

Dementia in Canada: Economic Burden 2020 to 2050

July 2023



**CANADIAN CENTRE FOR
ECONOMIC ANALYSIS**

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About the Report

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EXECUTIVE SUMMARY

The Rising Tide Report, published in 2008, was the first study of its kind to highlight the growing challenge of dementia and to estimate the long-term burden of this disease on the health care and social service systems, on the lives of informal caregivers, and the Canadian economy. Given that over a decade has passed since this landmark study was published, two studies were performed that updates and expands upon the original analysis.

The first study, *Dementia in Canada: Prevalence and Incidence 2020 to 2050*, published in 2022 revisits the analysis using updated literature estimates of the prevalence and incidence of dementia, along with the most recent relative risk data, for dementia in Canada and its provinces. In addition, the study had expanded upon the original to take a closer look at the relationship between ethnicity and dementia for both people with dementia and their informal caregivers. This report (second study) expands upon the first update study to examine the components of the economic burden of dementia in Canada and its provinces.

ECONOMIC BURDEN OF DEMENTIA

The total annual economic burden of dementia in Canada is estimated to be \$40.1 billion in 2020, being an average of \$67,200 per person with dementia. The total economic burden includes costs arising from additional hospital stays, emergency department visits, and other direct costs. The economic burden from direct costs is estimated to be 46% of the total burden at \$15.1 billion. In addition, economic burden also includes the burden upon informal caregivers (see first report) which results in lost productivity through absenteeism, presenteeism, and early retirement. The economic burden that arises from the impact upon informal caregivers is estimated to be 54% of the total economic burden at \$25 billion. This includes consideration of an estimated 472 million hours of informal caregiving in 2020.

The annual economic burden of \$40.1 billion in 2020 is significant, and if current trends continue, the annual burden could grow by 275% by over the next 30 years.

While there is no known cure for dementia, there is ongoing research to identify the risk factors and mechanisms that give rise to dementia. In order to understand the significance of even modest improvements in reducing the risks of incidence of dementia and the corresponding delay in disease onset, three hypothetical scenarios were constructed to examine the impact. The analysis shows that by delaying the onset of dementia by 1, 5 or 10 years could reduce the annual burden in 2050 by 10%, 42%, and 70% respectively.

PROVINCIAL DIFFERENCES

The differences across the country arise from variation in the age profile of the population, informal caregiving distributions, provincial wages, and local health care costs. Across the country, average costs per person with dementia range from a low of \$52,900 in Prince Edward Island to a high of \$83,500 in Alberta.

1.0 INTRODUCTION

This report is the second part of the update to the 2008 Rising Tide report. The first part examined the prevalence and incidence of dementia in Canada and its provinces over the next 30 years. This report continues the analysis to understand the economic burden that dementia places on society including direct health care costs, as well as the impact upon the broader labour force. In addition, as in the first report, we examine the effect of delaying the onset of dementia through hypothetical scenarios.

1.1 APPROACH

This study utilizes CANCEA's socio-economic, agent-based statistical analysis platform to model and estimate the burden of dementia over the next 30 years in the Canadian population. In the model, each agent is a statistical representation of a person and is associated with several demographic characteristics, including age, sex, ethnicity which match those of the Canadian population, as informed by publicly available data from Statistics Canada. The initial state of the population is established with age- and sex-specific prevalence of chronic health conditions such as heart disease, smoking, hearing loss, or low-level of physical activity, and the comorbidities between them. The list of risk factors and their prevalence in Canada's population is described in more detail in the first report. The model simulates the agents and their interactions over time as they age and pass through various states, such as dementia diagnosis, hospitalization, and death. While similar to other micro-simulation models, such as POHEM (1), CANCEA's platform is able to run at the individual level, include interactions and connections between agents (such as family structure) and includes extensive financial and economic accounts associated with individuals and their households. This allows the single model to provide estimates and forecasts of the burden of dementia in Canada over time for measures of health (incidence, prevalence, and mortality), healthcare utilization and economics. This approach enables comparisons of the burden of dementia across different segments of the population, namely by sex and ethnicity, to identify populations particularly vulnerable to the impact of dementia in Canada. While the first report examined the health and demographic profile of dementia in Canada and its provinces, this report quantifies the economic burden of dementia.

