

Knowledge Update

Topic	Chronic Disease Forecasting
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Key messages

- Forecasting the prevalence of chronic diseases provides critical input for medium-term public health planning, health system capacity assessment, and resource prioritization in British Columbia. Population aging is expected to substantially increase the number of people living with chronic conditions over the next five years.
- Reliable forecasting requires methods that explicitly account for projected changes in the population age and sex structure while remaining flexible enough to capture evolving epidemiologic trends. Generalized additive models incorporating age- and sex-specific population projections offer a robust and scalable approach.
- Of the 27 chronic conditions tracked in the BC Chronic Disease Registry (CDR), 19 are forecasted to experience mild to moderate increases in prevalence between fiscal years 2025/26 and 2029/30. These include several high-burden conditions (hypertension, osteoarthritis, ischemic heart disease, and diabetes mellitus) that account for a substantial proportion of chronic disease-related healthcare utilization.
- Active prevalence of mood and anxiety disorders, which increased during the COVID-19 pandemic period, is forecasted to decline and return toward pre-pandemic levels by fiscal year 2029/30, suggesting a partial normalization of service-related burden for these conditions.

Background

Chronic diseases are major contributors to morbidity, premature mortality, and healthcare system costs.[1] In British Columbia, the burden of chronic disease has increased steadily over the past two decades. In 2022/23, 67% of women and 60% of men had a lifetime record of at least one common chronic condition, compared with 59% and 47%, respectively, in 2002/03.[2] Multimorbidity is also increasing, affecting more than one-quarter of adults overall and more than half of adults aged 65 years and older.[3]

Understanding how the prevalence of chronic diseases may evolve in the near future is essential for surveillance, prevention planning, and health system readiness. This is particularly important in the context of demographic change in British Columbia, where population aging is expected to accelerate over the coming decade. Forecasting provides decision-makers with a forward-looking evidence base that complements retrospective surveillance and supports proactive planning.

Forecasting methodology

Statistical forecasting methods can be applied to historical surveillance data to estimate future prevalence of chronic diseases under the assumption that recent trends continue. While overall population projections are informative, accurate forecasting requires explicit consideration of age and sex, as the prevalence of many chronic conditions varies substantially across these dimensions.[4] B.C. Stats produces age- and sex-specific population projections using census data, immigration patterns, and demographic analysis (see data sources section). Incorporating these projections ensures that our estimates of future chronic disease prevalence reflect population aging and demographic change, rather than relying solely on trends in past prevalence.

This report presents forecasts for 27 chronic conditions captured in the BC Chronic Disease Registry (CDR), produced and maintained by the Office of the Provincial Health Officer (OPHO). Conditions were selected on the basis of data availability and public health relevance. Disease-specific case definitions are applied consistently across time and rely on administrative health data, including hospitalizations, physician billings, and prescription drug dispensations, either alone or in combination, depending on the condition.[5]

Two types of prevalence are included (Table 1):

- **Lifetime prevalence**, where individuals remain classified as cases in all subsequent years after first meeting the case definition.
- **Active prevalence**, used for relapsing-remitting conditions, where cases are counted only in years with evidence of ongoing condition-related healthcare utilization.

Both measures are expressed as crude prevalence, defined as the proportion of the population meeting the case definition in a given fiscal year.

Table 1- Chronic diseases from BC Chronic Disease Registries with estimated forecasts in this report. The number in brackets indicates the age restriction for case definition.

Lifetime Prevalence Conditions	Active Prevalence Conditions
Alzheimer's and Dementia (40+)	Acute Myocardial Infarction (20+)
Atrial Fibrillation (18+)	Asthma (1+)
Chronic Kidney Disease (1+)	Mood and Anxiety Disorders (1+)
Chronic Obstructive Pulmonary Disease (35+)	Depressive Disorders (1+)
Diabetes (1+)	Gout (20+)
Epilepsy (1+)	Hospitalized Stroke (20+)
Heart Failure (1+)	Hospitalized Haemorrhagic Stroke (20+)
Hypertension (20+)	Hospitalized Ischemic Stroke (20+)
Ischemic Heart Disease (20+)	Hospitalized Transient Ischemic Attack (20+)
Juvenile Idiopathic Arthritis (0-15)	Schizophrenia and Delusional Disorders (10+)
Multiple Sclerosis (20+)	Substance Use Disorders (1+)
Osteoarthritis (1+)	Opioid Use Disorders (12+)
Osteoporosis (50+)	
Parkinson's Disease (40+)	
Rheumatoid Arthritis (1+)	

