2024 RHA Indicators Atlas
Indicator Definitions and Drug Codes

Table of Contents

Acute Myocardial Infarctions (AMI) 1
Ambulatory Consultation Visits 1
Ambulatory Physician and Nurse Practitioner Visits 2
Antidepressant Prescription Follow–Up Visits 2
Antidepressant Use 2
Arthritis 3
Asthma 5
Asthma Care: Controller Medication Use 7
Benzodiazepine Dispensations 8
Birth Rate 8
Breastfeeding Initiation 8
Caesarean Sections 9
Cardiac Catheterizations 9
Cataract Surgeries 9
Causes of Acute Care Hospital Days 10
Causes of Ambulatory Physician and Nurse Practitioner Visits 10
Causes of Child Mortality 11
Causes of Day Surgery Hospitalizations 11
Causes of Death 12
Cause of Injury Death 12
Causes of Injury Hospitalizations 12
Causes of Inpatient Hospitalizations 12
Causes of Premature Death 13
Child Mortality 13
Computed Tomography (CT) Scans 13
Congestive Heart Failure (CHF) 14
Continuity of Care Index 14
Coronary Artery Bypass Graft (CABG) Surgeries 14
Day Surgery Hospitalizations 15
Dementia 15
Demographic Summary 16
Dental Extractions Among Children 16
Diabetes 16
Diabetes Care: Eye Examinations 18
Estimated Glomerular Filtration Rate (eGFR) Lab Tests 19
Hemoglobin (HbA1c) Lab Tests 19
Hip Replacements 19

Hospital Catchment (Hospitalizations and Days) 19
Hospital Days for Acute Care 20
Hospital Days for Alternate Level of Care (ALC) 20
Hospital Location (Hospitalizations and Days) 21
Hospital Readmissions 21
Hospital Use 21
Hospitalizations for Ambulatory Care Sensitive (ACS) Conditions 22
Hypertension 24
Inadequate Prenatal Care 26
Infant Mortality 27
Influenza Immunizations 27
Injury Hospitalizations 28
Injury Mortality 29
Inpatient Hospitalizations 29
Ischemic Heart Disease (IHD) 30
Knee Replacements 33
Large for Gestational Age (LGA) Births 33
Life Expectancy at Birth 33
Location of Physician and Nurse Practitioner Visits 34
Location of Specialist Visits 34
Lower Limb Amputations Among Diabetics 34
Magnetic Resonance Imaging (MRI) Scans 35
Mood and Anxiety Disorders 35
Number of Different Types of Drugs Dispensed per User 36
Opioid-Related Mortality 36
Opioid Use 37
Osteoporosis 37
Percutaneous Coronary Interventions (PCI) 38
Personal Care Home (PCH) Admissions 38
Personal Care Home (PCH) Length of Stay by Level of Care on Admission 39
Personal Care Home (PCH) Level of Care on Admission 39
Personal Care Homes (PCH) Residents 39
Personal Care Home (PCH) Wait Time to Admission 40
Physician and Nurse Practitioner Use 40
Pneumococcal Immunizations 40
Population Pyramids 40
Potential Years of Life Lost (PYLL) 41
Premature Mortality Rate (PMR) 41
Preterm Births 42
Self-Inflicted Injury Hospitalizations 42
Small for Gestational Age (SGA) Births 43

Social and Material Deprivation Indices....43
Socioeconomic Factor Index (SEFI)....44
Strokes....44
Substance Use Disorders....45
Suicide Deaths....45
Teen Births....46
Teen Pregnancies....46
Total Mortality Rate (TMR)....46
Total Respiratory Morbidity (TRM)....47
Travelling to Give Birth....47
Unintentional Injury Causing Death....47
Urine Albumin-Creatine Ratio (ACR) Lab Tests....48

Acute Myocardial Infarctions (AMI)

Hospitalizations or deaths due to AMI (also known as heart attack) among residents aged 40 years and older. AMI was defined by either of the following:

- A hospitalization with a most responsible diagnosis code for AMI:
  - ICD-9-CM code 410 or ICD-10-CA code I21 and a length of stay of at least three days (unless the patient died from the AMI, in which case they are included regardless of length of stay), or
- AMI listed as the cause of death in Vital Statistics Mortality Registry.

Hospitalizations for less than three days were excluded as likely "rule out" AMI cases; transfers between hospitals were tracked to ensure all "true" AMI cases staying at least three days in hospital(s) were counted.

Time period analysis: Average annual AMI rates per 1,000 residents were calculated for 3 five-year periods: 2008-2012, 2013-2017, and 2018-2022. For each time period, the total number of AMIs among residents aged 40 years and older was determined and the average number of AMIs per year served as the numerator. The total number of residents aged 40 years and older as of December 31 in each year in the period was determined and the average number per year served as the denominator. The rates were age- and sex-adjusted to the Manitoba population aged 40 years and older as of December 31, 2022.

Trend analysis: Annual AMI rates per 1,000 residents were calculated for each year from 2003 to 2022 and were age- and sex-adjusted to the Manitoba population aged 40 years and older as of December 31, 2022.

Ambulatory Consultation Visits

Ambulatory consultation visits among all residents. Consultations visits to family physicians, specialists, and nurse practitioners were included. The definition of a consultation is an ambulatory visit with one of the following tariff codes:

- 8440 – Orthopaedic spinal consultation
- 8449 – Extended ophthalmology consultation for the assessment and/or treatment of uveitis
- 8550 – Consultation
- 8552 – Developmental assessment and report per 15-minute period or portion thereof
- 8553 – Psychiatry consultation - adult
- 8554 – Psychiatry consultation - child
- 8556 – Ophthalmology consultation, including refraction and other necessary tests (family physician or optometrist)
- 8557 – Otorhinolaryngology (ENT) consultation
- 8622 – Consultation, geriatric patient
- 8620 – Extended consultation (incl. requests by Geriatric Program Assessment Team, GPAT), minimum of 45 minutes of patient/physician contact time
- 8107 – Consultation initiated by Allied Health Professionals to RN (EP)
- 8108 – Consultation initiated by RN (EP) to Allied Health Professionals
- 8139 – Consultation initiated by Family Physician to RN (EP)
- 8140 – Consultation RN (EP) to RN (EP)

Time period analysis: Rates of ambulatory consultation visits per resident were calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23. For each time period, the total number of consultations was determined and served as the numerator, while the total number of residents as of December 31 in the year was determined and served as the denominator. The rates were age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Trend analysis: Rates of ambulatory consultation visits per resident were calculated for one-year periods from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Ambulatory Physician and Nurse Practitioner Visits

Ambulatory visits to physicians and nurse practitioners among all residents. Ambulatory visits include: regular office visits, walk-in clinic visits, home visits, nursing home visits, and visits to outpatient departments. Services provided to patients while admitted to hospital and emergency department visits are excluded.

Time period analysis: Rates of ambulatory visits per resident were calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23. For each time period, the total number of ambulatory visits was determined and served as the numerator, while the total number of residents as of December 31 in the year was determined and served as the denominator. The rates were age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Trend analysis: Rates of ambulatory visits per resident were calculated for one-year periods from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Antidepressant Prescription Follow–Up Visits

Residents of all ages with a new diagnosis of depression (ICD-9-CM codes 296 or 311) and were dispensed an antidepressant (ATC class N06A) within 2 weeks of diagnosis who had at least three family physician or nurse practitioner visits within four months of the prescription being dispensed. To be included, patients had to be alive for the entire follow–up period and to have no dispensations for antidepressants or a physician visit with diagnosis of depression in the two years prior to the index depression diagnosis.

Time period analysis: The crude percent of patients with newly diagnosed depression and were dispensed an antidepressant who had at least three family physician or nurse practitioner follow-up visits were calculated for 3 five-year periods: 2008/09-2012/13, 2013/14-2017/18, and 2018/19-2022/23.

Antidepressant Use

Residents who were dispensed an antidepressant drug at least once in a fiscal year. All prescription antidepressants were included, and dispensations were identified with ATC code N06A.

Time period analysis: Percent of residents with one or more dispensations for antidepressants was calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23. For each time period, the total number of residents with at least one antidepressant dispensation in the year was determined and served as the numerator, while the total number of residents as of December 31 in the year was determined and served as the denominator. The percents were age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Trend analysis: The percent of the population with one or more dispensations for antidepressants was calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Arthritis

Residents aged 19 years and older diagnosed with arthritis (rheumatoid or osteoarthritis) defined by any of the following:

- One or more hospitalizations:
  - ICD-9-CM codes 274, 446, 710-721, 725-729, 739, or
  - ICD-10-CA codes M00-M03, M05-M07, M10-M25, M30-M36, M65-M79, or
- Two or more physician visits:
  - ICD-9-CM codes 274, 446, 710-721, 725-729, 739, or
- One physician visit:
  - ICD-9-CM codes 274, 446, 710-721, 725-729, 739 and two or more dispensations of medications used to treat rheumatoid arthritis (listed below)

List of drug Anatomic Therapeutic Chemical (ATC) codes and generic drug names used to treat arthritis:

- A07EC01 – Sulfasalazine
- C01EB03 – Indometacin
- H02AB04 – Methylprednisolone
- H02AB06 – Prednisolone
- H02AB07 – Prednisone
- H02AB08 – Triamcinolone
- H02AB10 – Cortisone
- J01AA08 – Minocycline
- L01AA01 – Cyclophosphamide
- L01BA01 – Methotrexate
- L04AA13 – Leflunomide
- L04AA24 – Abatacept
- L04AA32 – Apremilast
- L04AB01 – Etanercept
- L04AB02 – Infliximab
- L04AB04 – Adalimumab
- L04AB05 – Certolizumab Pegol
- L04AB06 – Golimumab
- L04AC03 – Anakinra
- L04AC05 – Ustekinumab
- L04AC07 – Tocilizumab
- L04AC10 – Seukinumab
- L04AC13 – Ixekizmab

- L04AC14 – Sarilumab
- L04AC16 – Guselkumab
- L04AC18 – Risankizumab
- L04AD01 – Cyclosporine
- L04AX01 – Azathioprine
- L04AX03 – Methotrexate
- M01AA01 – Phenylbutazone
- M01AB01 – Indometacin
- M01AB02 – Sulindac
- M01AB03 – Tolmetin
- M01AB05 – Diclofenac
- M01AB08 – Etodolac
- M01AB15 – Ketorolac
- M01AB55 – Diclofenac, Combinations
- M01AC01 – Piroxicam
- M01AC02 – Tenoxicam
- M01AC06 – Meloxicam
- M01AE01 – Ibuprofen
- M01AE02 – Naproxen
- M01AE03 – Ketoprofen
- M01AE04 – Fenoprofen
- M01AE09 – Flurbiprofen
- M01AE11 – Tiaprofenic Acid
- M01AE12 – Oxaprozin
- M01AG01 – Mefenamic Acid
- M01AH01 – Celecoxib
- M01AH02 – Rofecoxib
- M01AH03 – Valdecoxib
- M01AX01 – Nabumetone
- M01CB01 – Sodium Aurothiomalate
- M01CB03 – Auranofin
- M01CB04 – Aurothioglucose
- M01CC01 – Penicillamine
- M02AA09 – Bufexamac
- M02AA15 – Diclofenac
- M02AC – Preparations with Salicylic Acid Derivatives
- M04AA01 – Allopurinol
- M04AA03 – Febuxostat
- M04AB01 – Probenecid
- M04AC01 – Colchicine
- N01AH01 – Fentanyl
- N02AA01 – Morphine

- N02AA03 – Hydromorphone
- N02AA05 – Oxycodone
- N02AA55 – Oxycodone and Naloxone
- N02AA59 – Codeine, Combinations excluding Psychotropic Drugs
- N02AA79 – Codeine Phosphate
- N02AB02 – Pethidine
- N02AB03 – Fentanyl
- N02AD01 – Pentazocine
- N02AJ06 – Codeine Phosphate
- N02AJ07 – Codeine Phosphate and Caffeine Citrate
- N02AJ13 – Acetaminophen
- N02AJ17 – Oxycodone Hydrochloride
- N02AJ18 – Oxycodone Hydrochloride
- N02AX02 – Tramadol
- N02BA01 – Acetylsalicylic Acid (Tablet Strength > 325 mg)
- N02BA11 – Diflunisal
- N02BE01 - Acetaminophen
- N02BE51 – Acetaminophen, Combinations excluding Psychotropic Drugs
- P01BA02 – Hydroxychloroquine
- R05DA04 – Codeine

Time period analysis: Prevalence was calculated for 3 two-year periods: 2011/12-2012/13, 2016/17-2017/18, and 2021/22-2022/23. For each time period, the total number of residents aged 19 years and older identified with arthritis was determined and served as the numerator, while the total number of residents aged 19 years and older as of December 31 in 2012, 2017, and 2022 served as the denominators for the first, second, and third time periods, respectively. The prevalences were age- and sex-adjusted to the Manitoba population aged 19 years and older as of December 31, 2022.

Trend analysis: Prevalence was calculated for each year from 2003/04 to 2022/23 and were age- and sex-adjusted to the Manitoba population aged 19 years and older as of December 31, 2022.

Asthma

Residents aged 5 to 19 years diagnosed with asthma as defined by any of the following:

- One or more hospitalizations: ICD-9-CM codes 493; ICD-10-CA codes J45, or
- One or more physician visits: ICD-9-CM codes 493, or
- One or more dispensations of medications to treat asthma (listed below)

List of included drug Anatomic Therapeutic Chemical (ATC) codes and generic drug names used to treat asthma:

- D11AH05 – Dupilumab
- R03AA01 – Epinephrine

- R03AB02 – Isoproterenol Hydrochloride
- R03AB03 – Orciprenaline Sulfate
- R03AC02 – Salbutamol
- R03AC03 – Terbutaline Sulfate
- R03AC04 – Fenoterol Hydrobromide
- R03AC08 – Pirbuterol Acetate Inhalation
- R03AC12 – Salmeterol
- R03AC13 – Formoterol Fumarate
- R03AC16 – Procaterol
- R03AC18 – Indacaterol Maleate
- R03AK04 – Salbutamol and Sodium Cromoglicate
- R03AK06 – Salmeterol/Fluticasone
- R03AK07 – Budesonide/Formoterol
- R03AK09 – Formoterol Fumarate Dihydrate/Mometasone Furoate
- R03AK10 – Fluticasone Furoate/Vilanterol Trifenatate
- R03AK14 – Indacaterol and Mometasone
- R03AL01 – Fenoterol Hydrobromide/Ipratropium Bromide
- R03AL02 – Salbutamol and Ipratropium Bromide
- R03AL03 – Vilanterol and Umeclidinium Bromide
- R03AL04 – Indacaterol and Glycopyrronium Bromide
- R03AL05 – Formoterol and Aclidinium Bromide
- R03AL06 – Olodaterol and Tiotropium Bromide
- R03AL08 – Vilanterol, Umeclidinium Bromide and Fluticasone Furoate
- R03AL11 – Formoterol, Glycopyrronium Bromide and Budesonide
- R03AL12 – Indacaterol, Glycopyrronium Bromide and Mometasone
- R03BA01 – Beclomethasone Dipropionate
- R03BA02 – Budesonide
- R03BA03 – Flunisolide
- R03BA05 – Fluticasone Propionate
- R03BA06 – Triamcinolone Acetonide
- R03BA07 – Mometasone Furoate
- R03BA08 – Ciclesonide
- R03BA09 – Fluticasone Furoate
- R03BB01 – Ipratropium Bromide
- R03BB04 – Tiotropium Bromide
- R03BB05 – Aclidinium Bromide

- R03BB06 – Glycopyrronium Bromide
- R03BB07 – Umeclidinium Bromide
- R03BC01 – Sodium Cromoglycate
- R03BC03 – Nedocromil Sodium
- R03CA02 – Ephedrine
- R03CB03 – Orciprenaline Sulfate
- R03CC02 – Salbutamol
- R03CC03 – Terbutaline Sulfate
- R03CC04 – Fenoterol Hydrobromide
- R03DA02 – Oxtriphylline
- R03DA04 – Theophylline
- R03DA05 – Aminophylline
- R03DA54 – Alcohol Anhydrous/Oxtriphylline
- R03DB04 – Phenobarbitone (Tal) and Theophylline
- R03DC01 – Zafirlukast
- R03DC03 – Montelukast
- R03DX05 – Omalizumab
- R03DX07 – Roflumilast
- R03DX09 – Mepolizumab
- R03DX10 – Benralizumab
- R03DX11 – Tezepelumab
- R06AX17 – Ketotifen Fumarate

Time period analysis: Prevalence was calculated for 3 two-year periods: 2011/12-2012/13, 2016/17-2017/18, and 2021/22-2022/23. For each time period, the total number of residents aged 5 to 19 years identified with asthma was determined and served as the numerator, while the total number of residents aged 5 to 19 years as of December 31 in 2012, 2017, and 2022 served as the denominators for the first, second, and third time periods, respectively. The prevalences were age- and sex-adjusted to the Manitoba population aged 5 to 19 years as of December 31, 2022.