In order to quantify the economic burden of dementia, each person in the model has the ability to participate in the labour force which contributes to economic activity (GDP), and incur health care costs. A person's health status, along with age, affects the likelihood that a person enters or remains in the labour force. Additionally, a person's informal caregiving status also affects the likelihood that a person enters, and the degree to which they remain, in the labour force. Through each individual's life, they also incur health care costs, described in Section 1.2, depending upon their health status.

The economic burden of dementia is calculated by running stochastic simulations with and without dementia and comparing the differences. The differences in health care costs and labour force participation and productivity yield the economic burden. An important benefit of this approach is that it robustly captures the incremental economic burden due to dementia, rather than the total costs for any who might have dementia. For example, the same person in the model might have 5 hospitalizations when dementia is present, but still have 3 hospitalizations due to other causes when dementia is removed from the model. In this case, only the additional 2 hospitalizations are considered due to dementia.

1.2 ECONOMIC BURDEN ASSOCIATED WITH DEMENTIA

The economic burden associated with dementia arises from two general categories:

- Direct costs associated with caring for those with dementia
- Productivity costs associated with changing participation and productivity in the labour force. This included both people with dementia, and informal caregivers.

The following sections describe the costs included in the analysis and any associated modelling assumptions.

1.2.1 DIRECT COSTS

The direct costs associated with dementia arise from providing regular or acute care for people with dementia. The event that triggers the need for care may or may not be dementia itself, but any additional costs to provide care to those with dementia are part of the economic burden. A person with dementia may or may not reside in long term care (see first report), and the costs associated with dementia differ depending upon the locale. Additionally, as a person ages, they may transition from being outside of long-term care with informal caregivers or home care, to being inside a long-term care centers.

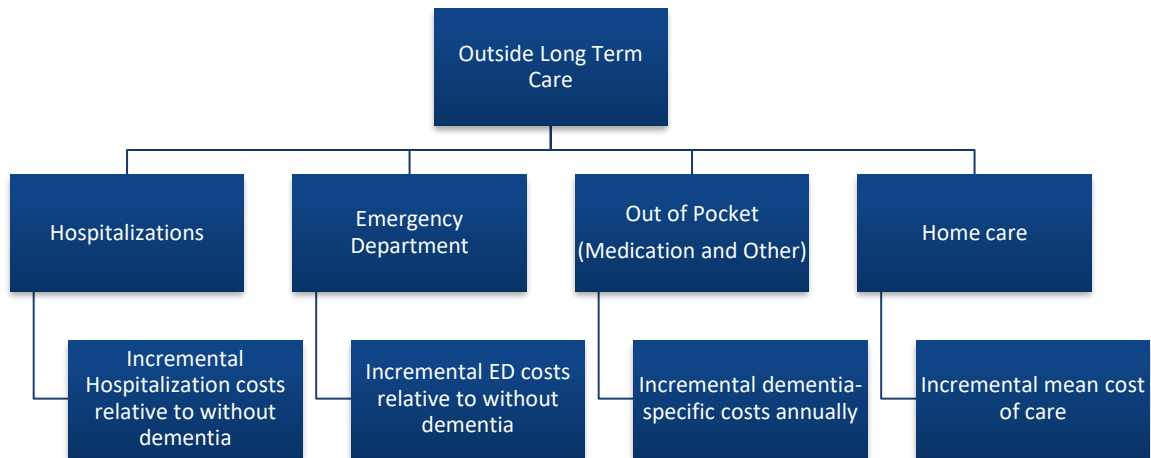
1.2.1.1 OUTSIDE OF LONG TERM CARE

For people with dementia outside of long-term care, costs are driven by four key categories (Figure 1). These include:

- Hospitalization costs,
- Emergency department visits,
- Out of pocket expenses, and
- Home care

The incremental costs associated with dementia outside LTC include both the incremental rate of service utilization for those with dementia, and the incremental cost per visit.

Figure 1 Components of direct costs for those not in long term care



The cost of hospitalizations are based on 2019 CIHI data on the provincial-specific costs of hospitalizations for a typical hospital stay (2). Note that 2019 was used as the base cost since 2020 and 2021 were atypical years due to the COVID-19 pandemic.

The increased likelihood of hospitalization for people with dementia was based on the CIHI Dementia in Canada Report (3) which included age-specific differences in utilizations.

For emergency department visits, the costs were based upon CIHI’s October 2020 Highlights report, which focused on emergency department spending across Canada (4). These ED costs used include the ‘all-in’ costs to account for hospital overhead in addition to direct care.

