canada between 1996 and 2001. *Canadian Journal of Cardiology, 19*(12), 1359-1366.

Kedward, J., & Dakin, L. (2003). A qualitative study of barriers to the use of stains and implementation of coronary heart disease prevention in primary care. *British Journal of General Practice, 53*(494), 684-689. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1314690/pdf/15103875.pdf

Kozyrskyj, A., Raymond, C., Dahl, M., Ekuma, O., Schultz, J., Skelpowich, M., & Bond, R. (2009). Pharmacare formulary policy on utilization of prescription medications. Winnipeg, Manitoba: Manitoba Centre for Health Policy. Retrieved from http://mchp-appserv.cpe.umanitoba.ca/reference/Rx%20Policy.pdf

Martens, P.J., Bartlett, J., Burland, E., Prior, H., Burchill, C., Huq, S., Romphf, L.,…& Bailly, A.. (2010). *Profile of Metis health status and healthcare utilization in Manitoba: A population-based study.* Winnipeg, MB: Manitoba Centre for Health Policy.

Marietta, C., & Nicholas, F. (2012). Drug treatment of obesity in cardiovascular disease. *American Journal of Cardiovascular Drugs, 12*(2), 93-104.

Neutel, C.I., Morrison, H., Campbell, R.C.C., & de Groh, N. (2007). Statin use in Canadian: Trends, determinants, and persistence. *Canadian Journal of Public Health*, *98*(5), 412-416.

Public Health Agency of Canada. (2009). *Tracking Heart Disease and Stroke in Canada.* Retrieved from http://www.phac-aspc.gc.ca/publicat/2009/cvd-avc/pdf/cvd-avs-2009-eng.pdf

Raymond, C.B., Morgan, S.G., Katz, A., & Kozyrskyj, A. (2007). A population-based analysis of Statin utilization in British Columbia. *Clinical Therapeutics*, *29* (9), 2107-2119.

World Health Organization (2007). *Prevention of cardiovascular disease: Guidelines for assessment and management of cardiovascular risk.* Geneva, Switzerland: Author. Retrieved from http://whqlibdoc.who.int/publications/2007/9789241547178_eng.pdf

Glossary

Age Linear and Age Quadratic

Factors that are used in the logistic regression models presented in this research study (See Table: 4.4.1 and Table: 4.13.1). The 'age linear' factor can be defined simply as the relationship between the true ages of Metis and All Other Manitobans. For example, if you look at Table 4.4.1, the age-linear adjusted Odds Ratio is 1.191 ($p<0.001$), which indicates whether the probability of IHD increases with increase in age. The 'age quadratic' factor indicates whether the age relationship plateaus—that is, if at some point an increase in age no longer increases or decreases the likelihood of the outcome of interest. In Table 4.4.1 the age quadratic adjusted Odds Ratio of 0.998 ($p<0.001$) indicates that at some point an increase in age no longer increases the risk of developing diabetes. From the Metis Atlas, "Many of the regression models include a quadratic age term, which mean that the model fit was improved through the use of an age term and an age-squared term". The way in which this can be interpreted is that the likelihood increases with age (since the aOR of the age term is greater than 1 and statistically significant) but that this effect levels off at higher ages (since the aOR of the quadratic age-square term is less than 1 and statistically significant) (Martens, Bartlett et al., 2010).

Aggregated Diagnostic Groups (ADG)

ADGs are a measure of co-morbidity that can be grouped into either co-existing mental illnesses or major physical illnesses. ADGs are often used in logistic regression modelling identified as 'covariates' of "Mental Illness ADGs" and "Major Physical Illness ADGs." ADGs measure the illness burden (morbidity) of individual patients by grouping individuals based on their age, sex and all known medical diagnoses assigned by their health care providers over a defined time period (typically one year). The ADGs look at all the hospitalizations and physician visits each Manitoban had in the past year. If an individual has a diagnosis for a mental illness or disorder, they will be assigned one of the three "Mental Illness ADGs", depending on the severity of their illness. Similarly, if an individual has been diagnosed with an unstable illness, such as tuberculosis, or a major illness, like cancer, then they will be assigned one of the "Major Physical Illness ADGs". If individuals had at least one of the ADGs, they were classified as having a mental or major physical ADG in the logistic regression. For the most part, the ADGs were identified and assigned in the year prior to the event in the regression model. For further information of the ADG refer to: http://www.acg.jhsph.edu/ (Martens, Bartlett, et al., 2010). In this study, ADGs are used in the logistic regression modelling of risk for Ischemic Heart Disease (Figure 4.4.1: Probability of Ischemic Heart Disease by Aggregate Region, All Manitobans with IHD and Only Metis with IHD) (Martens, Bartlett, et al., 2010).

