

BC Chronic Disease Dashboard Data Notes

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Introduction

Chronic non-communicable diseases substantially decrease the quality of life for patients and account for a large proportion of increasing healthcare costs. Monitoring patterns and trends of chronic diseases provides critical information for public health actions (disease prevention, health protection, and health promotion) and healthcare planning. Since the 1990s, the British Columbia Chronic Disease Registries (BCCDR) have been released each year to measure chronic disease burdens in BC, measure health inequalities, and support clinical and public health research. Each year, the data are produced and released around April by the Office of the Provincial Health Officer (OPHO), with each version named according to the most recent fiscal year included. Incidence and prevalence estimates from the registry are reported from the 2001/02 fiscal year onward; for example, estimates from v2024/25 include data from April 1, 2001 to March 31, 2025.

v2024/25 updates

- A new condition, opioid use disorder, has been added to the BC Chronic Disease Registry. Measures of incidence, lifetime prevalence, and active prevalence are now available.
- A minor correction was made to the chronic kidney disease (CKD) algorithm. This change has a very small impact on reported crude rates, and further improvements to the CKD definition are ongoing.
- The registry now uses the 2021 Canadian population as the standard for calculating age-standardized rates, applied across all years. As a result, rates from this version are not directly comparable to those from previous releases.

Data sources

The BCCDR utilizes health care administrative data to determine the incidence and prevalence of chronic conditions in the province. The list below summarizes the main data sources and their purpose.

- Client Roster: A record of people who are registered in the BC healthcare system.
- Medical Services Plan (MSP): Information on all medically required services, including general practitioners and specialist visits, laboratory services, and diagnostic procedures.
- PharmaNet (PNET): Records for prescription drugs and benefit non-prescription drugs/medical supplies/devices dispensed to patients at community pharmacies in BC.
- Discharge Abstract Database (DAD): Abstract summaries of patient hospital stays.
- The National Ambulatory Care Reporting System (NACRS): Provides patient-level data on ambulatory care services, including emergency department visits, day surgeries, and care at medical and surgical day clinics in hospitals, community settings, and private clinics. This source is currently only used for atrial fibrillation and opioid use disorder.

Overall Methodology

Chronic disease case definitions are determined using health care system usage data. This data is obtained from administrative health service data holdings. The Client Roster data holding is used to obtain a record of people who use the BC health care system; it contains information on people who live or have lived in BC over time, specifically focusing on people who have registered in the health care system with a Personal Health Number. Health care system data is obtained for each person, including data on MSP, prescription drugs, hospitalizations, and ambulatory care services. This information is then used to assign chronic disease cases based on their definitions, and to calculate disease incidence and prevalence in the province. For osteoarthritis, for example, patients are ascertained as a case if they have one or more hospitalizations with osteoarthritis diagnosis codes, or two or more practitioner claims within one year with osteoarthritis diagnosis codes.

The trends and distributions of incidence and prevalence of chronic conditions are then reported according to BC health boundaries, age groups, sex, and urban/rural classifications.

The following conditions are included in the BCCDR (27 chronic conditions, including 12 relapsing-remitting diseases indicated by an asterisk*):

- Chronic respiratory diseases: Asthma*, chronic obstructive pulmonary disease
- Cardiovascular diseases: Acute myocardial infarction*, atrial fibrillation and flutter, heart failure, ischemic heart disease, stroke*, hemorrhagic stroke*, ischemic stroke*, transient ischemic attack*
- Neurological disorders: Alzheimer's disease and other dementias, epilepsy, multiple sclerosis, Parkinson's disease/Parkinsonism
- Mental and substance use disorders: Depression*, mood and anxiety disorders*, schizophrenia and delusional disorders*, substance use disorder*, opioid use disorder*
- Musculoskeletal disorders: Gout*, osteoarthritis, osteoporosis, rheumatoid arthritis, juvenile idiopathic arthritis
- Diabetes and kidney diseases: Diabetes, chronic kidney disease, hypertension

Terms and definitions

Case definitions

A person is identified as having one of the chronic conditions in this report if they meet the criteria set out in the case definition for that specific condition. While the definitions are different for each condition, a typical case might be identified if the person has had a hospitalization diagnosis, a physician diagnosis, or drug utilization (i.e. from a pharmacy) - either alone or in combination - with a specified time frame relative to the year in question. For example, if a person has a hospitalization or two physician visits in any one year for asthma, or

one physician visit and two asthma prescriptions in any single year, then they are considered as a case in every subsequent year. The detailed definitions for each condition can be found at this [link](#).