The incremental rate and costs of emergency department visits are based on the CIHI Dementia in Canada Report (3) which includes age-specific differences. Interestingly, the rate of ED visits for those with dementia is less than those without dementia. This is likely due to higher LTC rates for those with dementia who are at greatest risk of requiring ED care.

In addition to the government funded services, people with dementia also have out-of-pocket expenses, whether for additional medication or care, or other household expenditures such as renovations. The average out-of-pocket expenses are estimated at \$3,700 per year (5).

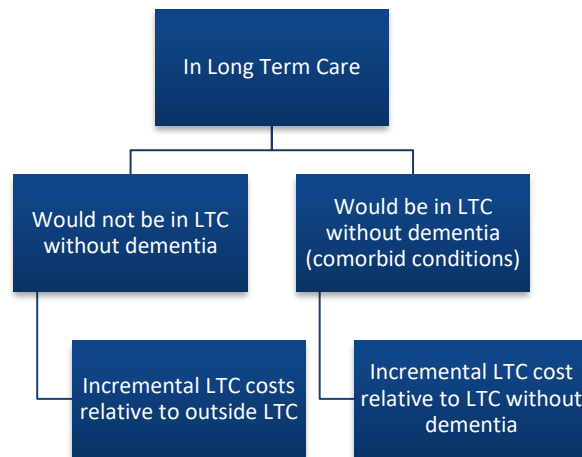
Finally, it has been shown that people with dementia have higher home care costs than those without. In particular, Cheng et al (6) highlighted how higher clinical complexity, including dementia comorbidities, are predictive of higher care costs.

Again it is important to note that for the categories described above, only the incremental costs due to dementia are considered part of the economic burden.

1.2.1.2 WITHIN LONG TERM CARE

People with more advanced stages of dementia, or other health conditions may reside in long-term care. The economic burden can arise through two possible channels as shown in Figure 2. The first, is the person that is in LTC due to dementia, and would otherwise not be in LTC. For these patients, the full cost of LTC is attributed to dementia. The second possibility is that the person would still be in LTC due to other health conditions, but dementia is an additional factor requiring a greater amount of care.

Figure 2 Components of direct costs for those in long term care



The incremental costs due to dementia in LTC is based upon Tonelli et al. (7) who did a retrospective population-based cohort study in Alberta merging morbidity data, administrative data, and associated health costs. The analysis yielded that dementia was associated with higher costs for most ages and comorbidities categories.

1.2.2 PRODUCTIVITY IMPACTS

Along with the direct costs, dementia significantly impacts the potential productivity of the labour force resulting in lost economic activity. Two distinct groups of people are affected by dementia in the labour force:

- People with dementia, particularly young-onset dementia, where dementia may limit their ability to work
- Informal caregivers for people with dementia whose caregiving duties interfere with their ability to participate as fully in the labour force as they may want

In both cases, in addition to leaving the labour force entirely, productivity is also impacted through absenteeism and presenteeism:

- **Absenteeism** refers to the person being away from work and the absence is unscheduled

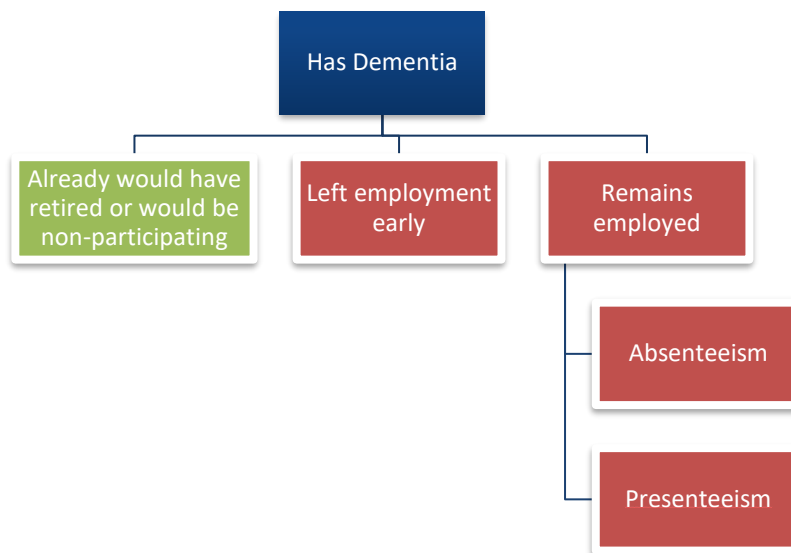
- **Presenteeism** refers to the reduced productivity of an employee while being at work (due to distractions, overtiredness, or other factors)

To quantify the economic activity (GDP) associated with the productivity impacts, Statistics Canada data on labour force participation and wages (by age and sex) are used (8; 9; 10).