Trend analysis: Prevalence was calculated for each year from 2003/04 to 2022/23 and were age- and sex-adjusted to the Manitoba population aged 5 to 19 years as of December 31, 2022.

Asthma Care: Controller Medication Use

Residents of all ages being treated for asthma that filled a prescription for medications recommended for long-term control of asthma. Being treated for asthma was defined by two or more dispensations of beta 2-agonists (ATC codes R03AA, R03AB, or R03AC). Recommended long-term controller medications included inhaled corticosteroids (ATC R03BA), leukotriene modifiers (ATC code R03DC), or adrenergics and other drugs for obstructive airway diseases (ATC code R03AK). Patients receiving ipratropium bromide (ATC codes R01AX03, R03AK04, or R03BB01) were excluded as likely chronic obstructive pulmonary disease patients.

Time period analysis: The crude percent of patients being treated for asthma who received controller medications were calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23.

Benzodiazepine Dispensations

Residents aged 75 years and older who filled at least two prescriptions for benzodiazepines (ATC codes N05BA, N05CD, N05CF, and N03AE01) or at least one dispensation of benzodiazepines with a greater than 30-day supply dispensed. Separate rates are provided for community–dwelling seniors, and seniors residing in personal care homes (PCH). If a resident lived in a PCH for one or more days during the study period, they were categorized as a senior residing in a PCH; otherwise, they were considered to be living in the community. PCHs with hospital–based pharmacies, including the pharmacy in Churchill PCH, are excluded from this analysis as their prescription data were unavailable. If an individual died during the fiscal year, then prescriptions are looked at one year before death.

Time period analysis: The percent of older adults in community (or PCH) dispensed benzodiazepines was calculated for 3 two-year periods: 2011/12-2012/13, 2016/17-2017/18, and 2021/22-2022/23. For each time period, the total number of residents aged 75 years and older living in community (or PCH) dispensed a benzodiazepine was determined and the average number or residents per year served as the numerator. The total number of residents aged 75 years and older living in community (or PCH) as of December 31 in each year of the period was determined and the average number per year served as the denominator.

Birth Rate

Births among women aged 15 to 45 years. Births were defined as live births coded in Manitoba hospital abstracts with ICD-10-CA codes Z37.0, Z37.2, Z37.3, or Z37.5. Note that home births and those occurring at the birth centre in Winnipeg are coded into the hospital abstract data system, so they were included in this analysis even if no hospital care is involved.

Time period analysis: The birth rate per 1,000 women was calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23. For each time period, the total number of births among women aged 15 to 45 years was determined and served as the numerator, while the total number of women aged 15 to 45 years as of December 31 in the year was determined and served as the denominator. The rates were age- and sex-adjusted to the Manitoba population of women aged 15 to 45 years as of December 31, 2022.

Trend analysis: The birth rate per 1,000 women was calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population of women aged 15 to 45 years as of December 31, 2022.

Breastfeeding Initiation

Live births where breastfeeding initiation occurred in hospital, defined as exclusive or partial breastfeeding at hospital discharge. Live births were determined in the hospital abstracts (ICD-10-CA code Z38). Stillborn births and records with missing breastfeeding initiation were excluded**.**

Time period analysis: The percent of live births where breastfeeding was initiated in the hospital was calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23. For each time period, the total number of live births where breastfeeding was initiated in the hospital was determined and served as the numerator, while the total number of live births as of December 31 in the year was determined and served as the denominator. The percents were age- and sex-adjusted to the Manitoba population of women who gave birth to liveborn infants in 2022/23.

Trend analysis: The percent of live births where breastfeeding was initiated in the hospital was calculated for each one-year period from 2003/04 to 2022/23 and was maternal age-adjusted to the Manitoba population of women who gave birth to liveborn infants in 2022/23.

Caesarean Sections

Caesarean sections out of all live births and stillbirths coded in Manitoba hospital abstracts (ICD-10-CA code Z37). Caesarean delivery was defined by an obstetric hospitalization in a Manitoba hospital (CCI code 5.MD.60).

Time period analysis: The average annual percent of Caesarean sections was calculated for three two-year periods from 2011/12-2012/13, 2016/17-2017/18, and 2021/22-2022/23. For each time period, the total number of Caesarean sections was determined and the average number of Caesarean sections per year served as the numerator, while the total number of live births and stillbirths in each year in the period was determined and the average number per year served as the denominator. The percents were maternal age-adjusted to the Manitoba population of women who gave birth in 2022/23.

Trend analysis: The percent of Caesarean sections was calculated for each one-year period from 2003/04 to 2022/23 and was maternal age-adjusted to the Manitoba population of women who gave birth in 2022/23.

Cardiac Catheterizations

Cardiac catheterizations among residents aged 40 years and older. This included CCI code 3.IP.10 in any intervention field in a hospital abstract. Cardiac catheterizations were only performed at the two tertiary hospitals in Manitoba (St. Boniface General Hospital and Health Sciences Centre). Out of hospital interventions were excluded to avoid double-counting.

Time period analysis: Average annual cardiac catheterization rates per 1,000 residents were calculated for 3 three-year periods: 2010/11-2012/13, 2015/16-2017/18, and 2020/21-2022/23. For each time period, the total number of cardiac catheterizations among residents aged 40 years and older was determined and the average number of catheterizations per year served as the numerator, while the total number of residents aged 40 years and older as of December 31 in each year in the period was determined and the average per year served as the denominator. The rates were age- and sex-adjusted to the Manitoba population aged 40 years and older in 2022/23.

Trend analysis: Cardiac catheterization rates per 1,000 residents were calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population aged 40 years and older as of December 31, 2022.

Cataract Surgeries

Cataract surgeries among residents aged 50 years and older. Cataract surgery was defined by a physician service claim with tariff codes 5611, 5612 and tariff prefix ‘2’ (surgery); or a hospital abstract with ICD–9–CM procedure codes 13.11, 13.19, 13.2, 13.3, 13.41, 13.42, 13.43, 13.51, or 13.59; or CCI code 1.CL.89. Additional cataract surgeries for Manitoba residents were added from medical reciprocal claims for out of province procedures, including Alberta (tariff code 27.72) and Saskatchewan (tariff codes 135S, 136S, 226S, and 325S).

Time period analysis: Average annual cataract surgery rates per 1,000 residents were calculated for 3 three-year periods: 2010/11-2012/13, 2015/16-2017/18, and 2020/21-2022/23. For each time period, the total number of cataract surgeries among residents aged 50 years and older was determined and the average number of surgeries served as the numerator, while the total number of residents aged 50 years and older as of December 31 in each year in the period was determined and the average per year served as the denominator. The rates were age- and sex-adjusted to the Manitoba population aged 50 years and older in 2022/23.

Trend analysis: Cataract surgery rates per 1,000 residents were calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population aged 50 years and older as of December 31, 2022.

Causes of Acute Care Hospital Days

The most common reasons for hospital days coded only as acute care (i.e., no ALC days) during inpatient hospitalizations. Each hospital abstract has a 'most responsible' diagnosis - the diagnosis that describes the most significant condition of a patient that contributed to their days in hospital. Diagnoses were grouped by ICD-10-CA chapter, and the most common reasons in Manitoba were used to set the order of the reasons for each of the regions.

Notes regarding two key groups of reasons:

- Health status and contact: hospitalizations in this broad category included a large number of issues not necessarily connected to a specific diagnosis or disease, including people awaiting placement in personal care homes, palliative care, rehabilitation and other services.
- Ill-defined conditions: for hospitalizations in this category, the patient was experiencing a specific problem (including malaise and fatigue, tendency to fall, and other unspecified pain), but it could not be assigned to a specific disease category.

Time period analysis: The average annual crude percent for the ten most common reasons for acute care hospital days in Manitoba were calculated for each region for 3 one-year periods: 2012/13, 2017/18, and 2022/23.

Causes of Ambulatory Physician and Nurse Practitioner Visits

The most common reasons for ambulatory visits to physicians and nurse practitioners. Each visit has only one diagnosis code recorded as the 'reason' for the visit, and these diagnoses were grouped by ICD-9-CM chapter.

Notes regarding some groups of causes:

- Health status and contact: the majority of visits in this category were for general physical examinations but also include a number of other issues like well-baby care, contraceptive management, and other examinations. For these visits, patients usually were not presenting for a problem related to a specific disease or condition.
- Ill-defined conditions: the majority of visits in this category were for chest and respiratory symptoms, abdominal and pelvic symptoms, and general symptoms. For the majority of these visits, the patient was experiencing a specific problem, but it could not be assigned to a specific disease category
- The infrequent causes, and those ambulatory visits with missing cause (i.e. no diagnosis code was recorded, or they were recorded as pregnant, but sex was male) were grouped into the "All Others" cause category.

The ICD-9-CM diagnoses codes were grouped into causes as follows:

- Cause 1 – Infectious and Parasitic Diseases (ICD-9-CM: 001-13999)
- Cause 2 – Cancer (ICD-9-CM: 140-23999)
- Cause 3 – Endocrine & Metabolic Diseases (ICD-9-CM: 240-27999)
- Cause 4 – Disorders of Blood (ICD-9-CM: 280-28999)
- Cause 5 – Mental Illnesses (ICD-9-CM: 290-31999)
- Cause 6 – Nervous System (ICD-9-CM: 320-38999)
- Cause 7 – Circulatory System (ICD-9-CM: 390-45999)
- Cause 8 – Respiratory System (ICD-9-CM: 460-51999)
- Cause 9 – Digestive System (ICD-9-CM: 520-57999)

- Cause 10 – Genitourinary System (ICD-9-CM: 580-62999)
- Cause 11 – Pregnancy & Birth
  - ICD-9-CM: 630-67999; OR
  - Sex: 2 and tariff: 8400, 8401, 8402, or 8416; OR
  - Sex: 2 and diagnosis ICD-9-CM: V22, V23, V24, V27, V28, or V91
  - Note: Pregnancy and Birth "overrides" the classification of some codes. For example, V22, V23, etc. for females would be classified as Cause 18 if we did not manually change their classification.
- Cause 12 – Disorders of Skin (ICD-9-CM: 680-70999)
- Cause 13 – Musculoskeletal System (ICD-9-CM: 710-73999)
- Cause 14 – Congenital Anomalies (ICD-9-CM: 740-75999)
- Cause 15 – Conditions Originating in Perinatal Period (ICD-9-CM: 760-77999)
- Cause 16 – Symptoms, Signs & Ill-Defined Conditions (ICD-9-CM: 780-79999)
- Cause 17 – Injury & Poisoning (ICD-9-CM: 800-99999)
- Cause 18 – Factors Influencing Health Status and Contact (ICD-9-CM: V01-V9199)
- Cause 19 – External Causes of Injury (ICD-9-CM: E800-E9999)
- Cause 99 – All Others
  - ' ' (Missing); OR
  - Pregnant male; OR
  - Infrequent causes
  - Other codes (e.g., incorrect codes)

Time period analysis: The average annual crude percent for the ten most common reasons for ambulatory visits in Manitoba were calculated for each region for 3 one-year periods: 2012/13, 2017/18, and 2022/23.

Causes of Child Mortality

The percent of all deaths for Manitobans aged 1 to 19 years by the cause of death. Cause of death obtained from the Vital Statistics death records and grouped by ICD-10 chapter. Note: Chapter 18 (Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified) include the code R99 for 'Other ill-defined and unspecified causes of mortality', which appeared in very high frequency in 2017 and 2018. This code was treated the same as a missing cause of death and moved to the "All other causes" category. This chapter also includes the code R69 for 'Unknown and unspecified causes of morbidity', which only appeared in 2020 and was the cause of death of 8.3% deaths in that year. This code was also moved to the "All other causes" category. Records that do not specify a cause of death are included in the category "All Others". The five most common causes of death in Manitoba between 2018-2022 were used to set the order of the causes.

Time period analysis: The average annual crude percent of all deaths among Manitobans aged 1 to 19 by cause were identified for 3 five-year periods: 2008-2012, 2013-2017, and 2018-2022.

Causes of Day Surgery Hospitalizations

The most frequent reasons for day surgery defined as surgical services received on an outpatient basis in acute care facilities. Each day surgery abstract has a 'most responsible' diagnosis - the diagnosis that describes the most significant condition of the patient who required day surgery. These diagnoses were grouped by ICD-10-CA chapter and the ten most common reasons in Manitoba overall were used to set the order of the reasons for each of the regions.

Time period analysis: The average annual crude percent for the ten most common reasons of day surgery hospitalizations in Manitoba were calculated for each region for 3 one-year periods: 2012/13, 2017/18, and 2022/23.

Causes of Death

Cause of death among all residents. Cause of death was obtained from the Vital Statistics death records and grouped by ICD-10 chapter. The causes of death in Manitoba between 2018-2022 were identified and the top ten causes were used to set the order of the causes for each region.

Note: Chapter 18 (Symptoms, signs, and abnormal clinical and laboratory findings, not elsewhere classified) include the code R99 for 'Other ill-defined and unspecified causes of mortality', which appeared in extremely high frequency in 2017 and 2018. This may reflect a data error, and this code was treated as a missing cause of death and moved to the "All other causes" category. This chapter also includes the code R69 for 'Unknown and unspecified causes of morbidity', which only appeared in 2020 and was the cause of death of 8.3% deaths in that year. This code was also moved to the "All other causes" category. Records that do not specify a cause of death are included in the category "All Others."

Time period analysis: The average annual crude percent of all deaths by cause were identified for 3 five-year periods: 2008-2012, 2013-2017, and 2018-2022.

Cause of Injury Death

Cause of injury death obtained from Vital Statistics death records. The causes of death in Manitoba between 2018-2022 were identified and the top ten causes were used to set the order of the causes for each region.

