



The socioeconomic cost of, and impact of COVID-19 on, multiple sclerosis in Canada

MS Canada
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Executive summary

Canada has one of the highest rates of MS in the world, with around 305 cases per 100,000 persons. This study and its findings estimated the socioeconomic cost of MS to be \$3.4 billion in 2019. A reduction in service delivery between 2020 and 2022 was estimated to have decreased expenditure by nearly \$566 million. This reduction in health expenditure created a backlog in health services estimated to require \$73 million in incremental costs in 2024 alone, and this will continue in future years.

Background

Canada has one of the highest rates of multiple sclerosis (MS) in the world.¹ It is the most common neurological disease among young adults in Canada, imposing a considerable cost on the health system and Canadian society more broadly.² The economic cost of MS has been estimated in other countries such as the U.S., the Netherlands and Australia, yet few studies have assessed the cost of MS in Canada, with an exception being a microsimulation modelling study published in 2017.^{3,4}

The COVID-19 pandemic significantly disrupted the delivery of health care to Canadians, including the 90,000 people living with MS.¹ A range of restrictions put in place to limit the spread of COVID-19, combined with behavioural changes stemming from these restrictions, led to significant changes in the way that services were delivered and accessed. These changes are likely to have led to a reduction in the total cost of MS in Canada during years directly affected by the restrictions. It is likely that costs in future years will increase as the longer-term consequences of the pandemic arise. The uncertainty of the extent and duration of these impacts limits the ability of health advocates and policymakers to respond effectively to meet the needs of people with MS.

MS Canada commissioned Deloitte Access Economics to undertake this study with two broad objectives:

1. Provide an up-to-date estimate of the socioeconomic cost of MS in Canada in a typical year before the pandemic (2019).
2. Estimate the health-related economic impact of COVID-19 on the MS community in Canada between 2020 and 2024. This component also considers impacts of changes to disease-modifying therapy (DMT) schedules and delayed diagnosis on the health outcomes of people living with MS.

The purpose of the report is to improve advocacy nationally and provincially and to inform policy decisions with an improved understanding of the consequences of the COVID-19 for people with MS and their caregivers.

Prevalence of MS in Canada

There are approximately **90,000 people living with MS in Canada**, equivalent to **1 in every 400 people**, or around 305 per 100,000 in the adult population.¹ Around three quarters of people living with MS in Canada are women, higher than the global average of two thirds.¹ Data from the Canadian Chronic Disease Surveillance System (CCDSS) shows there is some variation in MS prevalence across province and territories.⁵ Nova Scotia is shown to have the highest prevalence (355 persons per 100,000 population), while Newfoundland & Labrador is reported to have the lowest (169 per 100,000).

While this report recognizes the total number of people living with MS in Canada to be approximately 90,000, as reported by the Atlas of MS,¹ data from the CCDSS were used for the purpose of estimating the annual cost of MS. Figure i explains the differences between these two data sources and the reasoning for using the CCDSS data for costing.

Figure i: Prevalence-related considerations for estimating the costs attributable to MS in Canada

There are two main data sources available for estimating the number of people living with MS in Canada. These are the CCDSS and the Canadian Community Health Survey (CCHS). The CCDSS is a survey maintained by the Public Health Agency of Canada (PHAC),⁵ while the CCHS is maintained by Statistics Canada.

The two surveys use different sampling methodologies and produce different estimates of the number of people with MS in Canada. The CCDSS is based on health claims administrative data, in which people are required to have accessed multiple health services over a given period to be recorded as having MS. In contrast, the CCHS is a household survey in which participants self-report having MS. The CCHS was most recently conducted in 2010/11 and the CCDSS in 2014/15. Using the CCDSS data, it is estimated that just over 80,000 people in Canada are living with MS. The CCHS suggests that

this number could be 90,000 or more, as reported in the Atlas of MS.¹

For the purposes of this study, it was decided that the CCDSS survey methodology aligns more closely with the objectives of the current work (estimating the cost of MS in a single year) and other literature and data used as inputs to the modelling.