1.2.2.1 PEOPLE WITH DEMENTIA

For people with dementia, it can affect their ability to work. This is particularly true for almost 30,000 people today with early onset dementia who may retire early, or have higher rates of absenteeism and presenteeism.

Figure 3 Productivity impact for those with dementia

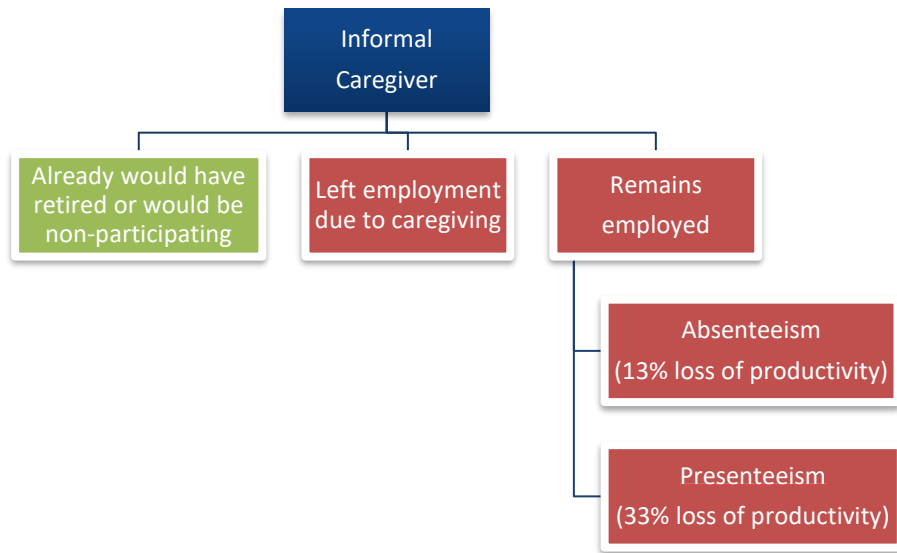


While the majority of people with dementia will have already left the labour force due to generally older age of disease onset, informal caregivers are frequently in their prime working years.

1.2.2.2 INFORMAL CAREGIVERS

Informal caregiving can demand a large amount of time and resources from a caregiver. This can impact their ability to fully participate in the labour force. The details about the number and characteristics of informal caregivers can be found in the first report. Figure 4 outlines the potential impacts of informal caregiving on their productivity.

Figure 4 Productivity impacts for informal caregivers



While some informal caregivers, such as a retiree whose partner has dementia, may not wish to participate in the labour force, caregiving frequently falls to those who are working. Among those, it is estimated that 22% leave the labour force as a result of their caregiving duties (11). Among those that remain in the labour force, there are absenteeism and presenteeism impacts to be taken into account (12). In particular, absenteeism (unscheduled time away from work) results in an average 13% loss in productivity. Presenteeism (at work, but not fully productive) results in a 33% loss of productivity.

2.0 THE ECONOMIC BURDEN OF DEMENTIA IN CANADA, 2020-2050

As shown in the first report in this series, the changes in Canada's demographic landscape are poised to have a significant effect on the dementia prevalence and incidence rates over the next 30 years. Accompanying the change in health status are the economic costs associated with dementia.

All results presented in the following sections, along with additional details, are available in an accompanying Excel-based Economic Dashboard.

