Otipemisiwak
Métis Government

HEALTH
DEPARTMENT

Epidemiological and Health Services Indicators of Arthritis

Among the Métis Population of Alberta

ACKNOWLEDGEMENTS

This report was completed in partnership with the Otipemisiwak Métis Government: the Government of the Métis Nation within Alberta (MNA) and researchers from the University of Alberta Injury Prevention Centre, Don Voaklander, Marla Palakkamanil and Elizabeth Wishart, the Alberta Health Analytics and Reporting Branch, through financial support from Alberta Health.

MESSAGE FROM THE PRESIDENT

Arthritis significantly affects our community, yet there is limited knowledge about the experiences of Métis Albertans living with this condition. To address this gap, our Health Department has collaborated with academic partners at the University of Alberta, embarking on a mission to better understand the impact of arthritis on the lives of Métis Albertans.

With this goal in mind, we present our latest health report, *Epidemiological and Health Services Indicators of Arthritis Among the Métis Population of Alberta*. This report underscores the health disparities experienced by Métis people, highlighting areas where we must improve and where we have achieved success in promoting health and wellness for Métis Albertans. We gratefully acknowledge and thank our partners, Dr. Don Voaklander, and his team at the Injury Prevention Centre at the University of Alberta.

Andrea Sandmaier
President, Otipemisiwak Métis Government

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GLOSSARY

Arthritis
A health condition where a person's joints become swollen, stiff, and painful. It can happen in one or more joints and can make it hard to move or do everyday activities.[1]

Biological Disease-Modifying Anti-Rheumatic Drugs (bDMARDs)
A category of medications used to treat autoimmune and inflammatory diseases, such as rheumatoid arthritis. These drugs are made from living organisms or their products, making them different from synthetic DMARDs. bDMARDs target specific proteins or cells involved in the inflammatory process, providing a more focused treatment approach.[1,2]

Canadian Classification of Health Interventions (CCI code)
A system that organizes different health-related actions. It was created and is managed by the Canadian Institute for Health Information (CIHI) to make it easier to record and keep track of the treatments and care provided in healthcare.[1,2]

Conventional Synthetic Disease-Modifying Anti-Rheumatic Drugs (csDMARDs)
A group of medications used to treat inflammatory conditions, particularly rheumatoid arthritis. These drugs help slow down the progression of the disease, reduce joint inflammation and pain, and improve overall function.[1,2]

Disease-Modifying and Anti-Rheumatic Drugs (DMARDs)
A class of drugs indicated for the treatment of several inflammatory arthritides, including rheumatoid arthritis.[1,2]

Glucocorticosteroids
Glucocorticosteroids, also known as glucocorticoids (GCs), are steroid hormones primarily used in medicine for their anti-inflammatory properties. They are effective in reducing inflammation and symptoms in conditions like arthritis, thereby improving physical function and reducing disability. Additionally, these steroids are widely utilized in treating autoimmune diseases like arthritis and cancer, due to their potent immunosuppressive and anti-inflammatory effects.[3]

Incidence of Arthritis

The number of new cases of arthritis in a certain time period. This helps us understand how often the condition is affecting people.[1]

Incidence Proportion

A process of understanding how frequently a disease or event happens in a group of people during a specific period. This is calculated by dividing the number of new cases of sickness or event by the total number of people who could have been affected at the start of the study. This helps us understand how common a disease is in different groups or how it changes over time.[4]

International Classification of Diseases, 9th Revision (ICD-9)

A classification used for administrative data on all acute and elective hospital discharges in this report.[1,2]

International Classification of Diseases, 10th Revision (ICD-10)

A classification used to categorize different medical conditions. This classification, helped find the payments made to doctors who charge for their services or use other payment methods with special codes related to diagnosing illnesses, specifically arthritis.[1,2]

Morbidity and Ambulatory Care Reporting (MACAR)

A system used to identify records from ambulatory and acute inpatient care to identify intakes related to arthritis for this report.[1,2]

Narcotic Analgesics

Narcotic analgesics are medications designed to control or relieve pain. They are particularly used for pain resulting from injuries, arthritis, cancer, and other conditions. These drugs work by altering the body's perception of pain. Common examples of narcotic analgesics include codeine, fentanyl, and oxycodone.[5]

Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)

NSAIDs, or non-steroidal anti-inflammatory drugs, are a class of medications widely used for their anti-inflammatory, analgesic, and antipyretic properties. They are particularly effective in managing symptoms associated with arthritis, such as inflammation and joint pain. NSAIDs help alleviate pain and improve joint function in individuals with various forms of arthritis. Common examples include ibuprofen, naproxen, aspirin, and diclofenac.[6]

Prevalence of Arthritis

The total number of people living with arthritis at a certain point in time. This helps us see how common arthritis is in a population and how many people are dealing with it.[1]

The Anatomical Therapeutic Chemical code (ATC Code)

A unique code assigned to a medicine according to the organ or system it works on and how it works.[1,2]

Targeted Synthetic Disease-Modifying Anti-Rheumatic Drugs (tsDMARDs)

A class of medications specifically designed to treat inflammatory diseases, such as rheumatoid arthritis. These drugs work by targeting particular molecules or pathways involved in the inflammatory process, leading to a more focused and effective treatment.[1,2]

1.0 INTRODUCTION

1.1 Background and Rationale

This research report is the result of a collaboration between the Otipemisiwak Métis Government: the Government of the Métis Nation within Alberta (MNA), the University of Alberta, and the Alberta Health Analytics and Reporting Branch to comprehensively characterize the epidemiological profile of Métis Albertans affected by arthritis. The Métis have been referred to as the "hidden" Indigenous peoples, which alludes to the lack of Métis-specific health data, policies, and services specific to their unique needs and experiences.[7] This study fills a significant knowledge gap, as there is little information from epidemiological studies regarding arthritis and its effect on the health of Métis populations in Canada.

Métis people are one of three distinct Indigenous peoples in Canada with a unique history. The Métis National Council defines Métis as "a person who self-identifies as Métis, is distinct from other Aboriginal [Indigenous] peoples, is of historic Métis Nation ancestry, and is accepted by the Métis Nation".[8] The Métis population has been growing rapidly over the last decade. The population increased by 51.2% between 2006 and 2016, representing Canada's most significant growth of Indigenous peoples.[9] This increase has been primarily driven by increased identification by individuals as Métis.[9,10] Of the 587,545 individuals who identify as Métis in Canada, Alberta has the second-largest provincial population, with 114,370 Métis Albertans identified in the 2016 census.[11] The MNA is the government for Métis people within Alberta and actively represents over 68,000 Métis Citizens. The MNA advances Métis self-determination through cultural, economic, health, educational, political, and social development.[12]

An individual's health is influenced by many intersecting factors known as the social determinants of health. The social determinants of health can be categorized as distal (historical, social, political, and economic components), intermediate (community resources, infrastructure), and proximal (physical and social environment).[13] For the Métis population, social determinants significantly impact chronic diseases, including arthritis. For Métis people, health and wellness are influenced by a complex interplay of social determinants. While the legacy of colonialism, racism, and paternalistic policies like residential schools have presented significant challenges, including forced separation and intergenerational trauma, Métis communities continue to demonstrate remarkable resilience. Central to this

resilience is the revitalization and celebration of Métis culture and language, which are vital strengths that help sustain community well-being and identity.

Arthritis represents a group of more than 100 disorders affecting the joints, ligaments, tendons, bones, and other components of the musculoskeletal system.[14] The most common arthritis conditions are rheumatoid arthritis and osteoarthritis.[14] Other common rheumatic diseases related to arthritis include spondyloarthropathies and arthropathies associated with systemic lupus erythematosus and gout.[14] While there are many different types of arthritis, much of the literature on the prevalence of musculoskeletal conditions uses the general heading "arthritis/rheumatism." This label refers to the collection of painful joint disorders that range from those related to wear and tear of cartilage (i.e., osteoarthritis) to those associated with inflammation resulting from an immune disease (i.e., rheumatoid arthritis). Because of this dual reference, it is often difficult to separate these two conditions. As such, an examination of the burden of arthritis is based on general information about rheumatoid arthritis, osteoarthritis, and other arthritis conditions.

Rheumatoid arthritis is a chronic, symmetrical, inflammatory autoimmune disease that initially affects small joints, progressing to larger joints and eventually the skin, eyes, heart, kidneys, and lungs.[15] Often, the bone and cartilage of joints are destroyed, and tendons and ligaments weaken.[16] Onset can occur at any age, including childhood, but most frequently starts at age 40–50. Rheumatoid arthritis affects women three times more often than men.[17]

Osteoarthritis, also known as arthrosis, degenerative arthritis, degenerative joint disease, and the "wear and tear" arthritis, is caused by a breakdown in the cartilage which covers and acts as a cushion inside joints and destruction or decrease of synovial fluid that lubricates those joints.[16] While osteoarthritis can affect any joint, it usually affects the peripheral joints (i.e., hips, knees, hands, and spine) and typically only affects one side of the body.[16] Osteoarthritis is thought to be largely hereditary; however, aging joints, previous injuries, and obesity are known to exacerbate the risk.[17]

A leading cause of pain, disability, and healthcare utilization; arthritis is one of Canada's most prevalent chronic health conditions. It affects approximately six million people, with over 23% of women and nearly 17% of men living with arthritis.[18] Often dismissed as an inevitable part of aging, individuals with arthritis may fail to

receive the appropriate and adequate help they require. Services aimed at helping them are not generally regarded as a priority.[19] Adverse health outcomes associated arthritis have significant consequences at the individual and population levels. At the individual level, the effects of arthritis include joint pain, fatigue, reduced mobility, limitations in self-care, domestic life, and restriction in various life situations (i.e. leisure activities, labour force).[19] The negative physical, mental, and social impacts of arthritis are substantial. While the prevalence of arthritis increases with age, O'Donnell et al. (2015) found that older adults were less likely to report adverse outcomes such as joint pain, sleep limitations, high-stress levels, and suboptimal mental health than younger adults. At the population level, these problems impact the individuals living with arthritis, their families, and their caregivers. Therefore, timely diagnosis and management of arthritis at all ages are crucial to prevent or minimize arthritis-related impairment.[19]

According to the 2017 Aboriginal Peoples Survey of 467,630 Métis adults aged 15 years and over in Canada, 20.3% self-reported a diagnosis of arthritis (excluding fibromyalgia).[11] Métis women were more likely than Métis men to report having chronic arthritis (23.3% and 17.3%, respectively). Within Alberta, 18.1% of 88,020 Métis adults aged 15 years and over self-reported a diagnosis of arthritis (excluding fibromyalgia). Among this surveyed group, 21.1% of Métis women reported having chronic arthritis compared to 14.6% of Métis men.[11] Beyond this self-reported data, there is a paucity of information published on the prevalence of specific forms of arthritis in the Métis population, as well as on disease severity, health outcomes, and healthcare use.[20]

The rate of population growth for the Métis in Canada is significant, with projections suggesting that the population could double in approximately 23.3 years if current trends continue.[21] Accurate population-based assessments of the burden of arthritis disorders in the Métis population are critical to helping healthcare providers and policymakers anticipate impacts on the healthcare and public health systems, and optimize clinical and public health strategies for disease management.[22] Identifying gaps and opportunities in our understanding and targeting potential interventions will allow for the development of effective programming.

1.2 Objectives

This report presents the results of five retrospective analytical cohort studies based on the linkage of provincial administrative health databases between the fiscal years (FYs) of 2009/10 and 2018/19. These studies examine arthritis among the Métis population in Alberta relative to the non-Métis population in Alberta. The objectives of this research are:

- To examine the yearly incidence of arthritis disorders (rheumatoid, osteoarthritis, and others)
- To examine the yearly prevalence of arthritis disorders (rheumatoid, osteoarthritis, and others)
- To examine the yearly prevalence of arthritis-related medication use
- To examine arthritis-related health service use
- To examine excess mortality related to arthritis

2.0 OVERVIEW OF RESEARCH METHODS

The studies shared in this report are retrospective cohort studies based on the linkage of administrative health databases in Alberta, Canada.

2.1 Data Sources

De-identified individual-level, longitudinal data by fiscal year (April 1st of a given year to March 31st of the subsequent year) from 2009 to 2019, were obtained from the following administrative health databases under the custodianship of Alberta Health:

- Alberta Health Care Insurance Plan (AHCIP) Registry (MNA linked)
- Canadian Institute for Health Information (CIHI) Hospital Inpatient Database
- The Morbidity and Ambulatory Care Reporting (MACAR) System
- Pharmaceutical Information Network (PIN)
- Alberta Physician Claims Assessment System
- Alberta Vital Statistics
- The MNA Identification Registry

Administrative health databases contained the following:

- Demographic information (AHCIP population registry)
- Data on all acute and elective hospital discharges using the International Classification of Diseases, 10th Revision; enhanced Canadian version (ICD-10-CA) for diagnosis coding
- Claims for services provided by fee-for-service physicians and physicians paid under alternate payment plans with diagnostic fee codes based on the International Classification of Diseases, 9th Revision (ICD-9) (Alberta Physician Claims Assessment System)
- Deaths that occur within the province (Alberta Vital Statistics)

Additionally, the MNA Identification Registry includes citizenship information for citizens of the MNA. All analyses were conducted using SAS v9.4.[23]

Deterministic data linkage across the AHCIP, MACAR, Physician Claims, and Vital Statistics databases was based on an encrypted, unique personal health number (PHN). To preserve confidentiality, a fictional study identification number was created that uniquely identified each recipient across all datasets. Using a deterministic record linkage system, this identifier was compared across databases, and a link was made if they were all in agreement. To increase the validity of the created links, combinations of different pieces of identifying information may have been employed.

2.2 Study Population

The eligibility criteria for this study were individuals with active registration in the AHCIP from FYs 2009 to 2019. For the definition of the study cohorts, Métis were individuals identified in the MNA identification registry. Non-Métis people were those individuals in the AHCIP registry without an alternate premium arrangement field for Registered First Nations or Inuit and not included in the MNA registry. Métis people not included in the MNA registry were considered part of the non-Métis population because there was no reliable method to identify them within the non-Métis population. All Métis people who met the eligibility criteria were included in the Métis cohort. Up to seven controls were selected from non-Métis individuals registered at the same time and living in the same Alberta region. Matching began in 2005/06 to provide up to four years to detect prevalent cases.