While the use of the CCDSS data was considered the most appropriate choice from a modelling perspective given the current study's parameters, it is acknowledged that some estimates presented within this study may be conservative due to potential omission of individuals who have less frequent interaction with the health system.

Annual cost of illness of MS in Canada

MS was estimated to cost more than **\$3.4 billion** in Canada in 2019. This comprises direct expenditure on the health system (38% of total), productivity losses (39%), and a range of other financial costs (e.g., aids and home modifications; 23%). This is equivalent to a cost of over **\$42,880 per case of MS**. This estimate is consistent with those from the TRIBUNE in MS study in 2012 which found that the average costs for people with mild, moderate, and severe disability were approximately \$30,800, \$46,600, and \$78,000 respectively.²

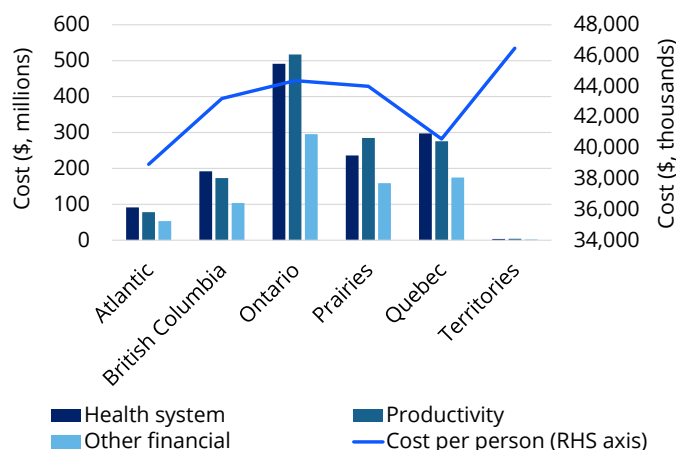
Pharmaceuticals were responsible for most of the cost to the health system, with an estimated **\$1.1 billion (or 87% of health system costs)** in expenditure in 2019. The substantial expenditure on pharmaceuticals largely relates to the scientific innovation and access to DMTs in the last two decades. DMTs are revolutionary treatment options that can slow progression and change the trajectory of MS, a condition which was previously considered non-treatable. The annual costs of DMTs range from \$6,000 to over \$50,000,⁶ where the majority is covered by government programs.⁷ A recent study estimated that the excess (i.e., out-of-pocket) cost of medications associated with MS was approximately \$11,300 in DMT users, which decreased to \$450 in non-DMT users, suggesting that DMT imposes significant out-of-pocket costs to people with MS.⁸

While DMTs are generally subsidised through provincial and territorial health plans, there are significant differences across provinces. The high out-of-pocket cost of MS and the difficulty in navigating the claim system can make it difficult to access DMT among people with MS. There are also other barriers to access, like the approval lag time between a DMT entering the market and its inclusion on the public drug reimbursement list.⁹ Many people with MS also claim DMT reimbursement through their private health insurance. However, some private insurance plans do not cover DMTs, requiring an individual to acquire provincial health plans in addition to their private plans to access DMTs.

Beyond pharmaceutical costs, around **\$170 million in expenditure was made in 2019 on other components of the health system**. This includes inpatient care, outpatient care, emergency department presentations, general practitioner and specialist consultations, and attributable expenditure on

falls and depression. There was a further **\$1.3 billion in indirect costs relating to productivity losses**, including reduced employment, absenteeism, presenteeism, premature mortality, and informal care. Finally, nearly **\$790 million in other financial costs** related to aids and modifications, formal home-based and long-term care, support payments, and deadweight losses (the burden of excess taxation), much of which was borne by individuals.

Chart i: Socioeconomic costs of MS in Canada in 2019



Source: Deloitte Access Economics analysis.