2.1 COSTS OF DEMENTIA

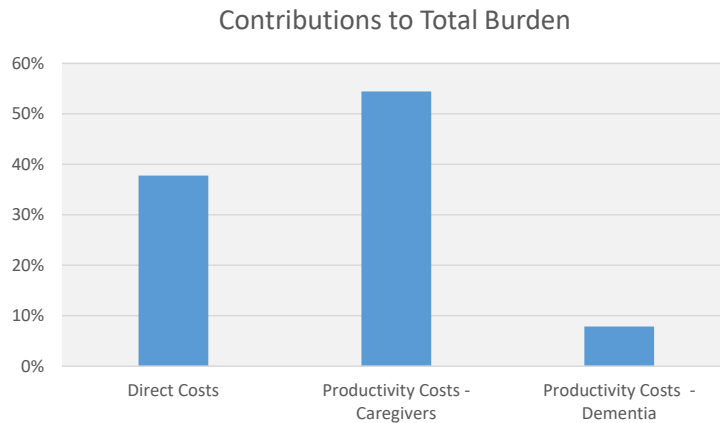
It is estimated that the total annual economic burden of dementia in Canada is \$40.1 billion in 2020. This includes costs arising from additional hospital stays, emergency department visits, and other direct costs totalling \$15.1 billion. In addition, over 472M hours of informal caregiving (see first report) result in \$21.8B of lost productivity through absenteeism, presenteeism, and early retirement. Note that not all hours of informal caregiving result in lost productivity since the caregiver would not necessarily be in the labour force, or may provide informal care outside of employed hours. An additional \$3.2B of annual lost productivity arises from early onset dementia in the labour force. Table 1 summarizes the components of the economic burden in Canada over the next 30 years.

Table 1 Components of the economic burden of dementia from 2020 to 2050 under current trends

Cost Component		2020	2030	2040	2050
Direct Costs	Emergency Dept.	\$40	\$70	\$90	\$100
	Hospitalizations	\$6,440	\$10,620	\$15,270	\$18,020
	Home care	\$310	\$510	\$610	\$630
	Long-term care	\$6,990	\$11,680	\$17,760	\$21,800
	Out of pocket	\$1,360	\$2,250	\$3,230	\$3,810
Productivity	Caregivers	\$21,830	\$35,990	\$52,360	\$60,730
	Dementia	\$3,160	\$4,130	\$4,510	\$5,190
Total		\$40,130	\$65,230	\$93,830	\$110,280

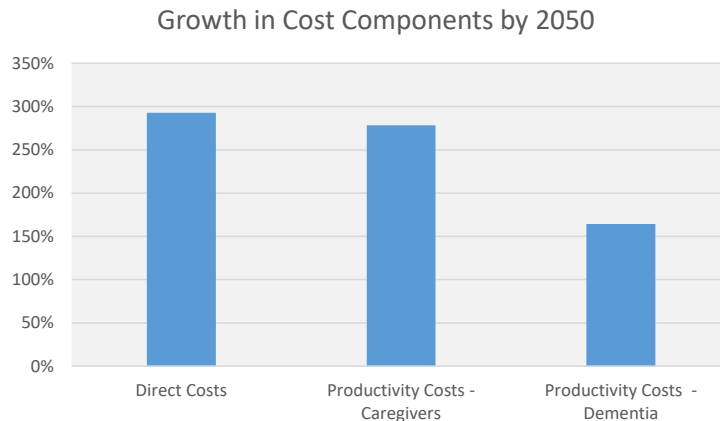
Of critical significance, as shown in Figure 5, is that over half of the total economic burden of dementia arises from caregiver activity, rather than dementia itself. This highlights how important it is to understand the economic burden from informal caregiving, in addition to those arising from dementia itself. Any policy which addresses direct costs only would be limited in its consideration of the total challenge as direct costs only make up less than half of the total burden.

Figure 5 Contributions to total economic burden



In addition to being the largest component of the economic costs of dementia, the caregiver costs are also expected to increase almost as fast as the direct health care costs, with a 278% estimated increase by 2050. This amounts to a \$60B annual cost to the economy (in constant dollars terms) by 2050.