2.3 Identification of Arthritis Cases

Coding Definitions for Arthritis

Arthritis	ICD-9	ICD-10-CA
Rheumatoid	714	M05-M06
Osteoarthritis	715	M15-M19
Other inflammatory and connective tissue diseases	274, 446, 710, 720	M07, M10, M11-M14, M30-M36, M45
Other arthritis and rheumatic conditions	711-713, 716-719, 721, 725-729, 739	M00-M03, M20-M25, M47, M65-M79

Health Service Use	ICD-10-CA/CCI Codes
Ankle replacement/fusion	1.WA.53, 1.WA.75
Hip Arthroplasty	1.VA.53, 1.VA.80
Knee Arthroplasty	1.VG.53

Medication Group	ATC Codes
Disease-Modifying and Anti-Rheumatic Drugs (DMARDS): Conventional Synthetic (cs) and Targeted Synthetic (ts)	A07EC01, J01AA08, L01AA01, L01BA01, L04AA06, L04AA13, L04AA29, L04AA32, L04AA37, L04AA44, L04AD01, L04AD02, L04AX01, L04AX02, L04AX03, M01CB01, M01CB03, M01CB04, M01CC01, P01BA02
DMARDS: Biological Agents	L01FA01, L04AA24, L04AA26, L04AB01, L04AB02, L04AB04, L04AB05, L04AB06, L04AC03, L04AC05, L04AC07, L04AC08, L04AC10, L04AC13, L04AC14, L04AC16, L04AC18, M04AC01
Narcotic Analgesics	N02AA01, N02AA03, N02AA05, N02AA58, N02AA59, N02AB03, N02AC52, N02AD01, N02AE01, N02AF01, N02AF02, N02AJ01, N02AJ02, N02AJ06, N02AJ07, N02AJ13, N02AJ17, N02AJ18, N02AX02, N02AX06, R05DA03, R05DA04, R05DA20
Glucocorticosteroids	H02AB01, H02AB02, H02AB04, H02AB06, H02AB07, H02AB08, H02AB09, H02AB10
Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)	M01AB01, M01AB02, M01AB03, M01AB05, M01AB08, M01AB15, M01AB55, M01AC01, M01AC02, M01AC06, M01AE01, M01AE02, M01AE03, M01AE04, M01AE09, M01AE11, M01AE12, M01AE51, M01AE52, M01AG01, M01AH01, M01AX01, M02AC, N02BA01, N02BA11

These codes were verified against study designs and methods in the data repository for the Manitoba Centre for Health Policy[24] as well as the Compendium for Therapeutic Choices.[17]

Using a similar algorithm to Martens et al.,[25] arthritis is defined as:

- one or more hospitalizations with a diagnosis of arthritis (ICD-9-CM and ICD-10-CA codes as listed in the table above)
- two or more physician visits with a diagnosis of arthritis (ICD-9-CM and ICD-10-CA codes as listed in the table above) with a mean of fewer than two years between visits
- one physician visit with a diagnosis of arthritis (ICD-9-CM and ICD-10-CA codes as listed in the table above) and one or more prescriptions for medications to treat arthritis

The earliest filed claim date or the earliest date of hospitalization was used to identify the date of diagnosis. The claim preceding the other was used for those who had a recognized arthritis diagnosis in both the physician claims database and the hospital inpatient database. No age limit was applied to this study.

2.4 Statistical Analysis and Outcomes Reported

Incidence of Arthritis (Rheumatoid Arthritis, Osteoarthritis, and Other Arthritis Conditions)

Annual arthritis incidence for Métis and non-Métis population cohorts were calculated for FY 2009 through 2016. All incidence rates were expressed as a proportion (per 100,000 person-years). All arthritis estimates were adjusted by age and sex using the direct standardization method. The 2016 Canadian Census population was the reference population.[21]

Prevalence of Arthritis (Rheumatoid Arthritis, Osteoarthritis, and Other Arthritis Conditions)

Annual arthritis prevalence for Métis and non-Métis population cohorts was calculated from FY 2005 to FY 2018. Prevalence estimates were expressed as a proportion (per 100,000 person-years). All arthritis estimates were adjusted by age and sex using the direct standardization method. The 2016 Canadian Census population was used as the reference population.[21]

Pharmaceutical Use Between 2010/11 and 2017/18

The initiation of csDMARDs, tsDMARDs, bDMARDs, narcotic analgesics, glucocorticosteroids, and NSAIDs for each of the above-listed disorders was calculated for FY 2010 through to and including FY 2017. Using the prescription records to identify arthritis medication dispensations, patients who had an arthritis medication dispensed were selected. The diagnosis for which the arthritis medication was prescribed was determined using the practitioner claims data and inpatient data as well as the ICD-9 and ICD-10-CA codes to define the arthritis conditions. Where there were multiple arthritis medication dispensations per patient, only the first dispensation was used. Medication initiation therapy was determined as the number of incident drug dispensations per the number of incident disorder diagnoses during each FY and expressed as a percentage. Drug initiation therapy was calculated for each medication, each disorder of interest, and each FY and then compared between the Métis and non-Métis populations.

Arthritis-Related Health Service Use

Health service use, specifically ankle replacement/fusion, hip arthroplasty, and knee arthroplasty, was examined within the inpatient hospital database for those with an incident diagnosis of rheumatoid arthritis, osteoarthritis, and other arthritis conditions in both the Métis and non-Métis population cohorts for FY 2009 through to and including FY 2016. The incidence of health service use was expressed as an incidence proportion (per 100,000 population) of the incident cases for each disorder (rheumatoid arthritis, osteoarthritis, and other arthritis conditions). The mean age of health service access was also determined. Health service use data for rheumatoid arthritis, osteoarthritis (ankle replacement/fusion), and other arthritis conditions are not

presented as the incident proportions for the Métis population (FY 2009–FY 2016) were less than 10.

Excess Mortality Related to Arthritis (Rheumatoid Arthritis, Osteoarthritis, and Other Arthritis Conditions)

Annual excess mortality rates for Métis and non-Métis population cohorts were calculated for FY 2009 through 2016 using the Alberta Vital Statistics database. Excess mortality rates were expressed as a proportion (per 100,000 person-years). All arthritis estimates were adjusted by age and sex using the direct standardization method. The 2016 Canadian Vital Statistics Death population was used as the reference population.[26]

3.0 RESULTS

3.1 Incidence of Arthritis

Rheumatoid Arthritis

The age-sex standardized incidence rate of rheumatoid arthritis was lower in the Métis population than in the non-Métis population from FYs 2009 to 2016 (Table 1.1, Figure 1.1). Between FYs 2013 and 2014, the age-sex standardized incidence rate of rheumatoid arthritis increased in the Métis population. In FY 2014, the age-sex standardized incidence rate was slightly higher in the Métis population at 99/100,000 compared to the non-Métis population at 91/100,000. After FY 2014, both populations had similar age-sex standardized incidence rates. The mean age-sex standardized incidence rate of rheumatoid arthritis among the Métis population for all years analyzed was 94/100,000. The mean age-sex standardized incidence rate of rheumatoid arthritis among the non-Métis population for all years analyzed was 109/100,000. Compared to the Métis population, people in the non-Métis population were, on average, 1.16 times more likely to have rheumatoid arthritis from FYs 2009 to 2016. Within the Métis population, the age-standardized incidence rate of rheumatoid arthritis was consistently higher among females than males (Table 1.1a, Figure 1.1a).

Osteoarthritis

The age-sex standardized incidence rate of osteoarthritis was consistently lower in the Métis population than in the non-Métis population from FYs 2009 to 2016 (Table 1.2, Figure 1.2). Within the non-Métis population, the age-sex standardized incidence rate of osteoarthritis decreased between FYs 2009 and 2016, whereas in the Métis population, the rate was relatively stable. The mean age-sex standardized incidence rate of osteoarthritis among the Métis population for all years analyzed was 532/100,000. The mean age-sex standardized incidence rate of osteoarthritis among the non-Métis population for all years analyzed was 803/100,000. Compared to the Métis population, people in the non-Métis population were, on average, 1.51 times more likely to have osteoarthritis from FYs 2009 to 2016. Within the Métis population, the age-standardized incidence rate of osteoarthritis was higher among females compared to males between FYs 2009 and 2012 and FYs 2014 and 2016. In FY 2013, males had a slightly higher incidence rate compared to females (Males: 515/100,000; Females: 490/100,000) (Table 1.2a, Figure 1.2a).

Other Arthritis Conditions

The age-sex standardized incidence rate of other arthritis conditions was consistently lower in the Métis population than in the non-Métis population from FYs 2009 to 2016 (Table 1.3, Figure 1.3). However, the gap between the two cohorts and the incidence rates in both cohorts decreased throughout the study period. The mean age-sex standardized incidence rate of other arthritis conditions among the Métis population for all years analyzed was 1,764/100,000. The mean age-sex standardized incidence rate of other arthritis conditions among the non-Métis population for all years analyzed was 1,968/100,000. Compared to the Métis population, people in the non-Métis population were, on average, 1.12 times more likely to have other arthritis conditions from FYs 2009 to 2016. Within the Métis population, the age-standardized incidence rate of other arthritis conditions was higher among females than males between FYs 2009 and 2013 (Table 1.3a, Figure 1.3a). Incidence rates in males were higher than in females between FYs 2014 and 2015 and then decreased to slightly below that of females in FY 2016.

3.2 Prevalence of Arthritis

Rheumatoid Arthritis

The age-sex standardized prevalence rate of rheumatoid arthritis was higher in the non-Métis population than in the Métis population for all FYs analyzed (Table 2.1, Figure 2.1). There was also a slight trending increase in the gap in prevalence rates between both populations. Compared to the Métis population, people in the non-Métis population were between 1.24–1.34 times more likely to have rheumatoid arthritis from FYs 2005 to 2018. Within the Métis population, the age-standardized prevalence rate of rheumatoid arthritis was consistently higher among females compared to males, with a steady trending increase in the gap in prevalence rates between the two sexes (Table 2.1a, Figure 2.1a).

Osteoarthritis

The age-sex standardized prevalence rate of osteoarthritis was higher in the non-Métis population than in the Métis population for all FYs analyzed (Table 2.2, Figure 2.2). There was also a trending increase in the gap in prevalence between both populations.

Compared to the Métis population, people in the non-Métis population were between 1.55–1.78 times more likely to have osteoarthritis from FYs 2005 to 2018. Within the Métis population, the age-standardized prevalence rate of osteoarthritis was consistently higher among females compared to males, with a slight trending increase in the gap in prevalence rates between the two sexes (Table 2.2a, Figure 2.2a).

Other Arthritis Conditions

The age-sex standardized prevalence rate of other arthritis conditions was higher in the non-Métis population than in the Métis population for all FYs analyzed (Table 2.3, Figure 2.3). Compared to the Métis population, people in the non-Métis population were between 1.10–1.16 times more likely to have other arthritis conditions from FYs 2005 to 2018. Within the Métis population, the age-standardized prevalence rate of other arthritis conditions was slightly higher among females compared to males, except for FY 2008 (Table 2.3a, Figure 2.3a).

3.3 Pharmaceutical Initiation Therapy (Incidence)

csDMARDs and tsDMARDs

Among csDMARDs and tsDMARDs, the Métis and non-Métis cohorts had similar average initiation incidence rates over the 8-year fiscal period analyzed for osteoarthritis and other arthritis conditions (Table 3.1, Figure 3.1). For rheumatoid arthritis, Métis people averaged a higher initiation incidence of csDMARDs and tsDMARDs. For other arthritis conditions, Métis people had a slightly higher initiation incidence of csDMARDs and tsDMARDs. For people in both populations with rheumatoid arthritis, the average csDMARD and tsDMARD initiation incidences were greater than 10% across the 8 years analyzed.

bDMARDs

Among bDMARDs, Métis and non-Métis populations had similar average initiation incidence rates over the 8-year fiscal period for osteoarthritis and other arthritis conditions (Table 3.2, Figure 3.2). The Métis population averaged a higher initiation incidence of bDMARDs for rheumatoid arthritis compared to the non-Métis population.

For people in both populations with rheumatoid arthritis, the average bDMARD initiation incidence was more than 5% across the 8 years analyzed.

Narcotic Analgesics

The average narcotic analgesic initiation incidence over the 8-year fiscal period was similar among Métis and non-Métis people diagnosed with osteoarthritis and other arthritis conditions (Table 3.3, Figure 3.3). The Métis population averaged a higher initiation incidence of narcotic analgesics for rheumatoid arthritis compared to the non-Métis population. Consistent across both populations, narcotics were, on average, more commonly prescribed for rheumatoid arthritis and osteoarthritis.

Glucocorticosteroids

The average glucocorticosteroid initiation incidence over the 8-year fiscal period was similar among Métis and non-Métis people for those diagnosed with osteoarthritis and other arthritis conditions (Table 3.4, Figure 3.4). Initiation incidence of glucocorticosteroids was generally higher among Métis people, except those diagnosed with other arthritis conditions. The average initiation incidence of glucocorticosteroids was slightly higher among non-Métis than Métis people. For those diagnosed with other arthritis conditions, glucocorticosteroids had a low initiation incidence in both populations, with an average initiation incidence of less than 4%.

Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)

The average NSAID initiation incidence across the 8-year fiscal period was similar among Métis and non-Métis people (Table 3.5, Figure 3.5). For all disorders, the initiation incidence of NSAIDs was generally higher among Métis people, notably those diagnosed with rheumatoid arthritis.

3.4 Arthritis-Related Health Service Use

Osteoarthritis

Among those within the Métis population with an incident diagnosis of osteoarthritis, 99 hip arthroplasties, and 142 knee arthroplasties were performed (Table 4.1). Among

those within the non-Métis population with an incident diagnosis of osteoarthritis, 18 ankle replacements/fusions, 1,267 hip arthroplasties, and 1,781 knee arthroplasties were performed. The incidence proportions (per 100,000 population) for knee arthroplasty and hip arthroplasty were more significant in the non-Métis population compared to the Métis population by 1.19 and 1.22 times, respectively (Figure 4.1).

3.5 Excess Mortality Related to Arthritis

Rheumatoid Arthritis

The age-sex standardized excess mortality rate for rheumatoid arthritis was zero in the Métis population (Table 5.1a, Figure 5.1a). In contrast, in the non-Métis population, the age-sex standardized excess mortality rate decreased overall across the period analyzed, with an average of 300 deaths attributed to rheumatoid arthritis per 100,000 person-years. (Table 5.1, Figure 5.1).

Osteoarthritis

The age-sex standardized excess mortality rates for osteoarthritis were zero in both the Métis and non-Métis populations (Table 5.2, Table 5.2a, Figure 5.2, Figure 5.2a).

