

# Supplement to Projected Patterns of Illness in Ontario: Regional Analysis Key Findings

Projected Pattern of Illness Report: [www.oha.com/health2040](http://www.oha.com/health2040)

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## Introduction and Overview of Methodological Approach

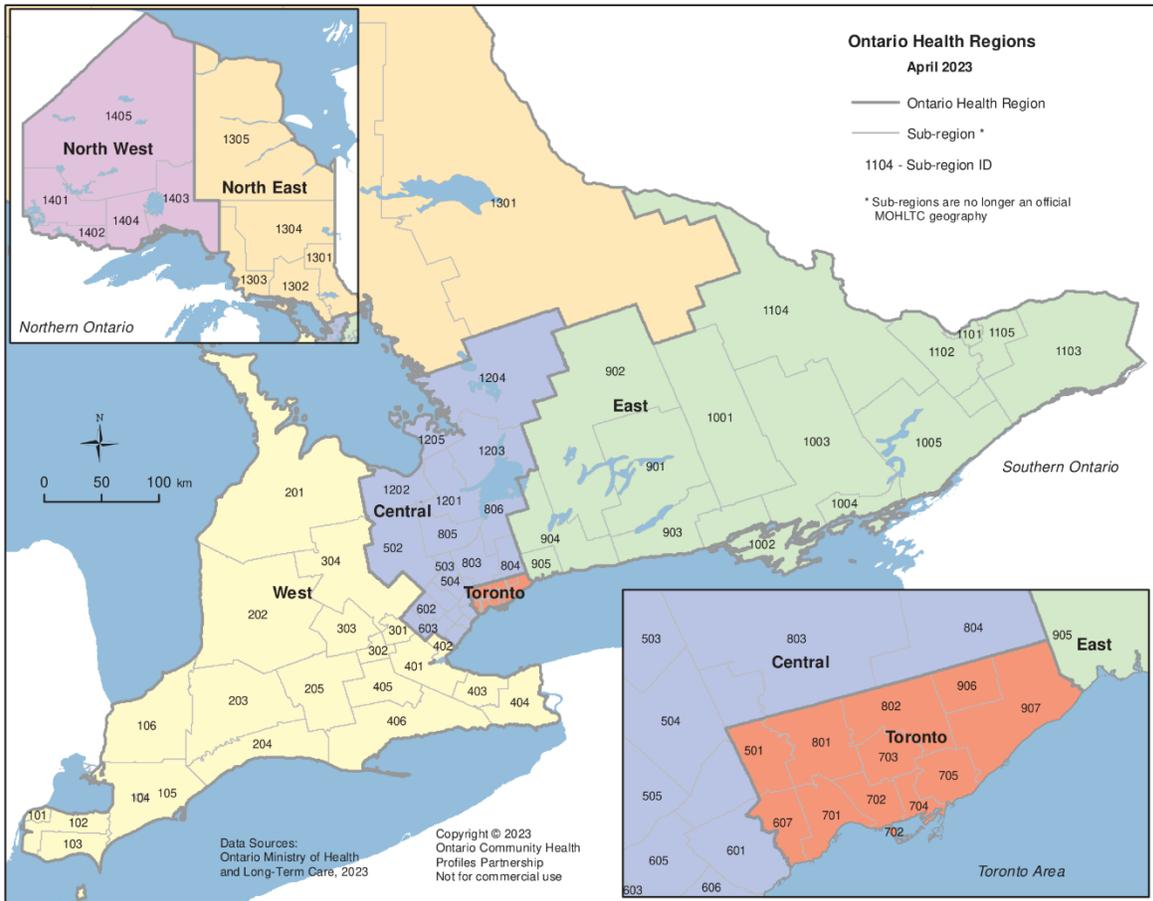
Demographic projections show that the population aged 65+ and 85+ will continue to grow over the next few decades. As our population continues to age, measuring the impact that this growth will have on the burden of chronic diseases within our province and beyond is critical to ensuring that our health system is prepared to best support these populations. Recognizing this, the Ontario Hospital Association (OHA) sponsored [research](#) by the Dalla Lana School of Public Health to project what the burden of illness in Ontario will look like by 2040 based on an analysis of disease trends within our province between 2002-2020, and on projections made by the Ontario Ministry of Finance which specifically describe demographic shifts that will be realized in Ontario by 2040.