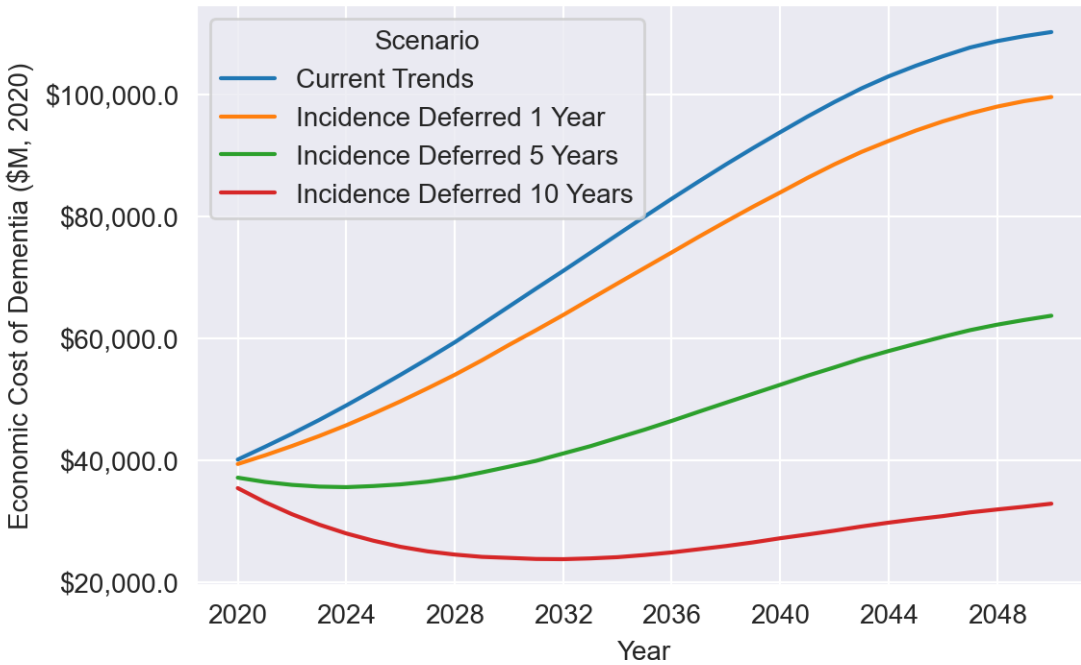
Figure 6 Growth in Cost Components by 2050



2.2 IMPACT OF DELAYING THE ONSET OF DEMENTIA

While there is no known cure for dementia, there is ongoing research to identify the risk factors and mechanisms that give rise to dementia. In order to understand the significance of even modest improvements in reducing the risks of incidence of dementia and the corresponding delay in disease onset, three hypothetical scenarios were constructed to examine the impact of delaying the onset of dementia by 1, 5 or 10 years. Refer to the first report for additional details on each scenario.

Figure 7 Impact of Delaying the Onset of Dementia in Canada



Nationwide, reducing the impact onset of dementia by 10 years could reduce the economic burden of dementia by \$77B annually by 2050. This is a 70% reduction compared to the annual costs if the current dementia trends were to continue.

Delaying the onset of dementia also shifts the economic burden on caregivers. The productivity burden of those with dementia itself would fall due to the ability to stay longer in the labour force, yet they would still require caregivers later in life. Notwithstanding, the the total economic burden is still significantly less.