Other Arthritis Conditions

The age-sex standardized excess mortality rate for other arthritis conditions was higher overall in the Métis population compared to the non-Métis population (Table 5.3, Figure 5.3) other than in FYs 2010 to 2012, with an average of 474 deaths attributed to other arthritis conditions per 100,000 person-years. The age-sex standardized excess mortality rate was relatively stable in the non-Métis population, with an average of 175 deaths attributed to other arthritis conditions per 100,000. Within the Métis population, the age-standardized excess mortality rate for females was zero, whereas males had a higher rate with an average of 934 deaths attributed to other arthritis conditions per 100,000 person-years. (Table 5.3a, Figure 5.3a)

4.0 DISCUSSION

Population-based analyses of Métis health risks in Canada are limited.[25,27] Pertinent to this study, there is a paucity of research on arthritis amongst Métis peoples. The similar health profiles between Métis and First Nations peoples, as suggested by Health Canada survey data, as well as the statistically similar rates of self-reported arthritis between Métis and First Nations peoples, have often led to the extrapolation of results of arthritis in the Métis population.[14]

Despite these two distinct peoples having "unique heritages, languages, cultural practices, and spiritual beliefs," previous studies have encountered difficulties separating data between First Nations and Métis populations.[28] For example, a significant limitation in the study by Barnabe et al. (2008) was the lack of information about the large Manitoba Métis population.[28] The widely "disparate data collection methods for the First Nations and Métis populations hampered comparability between the two populations" and between the Métis population and the general population.[28]

This study examined the occurrence of rheumatoid arthritis, osteoarthritis, and other arthritis conditions and their treatment among the Métis population of Alberta. These measures were then compared to the non-Métis population of the province. Overall, the incidence and prevalence of rheumatoid arthritis, osteoarthritis, and other arthritis conditions were higher among non-Métis Albertans than Métis Albertans. However, the difference in incidence rates for rheumatoid arthritis and other arthritis conditions between these two populations decreased in FY 2013, with increasingly similar rates between FYs 2014 to 2016. In contrast to the incidence rates of rheumatoid arthritis and osteoarthritis in the non-Métis population, which gradually declined over the study period, the incidence rates for these two disorders were relatively stable in the Métis population. For other arthritis conditions, the incidence rate decreased in both populations. Conversely, the prevalence rates of rheumatoid arthritis, osteoarthritis, and other arthritis conditions steadily increased over the study period in both populations.

Despite the noticeable increase in prevalence for all disorders, the incidence rates may indicate improved survival or earlier detection of cases in the Métis population. Alternatively, the decreasing incidence rates of other arthritis conditions may be due to factors affecting the time to diagnosis. Rheumatoid arthritis has no disease-specific diagnostic features, and the onset can be insidious with patients presenting with a wide range of manifestations.[29] Osteoarthritis has a very different etiology than

rheumatoid arthritis and has "traditionally been diagnosed with radiographs that demonstrate joint space width and osteophytes".[30] Magnetic resonance imaging, ultrasound, and optical coherence tomography have recently been used to enhance osteoarthritis diagnosis and management through improved soft tissue depiction.[31] With myriad rheumatic diseases and many overlapping symptoms, diagnosing arthritis can be challenging. For example, joint pain involving the hands is a common clinical presentation for various conditions; therefore, several other diagnoses must be considered in the differential diagnosis of rheumatoid arthritis.[17]

The initiation incidence of csDMARDs, tsDMARDs, and bDMARDs to treat rheumatoid arthritis was higher than those dispensed to treat other arthritis conditions, and it is possible that the prescriber assigned a diagnosis code of rheumatoid arthritis until further manifestations of disease and examinations led the prescriber to re-evaluate the diagnosis to be that of another rheumatic disorder potentially. The average initiation incidence of bDMARDs for rheumatoid arthritis in the Métis population was slightly higher than in the non-Métis population (9.7% vs. 5.2%). The low initiation incidence for these medications can be attributed to costs ranging from $9,600/year to $20,500/year.[32]

Unlike rheumatoid arthritis and many other arthritis conditions that are autoimmune disorders, osteoarthritis is caused by mechanical wear and tear on joints, and the primary function of the medications is to control pain. The initiation incidence of narcotics, glucocorticosteroids, and NSAIDs to control pain associated with osteoarthritis is similar in both the Métis and non-Métis populations. For all disorders, the initiation incidence of narcotics decreased over the 8 years analyzed for both populations. The decrease in narcotic initiation incidence for rheumatoid arthritis was most pronounced — from 17.7% in 2010 to 3.1% in 2017 in the Métis population and from 11.4% in 2010 to 3.9% in 2017 in the non-Métis population. This change in pain management reflects findings that narcotics' minor to moderate benefits outweigh the significantly increased risks of adverse effects.[17] For example, Bodden et al. (2021) found that opioid medication in knee osteoarthritis is associated with "worse baseline structural degenerative disease and faster progression of degenerative changes".[33] Baseline symptoms and pain control were worse in opioid users than in controls.[33] However, the American Geriatrics Society (2009) suggests that opioids may be safer than NSAIDs in elderly patients.[34] With the onset of osteoarthritis often beginning later in life, these initiation incidence rates may continue to rise as the Métis population ages.[17]

Early diagnosis and initiation of treatment or referral to a physician are vital in preventing severe disability and the loss of quality of life. Challenges to early and accurate diagnosis can be compounded by several factors, such as the need to travel for services, the lack of provision of more specialized care in rural locations, and the lack of access to a regular healthcare provider.[35,36] Many Métis communities in isolated or remote areas only have access to small healthcare facilities, such as nursing stations. This may require patients to travel long distances to obtain care.[37] Whereas most rheumatologists are clustered in metro areas, timely access to rheumatologists remains a challenge, particularly for those living in rural and remote areas. A rheumatologist's need for physician-to-physician referral to be assessed may further reduce the use of specialist care. According to Liu et al. (2021), rheumatoid arthritis prevalence rates are significantly higher in rural and remote areas of Alberta.[38]

Similarly, Barnabe et al. (2017) found that rheumatoid arthritis prevalence was 20% higher among people residing in rural areas compared with their urban counterparts in Alberta.[39] Given the lack of rheumatologists in rural areas, 75% of rheumatoid arthritis visits were associated with a family physician compared with 25% with specialists.[38] The difference in care delivery may raise the issue of the accuracy of arthritis diagnoses in general, as well as the appropriateness of medication initiation to treat arthritis. While healthcare may be more readily accessible to Métis people living closer to or within population centres, Métis people in these regions still face barriers. In 2017, 16% of Métis people did not have a family physician.[37]

Limited research has been conducted to map current healthcare utilization patterns for arthritis by Métis populations. One of the few studies in Alberta, Canada, analyzed provincial administrative data and focused on the First Nations population. Barnabe et al. (2013) found that the First Nations population had reduced utilization of orthopedic consultations and hip or knee arthroplasty compared to the general population.[40] These results are in accordance with the findings of this study in that knee arthroplasty and hip arthroplasty had a lower incidence proportion in the Métis population compared to the non-Métis population. Despite findings that "osteoarthritis not only occurs more frequently in women than in men but also with greater severity",[41] the proportion of males receiving and hip arthroplasties exceeds that of females in the Métis population.

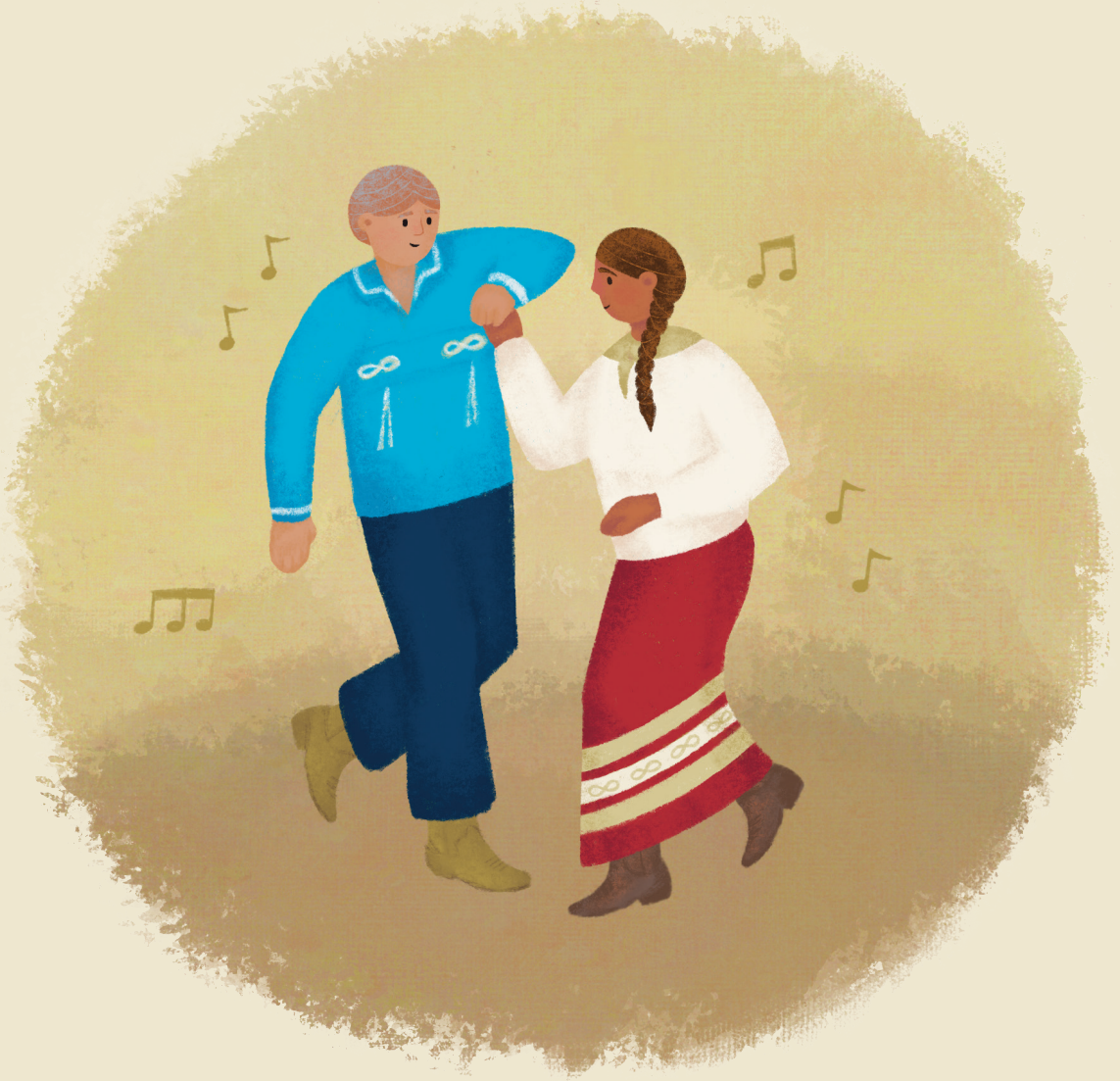
Amongst those diagnosed with other arthritis conditions in the Métis population, the proportion of males receiving and hip arthroplasties also exceeds that of females. In a population-based study conducted by Hawker et al. (2009), arthroplasty was underused in both men and women, but the degree of underuse was significantly greater for women.[42] Due to the higher prevalence of severe hip and knee arthroplasty in women, the estimated potential need for arthroplasty was more than twice as great among women than men. Compared to men, "women had greater arthritis pain, were more likely to be disabled, and were more likely to require personal assistance in performing daily activities, largely because they were more likely to live alone".[42] Therefore, the gender disparity in arthritis-related health service use cannot be explained by clinical need. Borkhoff, Hawker, and Wright (2011) affirm that the most likely explanations for the differential utilization of arthroplasty between genders exist at the patient level, physician level, or both.[43] Patient-level potential causes include patients' perception of arthroplasty indications, risks, benefits, or preferences for surgery. Alternatively, gender bias may contribute to the gender disparity in rates of use of arthroplasty as physicians were less likely to recommend arthroplasty and included fewer shared decision-making elements when the patient was a woman compared to a man in a study conducted by Borkhoff et al. (2008).[44]

Based on the present study's findings, the underuse of arthroplasty in women compared to men may have substantial direct costs to the healthcare system and indirect costs to society.

Systematic rheumatic diseases are characterized by increased morbidity and mortality.[45] However, the excess mortality rates of rheumatoid arthritis and osteoarthritis among males and females in the Métis population were zero. These findings may be explained by the 1991–2001 Canadian census mortality follow-up study that followed 11,800 Métis people for 11 years.[46] Comorbidities may overpower the effect that rheumatoid arthritis or osteoarthritis contribute to mortality. Among Métis men, the most common causes of death were circulatory system diseases (32% of the total age-standardized mortality rate), followed by all cancers (23%) and external causes such as suicides and motor vehicle accidents (18%).[46] Among Métis women, the most common causes of death were all cancers (33%), circulatory system diseases (29%), respiratory system diseases (7%), external causes (6%), and digestive system diseases (6%).[46]

For other arthritis conditions, excess mortality rates in the Métis population exceeded that of the non-Métis population. Whereas the excess mortality rate for other arthritis conditions was zero for Métis women, men had an average excess mortality rate of 933 deaths per 100,000 person-years. Due to the complexity of diseases that comprise this group of other arthritis conditions, it is essential to note that mortality risk is vastly different among various rheumatic diseases.[47] Comorbidities may amplify the effect that other arthritis conditions have on mortality. The variations in mortality risk are "due to diverse underlying pathogenetic mechanisms, the degree of vital organ involvement, different therapeutic regimens used, and different ages of onset of each disease".[47] Male sex and younger age in systemic rheumatic diseases, mainly systemic lupus erythematosus and systemic sclerosis, are adverse prognostic factors, highlighting the need for closer follow-up and more effective treatments for these patients.[47]

A significant rise in the prevalence of arthritis in the general population is anticipated over the following 20 years, according to a report published by the Arthritis Alliance of Canada.[48] Considering that Alberta has the largest Métis population in Western Canada,[49] and the average age in the Métis population of Alberta was 31.8 years in the 2016 Census,[9] there will be a significant increase in the need for arthritis care. The healthcare providers, communities, and healthcare administration must address future capacity issues now and strategize how to increase access to and provide adequate care for an increasing number of Métis people with arthritis.



5.0 CONCLUSION

This study contributes to the scant literature examining arthritis in the Métis population. Arthritis is a chronic disease that can lessen the quality of life directly through the pain and disability experienced and indirectly through limitations on the ability to work and enjoy other activities.

While biomedical diseases may follow similar paths in Métis and non-Métis people of similar age and background, social determinants of health experienced by Métis peoples create additional complexity in management. A general criticism of health system reform from a health promotion perspective is that risk factor epidemiology continues to be the dominant paradigm in North America, focusing on changing individual behaviours rather than addressing the social and structural determinants of health. Another criticism of health system reform is that programs and interventions for Métis people are often deficit-based; there should be a reorientation that utilizes a strengths-based approach and leverages the assets that support Métis health and well-being.