All Other Manitobans

All other people living in a geographical area except Metis. This cohort includes all people who are not Metis which includes First Nations people living on and off reserves in a geographical area (Martens, Bartlett et al., 2010)

Atherosclerosis

A process in which fat (and other biological materials) accumulate in the arteries and, over time, become hard, resulting in blockage of blood to the heart (Mitchell & Sidaway, 1998).

Average Household Income of Neighbourhood

The average household income is the mean income of a household at the neighbourhood level from the 2006 Canadian Census (Manitoba Centre for Health Policy, [MCHP], 2010).

Body Mass Index

Body Mass Index (BMI) is an international measure used as a guideline for healthy weight (International Obesity Task Force, 2011; PHAC, 2009). BMI is defined as weight in kilograms divided by square of the height in meters (PHAC, 2009). BMI is classified as follows: underweight - <18.5 kg/m2; normal range -18.5 – 24.9; overweight -25.0 – 29.9; obese class 1 30.0 – 34.9; obese class II -35.0 – 39.9; obese class III - >40.0 (PHAC, 2009).

Cardiovascular Disease

Cardiovascular diseases encompass a broad range of circulatory diseases that affect the heart and blood vessels (PHAC, 2009; PHAC, 2010). These include IHD, stroke, peripheral vascular disease, heart failure, and congenital heart diseases (PHAC, 2009; PHAC, 2010).

Cholesterol

Cholesterol is found in the cell membranes of animal tissue and its level in the blood stream plays a role in the development of fats in the coronary arteries (PHAC, 2009).

Chronic Disease

Encompasses a wide range conditions of which characteristics include prolonged development and a combination of host, agent, and environmental factors (PHAC).

Cerebrovascular Disease

Also known as stroke, which involves neurological symptoms caused by cerebral ischemia or hemorrhage with cardinal clinical signs of sudden or sub-acute onset (Good, 1990). There are several different kinds of strokes including ischemic stroke (80% are ischemic), caused by interruption of blood supply to the brain and intra-cerebral or subarachnoid stroke, caused by bleeding into or around the brain due to a ruptured artery (Canadian Stroke Network, 2011).

Data Suppression

Data were suppressed (represented as 's') when the number of persons or events involved was five or less. Data were not suppressed when the absolute count was zero (Martens, Bartlett, et al., 2010).

Dissemination Areas

A dissemination area can be defined as a "small area composed of one or more neighbourhood blocks, with a population of 400 to 700 persons" (Statistics Canada, 2011).

Drugs to Treat IHD

Cardiac Therapy Drugs: Glyceryl trinitrate (C01DA02); Pentaerithrityl tetranitrate (C01DA05); Isosorbide dinitrate (C01DA14); Isosorbide mononitrate (C01DA14); Ubidecareone (C01EB09)

Beta-Blocking Agents: Oxprenolol (C07AA02); Pindolol (C07AA03); Propranolol (C07AA05); Timolol (C07AA06); Nadolol (C07AA12); Metoprolol (C07AB02); Atenolol (C07AB03); Acebutolol (C07AB04); Bisoprolol (C07AB07); Labetalol (C07AG01); Propranolol and thiazides (C07BA05); Timolol and thiazides (C07BA06); Nadolol and thiazides (C07BA12); Pindolol and other diuretics (C07CA03); Atenolol and other diuretics (C07CB03);

Calcium Channel Blockers: Amlodipine (C08CA01); Felodipine (C08CA02); Nicardipine (C08CA04); Nifedipine (C08CA05); Nimodipine (C08CA06); Verapamil (C08DA01); Diltiazem (C08Db01).