Age- and sex-specific prevalence was calculated annually from fiscal years 2001/02 to 2024/25 using population estimates from BC Stats. Age was grouped into standard surveillance categories (1–19, 20–34, 35–49, 50–64, 65–79, 80+), with adaptations made where disease-specific age restrictions applied. For forecasting, BC Stats population projections were used as denominators, as projected MSP Client Roster counts are not available. As a result, prevalences shown here may differ slightly from published CDR estimates for recent years.

Forecasts were generated using generalized additive negative binomial models fitted separately for each condition. Annual case counts by age group and sex were used as outcomes, with age group, sex, and their interaction included as fixed effects. Smooth functions were specified to capture non-linear temporal trends, and age- and sex-specific population sizes were incorporated as offsets. Forecasts were produced five years beyond the most recent observed data, and uncertainty was quantified using simulation-based 95% prediction intervals.

Forecasting results

Overall, the modelling approach produced plausible and interpretable prevalence forecasts for most conditions examined (Figure 1). Conditions with very low prevalence, such as juvenile idiopathic arthritis, exhibited greater uncertainty, reflected in wider prediction intervals. Nineteen

of the 27 chronic conditions are projected to increase in prevalence over the five-year forecasting window. Except for substance use disorders, these increases primarily occur in conditions strongly associated with aging, including cardiovascular diseases and musculoskeletal conditions. Given their already high baseline prevalence, even modest percentage increases translate into substantial absolute growth in the number of affected individuals.

In contrast, depressive disorders and mood and anxiety disorders are projected to decline in active prevalence following peaks observed during the COVID-19 pandemic period (2020–2022). These patterns may reflect changes in healthcare-seeking behaviour, service availability/accessibility/use, and/or changes in population mental health after the pandemic.