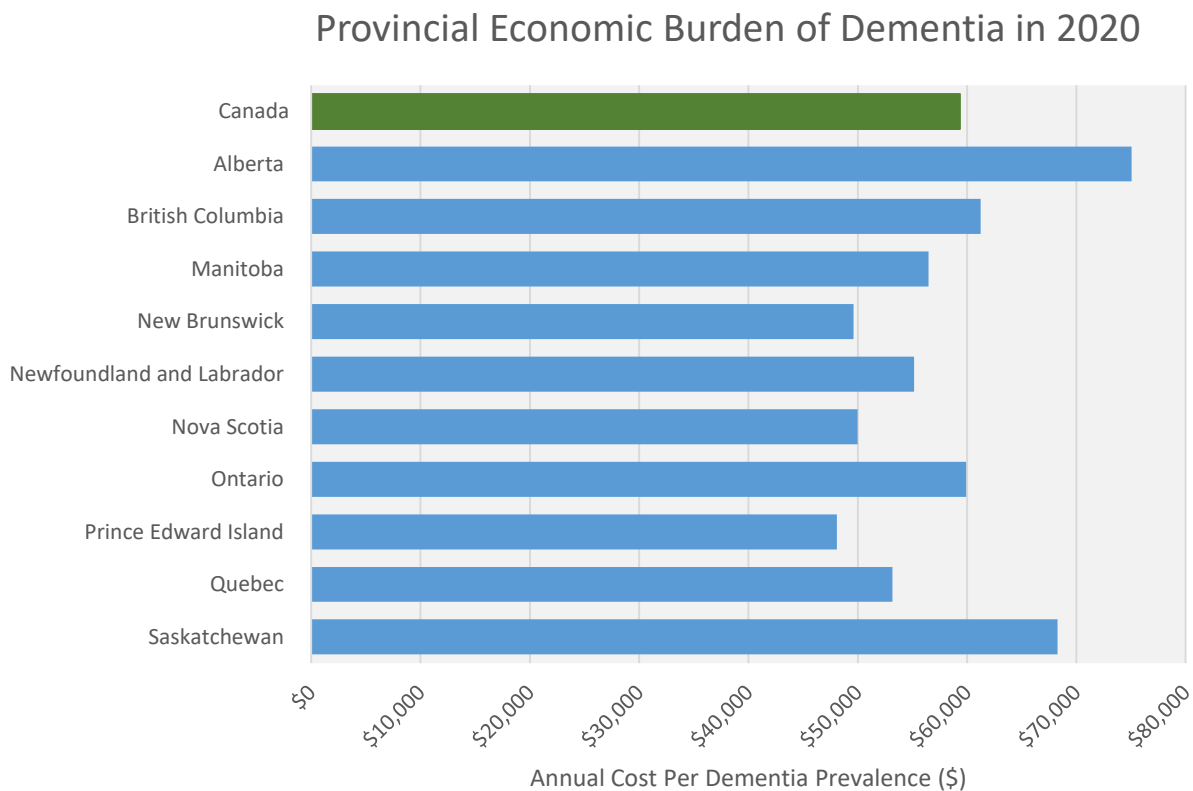
3.0 ECONOMIC BURDEN OF DEMENTIA IN CANADA'S PROVINCES

The previous section focused on the burden of dementia at the national level. While the overall trends are similar across the provinces, there are also differences unique to each province. Due to their smaller population sizes, the Northwest Territories, Nunavut and the Yukon, with a combined population of 126,000 in 2020, are not presented.

3.1 THE ECONOMIC BURDEN OF DEMENTIA IN CANADIAN PROVINCES: 2020-2050

Across the country, differences in the age distributions, migration patterns, and the prevalence of risk factors combine to produce specific challenges, needs and distribution of burden of dementia for each province. Additionally, the differences in the operation and costs of the provincial health care systems result in variations across the country. Figure 8 highlights the provincial differences by examining the average cost per dementia patient in 2020.

Figure 8 Provincial economic burden per dementia case in 2020



While there are differences in direct costs between the provinces, variations across the province are largely due to the differences in informal caregiving as the productivity impacts of informal caregivers

account for over half the total burden. For example, in Prince Edward Island, the burden of informal caregiving is less due to the age profile of the province.

3.2 IMPACT OF DELAYING THE ONSET OF DEMENTIA

Across the country, the impact of delaying the onset of dementia would also differ for each province. Table 2 shows the potential reduction in the economic burden for each province if the onset of dementia were to be delayed. For example, if dementia incidence were deferred by 10 years, the annual economic costs would be reduced by \$34.4B annually.

Table 2 Provincial economic burden of dementia by 2050, and the impact of deferring dementia onset in constant dollars

Province	Economic Burden in 2050 under Current Trends (\$M)	Reduction in 2050 Economic Burden (\$M) if Incidence		
		Deferred 1 Year	Deferred 5 Years	Deferred 10 Years
Alberta	\$15,300	\$1,500	\$6,700	\$11,000
British Columbia	\$15,900	\$1,500	\$6,600	\$11,100
Manitoba	\$2,300	\$200	\$1,000	\$1,700
New Brunswick	\$1,200	\$100	\$500	\$800
Newfoundland	\$600	\$100	\$200	\$400
Nova Scotia	\$1,500	\$200	\$700	\$1,100
Ontario	\$49,500	\$4,700	\$20,600	\$34,400
Prince Edward Island	\$300	\$30	\$100	\$200
Quebec	\$20,700	\$2,100	\$8,800	\$14,600
Saskatchewan	\$3,000	\$300	\$1,300	\$2,100
Canada	\$110,300	\$10,700	\$46,500	\$77,400

4.0 CONCLUSIONS

The economic burden of dementia will continue to be a growing issue in Canada. In 2020, the total annual economic burden of dementia in Canada is \$40.1 billion in 2020, equivalent to \$67,200 per person with dementia. Of the total burden, \$15.1B arises from direct costs such as additional hospital stays, emergency department, and other direct costs. The remaining \$25.0B is a result of productivity impacts in the labour force, with the majority being the result of informal caring. Of the total economic burden, 54% (\$21.8B) is a result of the productivity impact of informal care giving.

If current trends continue, this burden could grow by 275% by 2050 (in constant dollar terms). However, delaying the onset of dementia by 1, 5 or 10 years could reduce the annual burden in 2050 by 10%, 42%, and 70% respectively. This highlights how delaying the onset of dementia has both considerable health and economic benefits which extend far beyond those directly afflicted with dementia.

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