Agents Acting on the Renin-Angiotensis System: Captopril (C09AA01); Enalapril (C09AA02); Lisinopril (C09AA03); Perindopril (C09AA04); Ramipril (C09AA05); Quinapril (C09AA06); Benazepril (C09AA07); Cilazapril (C09AA08); Fosinopril (C09AA09); Trandolapril (C09AA10); Enalapril and diuretics (C09BA02); Lisinopril and diuretics (C09BA03); Perindopril and diuretics (C09BA04); Quinapril and diuretics (C09BA06); Cilazapril and diuretics (C09BA08); Losartan (C09CA01); Eprosartan (C09CA02); Valsartan (C09CA03); Irbesrtan (C09CA04); Candersrtan (C09CA06); Telmisartan (C09CA07); Losartan and diuretics (C09DA01); Eprosartan and diuretics (C09DA02); Valsartan and diuretics (C09DA03); Irbesartan and diuretics (C09DA04); Candesartan and diuretics (C09DA06); Telmisartan and diuretics (C09DA07);

Other: Reserpine and diuretics (Co2LA01); Hydrochlorothiazide (C03AA03)

Drug Program Information Network (DPIN)

The DPIN is a database of pharmaceutical drugs that allows for the tracing of these drugs through linkage of community pharmacies. It offers person identifiers such as age, medication history, and unique pharmacy identification number (just to name a few). It is limited because it does not capture pharmaceutical drug use in hospitals or personal care homes. It is used in this study in Section 7: Pharmaceutical Drug Use (Martens, Bartlett, et al., 2010).

Drug Identification Number (DIN)

Each drug approved for use in Canada is given an eight-digit number. One drug can have several DINs because of different manufacturers (Martens, Bartlett, et al., 2010). The DIN is used in this study in Section 7: Pharmaceutical Drug Use.

Hypertension

Generally defined as systolic (when the heart is contracting) blood pressure (SBP) equal to or greater than 140 mmHG and/or diastolic (when the heart is dilating) blood pressure (DBP) equal to or greater than 90 mmHG. Individuals with a cardiovascular disease, diabetes, or other chronic diseases should consider their blood pressure as high if >130/80 mmHG (Canadian Hypertension Education Program, 2010).

International Classification of Disease (ICD) Codes

The ICD is a classification system of medical diagnoses used internationally by clinicians, health managers, and epidemiologists. It was developed by the World Health Organization as a classification system of diseases, symptoms, injuries, and other health problems (WHO, 2011).

Income Quintiles

Income quintiles are divided into five categories (with 20% of the population in each category). There are five urban income quintile groupings and five rural income quintile groupings—each is ranked from poorest to wealthiest (1=poorest, 5=wealthiest). Urban income quintiles include all those living in Winnipeg or Brandon and rural income quintiles include all those living in the rest of the areas in Manitoba. The income quintiles are derived from Statistics Canada Census data, which have been aggregated and designated into a dissemination area (DA) level average household income. Each DA is "attributed" an average household income to reflect area income

as opposed to individual income (Manitoba Centre for Health Policy, 2011; Martens et al., 2004).

Income Not Found

A group of individuals who were not captured through the Statistics Canada census data. Unfortunately these individuals cannot be assigned to an income quintile category because they are in an institution or jail or they are persons without a permanent address These areas can include residents of long-term care facilities, residents of some personal care homes, residents of psychiatric facilities, federal and long-term prisoners, wards of Public Trustee or Child and Family Services, residents of various areas reporting no income in the census, and residents of dissemination areas (DA) with populations less than 250 persons (Manitoba Centre for Health Policy, 2006a).

Linear Trend Test

Linear trends are indentified through testing the association between indicator values (e.g., Metis with IHD) and area-level income data (e.g., rural Metis). In this study, a linear trend test was done by fitting a regression line to the crude rate with the income quintile and age as the independent variables. The value to the resulting coefficient for the income quintile variable denoted the magnitude of the trend (i.e., the larger the coefficient gives the direction of the trend (i.e., increasing if positive and decreasing if negative). The rural and urban income quintiles were run separately for both Metis and All Other Manitobans (Manitoba Centre for Health Policy 2006b; Martens et al., 2004).