In this regional analysis supplement, we explored the burden of disease for the projected top 5 *most common chronic conditions* in Ontario by 2040 (osteoarthritis, hypertension, diabetes, asthma, and cancer), as well as the *top 5 projected fastest growing chronic conditions* between 2020 and 2040 (kidney disease and failure, hearing loss, substance use disorders, Crohn's and colitis, and dementia).

### ***Methodological approach:***

Detailed methods can be found in the original report. Briefly, projections of the burden of these diseases in Ontario by 2040 were determined based on historical chronic disease trends between 2002 and 2020 and demographic projections until 2040 from the Ontario Ministry of Finance. Logistic regression models were used to generate disease projections for individual chronic conditions, and a multinomial logistic regression model was used to project 3 multimorbidity groups (no illness, some illness, and major illness), summarizing the overall burden of chronic disease across each Ontario Health Region. Findings for each region are described in further detail below. The purpose of this document is to provide an overview of historical and projected patterns of illness in Ontario and across Ontario Health Regions between 2002 and 2040, as communicated in the graphs included in our associated regional analysis slide deck.

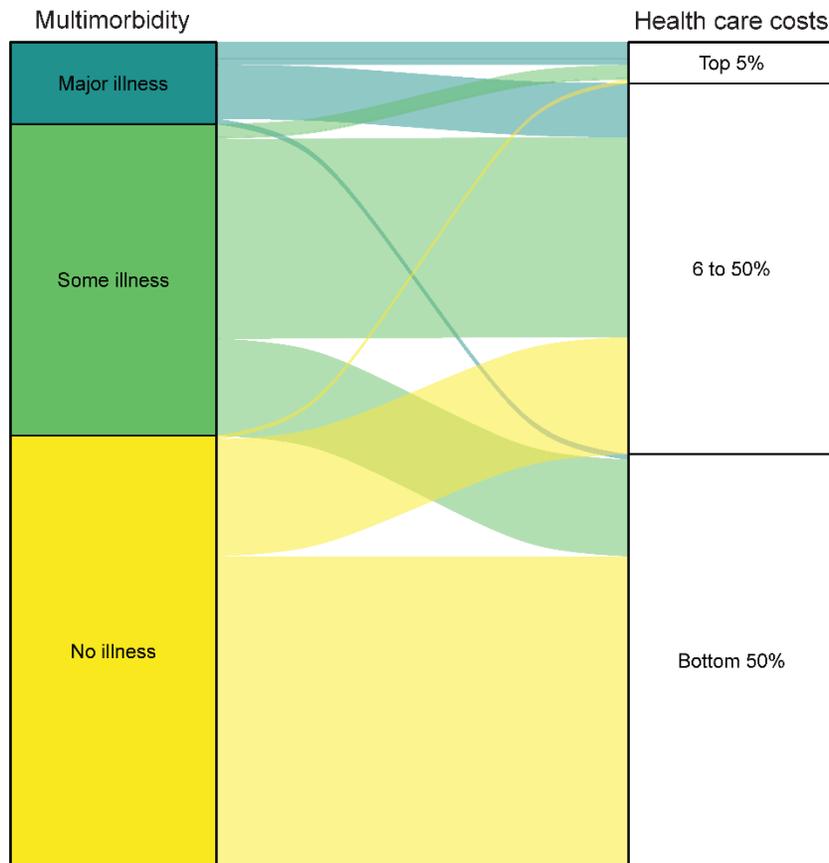
Populations were delineated according to Ontario Health Regions (OHRs), which are outlined below:



**Figure 1.** Map of Ontario Health Regions, 2023. Source: [Ontario Community Health Profiles Partnership \(OCHPP\)](#)

### Defining no, some, and major illness

Multimorbidity groups of no illness, some illness, and major illness were defined based on an equation developed using the 2021 Ontario population. The burden of 21 chronic conditions was quantified using three health system outcomes: number of primary care visits, unplanned hospital visits, and all-cause mortality. After estimating the equation weights using logistic regression and Poisson models, we defined three multimorbidity classes: no illness, some illness, and major illness. In simple terms, these groups summarize overall illness burden based on patterns of health-care use and mortality observed in the Ontario population. “Major illness” represents the highest-burden multimorbidity group in our classification. These categories correlate well with Ontario health care system costs, as shown in Figure 2.



**Figure 2.** Health care costs (2022) and morbidity groups for the Ontario population aged 30 and older.

These categorizations are used throughout this report to refer to the changes in no illness, some illness, and major illness based on historical 2002 and 2020 data, and projected rates across OHR.

## Key Findings: Demographics and Multimorbidity Profiles across Ontario Health Regions and Ontario Overall

### All of Ontario

- The Ontario population aged 85 and older is estimated to be approximately 750,000 by 2040.
- The top 5 fastest growing chronic conditions in Ontario between 2020 and 2040, based on % change over time, will be kidney disease and failure, hearing loss, substance use disorders, Crohn's and colitis, and dementia.
- By 2040, the top 5 most common chronic conditions in Ontario based on total number of cases will be osteoarthritis, hypertension, diabetes, asthma and cancer.

- Multimorbidity is increasing. While projected rates of no illness are relatively stable among populations aged 30-79 in 2040, rates of some illness will increase across all age groups, with increases projected among individuals aged 30-59.
- Major illness is projected to increase within our province, with the largest increases among individuals aged 70 and older, increasing from approximately 350,000 in 2002 to approximately 1.1 million by 2040 for those aged 70-79, and from approximately 200,000 in 2002 to approximately 950,000 by 2040 for those aged 80-89.

### Provincial Key Takeaways

- Increases in chronic disease are seen across all age groups and are most pronounced among individuals aged 30-59.
- Rates of major illness are projected to increase among all age groups by 2040, marking an earlier onset of chronic illness and disease. These findings demonstrate a need to prioritize many diverse age groups in approaches to address rates of illness by 2040.
- The largest projected increases in major illness are among individuals aged 70-89.

**Table 1.** Summary Table highlighting the 5 fastest growing chronic conditions, 2020 to 2040 (Δ) and top 5 most common chronic conditions in 2040 (O), by Ontario health region.

Condition	Region						
	Ontario (all)	West	Central	Toronto	East	North East	North West
Osteoarthritis	O	O	O	O	O	O	O
Hypertension	O	O	O	O	O	O	O
Diabetes	O	O	O	O	O	O	O
Asthma	O	O	O	O	O	O	O
Cancer	O			O			
Kidney disease and failure	Δ	Δ	O Δ	Δ	Δ	Δ	Δ
Hearing loss	Δ	O Δ	Δ	Δ	O Δ	Δ	Δ
Substance use disorders	Δ	Δ			Δ	Δ	O Δ
Crohn's and colitis	Δ	Δ	Δ	Δ	Δ	Δ	Δ
Dementia	Δ		Δ	Δ	Δ	Δ	Δ
COPD						O	
Rheumatoid arthritis		Δ					
Osteoporosis			Δ				

## West OHR

- In the West OHR, the top 5 fastest growing chronic conditions, based on % change over time between 2020 to 2040 are kidney disease and failure, substance use disorders, hearing loss, Crohn's and colitis, and rheumatoid arthritis.
- By 2040, the top 5 most common chronic conditions in the West OHR based on total number of cases will be osteoarthritis, hypertension, diabetes, asthma and hearing loss.
- Similar to the province overall, increases can be observed across all age categories for some illness and major illness between 2002 and 2040. Rates of no illness remain relatively stable within this time period across all age groups.
- Rates of some illness are projected to increase most notably among individuals aged 40-49 within this OHR; rising from approximately 170,000 in 2002 to approximately 405,000 in 2040.
- Similarly, individuals aged 40-49 are also projected to experience significant growth in rates of major illness, increasing from approximately 260,000, to approximately 380,000 by 2040.
- Individuals aged 70-79 are also expected to experience significant increases in major illness rates, increasing from approximately 110,000 in 2002, to a projected 330,000 by 2040.