Case definition criteria may be revised over time in response to new validation studies, new data sources, or new chronic disease surveillance or chronic disease management requirements. Where possible, case definitions used for national surveillance through the Canadian Chronic Disease Surveillance System (CCDSS) are adopted.

Incidence

This measures the number and rate of people who have been newly diagnosed with the condition during a specific year - for example, all the people who never had asthma previously, but who were diagnosed with asthma during 2014/15. The incidence rate is the number of incident cases divided by the population-at-risk during a specific year. Notably, the population-at-risk excludes the people who have been previously diagnosed with asthma.

Lifetime prevalence

This represents the proportion of people who have had and sought healthcare services for a condition for at least part of their lives at any time during their life course. For example, the number of lifetime prevalent cases for asthma in 2014/15 represents all the people that developed asthma in 2014/15 (incidence) along with all the people living with asthma that were diagnosed in a previous year and were still alive and residing in the province in 2014/15. Lifetime prevalence is the number of all prevalent cases divided by the total population in that year.

Episodic prevalence

Episodic prevalence (also termed active prevalence) is reported for relapsing-remitting conditions only (i.e., conditions that people may recover from such as depression, asthma, stroke). Episodic prevalence measures the proportion of the population that meet the full case definition for a given condition and that have a record of seeking healthcare services for a condition in a reporting period of interest. For example, if someone were to meet the case definition for depression in the previous fiscal year and had an additional physician visit during a later reporting year for a depression-related service, they would be captured in episodic prevalence estimates. This measure is useful for describing the existing burden of service utilization directly related to relapsing-remitting diseases. Episodic prevalence is the number of active prevalent cases divided by the total population in that year.

Population

This refers to all people of relevant age (varies for each condition) in a given geography and year who were BC residents and had a record of being enrolled in MSP for at least one day in the middle of the reporting period.

Population-at-risk

This is a subset of the population and reflects those at risk of developing a condition.

Crude rate

These rates are not adjusted to the standard population and represent the number of cases in a specific geographic region divided by the population/population-at-risk in that region. Crude rates are representative of the burden of disease in the population.

Age-standardized rate

To account for differences in the age structure of different geographical regions, rates are calculated as if all regions shared the same age structure, that of the Canada's 2021 population estimates. Age-standardized rates are appropriate for comparing regions or trends over time. They are not a good representation of the burden of disease in the population.

Confidence intervals

The rates and proportions of diseases in this report should be thought of as estimates and therefore may not represent the true rate in a given place and time. Confidence intervals (CIs) are the upper and lower limits within which the true value probably lies. For example, if the asthma incidence for BC in 2014/15 is 5.94, with narrow CIs of 5.87 and 6.02, you can be very confident in that stated incidence. However, wide CIs may suggest that there is uncertainty in the estimate. In this report, 95% CIs are used, which means that the true value should lie between the CIs 95% of the time.

Fiscal year

The Ministry of Health and all health authorities in BC report for the year starting April 1 and ending March 31. For example, the 2014/15 fiscal year includes all cases identified between April 1, 2014 to March 31, 2015.