Manitoba Metis Federation Membership

Metis identity is verified by self-identification, Metis ancestry, and community acceptance through membership application and confirmation process. Through a genealogy, with supporting evidentiary documents, an individual and his or her family are able to determine whether or not a Metis ancestral connection can be established. Supporting evidentiary documents many include Federal Census records, sacramental records, Manitoba and Northwest scrip affidavits, post records, and journals. All individuals seeking membership in the MMF are required to provide a genealogy and supporting evidentiary documents. The genealogy must be completed by a recognized institution. A genealogy meeting the Metis definition will objectively verify the applicant's historic Metis nation ancestry. Application for membership begins at the receiving Local in the area in which you reside (Manitoba Metis Federation, 2010).

Metis

The Metis are descendents of early 17th-century relationships between North American Indian and Europeans (Sprague & Frye, 1993). The Metis coalesced into a distinct nation in Manitoba in the late 18th century. After the 1885 fall of Batoche, "Metis were denied a separate identity and ignored for a century" (McMillan, 2995, pp.312-313). By 1967, with formation of the Manitoba Metis Federation, the Metis in Manitoba were again asserting their capacity to advocate and function once more in a collective manner. In the 1982 amendment to the Canadian Constitution Metis were named as one of the three Aboriginal peoples of Canada (Government of Canada, 1982).

Mid

Mid aggregate area is one of the three rural aggregate areas in Manitoba. It includes the rural RHAs of central Manitoba: Parkland, Interlake, and North Eastman RHAs (See Figure 1.5.1:

Geographical distribution of the MMF Regions, RHAs and Winnipeg CAs) (Martens, Bartlett et al., 2010).

Most Responsible Diagnosis

This is the diagnosis recorded on the hospital claims that is responsible for the greatest amount of time or resources in the hospital (MCHP, 2007).

North

North aggregate area is one of the three rural aggregate areas in Manitoba. It includes the rural RHAs of northern Manitoba: Nor-Man, Burntwood, and Churchill RHAs (Figure 1.5.1: Geographical distribution of the MMF Regions, RHAs, and Winnipeg CAs) (Martens, Bartlett et al., 2010)

Premature Mortality Rate (PMR)

PMR is defined as the rate of deaths occurring before age 75, and is usually described as the age-adjusted number of deaths per 1,000 persons under the age of 75. PMR is one of the most commonly used indicators in public health research. This is because it provides an overall indication of population health which can be easily compared with many health indicators (Martens, Bartlett et al., 2010).

Premature Mortality Rate (PMR) gradient

Throughout this report, the RHAs and Winnipeg CAs in the graphs are ordered by ten-year premature mortality rate (PMR). In each graph PMR increases from top to bottom, with the most healthy areas at the top of the graph and the least healthy areas at the bottom. This gradual slope in increasing PMR is referred to as the PMR gradient. It is expected that many indicators of morbidity, mortality, and health service use, high profile cardiac surgery, and pharmaceutical use will reflect this PMR gradient, increasing from top to bottom of each graph (Martens, Bartlett et al., 2010).

Prevalence (Treatment Prevalence)

Prevalence refers to the proportion of the population that has a given disease at a given time (Manitoba Centre for Health Policy, 2006c). All indicators used in this report are based on treatment prevalence values which indicate who received health service 'treatment' for a disease (through a combination of physician visits, hospitalizations, or prescriptions drugs) but does not reflect who has the disease (Manitoba Centre for Health Policy, 2006c)

Rural South

Rural South aggregate area is one of three rural aggregate areas in Manitoba, and it includes the rural RHAs of southern Manitoba: Assiniboine, Central, and South Eastman RHAs (See Figure 1.5.1: Geographical distribution of the MMF Regions, RHAs, and Winnipeg CAs) (Martens, Bartlett et al., 2010).

Shadow Billing

Shadow billings are physician claims submitted to the provincial government by physicians who are on an alternative payment plan for services they provide (Martens, Bartlett et al., 2010).

Vital Statistics

Vital Statistics is a Manitoba government department responsible for keeping records and registries of all births, deaths, marriages, and stillbirths that occur in Manitoba (Martens, Bartlett et al., 2010).