Time period analysis: The average annual crude percent of all injury deaths by cause were identified for 3 five-year periods: 2008-2012 (TP1), 2013-2017 (TP2), and 2018-2022 (TP3).

Causes of Injury Hospitalizations

The most common reasons for injury hospitalization in acute care facilities. Any hospital abstract with an external cause of injury diagnosis code (as identified in section 6.11) was included. If a hospital abstract had more than one injury coded, the first one was used. These diagnoses were grouped by type of injury and the ten most common reasons in Manitoba overall were used to set the order of the reasons for each of the regions.

Time period analysis: The average annual crude percent for the ten most common reasons of inpatient hospitalization for injury in Manitoba were calculated for each region for 3 five-year periods: 2008/09-2012/13 (TP1), 2013/14-2017/18 (TP2), and 2018/19-2022/23 (TP3).

Causes of Inpatient Hospitalizations

The most common reasons for inpatient hospitalization in acute care facilities. Each hospital abstract has a 'most responsible' diagnosis - the diagnosis that describes the most significant condition of a patient which required the hospital stay (and which may not be the same as the admitting diagnosis). These diagnoses were grouped by ICD-10-CA chapter and the ten most common reasons in Manitoba overall were used to set the order of the reasons for each of the regions.

Notes regarding two key groups of reasons:

- Health status and contact: hospitalizations in this broad category included a large number of issues not necessarily connected to a specific diagnosis or disease: colonoscopies, convalescence and follow-up after surgery, sterilization procedures, palliative care, and others.
- Ill-defined conditions: hospitalizations in this group were most commonly related to non-specific pain in the abdomen or chest, though a variety of other issues were also coded, including malaise and fatigue, fainting, and pain in other areas of the body. For the majority of these cases, the patient was experiencing a specific problem, but it could not be assigned to a specific disease category.

Time period analysis: The average annual crude percent for the ten most common reasons of inpatient hospitalization in Manitoba were calculated for each region for 3 one-year periods: 2012/13, 2017/18, and 2022/23.

Causes of Premature Death

Cause of death among residents aged 0 to 74 years. Cause of death was obtained from the Vital Statistics death records and grouped by ICD-10 chapter. The causes of death in Manitoba between 2018-2022 were identified and the top ten causes were used to set the order of the causes for each region.

Note: Chapter 18 (Symptoms, signs, and abnormal clinical and laboratory findings, not elsewhere classified) include the code R99 for 'Other ill-defined and unspecified causes of mortality', which appeared in extremely high frequency in 2017 and 2018. This may reflect a data error, and this code was treated as a missing cause of death and moved to the "All other causes" category. This chapter also includes the code R69 for 'Unknown and unspecified causes of morbidity', which only appeared in 2020. This code was also moved to the "All other causes" category. Records that do not specify a cause of death are included in the category "All Others."

Time period analysis: The average annual crude percent of all premature deaths by cause were identified for 3 five-year periods: 2008-2012, 2013-2017, and 2018-2022.

Child Mortality

Deaths among children aged 1 to 19 years.

Time period analysis: The average annual child mortality rate per 1,000 residents was calculated for 3 five-year periods: 2008-2012, 2013-2017, and 2018-2022. For each time period, the total number of deaths among children aged 1 to 19 years was determined and the average number of deaths per year served as the numerator, while the total number of children aged 1 to 19 years as of December 31 in each year in the period was determined and the average number per year served as the denominator. The rates were age- and sex-adjusted to the Manitoba population aged 1 to 19 years as of December 31, 2022.

Trend analysis: The child mortality rate per 1,000 residents was calculated for each one-year period from 2003 to 2022 and was age- and sex-adjusted to the Manitoba population aged 1 to 19 years as of December 31, 2022.

Computed Tomography (CT) Scans

CT scans among residents aged 20 years and older. CT scans were defined by a physician claim with tariff codes 7112-7115 or 7221-7230. Residents with multiple claims for CT scans in a day (e.g., multiple body parts scanned) were assigned only one scan for that day. The CT scan rates shown in this report underestimate the 'true' rates, as individual-level information regarding CT scans performed in some rural hospitals is incomplete.

Time period analysis: CT scan rates per 1,000 residents were calculated for 2 one-year periods: 2017/18 and 2022/23. For each time period, the total number of CT scans among residents aged 20 years and older was determined and served as the numerator, while the total number of residents aged 20 years and older as of December 31 in the year was determined and served as the denominator. The rates were age- and sex-adjusted to the Manitoba population aged 20 years and older in 2022/23.

Trend analysis: CT scan rates per 1,000 residents were calculated for each one-year period from 2013/14 to 2022/23 and was age- and sex-adjusted to the Manitoba population aged 20 years older as of December 31, 2022.

Congestive Heart Failure (CHF)

Residents aged 40 years and older with CHF defined by either of the following:

- One or more hospitalizations:
  - ICD-9-CM code 428
  - ICD-10-CA code I50, or
- Two or more physician visits:
  - ICD-9-CM code 428

Time period analysis: Prevalence was calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23. For each time period, the total number of residents aged 40 years and older with CHF in the period was determined and served as the numerator, while the total number of residents aged 40 years and older as of December 31 in the period was determined and served as the denominator. The prevalences were age- and sex-adjusted to the Manitoba population aged 40 years and older as of December 31, 2022.

Trend analysis: Prevalence was calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population aged 40 and older as of December 31, 2022.

Continuity of Care Index

The Continuity of Care Index weighs both the frequency of ambulatory visits to primary care providers (which includes both family physicians and nurse practitioners) and the dispersion of visits among different providers. The possible index values range from zero (if all visits are made to different providers) to one (if all visits are made to a single provider). Residents with fewer than three ambulatory visits over the three-year period were excluded.

Time period analysis: Continuity of care index scores were calculated for 3 three-year periods: 2010/11-2012/13, 2015/16-2017/18, and 2020/21-2022/23 and was age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Trend analysis: Continuity of care index scores were calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Coronary Artery Bypass Graft (CABG) Surgeries

Coronary artery bypass graft (CABG) surgeries among residents aged 40 years and older. Bypass surgery was defined by CCI code 1.IJ.76 in any intervention field in a hospital abstract. These surgeries were performed only at the two tertiary hospitals in Manitoba (St. Boniface General Hospital and Health Sciences Centre). Out of hospital interventions were excluded to avoid double-counting.

Time period analysis: Average annual CABG surgery rates per 1,000 residents were calculated for 3 five-year periods: 2008/09-2012/13, 2013/14-2017/18, and 2018/19-2022/23. For each time period, the total number of CABG surgeries among residents aged 40 years and older was determined and the average number of surgeries per year served as the numerator, while the total number of residents aged 40 years and older as of December 31 in each year in the period was determined and the average number per year served as the denominator. The rates were age- and sex-adjusted to the Manitoba population aged 40 years and older as of December 31, 2022.

Trend analysis: CABG surgery rates per 1,000 residents were calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population aged 40 years and older as of December 31, 2022.

Day Surgery Hospitalizations

Hospitalizations for day surgery procedures among all residents. This includes surgeries and procedures for which patients do not typically stay overnight, as defined by the Canadian Institute for Health Information (CIHI). Since a person could receive multiple surgeries in a year, this indicator shows the total number of procedures provided to all residents. All Manitoba hospitals were included; personal care homes, nursing stations, and long–term care facilities were excluded (Deer Lodge Centre, Manitoba Adolescent Treatment Centre, Rehabilitation Centre for Children, and Riverview Health Centre). In cases of birth, newborn hospitalizations were excluded (the mother's hospitalization was included).

Time period analysis: Day surgery hospitalization rates per 1,000 residents were calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23. For each time period, the total number of day surgery hospitalizations was determined and served as the numerator, while the total number of residents as of December 31 in the year was determined and served as the denominator. The rates were age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Trend analysis: Day surgery hospitalization rates per 1,000 residents were calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Dementia

Residents aged 55 years and older with dementia (including organic psychotic conditions, cerebral degenerations, and senility) as defined by either of the following:

- One or more hospitalizations:
  - ICD-9-CM codes 290, 291.1, 291.2, 292.82, 294, 331, 797
    ICD-10-CA codes F00, F01, F02, F03, F04, F05.1, F06.5, F06.6, F06.8, F06.9, F09, F10.7, F11.7, F12.7, F13.7, F14.7, F15.7, F16.7, F17.7, F18.7, F19.7, G30, G31.0, G31.1, G31.9, G32.8, G91, G93.7, G94, R54, or
- One or more physician visits:
  - ICD-9-CM codes 290, 294, 331, or 797

Time period analysis: Prevalence was calculated for 3 five-year periods: 2008/09-2012/13, 2013/14-2017/18, and 2018/19-2022/23. For each time period, the total number of residents aged 55 years and older identified with dementia was determined and served as the numerator, while the total number of residents aged 55 years and older as of December 31 in 2010, 2015, and 2020 served as the denominators for the first, second, and third time periods, respectively. The prevalences were age- and sex-adjusted to the Manitoba population aged 55 years and older as of December 31, 2022.

Trend analysis: Prevalence was calculated for 4 five-year periods starting from 2003/04-2007/08 and ending at 2018/19-2022/23. All periods were age- and sex-adjusted to the Manitoba population aged 55 years as of December 31, 2020 (midpoint year of the five-year time period).

Demographic Summary

The percent of the population as of December 31 in a given year by three age groups: Children (0-19 years), Adults (20-64 years), and Older Adults (65 years and older).

Time period analysis: Demographic summaries were calculated for two one-year periods: 2017 and 2022.

Trend analysis: Demographic summaries were calculated for each one-year period from 2003 to 2022.

Dental Extractions Among Children

Dental extraction surgeries among residents aged 0 to 5 years. Dental extractions were defined by a hospitalization with an ICD-9-CM procedure code of 23.01, 23.09, 23.11, or 23.19 or a CCI code of 1.FE.57 or 1.FE.89. Only interventions in Manitoba hospitals that were not marked out of hospital were included.

Time period analysis: The average annual dental extraction surgery rates per 1,000 residents were calculated for 3 five-year periods: 2008/09-2012/13, 2013/14-2017/18, and 2018/19-2022/23. For each time period, the total number of dental extraction surgeries among children aged 5 to 19 years was determined and the average number of surgeries per year served as the numerator, while the total number of residents aged 0 to 5 years as of December 31 in each year in the period was determined and the average number per year served as the denominator. The rates were age- and sex-adjusted to the Manitoba population aged 0 to 5 years as of December 31, 2022.

Trend analysis: The dental extraction surgery rates per 1,000 residents were calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population aged 0 to 5 years as of December 31, 2022.

Diabetes

Residents of all ages with diabetes (type 1 or 2) as defined by any of the following:

- One or more hospitalizations:
  - ICD-9-CM code 250
    ICD-10-CA codes E10-E14, or
- Two or more physician visits:
  - ICD-9-CM code 250, or
- One or more dispensations of medications to treat diabetes (listed below), or
- One or more glycosylated hemoglobin (HbA1c) test with a result ≥ 6.5%, or
- Identified as having type 1 or type 2 diabetes in youth, as identified in the Diabetes Education Resource for Children and Adolescents (DER-CA) database.

List of drug Anatomic Therapeutic Chemical (ATC) codes and generic drug names used to treat diabetes:

- A10A – Insulins and Analogues
- A10BA02 – Metformin

- A10BB01 – Glibenclamide
- A10BB02 – Chlorpropamide
- A10BB03 – Tolbutamide
- A10BB09 – Gliclazide
- A10BB12 – Glimepiride
- A10BB31 – Acetohexamide
- A10BD03 – Metformin and Rosiglitazone
- A10BD04 – Glimepiride and Rosiglitazone
- A10BD07 – Metformin and Sitagliptin
- A10BD09 – Pioglitazone and Alogliptin
- A10BD10 – Metformin and Saxagliptin
- A10BD11 – Metformin and Linagliptin
- A10BD13 – Metformin and Alogliptin
- A10BD15 – Metformin and Dapagliflozin
- A10BD16 – Metformin and Canagliflozin
- A10BD19 – Linagliptin and Empagliflozin
- A10BD20 – Metformin and Empagliflozin
- A10BD21 – Saxagliptin and Dapagliflozin
- A10BF01 – Acarbose
- A10BG01 – Troglitazone
- A10BG02 – Rosiglitazone
- A10BG03 – Pioglitazone
- A10BH01 – Sitagliptin
- A10BH03 – Saxagliptin
- A10BH04 – Alogliptin
- A10BH05 – Linagliptin
- A10BJ01 – Exenatide
- A10BJ02 – Liraglutide
- A10BJ03 – Lixisenatide
- A10BJ04 – Albiglutide
- A10BJ05 – Dulaglutide
- A10BJ06 – Semaglutide
- A10BK01 – Dapagliflozin
- A10BK02 – Canagliflozin
- A10BK03 – Empagliflozin
- A10BK04 – Ertugliflozin
- A10BX02 – Repaglinide
- A10BX03 – Nateglinide
- A10BX16 – Tirzepatide
- A10BB07 – Glipizide
- A10BF02 – Miglitol

Note the individuals with 1+ dispensations for metformin (ATC code A10BA) or semaglutide (ATC code A10BJ06) without any other diabetes related prescriptions, without a diagnosis for diabetes from a hospital or physician visit, without high HgA1c, and not in DER-CA, were not included.

This measure of diabetes combines type 1 and type 2 diabetes, as physician claims data do not allow separate identification. Gestational diabetes has a separate diagnosis code and is not specifically included here, but some cases may be included if gestational diabetes was not properly coded.

Prevalence

Time period analysis: Prevalence was calculated for 3 three-year periods: 2010/11-2012/13, 2015/16-2017/18, and 2020/21-2022/23. For each time period, the total number of residents identified with diabetes was determined and served as the numerator, while the total number of residents as of December 31 in 2011, 2016, and 2021 served as the denominators for the first, second, and third time periods, respectively. The prevalences were age- and sex-adjusted to the Manitoba population and older as of December 31, 2022.

Trend analysis: Prevalence was calculated for 6 three-year periods starting from 2005/06-2007/08 and ending at 2020/21-2022/23. All periods were age- and sex-adjusted to the Manitoba population as of December 31, 2021 (midpoint year of the three-year time period).

Incidence

Only residents at risk of developing diabetes were included in the analysis, and rate of new cases was calculated per 100 person–years at risk. A 3–year washout period prior to the start of the study years was used to distinguish between prevalent and incident cases, and residents had to be registered with Manitoba Health for the entire 3–year period to be included in the analysis.

Time period analysis: Incidence was calculated for 3 three-year periods: 2010/11-2012/13, 2015/16-2017/18, and 2020/21-2022/23. The incidence rates were age- and sex-adjusted to the Manitoba population of people at risk in the third time period (2020/21-2022/23).

Trend analysis: Incidence was calculated for 6 three-year periods starting from 2005/06-2007/08 and ending at 2020/21-2022/23. The incidence rates were age- and sex-adjusted to the Manitoba population of people at risk in the third time period (2020/21-2022/23).

Diabetes Care: Eye Examinations

Residents aged 19 years and older with diabetes who had an eye examination in a given year as defined by a visit to an ophthalmologist or an optometrist in the medical claims data. Although all residents with diabetes qualify for annual eye exams without having to pay for the service, some may not indicate their diabetic status to the provider, in which case the provider may bill the patient directly. If that occurs, there would be no record of the visit in medical claims data. Furthermore, services provided by family physicians could not be included, as there is no specific tariff for this service. As a result, this indicator under–estimates eye exam rates to some degree.