### *West OHR Key Takeaways*

- While rates of no illness seem relatively stable, rates of some illness and major illness are increasing in this OHR.
- Specifically, individuals aged 40-49 are a key population where increases are projected for some illness and major illness.

## Central OHR

- In the Central OHR, the top 5 fastest growing chronic conditions based on % change over time between 2020 – 2040 are kidney disease and failure, hearing loss, dementia, osteoporosis, and Crohn's and colitis.
- By 2040, the top 5 most common chronic conditions in the Central OHR based on total number of cases will be osteoarthritis, hypertension, diabetes, asthma and kidney disease and failure.
- Also, in this OHR rates of some illness and major illness are projected to increase most significantly among populations aged 40-49 and 70-79, respectively.

- Rates of no illness also remain relatively stable in this OHR; however, they are projected to increase slightly among populations aged 30-39 by 2040; rising from approximately 266,000 in 2002 to approximately 390,000 by 2040.
- Rates of some illness are projected to increase most significantly among populations aged 40-49, with populations aged 50-59 also seeing significant projected increases. For individuals aged 40-49, we see some illness rates projected to increase from approximately 220,000 in 2002 to approximately 400,000 by 2040.
- For individuals aged 50-59, some illness rates are projected to increase from approximately 183,000 in 2002 to approximately 346,000 by 2040.
- Major illness growth is projected to be most notable in the 70-79 age group, increasing from approximately 57,000 in 2002, to 286,000 by 2040.

### *Central OHR Key Takeaways*

- Rates of no illness remain stable but individuals aged 30-39 may experience some growth in this area by 2040.
- Populations aged 40-59 are projected to experience the largest increase in some illness rates; however, populations aged 70-79 will experience the highest rates of major illness, which will make them a key population by 2040.

### **Toronto OHR**

- In the Toronto OHR, the top 5 fastest growing chronic conditions, based on % change over time between 2020 – 2040 are kidney disease and failure, hearing loss, Crohn's and colitis, cancer, and dementia.
- By 2040, the top 5 most common chronic conditions in the Toronto OHR based on total number of cases will be osteoarthritis, hypertension, diabetes, asthma and cancer.
- Rates of no illness in the Toronto OHR are projected to remain stable in 2040.
- Similarly, rates of some illness remain relatively stable between 2002 and 2040; with minor increases realized within this time period for individuals aged 40-49 – growing from 183,000 in 2002 to approximately 251,000 in 2040.
- Similar trends were also observed for those aged 30-39 for some illness, rising from 157,000 in 2002 to 269,000 in 2040.
- While not as pronounced, projected increases can be noted in rates of major illness between 2002 and 2040. Most notably, this rise was observed among individuals aged 70-89.
- For those 70-79, major illness is projected to increase from 78,000 in 2002, to approximately 183,000 in 2040 projections.
- For those aged 80-89, major illness is projected to increase from approximately 44,000 in 2002 to 158,000 in 2040.

### *Toronto OHR Key Takeaways*

- Increases in rates of some illness, though minor, were most notable among individuals aged 30-39.
- Rates of major illness are projected to be most pronounced in the Toronto OHR among individuals aged 70-89 by 2040, making these populations priorities for preventative interventions pertaining to these illnesses.