While Métis people have access to mainstream services, little or no attention has been paid to their distinct cultural needs.[7] The jurisdictional limitations that fail to recognize Métis identity and rights have resulted in ongoing health disparities among the Métis.[50,51] Métis people have distinct social determinants of health that must be accounted for when developing programs to improve the health and wellness of Métis people. Advancing the social determinants of health requires challenging manifestations of ongoing racism within the healthcare system, improving health systems and human health resources, addressing jurisdictional ambiguities, providing equitable funding for health programs and services, and supporting community-driven, culturally meaningful, and culturally safe care for Métis peoples across Canada.[52]

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TABLES AND FIGURES

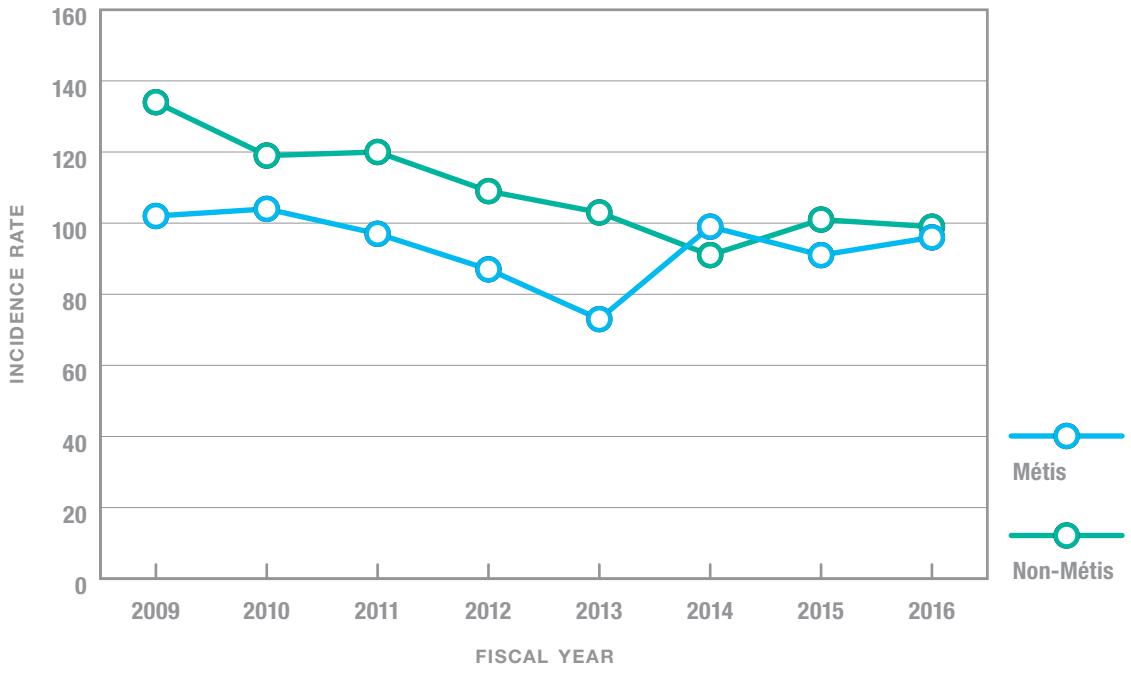
Rheumatoid Arthritis

Age-sex standardized incidence rate in Métis and non-Métis cohorts in Alberta, Canada per 100,000.

TABLE 1.1

Year	Métis	Non-Métis
2009	102	134
2010	104	119
2011	97	120
2012	87	109
2013	73	103
2014	99	91
2015	91	101
2016	96	99

FIGURE 1.1



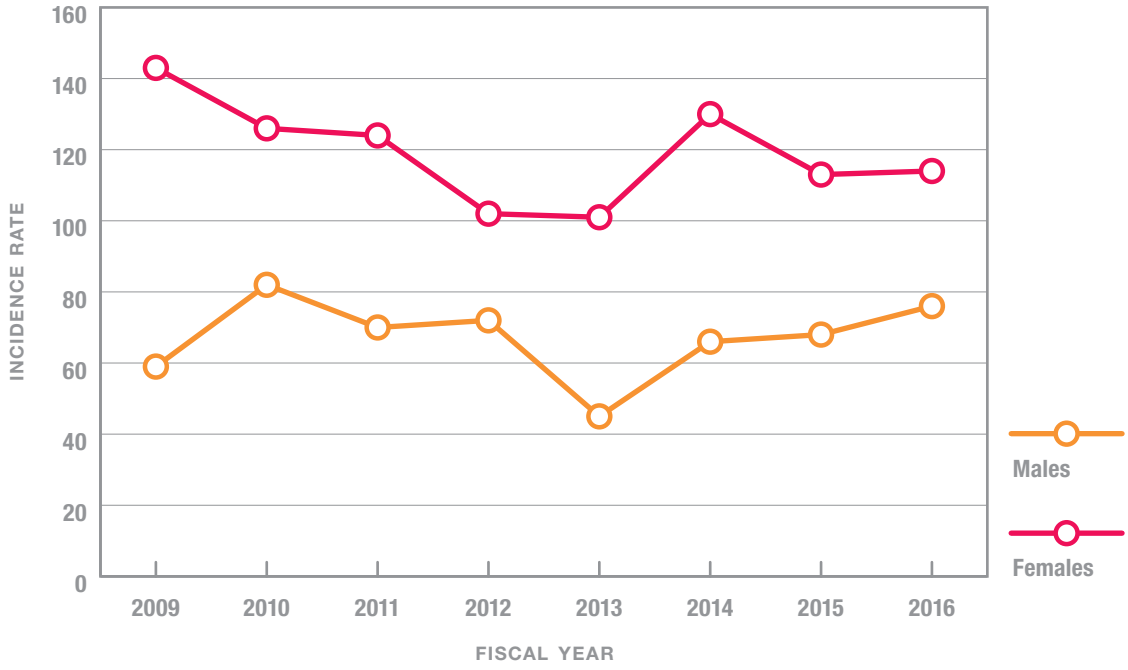
Rheumatoid Arthritis among Métis

Age-sex standardized incidence rate among Métis in Alberta, Canada per 100,000.

TABLE 1.1a

Year	Males	Females
2009	59	143
2010	82	126
2011	70	124
2012	72	102
2013	45	101
2014	66	130
2015	68	113
2016	76	114

FIGURE 1.1a



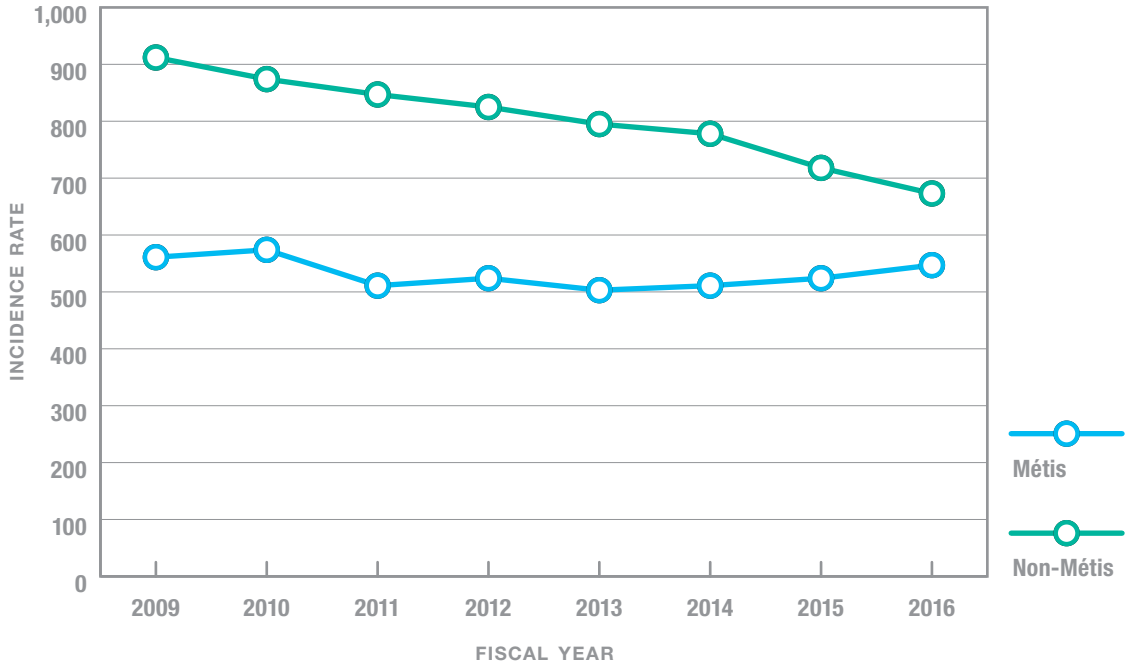
Osteoarthritis

Age-sex standardized incidence rate in Métis and non-Métis cohorts in Alberta, Canada per 100,000.

TABLE 1.2

Year	Métis	Non-Métis
2009	561	912
2010	574	874
2011	511	847
2012	524	825
2013	503	795
2014	511	778
2015	524	718
2016	547	673

FIGURE 1.2



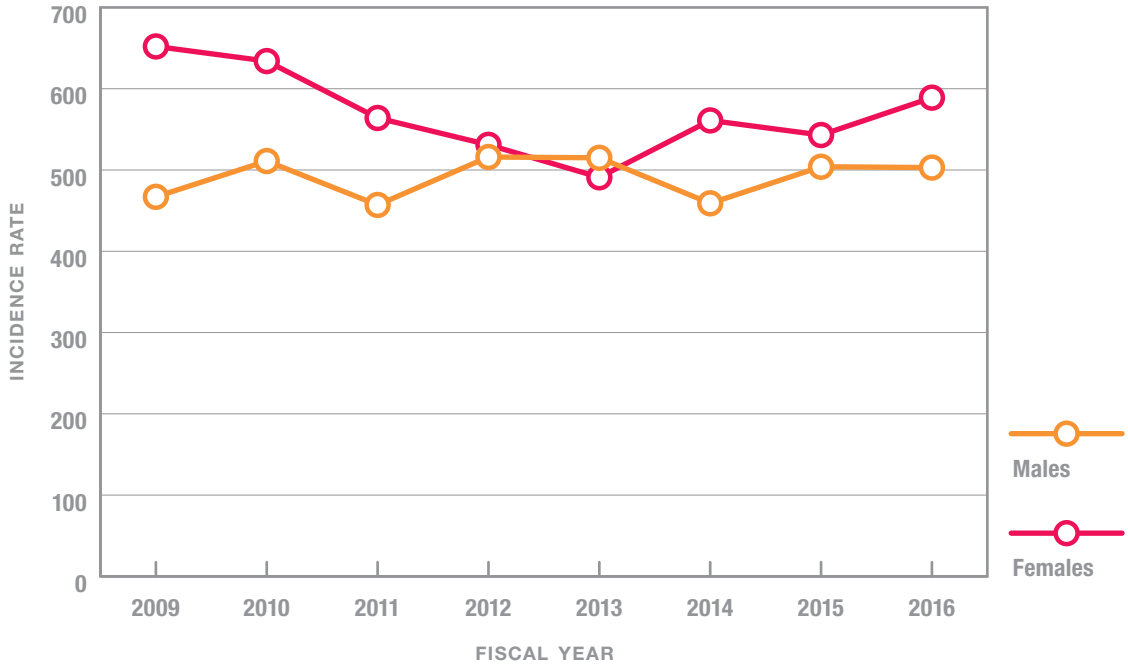
Osteoarthritis among Métis

Age-sex standardized incidence rate among Métis in Alberta, Canada per 100,000.

TABLE 1.2a

Year	Males	Females
2009	467	652
2010	511	634
2011	457	564
2012	516	531
2013	515	491
2014	459	561
2015	504	543
2016	503	589

FIGURE 1.2a



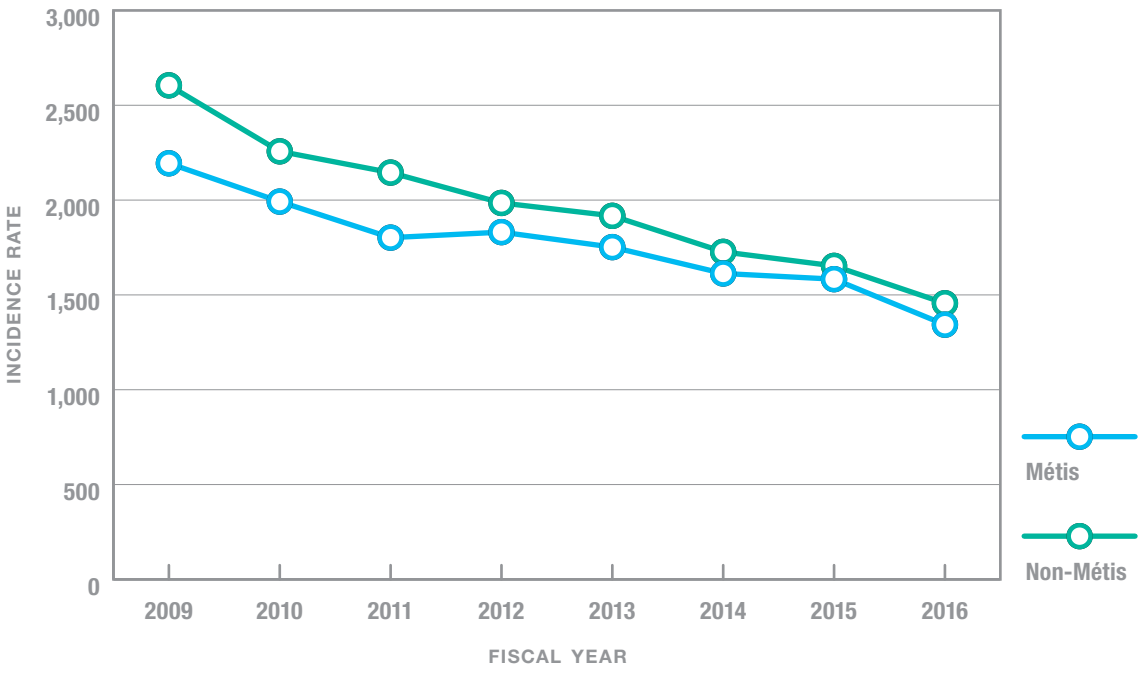
Other Arthritis Conditions

Age-sex standardized incidence rate in Métis and non-Métis cohorts in Alberta, Canada per 100,000.