Urban/Rural Classification

Urban and rural assignments are based on Community Health Service Areas (CHSAs), which are local geographic units within BC's regional health authorities. CHSAs vary in population size, with a mean of 21,617 residents, ranging from 501 residents in Telegraph Creek (Northern Health) to 81,098 residents in Whalley (Fraser Health). The population within each CHSA is assigned to one of seven categories (Metropolitan, Large Urban, Medium Urban, Small Urban, Rural Hub, Rural, and Remote). These are rolled up into two tiers reported in the dashboard:

Urban (Metropolitan, Large Urban, Medium Urban, Small Urban) and Rural (Rural Hub, Rural, and Remote).

A CHSA categorization is determined by its values for two Statistics Canada metrics: 1) Population Centre and 2) Index of Remoteness and is based primarily on the size and spread of population centers within the bounds of each CHSA.

Limitations

COVID-19 pandemic

Incidence measures in the dashboard were influenced by the COVID-19 pandemic during fiscal years 2020/21, 2021/22, and 2022/23. Changes in such measures may be driven by multiple factors, including (but not limited to) changes in healthcare seeking behavior, the availability, accessibility, and patterns of use of healthcare services, as well as true changes in health status. As a result, estimates during the pandemic should be interpreted with caution.

Morbidity case definitions

While many case definitions have been validated in other Canadian jurisdictions or internationally, no case definitions have been validated in BC due to the lack of access to gold standard patient data. We expect the case definitions, especially definitions validated in other Canadian jurisdictions, to perform reasonably well in BC because of the similarities in overall healthcare systems. In some cases, we modified the case definitions after consulting with clinicians (physicians, nurses, and pharmacists), due to the differences in public health insurance coverage, disease coding, physician billing, and information management.

Case algorithms based on administrative data are never 100% sensitive (sensitivity is the ability to completely identify all cases of a given disease – true positives) or 100% specific (specificity is the ability to correctly identify non-cases – true negatives). Only persons using the BC healthcare system (primary care, hospital care, and/or Pharmacare) can be identified as a chronic disease case. If a person does not use these services, there will be no diagnostic or treatment information available to qualify that person as a case. Also, individuals that were diagnosed in another province or another country and never used healthcare in BC for the conditions will not be identified as cases. Therefore, undiagnosed or untreated cases of disease will not be included in chronic disease estimates. As such, the chronic disease counts and rates/proportions may underestimate the actual number of cases in the province.

Prevalent cases misclassified as incident cases

Incident cases identified in the BCCDR might have been diagnosed with a chronic disease before the BC Ministry of Health (MoH) data holdings started operating in 1992/93. In other words, many incident cases identified by BCCDR algorithms in early years were actually prevalent cases. This is reflected by the high incidence values for many diseases in the first few years of

the BCCDR and a trend of significant incidence decline over time during this period (i.e., reporting washout period). Therefore, the recommended reporting period for incidence and prevalence is from 2001/02 onwards.

Data source update

Administrative data sources at the Ministry of Health are updated periodically, resulting in small changes of individual records. Every effort has been made to minimize the impacts of these updates on the BCCDR (e.g., creating snapshots of data sources), but discrepancies cannot be ruled out. The lack of complete synchronization among data sources might create discrepancies in some variables such as date of birth, place of residence, and service date. There is also a small proportion of records with unknown sex, date of birth, or health boundary assignment in the source tables. No imputations are conducted for these missing values when the BCCDR is created. Cases with unknown sex or health boundary assignment values are included in the total number of cases at the provincial level, but reporting on measures for unknown stratifiers such as health boundary specifically may not be meaningful and is likely misleading.

Sex and gender-based analysis

The chronic disease dashboard presents information stratified by sex as recorded in administrative databases. Information on gender is currently unavailable in the BCCDR.

Health boundary changes

Community Health Service Areas (CHSAs) are generated using Dissemination Block (DB) boundaries for the Canada Census in 2021 (i.e., a DB-CHSA relationship table). Due to DB boundary changes over time, applying these boundaries to residential addresses in previous and later years might have resulted in CHSA misassignments (i.e., Local Health Area/Health Service Delivery Area/Health Authority misassignments) for these time periods.