Time period analysis: The crude percent of eye examinations among residents with diabetes was calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23. For each time period, the total number of eye examinations among residents aged 19 years and older with diabetes was determined and served as the numerator, while the total number of residents aged 19 years and older with diabetes in the period was determined and served as the denominator.

Estimated Glomerular Filtration Rate (eGFR) Lab Tests

eGFR lab tests among residents aged 40 years and older. In any given period, a resident could have had more than one eGFR test.

Time period analysis: eGFR test rates per 1,000 residents were calculated for 3 one-year periods: 2011/12, 2016/17, and 2021/22. For each time period, the total number of eGFR tests was determined and served as the numerator, while the total number of residents aged 40 years and older as of December 31 in the year was determined and served as the denominator. The rates were age- and sex-adjusted to the Manitoba population aged 40 years and older on December 31, 2021.

Trend analysis: eGFR test rates per 1,000 residents were calculated for each one-year period from 2006/07-2021/22 and was age- and sex-adjusted to the Manitoba population in aged 40 years and older as of December 31, 2021.

Hemoglobin (HbA1c) Lab Tests

HbA1c lab tests among residents aged 40 years and older. In any given period, a resident could have had more than one HbA1c test.

Time period analysis: HbA1c test rates per 1,000 residents were calculated for 3 one-year periods: 2011/12, 2016/17, and 2021/22. For each time period, the total number of HbA1c tests was determined and served as the numerator, while the total number of residents aged 40 years and older as of December 31 in the year was determined and served as the denominator. The rates were age- and sex-adjusted to the Manitoba population aged 40 years and older on December 31, 2021.

Trend analysis: HbA1c test rates per 1,000 residents were calculated for each one-year period from 2006/07-2021/22 and was age- and sex-adjusted to the Manitoba population in aged 40 years and older as of December 31, 2021.

Hip Replacements

Total hip replacements (complete removal and replacement of joint) performed among residents aged 40 years and older. Hip replacements were defined by ICD-9-CM codes 81.50, 81.51, and 81.53 or CCI codes 1.VA.53.LA-PN and 1.VA.53. PN-PN in any intervention field in a hospital abstract. Out of hospital procedures were excluded to avoid double-counting.

Time period analysis: Average annual hip replacement rates per 1,000 residents were calculated for 3 five-year periods: 2008/09-2012/13, 2013/14-2017/18, and 2018/19-2022/23. For each time period, the total number of hip replacements among residents aged 40 years and older was determined and the average number of replacements per year served as the numerator, while the total number of residents aged 40 years and older as of December 31 in each year in the period was determined and the average number per year served as the denominator. The rates were age- and sex-adjusted to the Manitoba population aged 40 years and older as of December 31, 2022.

Trend analysis: Hip replacement rates per 1,000 residents were calculated for each one-year period from 2003/04 to 2022/23 and age- and sex-adjusted to the Manitoba population aged 40 years and older as of December 31, 2022.

Hospital Catchment (Hospitalizations and Days)

Information regarding where hospital patients came from with respect to each geographic region. Of all hospitalizations (or days) from all hospitals in each Regional Health Authority (RHA), this is the percent

that were provided to: (1) RHA residents, (2) residents of other RHAs, (3) Winnipeg residents, and (4) out of province residents. If a patient is transferred between hospitals, each stay is counted as a separate event, and the hospitalization (or days) is attributed to the appropriate hospital. Hospitalizations attributed to Non–Manitoba residents were included. For this analysis, the postal code information from the hospital abstract collected at time of hospitalization was used to assign residents to RHAs rather than sourced from the Manitoba Health Insurance Registry. The Registry is usually the gold standard but does not always capture all moves within the province if they are not reported and this discrepancy can be more noticeable when measuring indicators in less populated regions. Note that out of province hospital claims data was only available until 2021/22.

Time period analysis: The crude percent of hospitalizations (or hospital days) for each hospital catchment category were calculated for three one-year periods: 2012/13, 2017/1, and 2021/22.

Hospital Days for Acute Care

The number of hospital days coded as being for acute care among all residents. A hospital stay could have both acute and alternate level of Care (ALC) days. This indicator only includes acute care days. Acute hospital days were calculated by subtracting the number of alternate level care (ALC) days from the total number of days a patient stayed in hospital. Residents could have had more than one acute care hospitalization in a year, and the acute days used in all hospitalizations were summed.

Only hospitalizations of Manitoba residents in Manitoba hospitals were included; personal care homes, nursing stations, and long–term care facilities were excluded (Deer Lodge Centre, Manitoba Adolescent Treatment Centre, Rehabilitation Centre for Children, and Riverview Health Centre). Newborn hospitalizations were excluded.

Time period analysis: Rates of hospital days for acute care per 1,000 residents were calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23. For each time period, the total number of acute care hospital days was determined and served as the numerator, while the total number of residents as of December 31 in the year was determined and served as the denominator. The rates were age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Trend analysis: Rates of hospital days for acute care per 1,000 residents were calculated for each one-year period from 2004/05 to 2022/23 and was age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Hospital Days for Alternate Level of Care (ALC)

Hospital days for hospitalizations by Manitoba residents in Manitoba hospitals coded as ALC (as opposed to being for acute care). Newborn hospitalizations were excluded.

Time period analysis: Rates of hospital days for ALC per 1,000 residents were calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23. For each time period, the total number of ALC days was determined and served as the numerator, while the total number of residents as of December 31 in the year was determined and served as the denominator. The rates were age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Trend analysis: Rates of hospital days for ALC per 1,000 residents were calculated for each one-year period from 2004/05 to 2022/23 and was age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Hospital Location (Hospitalizations and Days)

Information regarding where Regional Health Authority (RHA) residents went for hospitalizations by the following categories: (1) percent of hospitalizations in patient's RHA, (2) percent of hospitalizations in another RHA, (3) percent of hospitalizations in a Winnipeg hospital, and (4) percent of hospitalizations outside of Manitoba. If a patient is transferred between hospitals, each stay is counted as a separate event, and the hospitalization (or days) is attributed to the appropriate hospital. Only hospitalizations attributed to Manitoba residents were counted. For this analysis, the postal code information from the hospital abstract collected at time of hospitalization was used to assign residents to RHAs rather than sourced from the Manitoba Health Insurance Registry. The Registry is usually the gold standard but does not always capture all moves within the province if they are not reported and this discrepancy can be more noticeable when measuring indicators in less populated regions. Note that out of province hospital claims data was only available until 2021/22.

Time period analysis: The crude percent of all hospitalizations (or hospital days) for each hospital location category were calculated for 3 one-year periods: 2012/13, 2017/18, and 2021/22.

Hospital Readmissions

Hospitalizations after which the patient was admitted to any hospital within 1-30 days of a preceding discharge. Only unplanned inpatient readmissions were counted, defined by admission category 'U' for urgent/emergent admissions. Hospital episodes combine multiple inpatient admissions by the same person to create a single continuous stay in the hospital system, linking transfers between hospitals. Readmissions less than 24 hours after discharge were considered to be part of the same hospital episode. Only unplanned inpatient readmissions were counted, defined by admission category "U" for urgent/emergent admissions. All Manitoba hospitals were included; personal care homes, nursing stations, and long–term care facilities were excluded (Deer Lodge Centre, Manitoba Adolescent Treatment Centre, Rehabilitation Centre for Children, and Riverview Health Centre). Out of province hospitalizations for Manitoba residents were not included. In cases of birth, both the newborn and the mother's hospitalizations were included as index hospitalizations.

Time period analysis: Hospital readmission percents were calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23. For each time period, the total number of hospital readmissions was determined and served as the numerator, while the total number of index hospitalizations among all residents in the year was determined and served as the denominator. The percents were age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Trend analysis: Hospital readmission percents were calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Hospital Use

Residents who were admitted to an acute care hospital at least once in a fiscal year. Note that this is a person-based measure (i.e., not a visit-based measure) and patients receiving day surgery are not included. All Manitoba hospitals were included; personal care homes, nursing stations, and long–term care facilities were excluded (Deer Lodge Centre, Manitoba Adolescent Treatment Centre, Rehabilitation Centre for Children, and Riverview Health Centre). Out of province hospitalizations for Manitoba residents were also included. In cases of birth, newborn hospitalizations were excluded (the mother's hospitalization was included).

Time period analysis: The percent of the population with one or more hospitalizations was calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23. For each time period, the total number of residents with at least one hospitalization in the year was determined and served as the numerator, while the total number of residents as of December 31 in the year was determined and served as the denominator. The percents were age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Trend analysis: The percent of the population with one or more hospitalizations was calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Hospitalizations for Ambulatory Care Sensitive (ACS) Conditions

Inpatient hospital separations for ACS conditions among residents aged 0 to 74 years in a given year. For all ACS conditions (except congenital syphilis), the ACS condition must be coded as the most responsible diagnosis. ACS conditions are a group of 25 diseases and diagnoses (listed below) for which it is thought that timely and effective outpatient care can reduce the risk of hospitalization. These conditions include asthma, angina, gastroenteritis, and congestive heart failure. All Manitoba hospitals were included; personal care homes, nursing stations, and long–term care facilities were excluded (Deer Lodge Centre, Manitoba Adolescent Treatment Centre, Rehabilitation Centre for Children, and Riverview Health Centre). Out of province hospitalizations for Manitoba residents were also included. Individuals who died in hospital were excluded from the numerator.

ACS conditions include:

- Congenital Syphilis: ICD–9–CM code 090, ICD–10–CA code A50 (newborns only)
- Immunization–related and Preventable Conditions: ICD–9–CM codes 033, 037, 045, 390, 391; ICD–10–CA codes A35, A37, A80, I00, I01 (also including hemophilus meningitis for children age 1 to 5 only: ICD–9–CM code 320.0; ICD–10–CA code G00.0)
- Epilepsy: ICD–9–CM code 345, ICD–10–CA codes G40, G41
- Convulsions: ICD–9–CM code 780.3, ICD–10–CA code R56
- Severe ENT Infections: ICD–9–CM codes 382, 462, 463, 465, 472.1; ICD–10–CA codes H66, J02, J03, J06, J312 (cases of otitis media: ICD–9–CM code 382, ICD–10–CA code H66, with a procedure code for myringotomy with insertion of tube are excluded: ICD–9–CM procedure code 20.01, CCI code 1.DF.53.JA–TS)
- Pulmonary Tuberculosis: ICD–9–CM code 011; ICD–10–CA codes A15.0, A15.1, A15.2, A15.3, A15.7, A15.9, A16.0, A16.1, A16.2, A16.7, A16.9
- Other Tuberculosis: ICD–9–CM codes 012–018; ICD–10–CA codes A15.4, A15.5, A15.6, A15.8, A16.3, A16.4, A16.5, A16.8, A17, A18, A19
- Chronic Obstructive Pulmonary Disease (COPD): ICD–9–CM codes 491, 492, 494, 496; ICD–10–CA codes J41, J42, J43, J44, J47 (also included in 2005/06 are patients with a primary diagnosis of acute lower respiratory infection: ICD–10–CA codes J10.0, J11.0, J12–J16, J18, J21, J22; and a secondary diagnosis of COPD with acute lower respiratory infection: ICD–10–CA code J44)
- Acute Bronchitis (only included if a secondary diagnosis of COPD is also present, diagnosis codes as above): ICD–9–CM code 466.0, ICD–10–CA code J20
- Bacterial Pneumonia: ICD–9–CM codes 481, 482.2, 482.3, 482.9, 483, 485, 486; ICD–10–CA codes J13, J14, J15.3, J15.4, J15.7, J15.9, J16, J18 (patients with a secondary diagnosis of sickle–cell anaemia: ICD–9–CM code 282.6; ICD–10–CA codes D57.0, D57.1, D57.2, D57.8 and patients less than two months of age are excluded)

- Asthma: ICD–9–CM code 493, ICD–10–CA code J45
- Congestive Heart Failure: ICD–9–CM codes 402.01, 402.11, 402.91, 428, 518.4; ICD–10–CA codes I50, J81 (patients with certain cardiac procedures coded are excluded: ICD–9–CM procedure codes 36.01, 36.02, 36.05, 36.1, 37.5, 37.7; CCI codes 1.HB.53, 1.HB.54, 1.HB.55, 1.HD.53, 1.HD.54, 1.HD.55, 1.HZ.53, 1.HZ.55, 1.HZ.85, 1.IJ.50, 1.IJ.57.GQ, 1.IJ.76)
- Hypertension: ICD–9–CM codes 401.0, 401.9, 402.00, 402.10, 402.90; ICD–10–CA codes I10.0, I10.1, I11 (patients with certain cardiac procedures coded are excluded, procedure codes as in CHF)
- Angina: ICD–9–CM codes 411.1, 411.8, 413; ICD–10–CA codes I20, I23.82, I24.0, I24.8, I24.9 (patients with any surgical procedure coded are excluded)
- Cellulitis: ICD–9–CM codes 681, 682, 683, 686; ICD–10–CA codes L03, L04, L08, L44.4, L88, L92.2, L98.0, L98.3 (patients with any surgical procedure coded are excluded, except for incisions of skin and subcutaneous tissue: ICD–9–CM procedure code 86.0; CCI codes 1.AX.53.LA–QK, 1.IS.53.HN–LF, I.IS.53.LA–LF, 1.JU.53.GP–LG, 1.KR.53.LA–LF, 1.OA.53.LA–QK, 1.SY.53.LA–QK, 1.YA.35.HA–W1, 1.YA.35.HA–X4, 1.YA.52.HA, 1.YA.52.LA, 1.YA.55.DA–TP, 1.YA.55.LA–TP, 1.YA.56.LA, 1.YB.52.HA, 1.YB.52.LA, 1.YB.55.DA–TP, 1.YB.55.LA–TP, 1.YB.56.LA, 1.YF.35.HA–W1, 1.YF.35.HA–X4, 1.YF.52.HA, 1.YF.55.DA–TP, 1.YF.55.LA–TP, 1.YF.56.LA, 1.YG.52.HA, 1.YG.52.LA, 1.YG.55.DA–TP, 1.YG.55.LA–TP, 1.YG.56.LA, 1.YR.52.HA, 1.YR.52.LA, 1.YR.56.LA, 1.YS.35.HA–W1, 1.YS.35.HA–X4, 1.YS.52.HA, 1.YS.52.LA, 1.YS.55.DA.TP, 1.YS.55.LA–TP, 1.YS.56.LA, 1.YT.35.HA–W1, 1.YT.35.HA–X4, 1.YT.52.HA, 1.YT.52.LA, 1.YT.55.DA–TP, 1.YT.55.LA–TP, 1.YT.56.LA, 1.YU.52.HA, 1.YU.52.LA, 1.YU.55.DA–TP, 1.YU.55.LA–TP, 1.YU.56.LA, 1.YV.35.HA–W1, 1.YV.35.HA–X4, 1.YV.52.HA, 1.YV.52.LA, 1.YV.55.DA–TP, 1.YV.55.LA–TP, 1.YV.56.LA, 1.YW.52.HA, 1.YW.52.LA, 1.YW.55.DA–TP, 1.YW.55.LA–TP, 1.YW.56.LA, 1.YX.52.HA, 1.YX.52.HA–AV, 1.YX.52.LA, 1.YX.56.LA, 1.YZ.35.HA–W1, 1.YZ.35.HA–X4, 1.YZ.52.HA, 1.YZ.52.LA, 1.YZ.55.DA–TP, 1.YZ.55.LA–TP, 1.YZ.56.LA)
- Diabetes: ICD–9–CM codes 250.0, 250.1, 250.2, 250.3, 250.8, 250.9; ICD–10–CA codes E10.1, E10.6, E10.7, E10.9, E11.0, E11.1, E11.6, E11.7, E11.9, E13.0, E13.1, E13.6, E13.7, E13.9, E14.0, E14.1, E14.6, E14.7, E14.9
- Hypoglycemia: ICD–9–CM code 251.2; ICD–10–CA codes E16.0, E16.1, E16.2
- Gastroenteritis: ICD–9–CM code 558.9; ICD–10–CA codes K52.2, K52.8, K52.9
- Kidney/Urinary Infections: ICD–9–CM codes 590, 599.0, 599.9; ICD–10–CA codes N10, N11, n12, N13.6, N15.1, N15.8, N15.9, N16.0–N16.5, N28.83–N28.85, N36.9, N39.0, N39.9
- Dehydration/Volume Depletion: ICD–9–CM code 276.5, ICD–10–CA code E86
- Iron Deficiency Anemia: ICD–9–CM codes 280.1, 280.8, 280.9; ICD–10–CA codes D50.1, D50.8, D50.9 (patients age 0 to 5 only)
- Nutritional Deficiencies: ICD–9–CM codes 260, 261, 262, 268.0, 268.1; ICD–10–CA codes E40–E43, E55.0, E64.3
- Failure to Thrive: ICD–9–CM code 783.4, ICD–10–CA code R62 (patients less than one year of age only)
- Pelvic Inflammatory Disease: ICD–9–CM code 614; ICD–10–CA codes N70, N73, N99.4 (female patients only, patients with a hysterectomy procedure coded are excluded: ICD–9–CM procedure codes 68.3–68.8; CCI codes 1.RM.87, 1.RM.89, 1.RM.91, 5.CA.89.CK, 5.CA.89.DA, 5.CA.89.GB, 5.CA.89.WJ, 5.CA.89.WK)
- Dental Conditions: ICD–9–CM codes 521, 522, 523, 525, 528; ICD–10–CA codes K02–K06, K08, K09.8, K09.9, K12, K13