TABLE 1.3

Year	Métis	Non-Métis
2009	2,194	2,605
2010	1,992	2,257
2011	1,802	2,145
2012	1,831	1,985
2013	1,752	1,917
2014	1,613	1,727
2015	1,583	1,653
2016	1,343	1,456

FIGURE 1.3



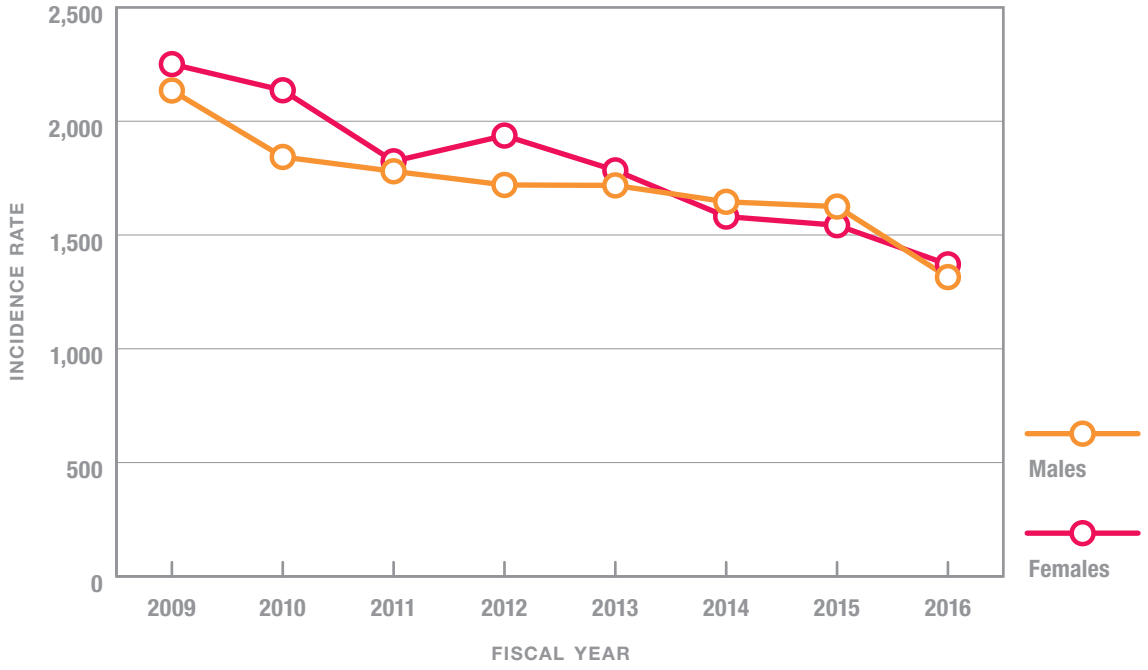
Other Arthritis Conditions among Métis

Age-sex standardized incidence rate among Métis in Alberta, Canada per 100,000.

TABLE 1.3a

Year	Males	Females
2009	2,135	2,251
2010	1,843	2,136
2011	1,780	1,824
2012	1,720	1,937
2013	1,718	1,784
2014	1,646	1,581
2015	1,625	1,543
2016	1,315	1,371

FIGURE 1.3a



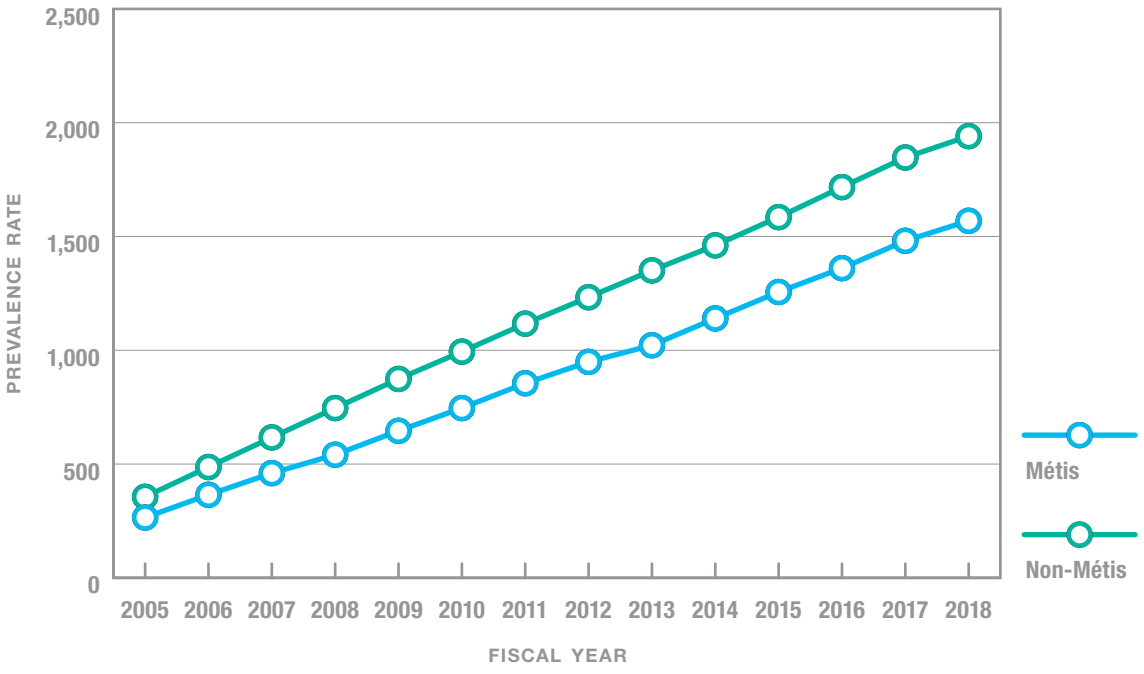
Rheumatoid Arthritis Prevalence

Age-sex standardized incidence rate in Métis and non-Métis cohorts in Alberta, Canada per 100,000.

TABLE 2.1

Year	Métis	Non-Métis
2005	265	356
2006	365	487
2007	460	617
2008	541	746
2009	646	874
2010	746	994
2011	855	1,117
2012	949	1,233
2013	1,022	1,351
2014	1,140	1,461
2015	1,256	1,585
2016	1,361	1,717
2017	1,481	1,847
2018	1,569	1,941

FIGURE 2.1



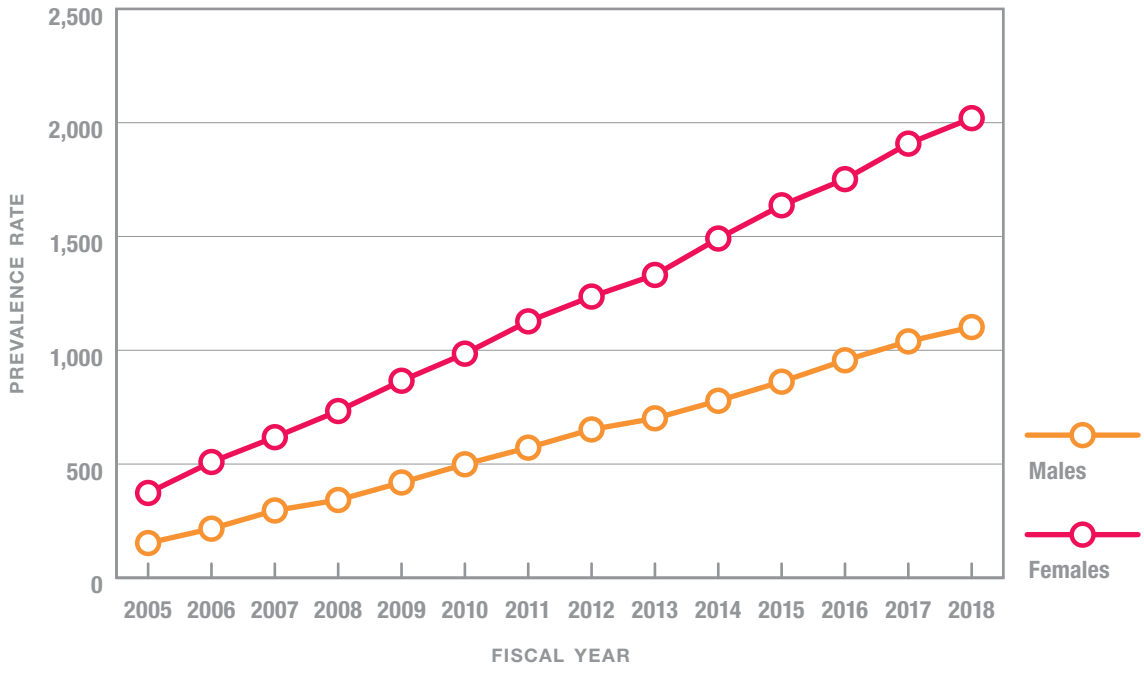
Rheumatoid Arthritis Prevalence among Métis

Age-sex standardized incidence rate among Métis in Alberta, Canada per 100,000.

TABLE 2.1a

Year	Males	Females
2005	153	373
2006	216	509
2007	296	618
2008	342	733
2009	419	866
2010	499	985
2011	572	1,127
2012	652	1,236
2013	701	1,331
2014	778	1,491
2015	862	1,637
2016	956	1,752
2017	1,039	1,908
2018	1,102	2,020

FIGURE 2.1a



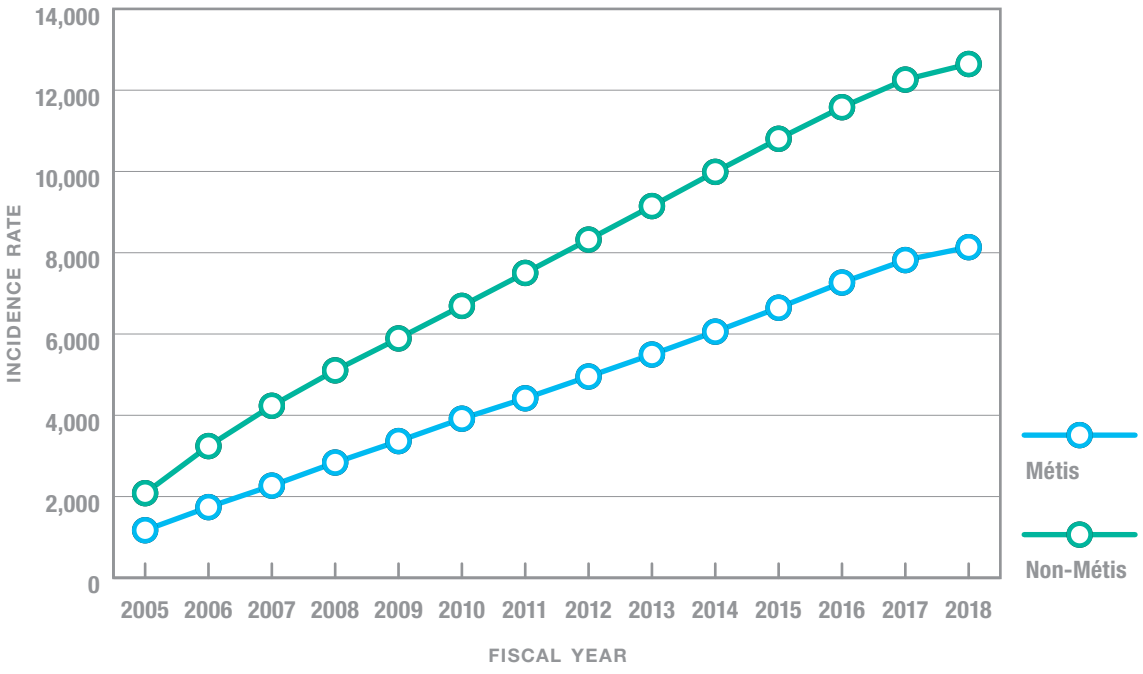
Osteoarthritis Prevalence

Age-sex standardized incidence rate in Métis and non-Métis cohorts in Alberta, Canada per 100,000.

TABLE 2.2

Year	Métis	Non-Métis
2005	1,171	2,083
2006	1,740	3,242
2007	2,269	4,234
2008	2,837	5,105
2009	3,365	5,891
2010	3,916	6,692
2011	4,418	7,503
2012	4,954	8,323
2013	5,495	9,148
2014	6,058	9,990
2015	6,647	10,804
2016	7,266	11,581
2017	7,819	12,260
2018	8,137	12,644

FIGURE 2.2



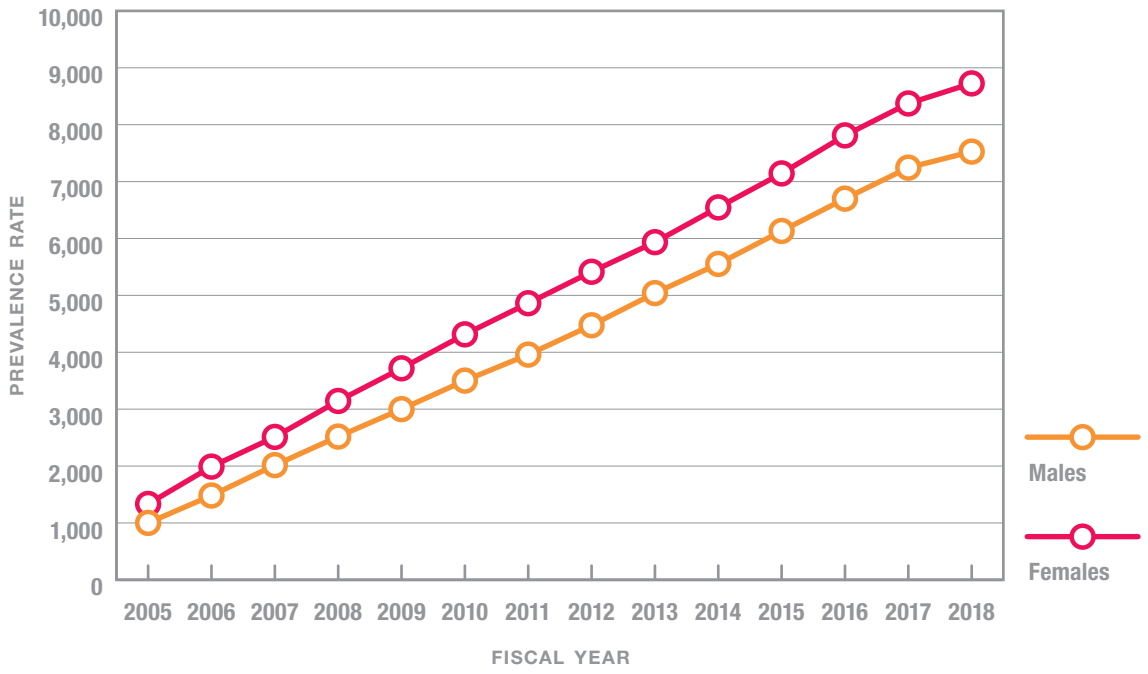
Osteoarthritis Prevalence among Métis

Age-sex standardized incidence rate among Métis in Alberta, Canada per 100,000.