Winnipeg Aggregate Area

Winnipeg Regional Health Authority is divided into 3 sub-groups which are known as the Winnipeg aggregate areas. They are 'Winnipeg most healthy', 'Winnipeg average healthy', and 'Winnipeg least healthy'. Sub-groupings are based on PMR—those with the lowest PMR in Winnipeg's most healthy group, those with the average PMR in the 'Winnipeg average healthy group', and those with the highest PMR in 'Winnipeg least healthy group' (Martens, Bartlett et al., 2010).

Winnipeg Least Healthy

One of three Winnipeg Community Aggregate areas in which the sub-groups include the following Winnipeg Community Areas in which the PMR is lower than the Winnipeg average PMR: It includes Assiniboine South, Fort Garry North, Fort Garry South, Inkster West, River East North, River East, River Heights West, St. Boniface Eat, St. James–Assiniboia West and St.Vital South (Martens, Bartlett, et al., 2010).

Winnipeg Average Healthy

One of three Winnipeg Community Aggregate areas in which the sub-groups include the following Winnipeg Community Areas in which the PMR is similar is similar to the average PMR in Winnipeg: River Heights East, Seven Oaks North, Seven Oaks East, Seven Oaks West, St. Vital North, and Transcona (Martens, Bartlett, et al., 2010).

References

Canadian Hypertension Education Program (2010). *2010 Canadian Hypertension Education Program Recommendations: The short clinical summary – an annual update.* Retrieved from http://cesnstroke.ca/documents/ShortClinicalSummary_2010.pdf

Canadian Stroke Network. (2011). *The Quality of Stroke Care in Canada.* Retrieved from http://www.canadianstrokenetwork.ca/wp-content/uploads/2011/06/QoSC-EN1.pdf

Good, C.D. (1990). Chapter 55: Clinical methods: The history, physical, and laboratory examinations. In H.K. Walker, W.D. Hall, & J.W. Hurst (Eds.), *Cerebrovascular Disease (3rd ed.)* (pp. 288-292). Boston, MA: Butterworths.

Government of Canada. (1982). *Constitution Act: Section 35.* Retrieved June 17, 2011 from http://laws.justice.gc.ca/eng/Const/page-12.html#anchorsc:7-bo-ga:l_II

Manitoba Centre for Health Policy. (2006a). *Glossary definition: Income not found.* Retrieved from http://mchp-appserv.cpe.umanitoba.ca/viewDefinition.php?definitionID=102883

Manitoba Centre for Health Policy. (2006b) *Glossary definition: Linear trend test.* Retrieved from http://mchp-appserv.cpe.umanitoba.ca/viewDefinition.php?definitionID=102973

Manitoba Centre for Health Policy. (2006c). *Glossary definition: Treatment prevalence.* Retrieved from http://mchp-appserv.cpe.umanitoba.ca/viewDefinition.php?definitionID=103681

Manitoba Centre for Health Policy. (2007). *Glossary definition: Most responsible diagnosis.* Retrieved from http://mchp-appserv.cpe.umanitoba.ca/viewDefinition.php?definitionID=103120

Manitoba Centre for Health Policy. (2008). *Glossary definition: Shadow billing.* Retrieved from http://mchp-appserv.cpe.umanitoba.ca/viewDefinition.php?definitionID=103569

Manitoba Centre for Health Policy (2010). *Glossary definition: Term: Average Household Income (neighbourhood income).* Retrieved from http://mchp-appserv.cpe.umanitoba.ca/viewDefinition.php?definitionID=104067

Manitoba Centre for Health Policy. (2011). *Glossary definition: Income quintile.* Retrieved from http://mchp-appserv.cpe.umanitoba.ca/viewDefinition.php?definitionID=102882

Manitoba Metis Federation. (2010). *Membership application and confirmation package.* Retrieved Sept 30, 2010 from http://mmf.mb.ca/images/pdf/membership/mmf_membership_package.pdf

Martens, P.J., Fransoo, R., McKeen, N., The Need to Know Team, Burland, E., Jebamani, L., …& Metge, C. (2004). *Patterns of regional mental illness disorder diagnoses and service use in Manitoba: A population-based study.* Winnipeg, Mb. Retrieved from http://mchp-appserv.cpe.umanitoba.ca/reference/mental.health.pdf

Martens, P.J., Bartlett, J., Burland, E., Prior, H., Burchill, C., Huq, S., Romphf, L., Sanguins, J., Carter, S., & Bailly, A. (2010). *Profile of Metis health status and healthcare utilization in Manitoba: A population-based study.* Winnipeg, MB: Manitoba Centre for Health Policy.