NACRS as a data source for surveillance

Not all emergency departments (EDs) in BC report to NACRS, and reporting varies by Regional Health Authority. Caution is advised when comparing jurisdictions or reporting at the provincial level. In the BCCDR, NACRS is used for only two conditions: 1) Atrial Fibrillation and Flutter where ED diagnoses are reliable due to standardized coding and diagnostic testing and 2) opioid use disorder, a condition for which there is a high utilization of emergency health services and a significant underrepresentation in administrative health data overall. The inclusion of NACRS as an additional data source in these two definitions helps to reduce geographic differences related to NACRS coverage.

CHSA urban-rural classification limitations

The CHSA urban-rural methodology is sensitive to small population changes, so updates using new census data can cause significant shifts in classification. While provincial measures and

Health Authority input help guide thresholds, a few CHSAs may still be classified in ways that don't align with local perspectives

Historical changes

v2023/24 updates

- The chronic condition of Atrial Fibrillation & Flutter (AFib) was added to the BCCDR and the dashboard. Incorporating AFib required the use of a new data source in the case identification algorithm: the National Ambulatory Care Reporting System (NACRS), which captures emergency department visits.
- A new Urban/Rural (2-tier) stratification option was added to the dashboard and is available for chronic disease estimates at the provincial and Regional Health Authority levels.
- BCCDR case identification algorithms were updated to capture chronic conditions identified through Medical Services Plan records billed under the new Longitudinal Family Physician payment model that was implemented February 1, 2023. As a result, reported incidence estimates for some conditions in the 2022/23 fiscal year may differ when compared to the previous version of the Chronic Disease Dashboard.
- Individuals with reported ages of older than 110 years are now excluded from the BCCDR.
- Minor errors in case identification algorithms have been corrected affecting historical estimates (2001/02–2022/23) for Juvenile Arthritis, Rheumatoid Arthritis, Multiple Sclerosis, and Schizophrenia.

v2022/23 updates

- The Longitudinal Family Physician (LFP) payment model came into effect in BC on February 1, 2023, which may impact incidence rates of some chronic conditions that are identified primarily through Medical Services Plan billing records in the BCCDR. The impacts on annual rates in the 2022/23 fiscal year are not expected to be large because this change has only been in effect for two months of the current data release (February and March 2023). Potentially larger effects in subsequent data cycles will be closely monitored and reported.
- As of 2022, the Canadian Institute for Health Information requires hypertension to be recorded whenever documented by a physician or primary care provider, regardless of significance. This has led to a notable increase in hospital-based hypertension records in fiscal year 2022/23 which at least partially explains the rise in hypertension in the 2022/23 dashboard data. This coding change may lead to future revisions to the algorithm used to identify cases.
- The diabetes case definition was updated such that all diabetes medications except insulin now require confirmation of being prescribed within one year of a practitioner visit with a diabetes mellitus diagnostic code to be considered in the case detection algorithm. This prevents off-label use of diabetes medications from being used to identify cases. This

change is applied across all years displayed on the dashboard. Rates from more recent years may appear lower if compared to data obtained from past dashboard versions.

- The chronic kidney disease (CKD) case definition was modified such that four ICD codes were excluded that are not related to the condition (V564-V567) and ICD code V4510 was changed to V451. These changes did not have a notable impact on CKD case numbers.

v2021/22 updates

- The Alzheimer's disease and other types of dementia case definition was updated to include more specific diagnosis codes (e.g., code 294 replaced with 294.1 and 294.2).
- Age standardized rates now use Statistics Canada's 2011 postcensal population estimates, replacing the previous cycle's unadjusted census counts from 2011.
- Highest reported age group is now ≥ 90 years old (previously ≥ 95 years old) due to a change in the data source for age standardized rates.
- Lifetime prevalence rates for Juvenile Arthritis now exclude cases exceeding 15 years of age (previously, all cases were included regardless of age).
- Incidence rate denominator is now calculated as reporting year's prevalent cases minus the reporting year's incident cases (previously, the sum of all prior years' incident cases was used).