Time period analysis: Hospitalization rates for ACS conditions per 1,000 residents aged 0 to 74 years were calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23. For each time period, the total number of ACS hospitalizations among residents aged 0 to 74 years was determined and served as the numerator, while the total number of residents aged 0 to 74 years as of December 31 in the year was determined and served as the denominator. The rates were age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Trend analysis: Hospitalization rates for ACS conditions per 1,000 residents aged 0 to 74 years for ACS conditions were calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Hypertension

Residents aged 19 years or older with hypertension (high blood pressure) as defined by any of the following:

- One or more hospitalizations with:
  - ICD-9-CM codes 401-405
    ICD-10-CA codes I10-I13, I15, or
- Two or more physician visits:
  - ICD-9-CM codes 401-405, or
- Two or more dispensations of medications to treat hypertension (listed below)

List of included drug Anatomic Therapeutic Chemical (ATC) codes and generic drug names used to treat hypertension:

- C02AB02 – Methyldopa
- C02AC01 – Clonidine
- C02CA01 – Prazosin
- C02CA04 – Doxazosin
- C02DB02 – Hydralazine
- C02DC01 – Minoxidil
- C02LA01 – Reserpine and Diuretics
- C02LB01 – Methyldopa and Diuretics
- C03AA03 – Hydrochlorothiazide
- C03BA04 – Chlorthalidone
- C03BA08 – Metalozone
- C03BA11 – Indapamide
- C03CA01 – Furosemide
- C03CA02 – Bumetanide
- C03CC01 – Etacrynic Acid
- C03DA01 – Spironolactone
- C03DA04 – Eplerenone
- C03DB01 – Amiloride

- C03DB02 – Triamterene
- C03EA01 – Hydrochlorothiazide and Potassium Sparing Agents
- C07AA02 – Oxprenolol
- C07AA03 – Pindolol
- C07AA05 – Propranolol
- C07AA06 – Timolol
- C07AA12 – Nadolol
- C07AB02 – Metoprolol
- C07AB03 – Atenolol
- C07AB04 – Acebutalol
- C07AB07 – Bisoprolol
- C07AB12 – Nebivolol
- C07AG01 – Labetalol
- C07BA05 – Propranolol and Thiazide
- C07BA06 – Timolol and Thiazide
- C07CA03 – Pindolol and Thiazide
- C07CB03 – Atenolol and Diuretics
- C08CA01 – Amlodipine
- C08CA02 – Felodipine
- C08CA04 – Nicardipine
- C08CA05 – Nifedipine
- C08CA06 – Nimodipine
- C08CA55 – Nifedipine, Combinations
- C08DA01 – Verapamil
- C08DB01 – Diltiazem
- C09AA – Ace Inhibitors, Plain
- C09BA – Ace Inhibitors and Diuretics
- C09BB – Ace Inhibitors and Calcium Channel Blockers
- C09CA – Angiotensin II Antagonists, Plain
- C09DA – Angiotensin II Antagonists and Diuretics
- C09DB – Angiotensin II Receptor Blockers and Calcium Channel Blockers
- C09XA02 – Aliskiren
- C09XA52 – Aliskiren and Hydrochlorothiazide
- C10BX03 – Atorvastatin and Amlodipine
- G04CA03 – Terazosin

List of excluded Drug Information Numbers (DINs) for Nifedipine, which is not indicated for hypertension:

- 00756830
- 00557633
- 00692727
- 00755907
- 01946307
- 02155877
- 02235898
- 00692735
- 02047462
- 00613258
- 00725110
- 02155869

Prevalence

Time period analysis: Prevalence was calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23. For each time period, the total number of residents aged 19 years and older identified with hypertension was determined and served as the numerator, while the total number of residents aged 19 years and older as of December 31 in each year in the period was determined and served as the denominator. The prevalences were age- and sex-adjusted to the Manitoba population aged 19 years and older as of December 31, 2022.

Trend analysis: Prevalence was calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population aged 19 years and older as of December 31, 2022.

Incidence

For incidence, only residents at risk of developing hypertension were included in the analysis, and rate of new cases was calculated per 100 person–years at risk. A 1–year washout period prior to the start of the study years was used to distinguish between prevalent and incident cases, and residents had to be registered with Manitoba Health for the entire 1–year period to be included in the analysis.

Time period analysis: Incidence was calculated for 3 three-year periods: 2012/13, 2017/18, and 2022/23. The incidence rates were age- and sex-adjusted to the Manitoba population of people at risk in the third time period (2022/23).

Trend analysis: Incidence was calculated for one-year periods from 2003/04 to 2022/23. The incidence rates were age- and sex-adjusted to the Manitoba population of people at risk in the third time period (2022/23).

Inadequate Prenatal Care

Mothers of singleton live births who received inadequate, or no prenatal care based on their R-GINDEX (Revised-Graduated Prenatal Care Utilization Index) score. The denominator included all singleton live births coded in Manitoba hospital abstracts with ICD-10-CA codes Z38.0, Z38.1, Z38.2 where the mother had Manitoba Health Insurance coverage for the entire gestation period. Stillbirths and records with gestational age missing, less than 20 weeks, or greater than 45 weeks were excluded.

The ICD-9-CM tariffs used to identify a prenatal care visit were 8400 and 8401. If a diagnosis of pregnancy was also recorded on the medical claim, then ICD-9-CM tariffs 8501, 8507, 8509, 8529, 8530,

8540, and 8550 were also used. The ICD-9-CM diagnosis codes used to identify a prenatal care visit were 640-669, V22, and V23.

Note that the definition used is the same as in previous Atlas reports. However, due to the changes to provision in care because of the COVID-19 pandemic, a definition that also includes virtual visits was also used.

Time period analysis: The average annual percent of inadequate prenatal care was calculated for 3 five-year periods: 2008/09-2012/13, 2013/14-2017/18, and 2018/19-2022/23. For each time period, the total number of women receiving inadequate or no prenatal care was determined and the average number per year served as the numerator, while the total number of women who had singleton live births in each year in the period was determined and the average number per year served as the denominator. The percents were age- and sex-adjusted to the population of women who gave birth to live born singletons as of December 31, 2022.

Trend analysis: The percent of inadequate prenatal care was calculated for each one-year period from 2003/04 to 2022/23 and maternal age-adjusted to the Manitoba population of women who gave birth to live born singletons in 2022/23.

Infant Mortality

Deaths among infants aged 0 to 364 days.

Time period analysis: The average annual crude percent of all deaths among Manitobans (age 1-19) by cause were identified for 3 five-year periods: 2008-2012, 2013-2017, and 2018-2022.

Time period analysis: The average annual infant mortality rate per 1,000 infants was calculated for 3 five-year periods: 2008-2012, 2013-2017, and 2018-2022. For each time period, the total number of deaths among infants aged 0 to 364 days was determined and the average number of deaths per year served as the numerator, while the total number of live births in each year in the period was determined and the average number per year served as the denominator. The rates were age- and sex-adjusted to the Manitoba population of women who gave birth to liveborn infants in 2022.

Trend analysis: The infant mortality rate per 1,000 infants was calculated for each one-year period from 2003 to 2022 and was maternal age-adjusted to the Manitoba population of women who gave birth to liveborn infants in 2022.

Influenza Immunizations

Residents of all ages who received an influenza immunization (“flu shot”). Flu shots were defined by physician tariff codes 8791, 8792, 8793, or 8799 in the Manitoba Immunization Monitoring System (MIMS) data, and equivalent Systematized Nomenclature of Medicine – Clinical Terms (SNOMED) codes in the Manitoba Immunization Registry data from PHIMS.

Time period analysis: Percent of residents with a flu shot was calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23. For each time period, the total number of residents with a flu shot in the year was determined and served as the numerator, while the total number of residents as of December 31 in the year was determined and served as the denominator. The percents were age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Trend analysis: The percent of the population with a flu shot was calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Injury Hospitalizations

Inpatient hospitalizations for injury. In any given period, a resident could be hospitalized for injury more than once, so this measure indicates the total number of injury-related separations from acute care facilities by all residents of the area. This definition encompasses injuries by all reasons (including self-inflicted). Transfers between hospitals were tracked and only hospital episodes were counted, not individual separations, to reduce double–counting injuries. All Manitoba hospitals were included; nursing stations and long–term care facilities (Deer Lodge Centre, Manitoba Adolescent Treatment Centre, Rehabilitation Centre for Children, and Riverview Health Centre) were excluded. Out of province hospitalizations for Manitoba residents were also included. Newborn birth injuries or deaths, stillbirths and brain deaths were excluded.

Hospitalizations were defined as:

- Any inpatient hospitalization with an external cause of injury diagnosis code:
  - ICD-9-CM codes E800-E999*
    ICD-10-CA codes V01-Y89.

Excluded from the count of hospitalizations due to injury are those related to medical error or drug complications, as follows:

- Misadventures during surgical or medical care:
  - ICD-9-CM codes E870-E876
    ICD-10-CA codes Y60-Y69, Y88.1
- Reactions or complications due to medical care:
  - ICD-9-CM codes E878-E879
    ICD-10- CA codes Y70-Y84, Y88.2, Y88.3
- Adverse effects due to drugs:
  - ICD-9-CM codes E930-E949
    ICD-10-CA codes Y40-Y59, Y88.0
- Late effects of injury:
  - ICD-9-CM code E29.9
- Location of Injury
  - ICD-9-CM code E84.9
- Supplementary factors related to causes of morbidity and mortality classified elsewhere:
  - ICD-10-CA codes Y90-Y98

Time period analysis: Injury hospitalization rates per 1,000 residents were calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23. For each time period, the total number of injury hospitalizations was determined and served as the numerator, while the total number of residents as of December 31 in the year was determined and served as the denominator. The rates were age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Trend analysis: Injury hospitalization rates per 1,000 residents were calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Injury Mortality

Deaths caused by injuries among all residents defined as a death recorded in the Vital Statistics Mortality data with any of the following ICD-10-CA codes:

- V01-X59 – Accidental deaths
- X60-X84 – Suicide
- X85-Y09 – Assault
- Y10-Y34 – Event of undetermined intent
- Y35-Y36 – Legal intervention/war
- Y85, Y86 – Sequelae of external causes of morbidity and mortality
- Y87, Y89

Excluded are those related to medical error, or drug complications, or supplementary factors (not direct injury causes), as follows:

- Y40-Y84 – Complications of medical and surgical care
- Y88 – Sequelae with surgical and medical care as external cause
- Y90-Y98 – Supplementary factors related to causes of morbidity and mortality
- classified elsewhere

Time period analysis: The average annual rate of deaths caused by injury per 10,000 residents was calculated for 3 five-year periods: 2008-2012 (TP1), 2013-2017 (TP2), and 2018-2022 (TP3) 2022. For each time period, the total number of injury deaths was determined and the average number of deaths per year served as the numerator, while the total number of residents in each year in the period was determined and the average number per year served as the denominator. The rates were age- and sex-adjusted to the Manitoba population in 2022.

Trend analysis: The rate of deaths caused by injury was calculated for each one-year period from 2003 to 2022 and was age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Inpatient Hospitalizations

Inpatient hospital separations among all residents. In any given period, a resident could be hospitalized more than once, so this indicator shows the total number of hospitalizations from acute care facilities by all residents of the area. Transfers within the same hospitalization were not counted as separate events. Only hospitalizations of Manitoba residents in Manitoba hospitals were included; personal care homes, nursing stations, and long–term care facilities were excluded (Deer Lodge Centre, Manitoba Adolescent Treatment Centre, Rehabilitation Centre for Children, and Riverview Health Centre). In cases of birth, newborn hospitalizations were excluded while the mother's hospitalization was included.