McMillan, A.D. (1995). *Native peoples and cultures of Canada.* Toronto, ON: Douglas & McIntyre.

Mitchell, M.E., & Sidaway, A.N. (1998). The pathophysiology of atherosclerosis. *Seminars in Vascular Surgery, 11*(3), 134-141.

Public Health Agency of Canada. (2009). *Tracking heart disease and stroke in Canada.* Retrieved from http://www.phac-aspc.gc.ca/publicat/2009/cvd-avc/pdf/cvd-avs-2009-eng.pdf

Public Health Agency of Canada. (2010). Six types of cardiovascular disease. Retrieved from http://www.phac-aspc.gc.ca/cd-mc/cvd-mcv/cvd-mcv-eng.php

Sprague, D.N., & Frye, R.P. (1983). *The genealogy of the first Metis nation: The development and dispersal of the Red River Settlement, 1820-1900.* Winnipeg, MB: Pemmican Publications.

Statistics Canada. (2011). Dissemination area (DA). Retrieved from http://www12.statcan.ca/english/census01/Products/Reference/dict/geo021.htm

Vital Statistics Agency. (n.d.). *What we do.* Retrieved January 31, 2011, from http://vitalstats.gov.mb.ca/

World Health Organization. (2011). *Classifications: International Classification of Diseases (ICD).* Retrieved from http://www.who.int/classifications/icd/en/

Appendix 1

Crude prevalence and incidence rates of Metis with IHD in Manitoba who have a certain combination of other disorders (diabetes, congestive heart failure, stroke, depression, anxiety disorders, and/or substance abuse) are shown in the following tables. If there is a check-mark (√), it indicates the presence of the morbidity indicator. The column 'Count of Metis with IHD' indicates the number of Metis with IHD who had that specific grouping of comorbidities; however, if there were 5 or fewer Metis with IHD who had that specific grouping of comorbidities the data were suppressed, as indicated by 's' in Table 4.10.5. These numbers are not age- or sex-adjusted, but are observed counts.

Table: 4.10.1: None or One Comorbidity among Specified Illness for Metis with IHD and All Other Manitobans with IHD, aged 19+, 2002/03-2006/07[8]

Diabetes	Congestive Heart Failure	Stroke	Depression	Anxiety Disorders	Substance Abuse	Count of Metis IHD	Percent of Metis with IHD	Percent of All Other Manitobans with IHD
0	0	0	0	0	0	1047	30.21	34.07
√	0	0	0	0	0	499	14.40	11.21
0	√	0	0	0	0	302	8.71	13.29
0	0	√	0	0	0	19	0.55	0.73
0	0	0	√	0	0	266	7.67	7.43
0	0	0	0	√	0	54	1.56	1.52
0	0	0	0	0	√	51	1.47	1.14

Table 4.10.2: Two Comorbidities among Specified Illness for Metis with IHD and All Other Manitobans with IHD, aged 19+, 2002/03- 2006-07

Diabetes	Congestive Heart Failure	Stroke	Depression	Anxiety Disorders	Substance Abuse	Count of Metis IHD	Percent of Metis with IHD	Percent of All Other Manitobans with IHD
√	√	0	0	0	0	329	9.49	8.00
√	0	√	0	0	0	13	0.38	0.41
√	0	0	√	0	0	139	4.01	2.67
√	0	0	0	√	0	18	0.52	0.39
√	0	0	0	0	√	21	0.61	0.41
0	√	√	0	0	0	13	0.38	0.81
0	√	0	√	0	0	78	2.25	3.81
0	√	0	0	√	0	19	0.55	0.54
0	√	0	0	0	√	19	0.55	0.49
0	0	√	√	0	0	6	0.17	0.25
0	0	√	0	√	0	s	s	0.04
0	0	√	0	0	√	s	s	0.03
0	0	0	√	√	0	133	3.84	3.07
0	0	0	√	0	√	38	1.10	0.66
0	0	0	0	√	√	11	0.32	0.05