### *East OHR*

- In the East OHR, the top 5 fastest growing chronic conditions, based on % change over time between 2020 – 2040 are kidney disease and failure, hearing loss, Crohn’s and colitis, substance use disorders, and dementia.
- By 2040, the top 5 most common chronic conditions in the East OHR based on total number of cases will be osteoarthritis, hypertension, asthma, diabetes and hearing loss.
- Rates of no illness remain relatively stable in 2040 projections when compared to historical 2002 rates. However, notable increases can be observed in some illness for individuals aged 30-59. Moreover, a sharp rise can be observed in rates of major illness in this OHR for individuals aged 70-89.
- For individuals aged 30-39, some illness is projected to increase from approximately 152,000 in 2002 to approximately 304,000 by 2040. For individuals aged 40-49, some illness is projected to increase from approximately 203,000 to approximately 331,000 in 2040. Finally, those aged 50-59 are expected to experience an increase in rates of some illness from 174,000 in 2002 to approximately 292,000 by 2040.
- Among those aged 70-79, rates of major illness are projected to increase notably, from approximately 75,000 in 2002 to approximately 243,000 by 2040. For those aged 80-89, rates of major illness are projected to increase from approximately 45,000 in 2002 to approximately 216,000 in 2040.

### *East OHR Key Takeaways*

- The most significant projected increase in the East OHR is notable in the some illness categories across many age groups, spanning from those aged 30-59.
- However, the East OHR is also projected to have large shares of individuals experiencing major illness between the ages of 70-89.
- Similar to many other OHRs, rates of no illness are expected to remain relatively stable.

## North East OHR

- In the North East OHR, the top 5 fastest growing chronic conditions, based on % change over time between 2020 – 2040 are substance use disorders, kidney disease and failure, hearing loss, Crohn’s and colitis, and dementia.
- By 2040, the top 5 most common chronic conditions in the North East OHR based on total number of cases will be osteoarthritis, hypertension, diabetes, asthma, and COPD.
- The North East OHR is projected to experience some notable reductions in rates of no illness by 2040, most significantly among populations aged 30-49.
- At the same time, rates of some illness in this OHR remain relatively stable across most age groups.
- The most increase in this OHR can be observed among individuals experiencing major illness aged 70-89. For those 70-79, major illness rates are projected to increase from approximately 21,000 in 2002, to approximately 53,000 by 2040.
- For those aged 80-89, rates of major illness are projected to increase from approximately 10,000 in 2002 to approximately 44,000 by 2040.

### *North East OHR Key Takeaways*

- While rates of no illness and some illness remain relatively stable, rates of major illness are projected to increase quite notably for individuals aged 70-89. These will be priority populations.

## North West OHR

- In the North West OHR, the top 5 fastest growing chronic conditions, based on % change over time between 2020 – 2040 are substance use disorders, kidney disease and failure, hearing loss, Crohn’s and colitis, and dementia.
- By 2040, the top 5 most common chronic conditions in the North West OHR based on total number of cases will be osteoarthritis, hypertension, diabetes, substance use disorders, and asthma.
- In the North West OHR, projections predict that there will be a significant decline in the proportion of individuals aged 30-49 experiencing no illness in 2040. Among those 30-39, this proportion is expected to decrease from approximately 22,000 in 2002, to approximately 8,000 by 2040.
- Rates of some illness remain relatively stable between 2002-2040.
- Increases in major illness are projected across diverse age groups by 2040, including a significant increase among individuals 30-39 (growing from approximately 1,000 in 2002 to approximately 17,000 by 2040), and individuals aged 70-79 (7,000 in 2002 and 18,000 by 2040). Individuals aged 80-89 are also

projected to experience significant increases in rates of major illness (approximately 4,000 in 2002 and 16,000 in 2040).

- While the age groups above experienced the steepest increases in major illness, increases were observed in projected rates of major illness between 2002-2040 across all age groups.

#### *North West OHR Key Takeaways*

- The North West OHR is expected to experience some declines in the proportion of individuals experiencing no illness by 2040, largely among younger populations (aged 30-49).
- Moreover, we are seeing trends in increases in major illness across diverse age groups, including those in younger age groups (i.e., 30-39), as well as those aged 70-89. The approach to addressing major illness in these OHRs in 2040 will need to adopt an approach that is mindful of these distinct age groups.