Time period analysis: Hospitalization rates per 1,000 residents were calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23. For each time period, the total number of hospitalizations was determined and served as the numerator, while the total number of residents as of December 31 in the year was determined and served as the denominator. The rates were age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Trend analysis: Hospitalization rates per 1,000 residents were calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Ischemic Heart Disease (IHD)

Residents aged 19 years and older with IHD defined by any of the following:

- One or more hospitalizations:
  - ICD-9-CM codes 410-414
    ICD-10-CA codes I20-I22, I24, I25, or
- Two or more physician visits:
  - ICD-9-CM codes 410-414, or
- One physician visit:
  - ICD-9-CM codes 410-414 and two or more dispensations of medications used to treat I HD (listed below)

List of drug Anatomic Therapeutic Chemical (ATC) codes and corresponding generic drug names used to treat IHD:

- B01AC04 – Clopidogrel
- B01AC06 – Acetylsalicylic Acid (81mg)
- B01AC22 – Prasugrel
- B01AC24 – Ticagrelor
- B01AC30 – Platelet Aggregation Inhibitors (excluding Heparin) Combinations
- C01DA02 – Glyceryl Trinitrate
- C01DA05 – Pentaerithrityl Tetranitrate
- C01DA08 – Isosorbide Dinitrate
- C01DA14 – Isosorbide Mononitrate
- C07AA02 – Oxprenolol
- C07AA03 – Pindolol
- C07AA05 – Propranolol
- C07AA06 – Timolol
- C07AA12 – Nadolol
- C07AB02 – Metoprolol
- C07AB03 – Atenolol
- C07AB04 – Acebutolol
- C07AB07 – Bisoprolol
- C07AB12 – Nevibolol
- C07AG01 – Labetalol
- C07BA05 – Propranolol and Thiazides
- C07BA06 – Timolol and Thiazides

- C07CA03 – Pindolol and Other Diuretics
- C07CB03 – Atenolol and Other Diuretics
- C08CA01 – Amlodipine
- C08CA02 – Felodipine
- C08CA04 – Nicardipine
- C08CA05 – Nifedipine
- C08CA06 – Nimodipine
- C08DA01 – Verapamil
- C08DB01 – Diltiazem
- C09AA01 – Captopril
- C09AA02 – Enalapril
- C09AA03 – Lisinopril
- C09AA04 – Perindopril
- C09AA05 – Ramipril
- C09AA06 – Quinapril
- C09AA07 – Benazepril
- C09AA08 – Cilazapril
- C09AA09 – Fosinopril
- C09AA10 – Trandolapril
- C09BA02 – Enalapril and Diuretics
- C09BA03 – Lisinopril and Diuretics
- C09BA04 – Perindopril and Diuretics
- C09BA05 – Ramipril and Diuretics
- C09BA06 – Quinapril and Diuretics
- C09BA08 – Cilazapril and Diuretics
- C09CA01 – Losartan
- C09CA02 – Eprosartan
- C09CA03 – Valsartan
- C09CA04 – Irbesartan
- C09CA06 – Candesartan
- C09CA07 – Telmisartan
- C09CA08 – Olmesartan
- C09CA09 – Azilsartan Medoxomil
- C09DA01 – Losartan and Diuretics
- C09DA02 – Eprosartan and Diuretics

- C09DA03 – Valsartan and Diuretics
- C09DA04 – Irbesartan and Diuretics
- C09DA06 – Candesartan and Diuretics
- C09DA07 – Telmisartan and Diuretics
- C09DA08 – Olmesartan and Diuretics
- C09DA09 – Azilsartan Medoxomil and Diuretics
- C10AA01 – Simvastatin
- C10AA02 – Lovastatin
- C10AA03 – Pravastatin
- C10AA04 – Fluvastatin
- C10AA05 – Atorvastatin
- C10AA06 – Cerivastatin
- C10AA07 – Rosuvastatin
- C10AB02 – Bezafibrate
- C10AB04 – Gemfibrozil
- C10AB05 – Fenofibrate
- C10AX – Other Lipid Modifying Agents
- C10AX09 – Ezetimibe
- C10AX13 – Evolocumab
- C10AX14 – Alirocumab
- C10AX16 – Inclisiran
- C10BX03 – Atorvastatin and Amlodipine
- M04AC01 – Colchicine

Prevalence

Time period analysis: Prevalence was calculated for 3 five-year periods: 2008/09-2012/13, 2013/14-2017/18, and 2018/19-2022/23. For each time period, the total number of residents aged 19 years and older identified with IHD was determined and served as the numerator, while the total number of residents aged 19 years and older as of December 31 in 2010, 2015, and 2020 served as the denominators for the first, second, and third time periods, respectively. The prevalences were age- and sex-adjusted to the Manitoba population aged 19 years and older as of December 31, 2022.

Trend analysis: Prevalence was calculated for 4 five-year periods starting from 2003/04-2007/08 and ending at 2018/19-2022/23. All periods were age- and sex-adjusted to the Manitoba population aged 19 years as of December 31, 2020 (midpoint year of the five-year time period).

Incidence

Only residents at risk of developing IHD were included in the analysis, and rate of new cases was calculated per 100 person–years at risk. A 5–year washout period prior to the start of the study years was used to distinguish between prevalent and incident cases, and residents had to be registered with Manitoba Health for the entire 5–year period to be included in the analysis.

Time period analysis: Incidence was calculated for 3 five-year periods: 2008/09-2012/13, 2013/14-

2017/18, and 2018/19-2022/23. The incidence rates were age- and sex-adjusted to the Manitoba population of people at risk in the third time period (2018/19-2022/23).

Trend analysis: Incidence was calculated for 4 five-year periods starting from 2003/04-2007/08 and ending at 2018/19-2022/23. The incidence rates were age- and sex-adjusted to the Manitoba population of people at risk in the third time period (2018/19-2022/23).

Knee Replacements

Total knee replacement surgeries (complete removal and replacement of joint) among residents aged 40 years and older. Knee replacements were defined by ICD-9-CM codes 81.54 and 81.55 or CCI codes 1.VG.53.LA-PN and 1.VG.53. LA-PP in any intervention field in a hospital abstract. Out of hospital procedures were excluded to avoid double-counting.

Time period analysis: Average annual knee replacement rates per 1,000 residents were calculated for 3 five-year periods: 2008/09-2012/13, 2013/14-2017/18, and 2018/19-2022/23. For each time period, the total number of hip replacements among residents aged 40 years and older was determined and the average number of replacements per year served as the numerator, while the total number of residents aged 40 years and older as of December 31 in each year in the period was determined and the average number per year served as the denominator. The rates were age- and sex-adjusted to the Manitoba population aged 40 years and older as of December 31, 2022.

Trend analysis: Knee replacement rates per 1,000 residents were calculated for each one-year period from 2003/04 to 2022/23 and age- and sex-adjusted to the Manitoba population aged 40 years and older as of December 31, 2022.

Large for Gestational Age (LGA) Births

LGA births out of all live singleton births coded in Manitoba hospital abstracts with ICD-10-CA code Z37.0, Z37.2, Z37.3, Z37.5. Records with gestational age missing, less than 22 weeks, or greater than 43 weeks or birth weight missing, less than 300g or greater than 9kg were excluded.

Note that the definition used in the previous Atlas included births between 20 and 45 weeks. The current Atlas only includes births between 22 and 43 weeks to be consistent with the definition used by the Canadian Perinatal Surveillance System. In addition, the definition used in previous atlases included all live births, whereas the current atlas limits the denominator to only live singleton births.

Time period analysis: The average annual percent of LGA births was calculated for 3 five-year periods: 2008/09-2012/13, 2013/14-2017/18, and 2018/19-2022/23. For each time period, the total number of LGA births was determined and the average number of LGA births per year served as the numerator, while the total number of live singleton births in each year in the period was determined and the average number per year served as the denominator. The percents were age- and sex-adjusted to the Manitoba population of women who gave birth to live born infants in 2022/23.

Trend analysis: The percent of LGA births was calculated for each one-year period from 2003/04 to 2022/23 and was maternal age-adjusted to the Manitoba population of women who gave birth to live born infants in 2022/23.

Life Expectancy at Birth

The expected length of life from birth for males and females based on the average annual mortality in the population. LE values are not age-adjusted but calculated directly from the mortality experience of local residents using a ‘life table’ approach. Slight differences in LE values imply important differences in population health status.

Time period analysis: The LE was calculated for 3 five-year periods: 2008-2012, 2013-2017, and 2018-2022.

Trend analysis: The LE was calculated for each one-year period from 2003 to 2022.

Location of Physician and Nurse Practitioner Visits

Information regarding where Regional Health Authority (RHA) residents went for ambulatory visits to family physicians and nurse practitioners by the following categories: (1) percent of visits in patient's RHA district, (2) percent of visits elsewhere in patient's RHA, (3) percent of visits to another RHA, and (4) percent of visits to Winnipeg. A physician's location is assigned based on where the majority of their patients reside. Only ambulatory visits to family physicians and nurse practitioners were counted, defined by mdblocs 11 and 200. Only visits for Manitoba residents within Manitoba were counted. MD number – 001 was assigned to out of province physicians and was therefore excluded. This may result in some possible under counting of visits to RHA districts that border other provinces.

Time period analysis: The crude percent for each visit location category were calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23.

Location of Specialist Visits

Information regarding where Regional Health Authority (RHA) residents went for ambulatory specialist visits by the following categories: (1) percent of visits in patient's RHA district, (2) percent of visits elsewhere in patient's RHA, (3) percent of visits to another RHA, and (4) percent of visits to Winnipeg. For each month, every specialist in Manitoba is assigned to the area (RHA district) from which the majority of their patients came. Each visit they had that month is then deemed to have taken place in that area. For Winnipeg residents, all visits received within the city were called 'in district.' Only visits made by Manitoba residents within Manitoba were included.

Time period analysis: The crude percent for each specialist visit location category were calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23.

Lower Limb Amputations Among Diabetics

Residents aged 19 years and older with diabetes who had a lower limb amputation (below or including the knee) as defined by the following:

- Surgical procedure code:
  - ICD-9-CM codes 84.10–84.17, or
  - CCI codes 1.VC.93, 1.VG.93, 1.VQ.93, 1.WA.93, 1.WE.93, 1.WJ.93, 1.WK.93, 1.WM.93, or 1.WN.93.

Amputations associated with accidental injury were excluded (defined by ICD–9–CM diagnosis codes 878, 885, 886, 895, 896, 897 and ICD–10–CA codes: S08, S18, S28.1, S38.2, S38.3, S48, S58, S68, S78, S88, S98, T05, T11.6, T13.6, T14.7). Manitoba residents with diabetes was defined in the three fiscal year period at the start of each study period.

Time period analysis: Percents of lower limb amputations among residents with diabetes were calculated for 3 five-year periods: 2008/09-2012/13, 2013/14-2017/18, and 2018/19-2022/23. For each time period, the total number of lower limb amputations among residents aged 19 years and older with diabetes was determined and the average number of amputations per year served as the numerator, while the total number of residents aged 19 years and older with diabetes as of December 31 in each year in the period was determined and the average number per year was calculated and served as the denominator.

The percents were age- and sex-adjusted to the Manitoba population aged 19 years and older as of December 31, 2022.

Trend analysis: Percents of lower limb amputations among residents with diabetes were calculated for 4 five-year periods starting from 2003/04-2007/08 and ending at 2018/19-2022/23. All periods were age- and sex-adjusted to the Manitoba population with diabetes aged 19 years and older as of December 31, 2021.

Magnetic Resonance Imaging (MRI) Scans

Magnetic resonance imaging (MRI) scans among residents aged 20 years and older. MRI scans were defined by physician claims with tariff codes 7501-7528. Residents with multiple claims for MRI scans in one day (e.g., multiple body parts scanned) were assigned only one scan for that day.

Time period analysis: MRI scan rates per 1,000 residents were calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23. For each time period, the total number of MRIs among residents aged 20 years and older was determined and served as the numerator, while the total number of residents aged 20 years and older as of December 31 in the year was determined and served as the denominator. The rates were age- and sex-adjusted to the Manitoba population aged 20 years and older in 2022/23.

Trend analysis: MRI scan rates per 1,000 residents were calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population aged 20 years and older as of December 31, 2022.

Trend analysis: The median wait time for PCH admission from the hospital was calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population aged 75 years and older residing in LTC in 2022/23.

Mood and Anxiety Disorders

Residents aged 10 years and older with mood and anxiety disorders. Mood and anxiety disorders include depression, episodic mood disorders (bipolar disorder, manic episode), anxiety (anxiety disorders, phobic disorders, obsessive-compulsive disorders), dissociative and somatoform disorders, or adjustment reaction. These were identified in a five-year period using the following definition:

- One or more hospitalizations:
  - ICD-9-CM codes 296.1-296.8, 300.0, 300.2-300.4, 300.7
    ICD-10-CA codes F31, F32, F33, F34.1, F38.0, F38.1, F40, F41.0-F41.3, F41.8, F41.9, F42, F43.1, F43.2, F43.8, F45.2, F53.0, F93.0, or
- One or more physician visits:
  - ICD-9-CM codes 296, 311, or
- One hospitalization or physician visit:
  - ICD-9-CM code 300
    ICD-10-CA codes F32, F34.1, F40, F41, F42, F44, F45.0, F45.1, F48, F68.0, F99
    and one or more dispensation for mood and anxiety disorder medications (listed below); or
- Three or more physician visits:
  - ICD-9-CM codes 300, 309

List of drug Anatomic Therapeutic Chemical (ATC) codes and generic drug names used to treat mood and anxiety disorders:

- N05AN01 – Lithium
- N05BA – Phenothiazines with Piperazine Structure
- N06A – Antidepressants

Time period analysis: Prevalence was calculated for 3 five-year periods: 2008/09-2012/13, 2003/14-2017/18, and 2018/19-2022/23. For each time period, the total number of residents aged 10 years and older identified with a mood or anxiety disorder was determined and served as the numerator, while the total number of residents aged 10 and older as of December 31 in 2010, 2015, and 2020 served as the denominators for the first, second, and third time periods, respectively. The prevalences were age- and sex-adjusted to the Manitoba population aged 10 years and older as of December 31, 2022.

Trend analysis: Prevalence was calculated for 4 five-year periods starting from 2003/04-2007/08 and ending at 2018/19-2022/23. All periods were age- and sex-adjusted to the Manitoba population aged 10 years and older as of December 31, 2020 (midpoint year of the five-year time period).

Number of Different Types of Drugs Dispensed per User

The number of different types of drugs dispensed to each resident (all ages) who had at least one prescription in a given year. Each pharmaceutical agent that falls under a different fourth-level Anatomic Therapeutic Chemical (ATC) class is counted as a "different" drug. This ATC level separates drugs used for different health problems. A person who has several prescriptions for drugs in the same fourth-level ATC class is considered as having one drug type in that year. Using antidepressants as one third-level drug as an example, the ATC system identifies 5 fourth-level codes (N06AA, N06AB, N06AF, N0AG, and N06AX). If a person who has multiple antidepressant dispensations and they all fall under one fourth-level code, they would only have one type of drug dispensed. However, if they had dispensations that fall under two different fourth-level codes, they would have two types of drugs dispensed.

Time period analysis: The average number of different drugs dispensed per user was calculated for 3 one-year periods: 2012/13 (TP1), 2017/18 (TP2), and 2022/23 (TP3) and was age- and sex-adjusted to the Manitoba population with one or more prescription dispensations in 2022/23.

Trend analysis: The average number of different drugs dispensed per user was calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population with one or more prescription dispensations in 2022/23.

Opioid-Related Mortality

Deaths related to opioid use among residents aged 10 years and older. Opioid-related mortality was defined as a death recorded in Vital Statistics Mortality data with any of the following causes:

- Poisoning as primary cause of death with ICD-10-CA codes:
  - X40-X49 Accidental poisoning
  - X60-X69 Intentional self-poisoning
  - X85-X90 Assault by drugs & other substances
  - Y10-Y19 Poisoning of undetermined intent

  AND
- Poisoning by opioids as underlying cause of death with ICD-10-CA codes:
  - T40.0 Poisoning by opium
  - T40.1 Poisoning by heroin
  - T40.2 Poisoning by other opioids
  - T40.3 Poisoning by methadone
  - T40.4 Poisoning by other synthetic narcotics[4]
  - T40.6 Poisoning by other and unspecified narcotics

Time period analysis: The average annual rate of deaths related to opioid use per 100,000 residents was calculated for 3 five-year periods: 2008-2012, 2013-2017, and 2018-2022. For each time period, the total number of opioid-related deaths among residents aged 10 years and older was determined and the average number of suicide deaths per year served as the numerator, while the total number of residents aged 10 years and older as of December 31 in each year in the period was determined and the average number per year served as the denominator. The rates were age- and sex-adjusted to the Manitoba population aged 10 years and older as of December 31, 2022.