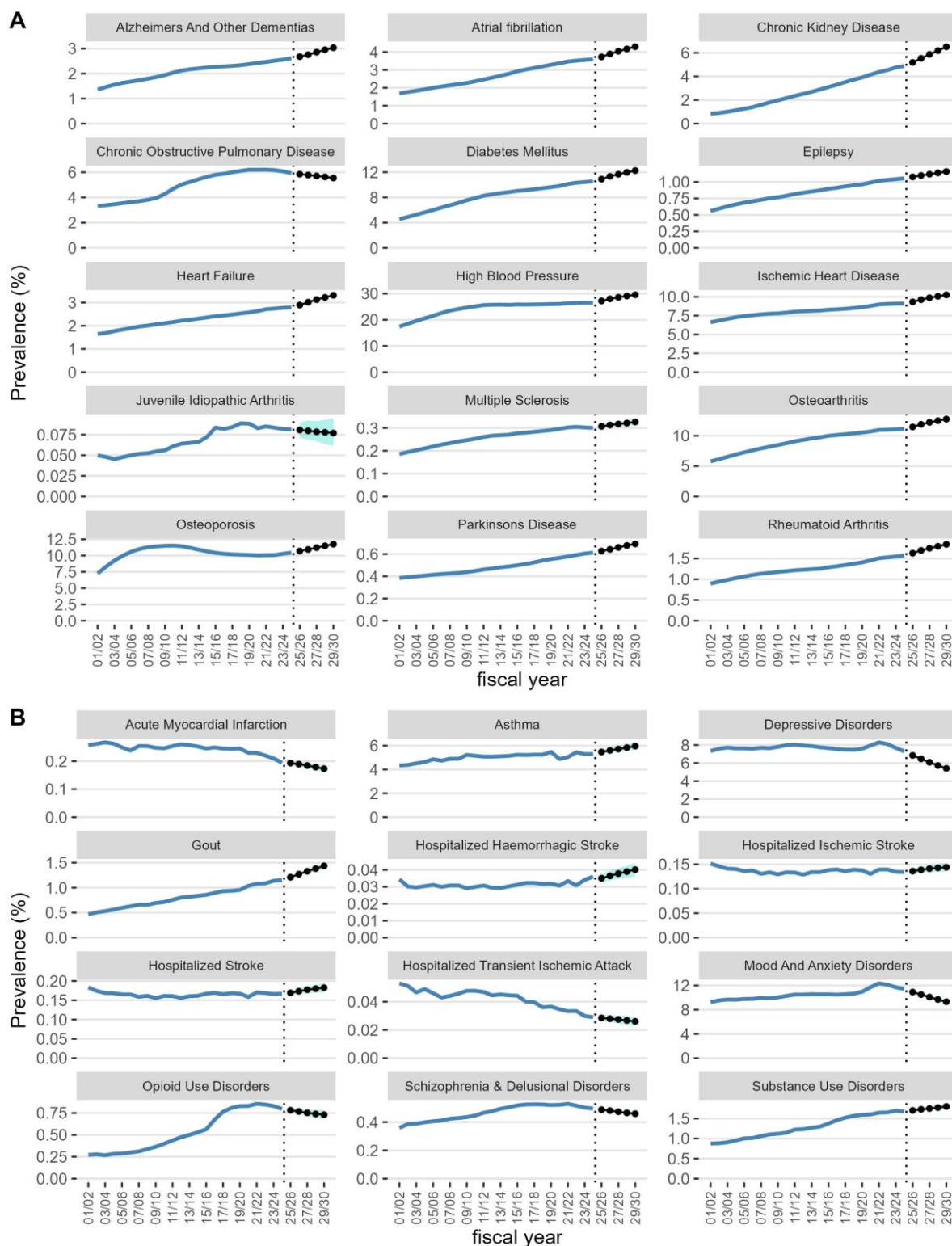


Figure 1- Historical and forecasted prevalences for lifetime (A) and active (B) prevalence conditions. Historical observations are shown as blue lines while the forecasted values are shown as black points with 95% prediction intervals indicated by light blue shading. For most conditions, the large population denominators result in extremely narrow prediction intervals that are visually indistinguishable from the forecast point estimates, unlike some age-restricted conditions where smaller population denominators contribute to greater uncertainty.

Stratified results illustrate how overall trends mask important heterogeneity by age and sex. Using gout as an example (Figure 2), overall active prevalence is forecasted to increase modestly over time. However, prevalence remains highest among older adults and males. Forecasted case counts further highlight that the largest absolute burdens arise in age groups with both elevated prevalence and large population size, underscoring the importance of integrating demographic projections into forecasting models.