[8] The sample size (population cohort) of the 3438 Metis with IHD and 57811 All Other Manitobans with IHD in these comorbidity tables (Table 4.10.1–Table 4.10.6) are different from the sample size (population cohort) used to develop the population pyramid and to measure morbidity, health services use, high profile cardiac surgery, and pharmaceutical drugs (3000 Metis with IHD and 46,347 All Other Manitobans with IHD). This is because each indicator in the Metis IHD study is based on a different total number of years of data when combined for comparison. In the comorbidity tables, the sample size changed to accommodate these different years of measurement. Diabetes prevalence, stroke incidence rate, depression prevalence, anxiety disorder prevalence, and substance abuse prevalence are based on 5 years of data while CHF is based on three years of data.

Table 4.10.3: Three Comorbidities among Specified Illness for Metis with IHD and All Other Manitobans with IHD, aged 19+, 2002/03-2006/07

Diabetes	Congestive Heart Failure	Stroke	Depression	Anxiety Disorders	Substance Abuse	Count of Metis IHD	Percent of Metis with IHD	Percent of All Other Manitobans with IHD
√	√	0	√	0	0	100	2.89	2.47
√	√	0	0	√	0	13	0.38	0.28
√	√	0	0	0	√	14	0.40	0.29
√	0	√	√	0	0	s	s	0.14
√	0	√	0	√	0	0	0.00	s
√	0	√	0	0	√	s	s	0.02
√	0	0	√	√	0	60	1.73	0.82
√	0	0	√	0	√	15	0.43	0.27
√	0	0	0	√	√	s	s	0.01
0	√	√	√	0	0	s	s	0.31
0	√	√	0	√	0	0	0.00	0.02
0	√	√	0	0	√	s	s	0.03
0	√	0	√	√	0	33	0.95	1.27
0	√	0	√	0	√	9	0.26	0.23
0	√	0	0	√	√	0	0.00	0.03
0	0	√	√	√	0	s	s	0.08
0	0	√	√	0	√	0	0.00	0.02
0	0	√	0	√	√	0	0.00	s
0	0	0	√	√	√	31	0.89	0.45

Table 4.10.4: Four Comorbidities among Specified Illness for Metis with IHD and All Other Manitobans with IHD, aged 19+, 2002/03-2006/07

Diabetes	Congestive Heart Failure	Stroke	Depression	Anxiety Disorders	Substance Abuse	Count of Metis IHD	Percent of Metis with IHD	Percent of All Other Manitobans with IHD
√	√	√	0	√	0	0	0.00	0.02
√	√	√	0	0	√	s	s	0.03
√	√	0	√	√	0	30	0.87	0.67
√	√	0	√	0	√	12	0.35	0.21
√	√	0	0	√	√	s	s	0.02
√	0	√	√	√	0	0	0.00	0.03
√	0	√	√	0	√	0	0.00	s
√	0	√	0	√	√	0	0.00	s
√	0	0	√	√	√	11	0.32	0.13
0	√	√	√	√	0	s	s	0.09
0	√	√	√	0	√	0	0.00	0.01
0	√	√	0	√	√	0	0.00	s
0	√	0	√	√	√	7	0.20	0.12
0	0	√	√	√	√	0	0.00	0.01

Table 4.10.5: Five Comorbidities among Specified Illness for Metis with IHD and All Other Manitobans with IHD, aged 19+, 2002/03-2006/07

Diabetes	Congestive Heart Failure	Stroke	Depression	Anxiety Disorders	Substance Abuse	Count of Metis IHD	Percent of Metis with IHD	Percent of All Other Manitobans with IHD
√	√	√	√	0	√	s	s	0.02
√	√	√	0	√	√	0	0.00	0.00
√	√	0	√	√	√	6	0.17	0.08
√	0	√	√	√	√	0	0.00	s
0	√	√	√	√	√	0	0.00	s

Table 4.10.6: Six Comorbidities among Specified Illness for Metis with IHD and All Other Manitobans with IHD, aged 19+, 2002/03-2006/07

Diabetes	Congestive Heart Failure	Stroke	Depression	Anxiety Disorders	Substance Abuse	Count of Metis IHD	Percent of Metis with IHD	Percent of All Other Manitobans with IHD
√	√	√	√	√	√	0	0.00	s