Opioid Use

Residents who were dispensed an opioid drug at least once in a fiscal year. All prescription opioids were included, and dispensations were identified with ATC code N02A.

Time period analysis: Percent of residents with one or more dispensations for opioid was calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23. For each time period, the total number of residents with at least one opioid dispensation in the year was determined and served as the numerator, while the total number of residents as of December 31 in the year was determined and served as the denominator. The percents were age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Trend analysis: The percent of the population with one or more dispensations for antidepressants was calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Osteoporosis

Residents aged 50 years and older with osteoporosis as defined by any of the following:

- One or more hospitalizations:
  - ICD-9-CM code 733.0
    ICD-10-CA code M80, M81, or
- One or more physician visits:
  - ICD-9-CM code 733
    ICD-10-CA code M80, M81, or
- One or more dispensations of medications used to treat osteoporosis (listed below).

List of drug Anatomic Therapeutic Chemical (ATC) codes and generic drug names used to treat osteoporosis:

- M05BB01 – Etidronic Acid and Calcium, Sequential
- M05BA04 – Alendronic Acid
- G03XC01 – Raloxifene
- H05BA01 – Calcitonin (Salmon Synthetic)
- M05BA07 – Risedronic Acid
- H05AA02 – Teriparatide
- M05BA08 – Zoledronic Acid
- M05BB03 – Alendronic Acid and Colecalciferol
- M05BB02 – Risedronic Acid and Calcium, Sequential
- M05BB04 – Risedronic Acid, Calcium and Colecalciferol, Sequential
- M05BX04 – Denosumab
- M05BX06 – Romosozumab

Time period analysis: Prevalence was calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23. For each time period, the total number of residents aged 50 years and older identified with osteoporosis was determined and served as the numerator, while the total number of residents aged 50 years and older as of December 31 in the period was determined and served as the denominator. The prevalences were age- and sex-adjusted to the Manitoba population aged 50 years and older as of December 31, 2022.

Trend analysis: Prevalence was calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population aged 50 years and older as of December 31, 2022.

Percutaneous Coronary Interventions (PCI)

PCIs among residents age 40 years and older defined by CCI codes 1.IJ.50 and 1.IJ.57 in any intervention field in a hospital abstract. PCIs were only performed at the two tertiary hospitals (Health Sciences Centre and St. Boniface General Hospital), so only hospitalizations from those two hospitals were included in the analysis in order to eliminate the potential for double–counting of interventions. To further reduce double–counting, only interventions that were not marked out of hospital were included.

Time period analysis: Average annual PCI rates were calculated for 3 five-year periods: 2008/09-2012/13, 2013/14-2017/18, and 2018/19-2022/23. For each time period, the total number of PCIs among residents aged 40 years and older was determined and the average number of PCIs per year served as the numerator, while the total number of residents aged 40 and older as of December 31 in each year in the period was determined and the average number per year served as the denominator. The rates were age- and sex-adjusted to the Manitoba population aged 40 years and older as of December 31, 2022.

Trend analysis: PCI rates per 1,000 residents were calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population aged 40 years and older as of December 31, 2022.

Personal Care Home (PCH) Admissions

Residents aged 75 and older who were admitted to a PCH for the first time ever in a given year. Area of residence was assigned based on where people lived prior to first PCH admission. Misericordia and Churchill Hospital Long-Term Care patients were included.

Time period analysis: The average annual percent of residents admitted to PCHs was calculated for 3 two-year periods: 2011/12-2012/13, 2016/17-2017/18, and 2021/22-2022/23. For each time period, the total number of admissions among residents aged 75 years and older was determined and the average number of admissions per year served as the numerator. The total number of residents aged 75 years and older as of December 31 in each year in the period was determined and the average number per year served as the denominator. The percents were age- and sex-adjusted to the Manitoba population aged 75 years and older as of December 31, 2022.

Trend analysis: The percent of residents admitted to PCHs was calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population aged 75 years and older as of December 31, 2022.

Personal Care Home (PCH) Length of Stay by Level of Care on Admission

The minimum length of time (in years) which 50% of all PCH residents age 75 years and older spent in PCH before leaving the facility, according to their level of care on admission; so half of PCH residents spent less than this amount of time, and half spent longer. Level 1 represents the lowest level of need, and Level 4 represents the highest. Levels 2 and 3 are stratified into residents whose assessment indicated a need for close supervision due to possible behavioural issues ("2Y" or "3Y") and those who did not ("2N" or "3N"). Area of residence was assigned based on where people lived prior to admission (postal code and municipal code).

Time period analysis: The median length of stay (i.e., half of PCH residents spent less than this amount of time in the PCH, and half spent longer) for PCH residents was calculated for 3 two-year periods: 2011/12-2012/13, 2016/17-2017/18, and 2021/22-2022/23.

Personal Care Home (PCH) Level of Care on Admission

The distribution of levels of care assigned to PCH residents 75 years and older at the time of their admission to a provincial PCH. Level 1 represents the lowest level of need, and Level 4 represents the highest. Levels 2 and 3 are stratified by the close supervision indicator (coded as yes/no on assessment to indicate the need for close supervision due to possible behavioural issues), but due to small numbers level 4 was not stratified.

The denominator includes all Manitoba residents 75 years and older as of December 31 of each year. Region assignment in the numerator was based on postal code and municipal code prior to admission. This indicator only includes information on provincial PCH beds; federal beds are not included due to lack of information in the provincial data. Misericordia and Churchill Hospital Long Term Care patients are included in the analysis.

Time period analysis: The distribution of levels of care assigned to PCH residents who were age 75 years and older at the time of their admission was calculated for 3 two-year periods: 2011/12-2012/13, 2016/17-2017/18, and 2021/22-2022/23.

Personal Care Homes (PCH) Residents

The percent of residents aged 75 years and older who lived in a PCH for at least one day in a given year. Misericordia and Churchill Hospital Long Term Care patients are included in the analysis. Region assignment in the numerator was based on current postal code and municipal code, which was determined by the location of the PCH.

Time period analysis: The average annual percent of residents living in PCHs was calculated for 3 two-year periods: 2011/12-2012/13, 2016/17-2017/18, and 2021/22-2022/23. For each time period, the total number of PCH residents aged 75 years and older was determined and the average number of residents per year served as the numerator, while the total number of Manitoba residents aged 75 years and older as of December 31 in each year in the period was determined and the average number per year served as the denominator. The percents were age- and sex-adjusted to the Manitoba population aged 75 years and older as of December 31, 2022.

Trend analysis: The average annual percent of residents living in PCHs was calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population aged 75 years and older as of December 31, 2022.

Personal Care Home (PCH) Wait Time to Admission

The wait time (in weeks) for 50% of PCH residents aged 75 years and older for admission to a PCH after being assessed as requiring PCH placement. Adjusted medians were estimated in quantile regression models, controlling for age, sex, Regional Health Authority (RHA) (or zone/Winnipeg CA, or district/Winnipeg NC), and time period, and separate models were run for residents assessed for PCH placement while in hospital and while residing in the community. This indicator only includes information on provincial PCH beds; federal beds are not included due to lack of information in the provincial data. Misericordia and Churchill Hospital Long Term Care patients are included in the analysis. Area of residence was assigned based on where people lived prior to PCH admission.

Time period analysis: The median wait time (i.e., half of the population waited less than this amount of time, and half waited longer) for PCH admission from the hospital was calculated for 3 two-year periods: 2011/12-2012/13, 2016/17-2017/18, and 2021/22-2022/23. Median wait times were age- and sex-adjusted to the Manitoba population aged 75 years and older as of December 31, 2022.

Physician and Nurse Practitioner Use

Residents of all ages who had at least one ambulatory visit with a physician or a nurse practitioner in a fiscal year. Ambulatory visits include virtually all contacts with physicians and nurse practitioners, except during inpatient hospitalization and emergency department visits.

Time period analysis: The percent of the population with one or more ambulatory visits to a physician or nurse practitioner was calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23. For each time period, the total number of residents with at least one ambulatory visit in the year was determined and served as the numerator, while the total number of residents as of December 31 in the year was determined and served as the denominator. The percents were age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Trend analysis: The percent of the population with one or more ambulatory visits to a physician or nurse practitioner was calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Pneumococcal Immunizations

The percent of residents aged 65 and older who received an immunization for pneumonia. The figures show the cumulative percent of residents who ever had a pneumococcal vaccination, as this immunization is considered a once-in-a-lifetime event for most seniors. Pneumococcal vaccination was defined by physician tariff codes 8681-8684 or 8961 in MIMS data, and equivalent SNOMED codes in the Manitoba Immunization Registry data from PHIMS.

Time period analysis: The percent of residents with a pneumococcal shot was calculated for 3 one-year periods: 2012/13 (TP1), 2017/18 (TP2), and 2022/23 (TP3) and was age- and sex-adjusted to the Manitoba population in TP3.

Trend analysis: The percent of residents with a pneumococcal shot was calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population aged 65 and older as of December 31, 2022.

Population Pyramids

The percent (or actual number) of residents within each five–year age group (from age 0 to 90+ years) is shown for both males (on the left side of the graph) and females (on the right side). In this report, there are two types of population pyramids shown for each RHA:

a. The first pyramid is a comparison of one RHA to the Manitoba population in 2017, showing the percentage of males and females in each five–year age category. For each RHA and for Manitoba, the male plus female bars add up to 100%.

b. The second pyramid shows how each RHA has changed over time. The RHA population in 2017 is compared with that in 2022, showing the actual number of males and females in each five–year age category (males on the left, females on the right). The numbers in each of the bars add up to the total population for that RHA in each year.

Post–Acute Myocardial Infarction (AMI) Care: Beta–Blocker Dispensations

Residents aged 20 years and older hospitalized for an AMI who then filled at least one prescription for a beta–blocker within four months of hospital discharge. AMI patients were identified by a hospitalization with a diagnosis of AMI (ICD–9–CM code 410 or ICD–10–CA code I21). Beta–blocker medications were defined by ATC codes C07AA and C07AB. To be included in the analysis, patients had to be alive for the entire follow–up period. Patients with a previous hospitalization for an Acute Myocardial Infarction (AMI) in the three years prior to the index AMI hospitalization were excluded from analyses. Patients with the following diagnoses in hospital in the three years prior to the index event were also excluded from analyses because beta–blockers are contra–indicated for patients with these conditions:

- Asthma: ICD–9–CM code 493, ICD–10–CA code J45
- Chronic obstructive pulmonary disease: ICD–9–CM codes 491 and 492, ICD–10–CA codes J41–J44
- Peripheral vascular disease: ICD–9–CM codes 443 and 459, ICD–10–CA codes I73, I79.2, I87

Time period analysis: The crude percent of people who were dispensed beta blocker post AMI was calculated for 3 five-year periods: 2008/09-2012/13, 2013/14-2017/18, and 2018/19-2022/23.

Potential Years of Life Lost (PYLL)

The number of potential years of life lost per 1,000 residents aged 1 to 74 years. The PYLL value is calculated as the difference (in years) between 75 years of age and the age at death.

Time period analysis: The average annual PYLL rate per 1,000 residents was calculated for 3 five-year periods: 2008-2012, 2013-2017, and 2018-2022. For each time period, the total number of PYLL among residents aged 1 to 74 years was determined and the average number of PYLL per year served as the numerator, while the total number of residents aged 1 to 74 years as of December 31 in each year in the period was determined and the average number per year served as the denominator. The rates were age- and sex-adjusted to the Manitoba population aged 1 to 74 years and older as of December 31, 2022.

Trend analysis: The PYLL rate per 1,000 residents was calculated for each one-year period from 2003 to 2022 and was age- and sex-adjusted to the Manitoba population aged 1 to 74 years in 2022.

Premature Mortality Rate (PMR)

Deaths among residents aged 0 to 74 years.

Time period analysis: The average annual PMR per 1,000 residents was calculated for 3 five-year periods: 2008-2012, 2013-2017, and 2018-2022. For each time period, the total number of premature deaths among residents aged 0 to 74 years across all years in the period was determined and the average number of deaths per year served as the numerator, while the total number of residents aged 0 to 74 years as of December 31 in each year in the period was determined and the average number per year served as the denominator. The rates were age- and sex-adjusted to the Manitoba population aged 0 to 74 years as of December 31, 2022.

Trend analysis: The PMR per 1,000 residents was calculated for each one-year period from 2003 to 2022 and was age- and sex-adjusted to the Manitoba population aged 0 to 74 years in 2022.

Note that PMR was also calculated for a 10-year period (2011-2020) and used to set the order of the health regions (and smaller geographical areas within the health regions) in the figures and tables.

Preterm Births

Live singleton births with a gestational age of less than 37 completed weeks out of all live births coded in Manitoba hospital abstracts with ICD-10-CA code Z38. Records with gestational age missing, less than 20 weeks, or greater than 45 weeks were excluded.

Note that the definition used in previous atlases included all live births. The definition used in the current atlas limits the denominator to only live singleton births.

Time period analysis: The average annual percent of preterm births was calculated for 3 five-year periods: 2008/09-2012/13, 2013/14-2017/18, and 2018/19-2022/23. For each time period, the total number of preterm births was determined and the average number of preterm births per year served as the numerator, while the total number of live singleton births in each year in the period was determined and the average number per year served as the denominator. The percents were age- and sex-adjusted to the Manitoba population of women who gave birth to live born infants in 2022/23.

Trend analysis: The percent of preterm births was calculated for each one-year period from 2003/04 to 2022/23 and was maternal age-adjusted to the Manitoba population of women who gave birth to live born infants in 2022/23.

Self-Inflicted Injury Hospitalizations

Inpatient hospitalizations for self-inflicted injury among all residents. A resident could be hospitalized for this type of injury more than once, so this measure indicates the total number of self-inflicted injury-related hospitalizations at acute care facilities by all residents of the area. Transfers between hospitals were tracked and only hospital episodes were counted, not individual separations, to reduce double-counting injuries. Self-inflicted injury hospitalizations were identified by:

- ICD-9-CM codes E95.0-E95.9
  ICD-10-CA codes X60-X84

Hospitalizations with a diagnosis code for accidental poisoning, and injury or poisoning with undetermined intent are also included, but only if there was also a mental illness diagnosis on the same hospital record.

- Accidental poisoning diagnosis codes:
  - ICD-9-CM: E85.0-E85.4, E85.8, E86.2, E86.8
    ICD-10-CA: X44, X46, X47
- Poisoning with undetermined intent diagnosis codes:
  - ICD-9-CM: E98.0-E98.2
    ICD-10-CA: Y10-Y19
- Injury with undetermined intent diagnosis codes:
  - ICD-9-CM: E98.3-E98.8
    ICD-10-CA: Y20-Y34
- Poisoning by drugs, meds and biological substances diagnosis codes:
  - ICD-9-CM: 965, 967, 969, 977.9, 986
    ICD-10-CA: T39, T40, T42.3, T42.4, T42.7, T43, T50.9, T58
- Mental illness diagnoses include entire mental health chapter:
  - ICD-9-CM: 290-319
    ICD-10-CA: F00-F99

Time period analysis: The average annual rate of self-inflicted injury hospitalizations per 100,000 residents was calculated for 3 five-year periods: 2008/09-2012/13, 2013/14-2017/18, and 2018/19-2022/23. For each time period, the total number of self-inflicted injury hospitalizations was determined and the average number of self-inflicted injury hospitalizations per year served as the numerator, while the total number of residents in each year in the period was determined and the average number per year served as the denominator. The rates were age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Trend analysis: The rate of self-inflicted injury hospitalizations per 100,000 residents was calculated for each one-year period from 2003 to 2022 and was age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Small for Gestational Age (SGA) Births

SGA births out of all live singleton births coded in Manitoba hospital abstracts ICD-10-CA code Z37.0, Z37.2, Z37.3, Z37.5. Records with gestational age missing, less than 22 weeks, or greater than 43 weeks or birth weight missing, less than 300g or greater than 9kg were excluded.