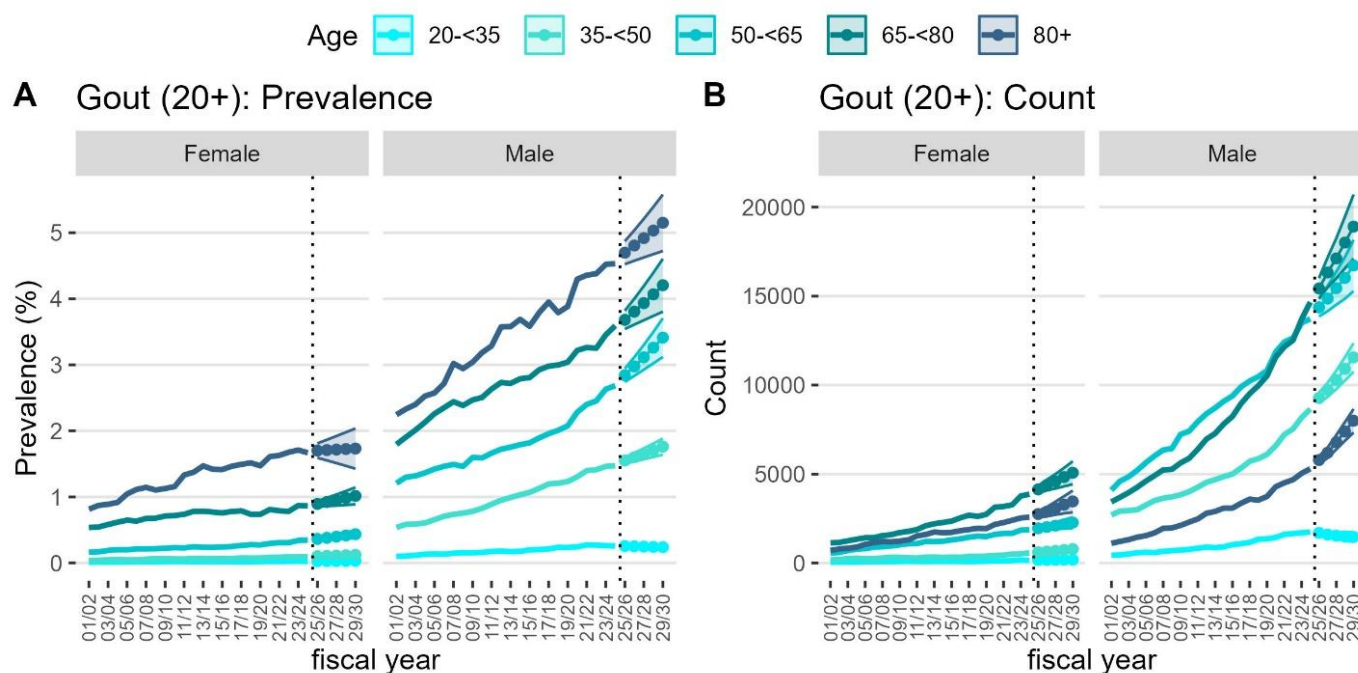


Figure 2- Historic prevalences and forecasted active prevalence of gout (A) and historic and forecasted counts of active gout cases (B). Historic observations are shown as solid lines while the forecasted values are shown as points with 95% prediction intervals as shading.

Limitations

These forecasts are subject to several limitations. Most importantly, they assume that historical patterns observed in the data will continue over the forecasting horizon. Unexpected changes—such as new screening programs, major therapeutic innovations, shifts in clinical and/or coding practices, or population-level shocks—could alter estimated disease trajectories.

Limitations associated with the CDR are delineated in the BCCDC Chronic Disease Dashboard's data notes ([Chronic Disease Dashboard](#)). In addition, the CDR captures diagnosed conditions among individuals who interact with the healthcare system and therefore does not fully enumerate

undiagnosed disease. As a result, true population prevalence may be underestimated for some conditions. Lastly, conditions were modelled independently, despite the growing importance of multimorbidity in aging populations. Ongoing work is exploring approaches to forecasting multimorbidity patterns and their implications for health system planning.

Conclusion

The burden of many chronic diseases in BC is expected to continue to grow. Generalized additive negative binomial models incorporating age- and sex-specific population projections provide a flexible and interpretable framework for forecasting chronic disease prevalence in British Columbia. This approach supports estimation of both prevalence and absolute case counts and can be readily updated as new data become available. Forecast outputs can be stratified to inform surveillance, service planning, and equity-focused analyses, making them a valuable addition to the chronic disease surveillance toolkit.

Supporting Information

Acknowledgements

We acknowledge the Title and Rights of BC First Nations who have cared for and nurtured the lands, air and waters for all time, including the [xʷməθkʷəyəm \(Musqueam\)](#), [Skwxwú7mesh Úxwumixw \(Squamish Nation\)](#), and [səlílwətaʔ \(Tsleil-Waututh Nation\)](#) on whose unceded, occupied, and ancestral territory BCCDC is located. As a provincial organization, we also recognize and acknowledge the inherent Title and Rights of BC First Nations whose territories stretch to every inch of the lands colonially known as “British Columbia.”

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Data Sources

- The Chronic Disease Registry (CDR) from the Office of the Provincial Health Officer (OPHO) for the 2024/25 fiscal year.
- B.C. Estimates and Projections from B.C. Stats: [BC Population Estimates & Projections](#) accessed June 3, 2026.

Data steward(s) disclaimer

All inferences, opinions, and conclusions drawn in this Knowledge Update are those of the authors, and do not reflect the opinions or policies of the Data Steward(s).

Document citation

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4. BC Centre for Disease Control. Chronic disease dashboard. Accessed 16 April 2026. www.bccdc.ca/health-professionals/data-reports/chronic-disease-dashboard.
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