TABLE 2.2a

Year	Males	Females
2005	1,001	1,334
2006	1,482	1,990
2007	2,016	2,512
2008	2,518	3,144
2009	3,000	3,718
2010	3,502	4,315
2011	3,959	4,862
2012	4,475	5,415
2013	5,040	5,935
2014	5,553	6546,
2015	6,132	7,144
2016	6,700	7,812
2017	7,245	8,373
2018	7,527	8,726

FIGURE 2.2a



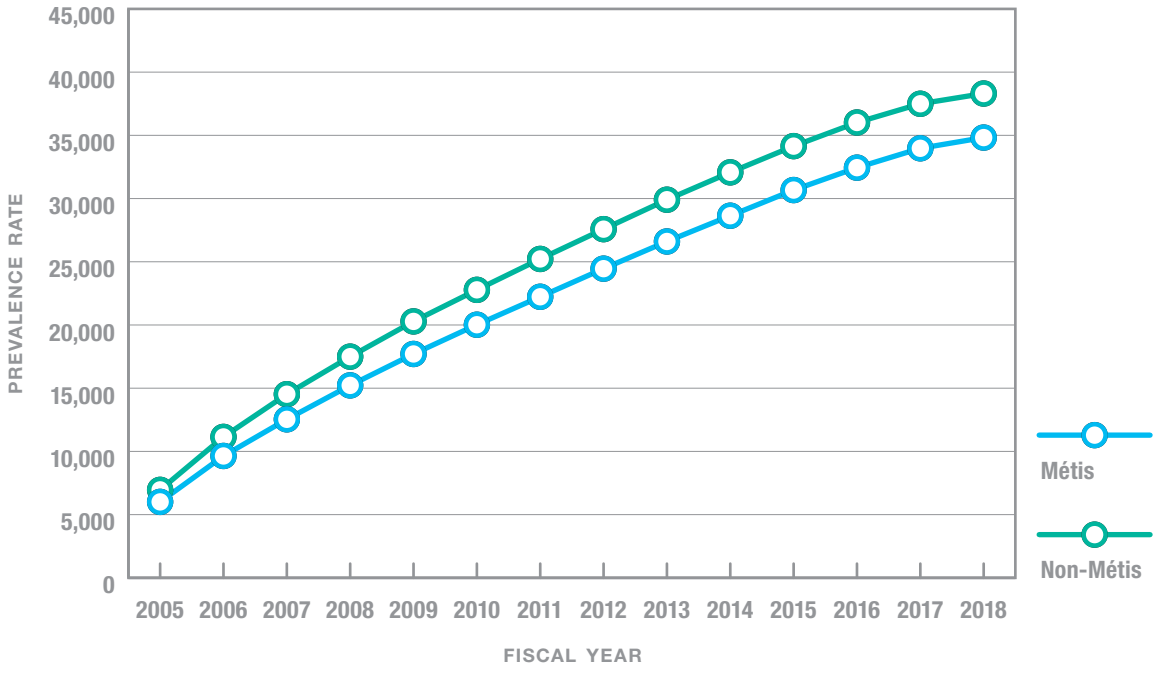
Other Arthritis Conditions Prevalence

Age-sex standardized incidence rate in Métis and non-Métis cohorts in Alberta, Canada per 100,000.

TABLE 2.3

Year	Métis	Non-Métis
2005	6,007	6,958
2006	9,640	1,1147
2007	12,538	14,525
2008	15,222	17,496
2009	17,707	20,282
2010	20,021	22,779
2011	22,232	25,223
2012	24,455	27,580
2013	26,605	29,909
2014	28,642	32,072
2015	30,672	34,147
2016	32,444	36,016
2017	33,975	37,498
2018	34,823	38,307

FIGURE 2.3



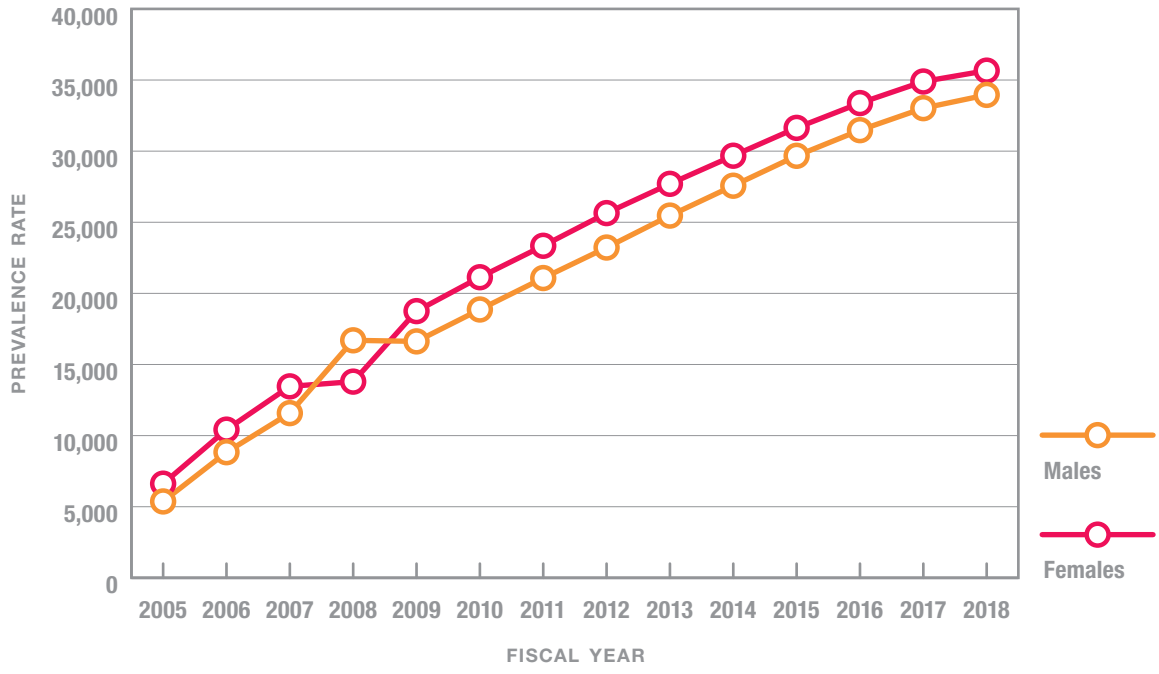
Other Arthritis Conditions among Métis

Age-sex standardized incidence rate among Métis in Alberta, Canada per 100,000.

TABLE 2.3a

Year	Males	Females
2005	5,371	6,621
2006	8,832	10,420
2007	11,580	13,462
2008	16,700	13,795
2009	16,624	18,752
2010	18,866	21,135
2011	21,078	23,346
2012	23,223	25,644
2013	25,469	27,702
2014	27,569	29,678
2015	29,672	31,637
2016	31,475	33,379
2017	33,021	34,896
2018	33,955	35,660

FIGURE 2.3a



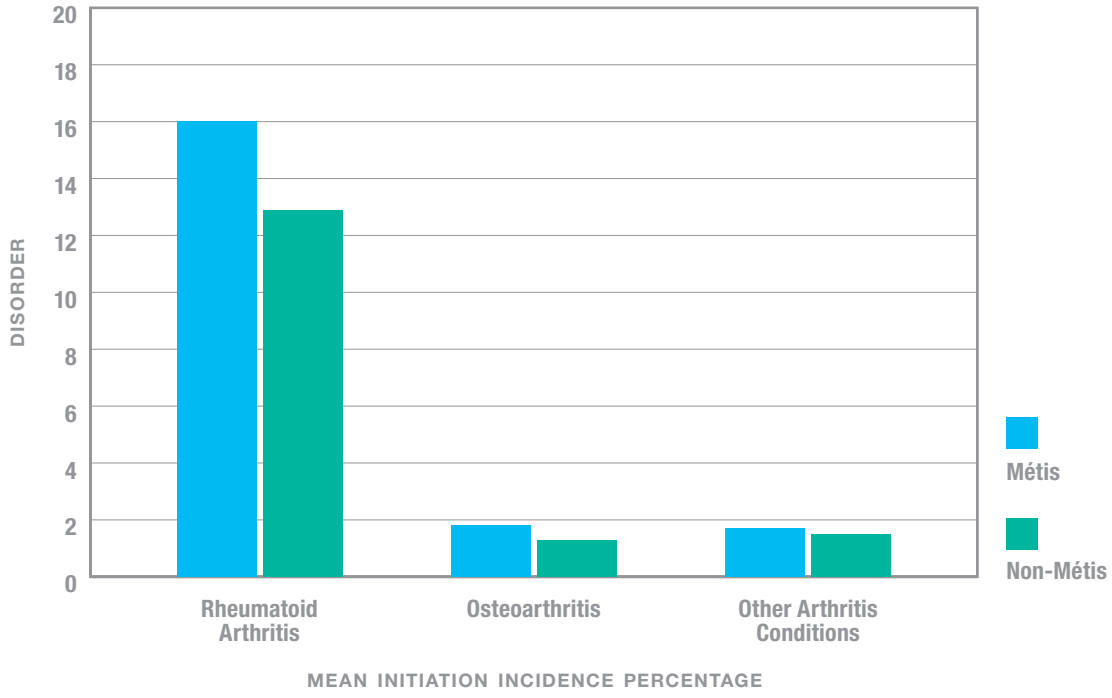
csDMARDs and tsDMARDs Initiation Incidence

Conventional Synthetic Disease-Modifying Anti-Rheumatic Drugs (csDMARDs) and Targeted Synthetic Disease-Modifying Anti-Rheumatic Drugs (tsDMARDs) Initiation Incidence in Alberta, Canada.

TABLE 3.1 (%)

Disorder	Population	2010	2011	2012	2013	2014	2015	2016	2017	Mean
Rheumatoid Arthritis	Métis	1.4	7.4	11.3	11.0	7.8	13.8	22.5	22.9	12.3
	Non-Métis	2.2	2.8	7.8	7.8	8.6	8.8	14.0	16.2	8.5
Osteoarthritis	Métis	10.6	16.7	25.4	29.3	27.7	30.4	34.7	28.9	25.5
	Non-Métis	11.7	19.7	22.8	25.7	27.9	28.7	29.8	28.5	24.4
Other Arthritis Conditions	Métis	5.3	10.0	10.8	17.9	19.0	35.0	32.0	24.5	19.3
	Non-Métis	3.9	7.2	10.0	13.4	10.0	23.6	18.9	19.4	13.3

FIGURE 3.1 – MEAN (%)



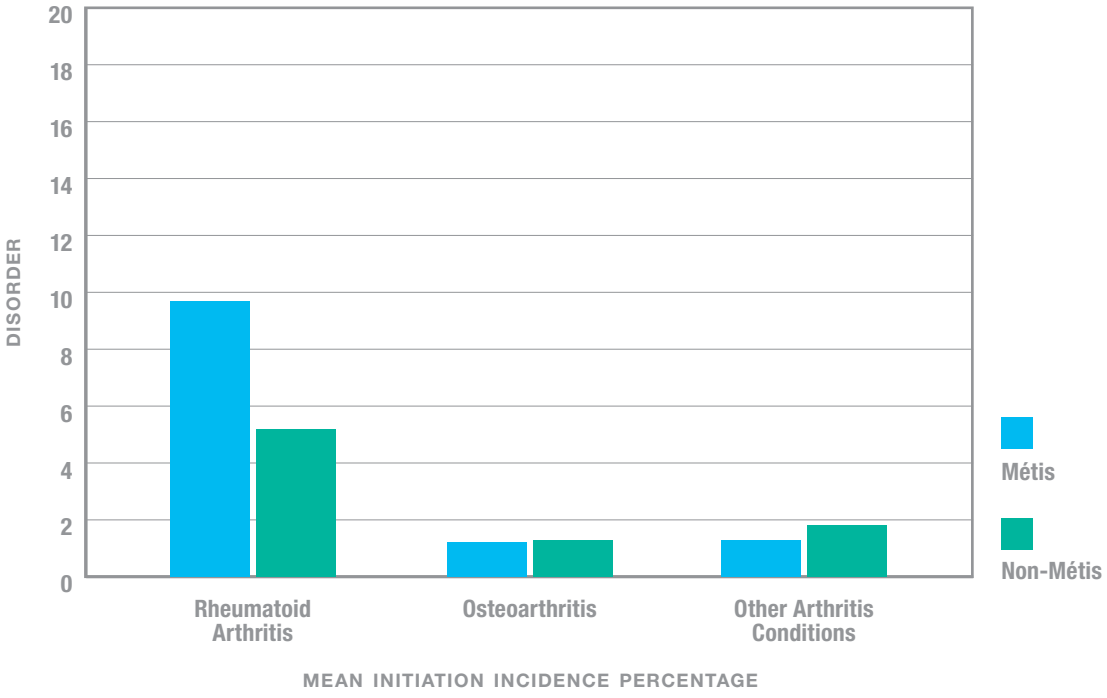
bDMARDs Initiation Incidence

Biological Disease-Modifying Anti-Rheumatic Drugs (bDMARDs) Initiation Incidence in Alberta, Canada.