Note that the definition used in the previous Atlas included births between 20 and 45 weeks. The current Atlas only includes births between 22 and 43 weeks to be consistent with the definition used by the Canadian Perinatal Surveillance System. In addition, the definition used in previous atlases included all live births, whereas the current atlas limits the denominator to only live singleton births.

Time period analysis: The average annual percent of SGA births was calculated for 3 five-year periods: 2008/09-2012/13, 2013/14-2017/18, and 2018/19-2022/23. For each time period, the total number of SGA births was determined and the average number of SGA births per year served as the numerator, while the total number of live singleton births in each year in the period was determined and the average number per year served as the denominator. The percents were age- and sex-adjusted to the Manitoba population of women who gave birth to live born infants in 2022/23.

Trend analysis: The percent of SGA births was calculated for each one-year period from 2003/04 to 2022/23 and was maternal age-adjusted to the Manitoba population of women who gave birth to live born infants in 2022/23.

Social and Material Deprivation Indices

Factor scores based on Canadian Census data, including the proportion of the population age 15 and older that are separated, divorced, or widowed; proportion of the population that lives alone; and proportion of the population that has moved in the past five years. Indicator variables included in material deprivation are average household income, unemployment rate for those age 15 years and older, and proportion of population age 15 years and older without high school graduation.

Social and material deprivation indices were calculated at the geographic level of Dissemination Area (DA). DAs are the smallest standard geographic unit for which Census data are collected and typically have a population of 400 to 700 people. DAs with missing values for any indicator variable had values imputed from corresponding Census subdivisions, a larger census geographic unit. First Nations communities with missing values had the weighted means from Northern or Southern First Nations communities applied. Population–weighted mean scores and 95% confidence intervals (CIs) were calculated for larger geographical regions (Regional Health Authorities (RHA), Winnipeg Community Area, etc.) and comparisons to the Manitoba average for each index were calculated via weighted t–tests. Values above zero indicate more deprivation and values below zero represent less deprivation, so negative values represent “good” results.

Time period analysis: The average social (or material) deprivation score was calculated for 3 one-year periods: 2011, 2016, and 2021.

Trend analysis: The average social (or material) deprivation score was calculated for each one-year period from 2003 to 2022.

Socioeconomic Factor Index (SEFI)

A factor score based on Canadian Census data, including average household income, proportion of single parent households, unemployment rate for those age 15 and older, and proportion of population age 15 years older without high school graduation. SEFI scores range from approximately –5 to +5, and a value of zero represents the Manitoba average with 95% of scores falling within ±2 points. Scores less than zero indicate more favourable socioeconomic conditions, while scores greater than zero indicate less ideal socioeconomic conditions].

SEFI scores were calculated in a factor analysis at the geographic level of dissemination area (DA), the smallest standard geographic unit for which all Census data are collected and typically have a population of 400 to 700 people. DAs with missing values for any indicator variable had values imputed from corresponding Census subdivisions, a larger census geographic unit. First Nations communities with missing values had the weighted means from Northern or Southern First Nations communities applied. Population–weighted mean SEFI scores and 95% CIs were calculated for larger geographical regions (Regional Health Authorities (RHA), Winnipeg Community Area, etc.) and comparisons to the Manitoba average SEFI and within region between Census years were calculated via weighted t–tests. Values above zero indicate more deprivation, and values below zero represent less deprivation, so negative values represent “good” results.

Time period analysis: The average SEFI score was calculated for 3 one-year periods: 2011, 2016, and 2021.

Trend analysis: The average SEFI score was calculated for each one-year period from 2003 to 2022.

Strokes

Hospitalizations or deaths due to stroke among residents aged 40 years and older.

Stroke was defined by either of the following:

- A hospitalization with a most responsible diagnosis code for stroke:
- ICD-9-CM codes 431, 434, or 436 or ICD-10-CA codes I61, I63, I64 and a length of stay greater than or equal to one day (unless the patient died from the stroke, in which case they are included regardless of length of stay), or
- Stroke listed as the cause of death in Vital Statistics files.

Transfers between hospitals were tracked and only hospital episodes were counted, not individual hospitalizations, to reduce double–counting.

Time period analysis: Average annual stroke rates per 1,000 residents were calculated for 3 five-year periods: 2008-2012, 2013-2017, and 2018-2022. For each time period, the total number of strokes among residents 40 years and older was determined and the average number of strokes per year served as the numerator, while the total number of residents aged 40 years and older as of December 31 in each year in the period was determined and the average number per year served as the denominator. The rates were age- and sex-adjusted to the Manitoba population aged 40 years and older as of December 31, 2022.

Trend analysis: Annual stroke rates per 1,000 residents were calculated for each year from 2003 to 2022 and were age- and sex-adjusted to the Manitoba population aged 40 years and older as of December 31, 2022.

Substance Use Disorders

Residents aged 10 years and older with a substance use disorder. Substance use disorder includes those for alcohol, opioids, cannabis, sedatives/hypnotics, cocaine, stimulants, hallucinogens, tobacco, solvents, psychoactive agents, and harmful use of non-dependent substances. These were identified in a five-year period using the following definition:

- One or more hospitalizations:
  - ICD-9-CM codes 291, 292, 303, 304, 305
    ICD-10-CA codes F10–F19, F55, or
- One or more physician visits:
  - ICD-9-CM code 291, 292, 303, 304, 305

Time period analysis: Prevalence of substance use disorders was calculated for 3 five-year periods: 2008/09-2012/13, 2013/14-2017/18, and 2018/19-2022/23. For each time period, the total number of residents aged 10 years and older identified with a substance use disorder was determined and served as the numerator, while the total number of residents aged 10 years and older as of December 31 in 2010, 2015, and 2020 served as the denominators for the first, second, and third time periods, respectively. The prevalences were age- and sex-adjusted to the Manitoba population aged 10 years and older as of December 31, 2022.

Trend analysis: Prevalence of substance use disorders was calculated for 4 five-year periods starting from 2003/04-2007/08 and ending at 2018/19-2022/23. All periods were age- and sex-adjusted to the Manitoba population aged 10 years as of December 31, 2020 (midpoint year of the five-year time period).

Suicide Deaths

Deaths due to suicide among residents aged 10 years and older. Suicide was defined as a death recorded in Vital Statistics Mortality data with any of the following ICD-10-CA codes:

- X60-X84 Intentional self-harm
- Y87.0 Late effects of intentional self-harm
- Y10-Y19 Poisoning of undetermined intent
- Y20-Y34 Other events of undetermined intent
- Y87.2 Late effects of other events of undetermined intent

A relatively ‘inclusive’ definition was used in an attempt to overcome suspected undercounting of suicides in administrative data; however, deaths due to accidental poisoning were excluded.

Time period analysis: The average annual rate of deaths caused by suicide per 10,000 residents was calculated for 3 five-year periods: 2008-2012, 2013-2017, and 2018-2022. For each time period, the total number of suicide deaths among residents aged 10 years and older was determined and the average number of suicide deaths per year served as the numerator, while the total number of residents aged 10 years and older as of December 31 in each year in the period was determined and the average number per year served as the denominator. The rates were age- and sex-adjusted to the Manitoba population aged 10 years and older as of December 31, 2022.

Trend analysis: The rate of deaths caused by suicide per 10,000 residents was calculated for each one-year period from 2003 to 2022 and was age- and sex-adjusted to the Manitoba population 10 years of age or older as of December 31, 2022.

Teen Births

Births among females aged 15 to 19 years. Births were defined as live births in Manitoba hospitals with ICD-9-CM diagnosis codes V27.0, V27.2, V27.3, V27.5, V27.6, or ICD-10-CA diagnosis CA codes Z37.0, Z37.2, Z37.3, Z37.5.

Time period analysis: The average annual teen birth rates per 1,000 females were calculated for 3 five-year periods: 2008/09-2012/13, 2013/14-2017/18, and 2018/19-2022/23. For each time period, the total number of teen births among females aged 15 to 19 years was determined and the average number of teen births per year served as the numerator, while the total number of females aged 15 to 19 years as of December 31 in each year in the period was determined and the average number per year served as the denominator. The rates were age- and sex-adjusted to the Manitoba population aged 15 to 19 years and older as of December 31, 2022.

Trend analysis: The teen birth rates per 1,000 females were calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba female population aged 15 to 19 years as of December 31, 2022.

Teen Pregnancies

Pregnancies among females aged 15 to 19 years. This included live births, still births, ectopic pregnancies, abortions and miscarriages, and was defined by a hospitalization in Manitoba with ICD-9-CM diagnosis codes V27, 632, 633, 634, 635, 636, 637, 656.4, ICD-10-CA diagnosis codes Z37, O00, O02.1, O03, O04, O05, O07, O08, or O36.4, ICD-9-CM intervention codes 66.62, 69.01, 69.51, 72.x, 73.x, 74.x, 75.x, or CCI codes 5.CA.xx, 5.MD.5, or 5.MD.60. Note that abortions performed in private clinics were not included in the count of teen pregnancies.

Time period analysis: The average annual teen pregnancy rates per 1,000 females were calculated for 3 five-year periods: 2008/09-2012/13, 2013/14-2017/18, and 2018/19-2022/23. For each time period, the total number of teen pregnancies among females aged 15 to 19 years was determined and the average number of teen pregnancies per year served as the numerator, while the total number of females aged 15 to 19 years as of December 31 in each year in the period was determined and the average number per year served as the denominator. The rates were age- and sex-adjusted to the Manitoba population aged 15 to 19 years and older as of December 31, 2022.

Trend analysis: The teen pregnancy rates per 1,000 females were calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba female population aged 15 to 19 years as of December 31, 2022.

Total Mortality Rate (TMR)

Deaths among all residents.

Time period analysis: The average annual TMR per 1,000 residents was calculated for 3 five-year periods: 2008-2012, 2013-2017, and 2018-2022. For each time period, the total number of deaths was determined and the average number of deaths per year served as the numerator, while the total number of residents in each year in the period was determined and the average number per year served as the denominator. The rates were age- and sex-adjusted to the Manitoba population in 2022.

Trend analysis: The TMR per 1,000 residents was calculated for each one-year period from 2003 to 2022 and was age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Total Respiratory Morbidity (TRM)

Residents of all ages with a respiratory disease (asthma, chronic or acute bronchitis, emphysema, or chronic airway obstruction) defined by either of the following:

- One or more hospitalizations:
  - ICD-9-CM codes 466, 490, 491, 492, 493, 496
    ICD-10-CA codes J20, J21, J40-J45, or
- One or more physician visits:
  - ICD-9-CM codes 466, 490, 491, 492, 493, 496

Time period analysis: Prevalence was calculated for 3 one-year periods: 2012/13, 2017/18, and 2022/23. For each time period, the total number of residents identified with TRM was determined and served as the numerator, while the total number of residents as of December 31 in each year in the period was determined and served as the denominator. The prevalences were age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Trend analysis: Prevalence was calculated for each one-year period from 2003/04 to 2022/23 and was age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Travelling to Give Birth

Information regarding where women went to give birth by the following categories:

- Percent delivered at a maternity hospital in their home region,
- Percent delivered at a maternity hospital in another region,
- Percent delivered in a Winnipeg maternity hospital, and
- Percent delivered in a non-maternity hospital.

This indicator included live births and stillbirths coded in Manitoba hospital abstracts with ICD10-CA code Z37.

Time period analysis: The crude percent of births by location of delivery categories was calculated for 3 two-year periods: 2011/12-2012/13, 2016/17-2017/18, and 2021/22-2022/23.

Unintentional Injury Causing Death

Deaths caused by unintentional injuries among all residents. Unintentional injuries were defined as a death recorded in the Vital Statistics Mortality data with any of the following ICD-10-CA codes in the chapter ‘External Causes of Morbidity and Mortality’:

- V01-Y98 excluding any overlap with ICD-10-CA codes related to suicide listed in section 3.10.

Time period analysis: The average annual rate of deaths caused by unintentional injury per 10,000 residents was calculated for 3 five-year periods: 2008-2012, 2013-2017, and 2018-2022. For each time period, the total number of unintentional injury causing deaths was determined and the average number of unintentional injury causing deaths per year served as the numerator, while the total number of residents in each year in the period was determined and the average number per year served as the denominator. The rates were age- and sex-adjusted to the Manitoba population in 2022.

Trend analysis: The rate of deaths caused by unintentional injury per 10,000 residents was calculated for one-year periods from 2003 to 2022 and was age- and sex-adjusted to the Manitoba population as of December 31, 2022.

Urine Albumin-Creatine Ratio (ACR) Lab Tests

ACR lab tests among residents aged 40 years and older. In any given period, a resident could have had more than one ACR test.

Time period analysis: ACR test rates per 1,000 residents were calculated for 3 one-year periods: 2011/12, 2016/17, and 2021/22. For each time period, the total number of ACR tests was determined and served as the numerator, while the total number of residents aged 40 years and older as of December 31 in the year was determined and served as the denominator. The rates were age- and sex-adjusted to the Manitoba population aged 40 years and older on December 31, 2021.

Trend analysis: ACR test rates per 1,000 residents were calculated for each one-year period from 2006/07-2021/22 and was age- and sex-adjusted to the Manitoba population in aged 40 years and older as of December 31, 2021.

Vaginal Births after Caesarean Section (VBAC)

VBACs among females with a previous Caesarean Section. VBACs were defined as a:

- Obstetric hospitalization with a diagnosis of vaginal birth (ICD-9-CM V27 or ICD-10-CA code Z37) in the absence of a Caesarean section (CCI code 5.MD.60) and with a previous hospitalization for a Caesarean section (ICD-9-CM diagnosis code 654.2, or ICD-10-CA diagnosis code O34.20, or ICD-9-CM procedure codes 74.0, 74.1, 74.2, 74.4, 74.9 or CCI code 5.MD.60), or
- Obstetric hospitalization with a diagnosis for vaginal birth and a diagnosis for vaginal birth after Caesarean section (ICD-10-CA code O75.7).

The denominator for the percent calculation includes all females who ever had a previous Caesarean section delivery and had a subsequent delivery during the five-year time period (or fiscal year for trend analysis) in Manitoba hospitals. Live births and stillbirths are included. If women had more than one delivery, one is randomly chosen to only count women once per time period (or fiscal year).

Time period analysis: The average annual percent of VBAC was calculated for 3 five-year periods: 2008/09-2012/13, 2013/14-2017/18, and 2018/19-2022/23. For each time period, the total number of VBACs was determined and the average number of VBACs per year served as the numerator, while the total number of females with a previous Caesarean section in each year in the period was determined and the average number per year served as the denominator. The percents were age- and sex-adjusted to the Manitoba population females with a previous Caesarean section as of December 31, 2022.

Trend analysis: The percent of VBAC was calculated for each one-year period from 2003/04 to 2022/23 and was maternal age-adjusted to the Manitoba population of women who gave birth in 2022/23.

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