TABLE 3.2 (%)

Disorder	Population	2010	2011	2012	2013	2014	2015	2016	2017	Mean
Rheumatoid Arthritis	Métis	6.5	5.1	16.7	10.9	3.2	10.2	14.3	10.9	9.7
	Non-Métis	3.9	4.0	4.9	4.2	4.1	6.0	6.8	7.6	5.2
Osteoarthritis	Métis	1.2	1.6	1.5	1.9	1.5	0.3	0.6	0.9	1.2
	Non-Métis	1.3	1.2	1.1	1.4	1.1	1.3	1.7	1.4	1.3
Other Arthritis Conditions	Métis	0.8	1.0	1.0	1.0	1.5	1.3	2.3	1.7	1.3
	Non-Métis	1.2	1.7	1.4	1.7	1.6	1.8	2.1	2.7	1.8

FIGURE 3.2 – MEAN (%)



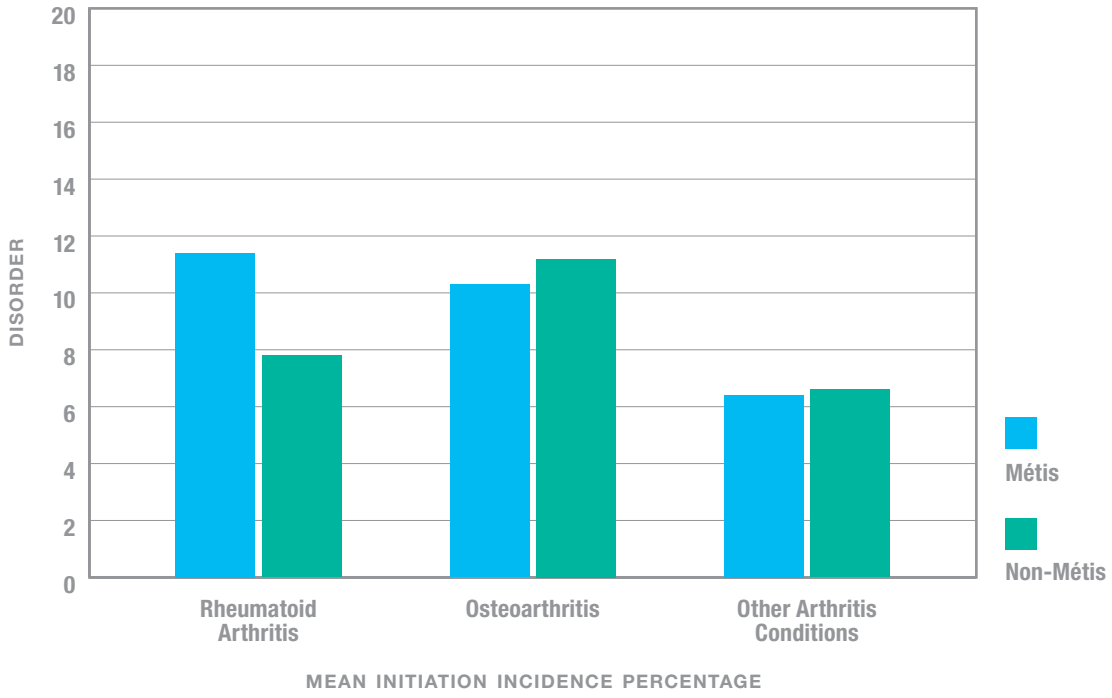
Narcotic Initiation Incidence

Narcotic Initiation Incidence in Alberta, Canada.

TABLE 3.3 (%)

Disorder	Population	2010	2011	2012	2013	2014	2015	2016	2017	Mean
Rheumatoid Arthritis	Métis	17.7	11.9	9.3	8.7	17.5	10.2	12.7	3.1	11.4
	Non-Métis	11.4	7.8	10.3	9.0	6.8	6.9	6.6	3.9	7.8
Osteoarthritis	Métis	14.1	14.8	13.3	11.4	8.9	6.5	6.9	6.3	10.3
	Non-Métis	16.4	12.0	11.4	11.1	9.6	8.8	9.0	10.9	11.2
Other Arthritis Conditions	Métis	7.9	8.2	6.8	5.0	5.6	4.1	7.0	6.7	6.4
	Non-Métis	8.5	7.0	7.0	6.3	5.3	5.3	6.0	7.1	6.6

FIGURE 3.3 – MEAN (%)



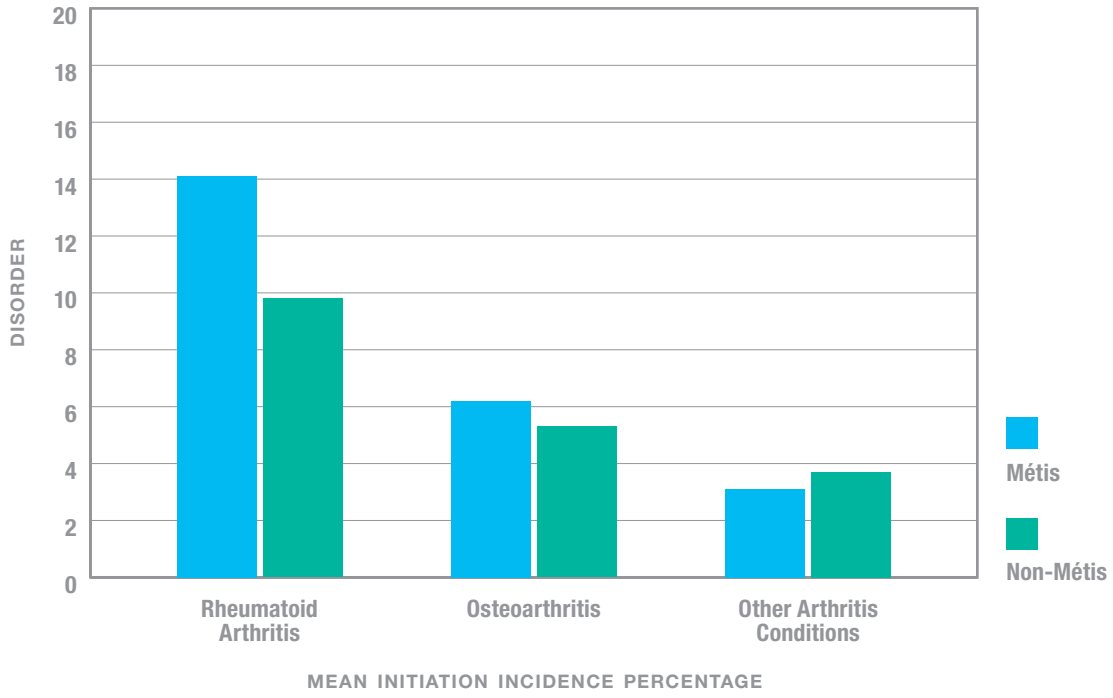
Glucocorticosteroids Initiation Incidence

Glucocorticosteroids Initiation Incidence in Alberta, Canada.

TABLE 3.4 (%)

Disorder	Population	2010	2011	2012	2013	2014	2015	2016	2017	Mean
Rheumatoid Arthritis	Métis	8.1	20.3	25.9	10.9	23.8	6.8	9.5	7.8	14.1
	Non-Métis	12.4	10.4	8.3	9.3	11.0	11.2	7.6	8.5	9.8
Osteoarthritis	Métis	5.6	9.4	6.5	5.4	7.6	6.5	5.5	3.5	6.2
	Non-Métis	5.8	5.5	6.3	5.0	5.5	5.5	4.6	4.5	5.3
Other Arthritis Conditions	Métis	2.4	4.0	3.1	2.9	1.9	2.9	4.2	3.5	3.1
	Non-Métis	3.0	3.6	3.9	3.2	3.7	3.8	4.3	4.4	3.7

FIGURE 3.4 – MEAN (%)



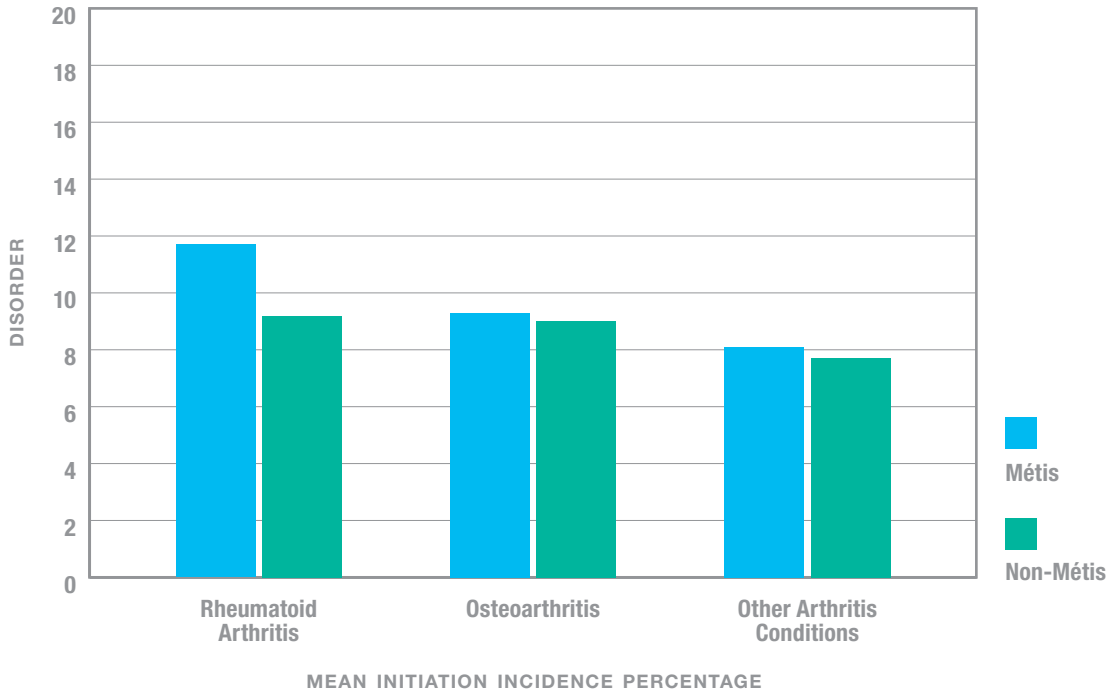
NSAIDs Initiation Incidence

Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) Initiation Incidence in Alberta, Canada.

TABLE 3.5 (%)

Disorder	Population	2010	2011	2012	2013	2014	2015	2016	2017	Mean
Rheumatoid Arthritis	Métis	27.4	11.9	13.0	10.9	9.5	8.5	7.9	4.7	11.7
	Non-Métis	17.4	13.0	11.1	9.5	7.8	8.0	3.7	3.0	9.2
Osteoarthritis	Métis	21.7	17.1	8.0	9.1	4.0	5.6	4.4	4.4	9.3
	Non-Métis	17.8	12.9	10.2	8.6	6.4	5.8	5.9	4.1	9.0
Other Arthritis Conditions	Métis	12.4	9.4	9.9	6.9	6.1	5.3	7.6	7.1	8.1
	Non-Métis	11.4	9.7	7.9	7.3	6.7	5.9	6.1	6.6	7.7

FIGURE 3.5 – MEAN (%)



Health Service Use Associated with Osteoarthritis

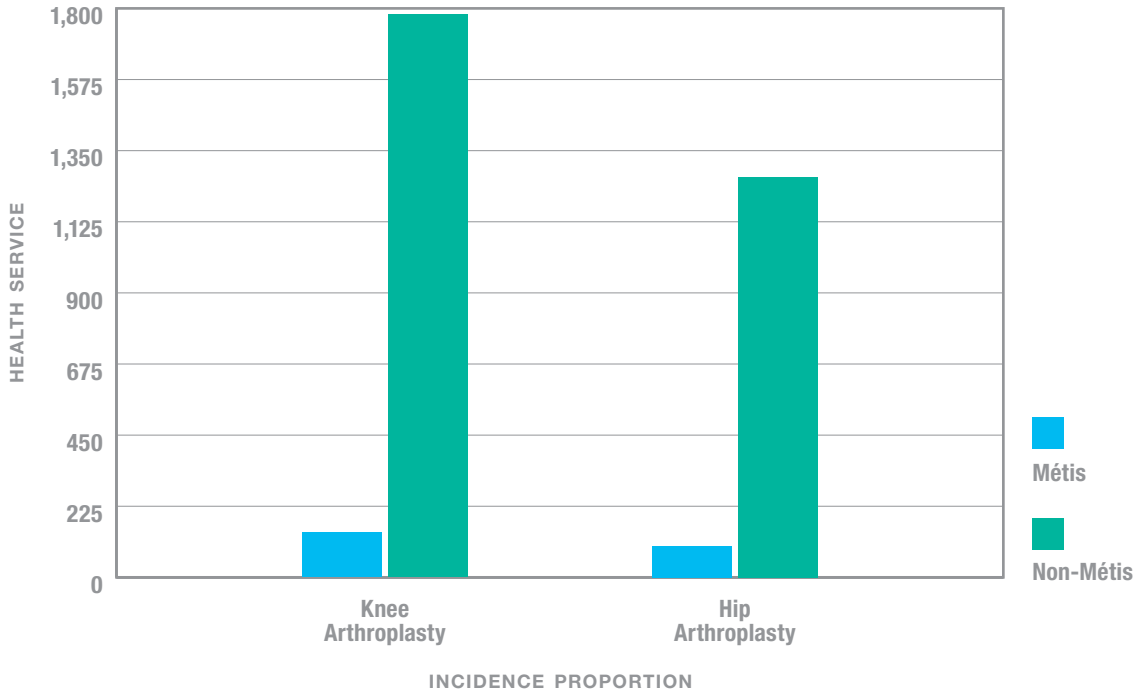
Health Service Use Associated with Osteoarthritis in Alberta, Canada per 100,000.

TABLE 4.1

Intervention	Population	2009	2010	2011	2012	2013	2014	2015	2016	Total
Hip Arthroplasty	Métis	*(n)	*(n)	*(n)	12	14	14	24	20	99
	Non-Métis	63	88	115	144	184	193	210	270	1,267
Knee Arthroplasty	Métis	*(n)	12	16	21	13	23	23	27	142
	Non-Métis	99	199	155	196	245	291	318	277	1,781

*(n) = Less than 10 is not reported to protect patient identity.

FIGURE 4.1 – TOTAL



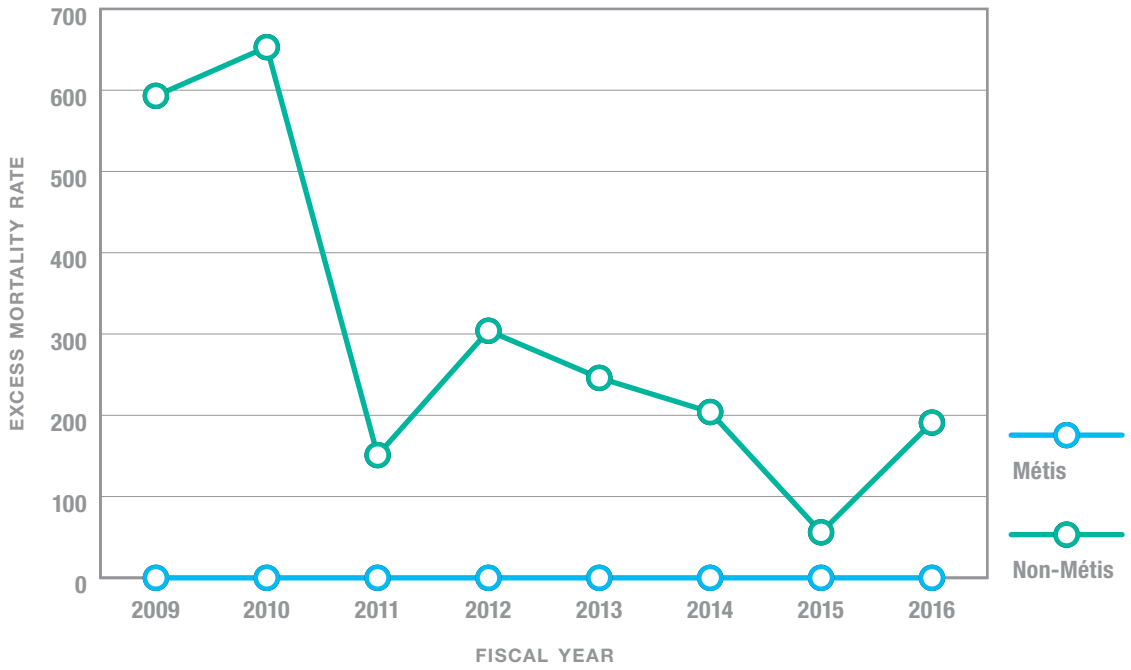
Excess Mortality Related to Rheumatoid Arthritis

Age-sex standardized incidence rate in Métis and non-Métis cohorts in Alberta, Canada per 100,000.

TABLE 5.1

Year	Métis	Non-Métis
2009	0	593
2010	0	653
2011	0	151
2012	0	304
2013	0	246
2014	0	204
2015	0	56
2016	0	191

FIGURE 5.1



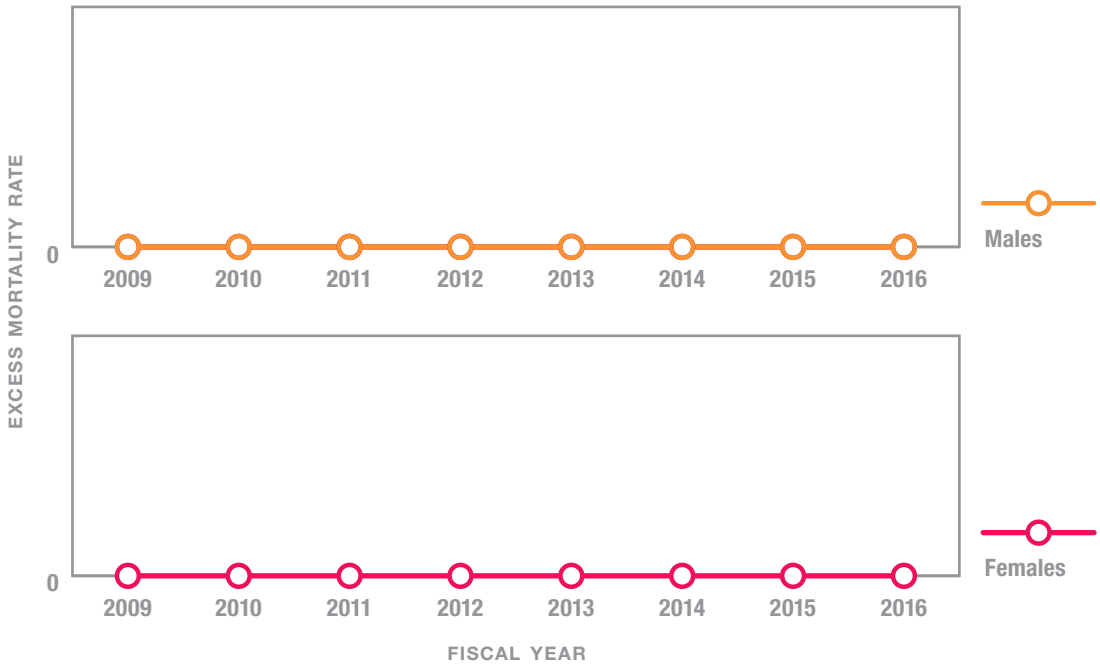
Excess Mortality Related to Rheumatoid Arthritis among Métis

Age-sex standardized incidence rate among Métis in Alberta, Canada per 100,000.

TABLE 5.1a

Year	Males	Females
2009	0	0
2010	0	0
2011	0	0
2012	0	0
2013	0	0
2014	0	0
2015	0	0
2016	0	0

FIGURE 5.1a



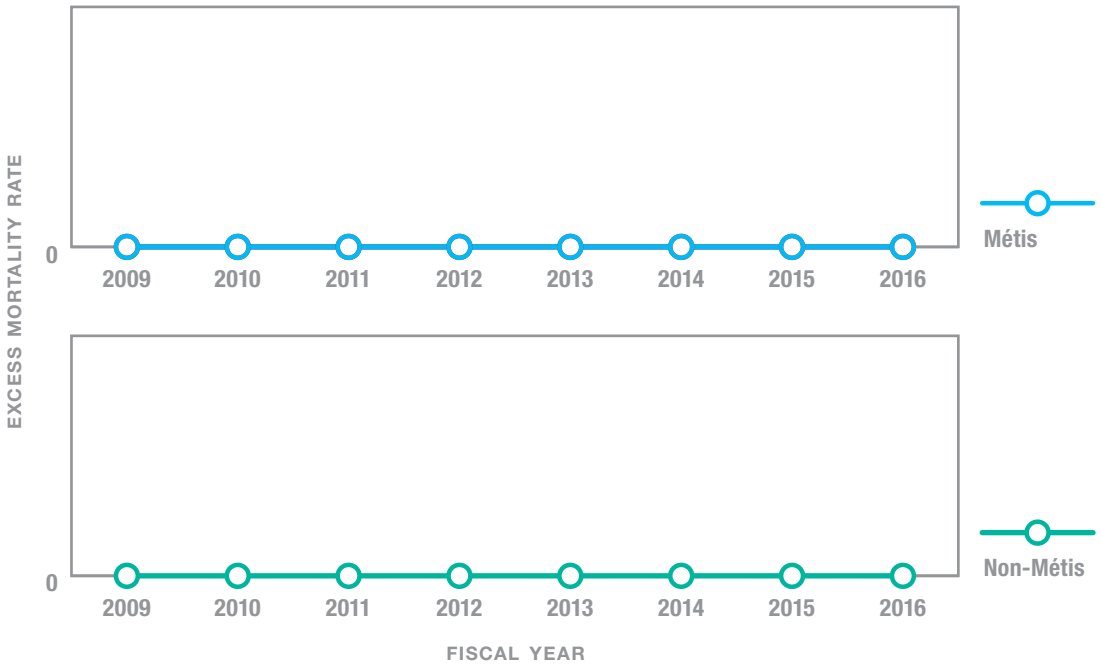
Excess Mortality Related to Osteoarthritis

Age-sex standardized incidence rate in Métis and non-Métis cohorts in Alberta, Canada per 100,000.

TABLE 5.2

Year	Métis	Non-Métis
2009	0	0
2010	0	0
2011	0	0
2012	0	0
2013	0	0
2014	0	0
2015	0	0
2016	0	0

FIGURE 5.2



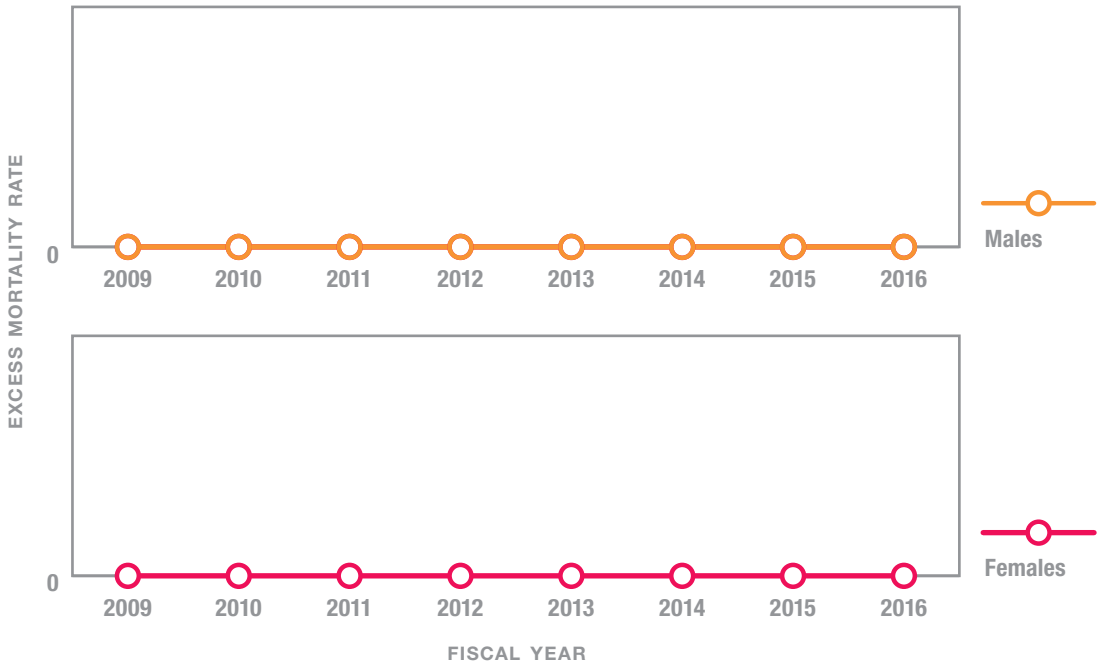
Excess Mortality Related to Osteoarthritis among Métis

Age-sex standardized incidence rate among Métis in Alberta, Canada per 100,000.

TABLE 5.2a

Year	Males	Females
2009	0	0
2010	0	0
2011	0	0
2012	0	0
2013	0	0
2014	0	0
2015	0	0
2016	0	0

FIGURE 5.2a



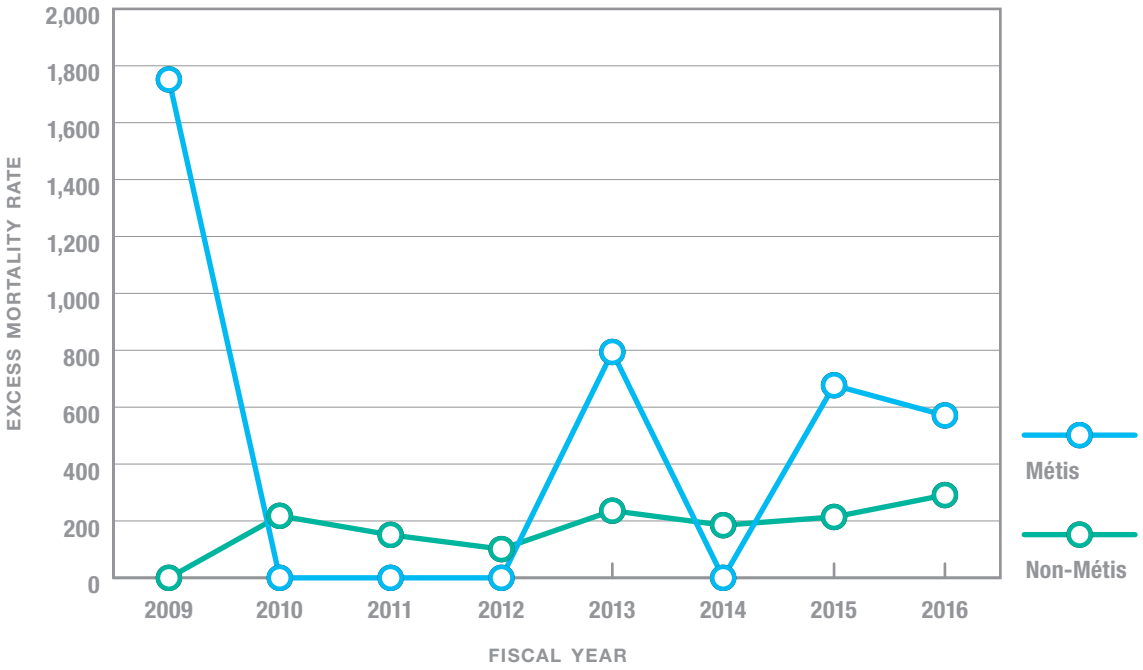
Excess Mortality Related to Other Arthritis Conditions

Age-sex standardized incidence rate in Métis and non-Métis cohorts in Alberta, Canada per 100,000.

TABLE 5.3

Year	Métis	Non-Métis
2009	1,752	0
2010	0	218
2011	0	151
2012	0	101
2013	794	236
2014	0	185
2015	677	214
2016	571	291

FIGURE 5.3



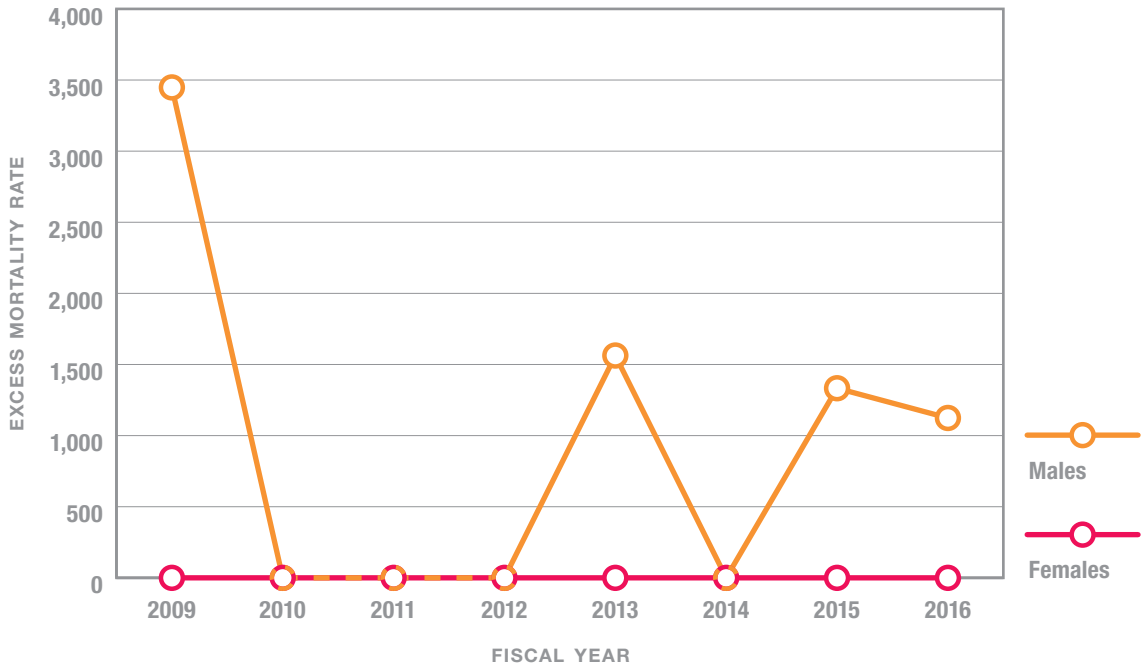
Excess Mortality Related to Other Arthritis Conditions among Métis

Age-sex standardized incidence rate among Métis in Alberta, Canada per 100,000.

TABLE 5.3a

Year	Males	Females
2009	3,448	0
2010	0	0
2011	0	0
2012	0	0
2013	1,563	0
2014	0	0
2015	1,333	0
2016	1,124	0

FIGURE 5.3a



Otipemisiwak
Métis Government

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