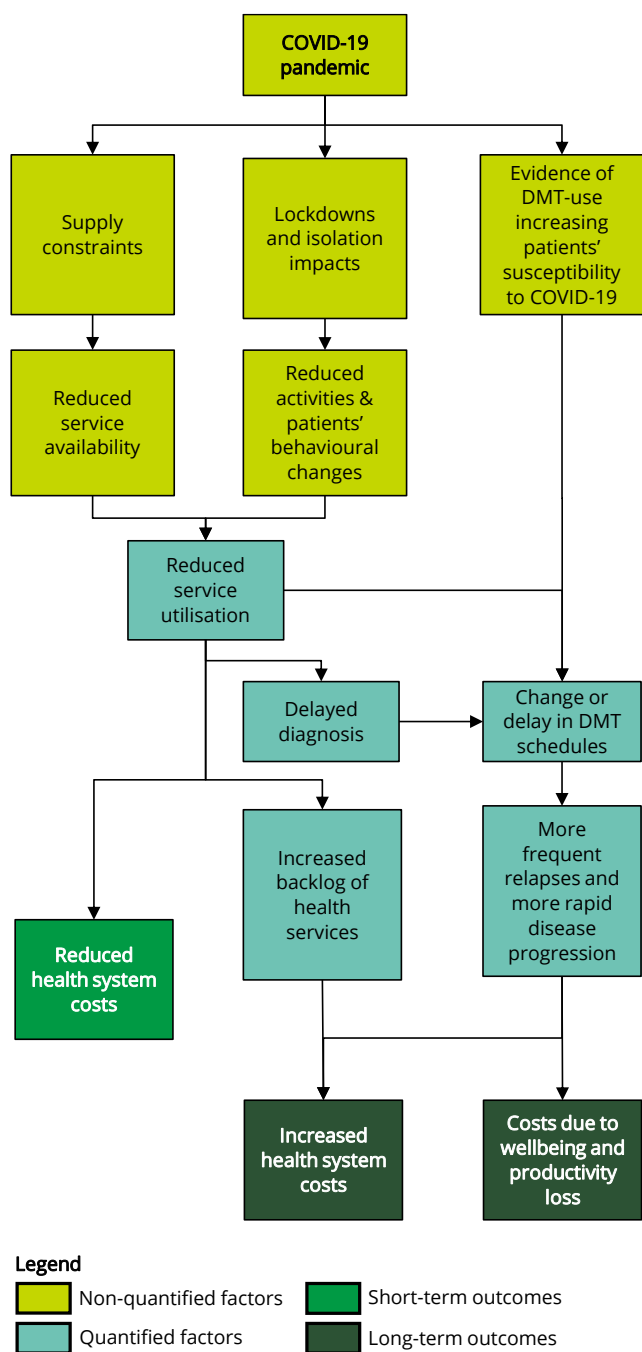
The COVID-19 pandemic and expenditure on MS in Canada

The substantial cost of MS in a typical undisrupted year (i.e., 2019) relates to its management (of symptoms, comorbidities, and complications) and treatment (e.g., use of DMTs) intersecting with many parts of the health system. This report evaluates whether the pandemic has resulted in significant change in the types and quality of health care received by people living with MS. It considers three of the most experienced impacts:

1. Supply constraints within the health system due to the reallocation of resources to address COVID-19
2. Changes in service utilization driven by public health mandates (e.g., lockdowns and social isolation) and related behavioural changes (e.g., hesitancy to visit clinics) designed to slow the transmission of COVID-19
3. Changes in treatments with certain classes of DMTs (anti-CD20 and S1Ps) due to emerging evidence of the potential risks of poorer outcomes from COVID-19 infection and vaccination.

Figure ii depicts these three impacts and the pathways through which they affected people living with MS. It was designed based on analysis and interpretation of data collected through desktop review of publicly available information, data requested from the Canadian Institute for Health Information (CIHI), and stakeholder engagement. As shown, the impacts created service backlogs and negatively affected MS patient outcomes in terms of relapse management, disease progression and disability accumulation. This is due in large part to delayed diagnosis and treatment of the disease as timeliness of diagnosis is known to be an important factor in disease outcomes.

Figure ii: Impact of COVID-19 pandemic on MS outcomes



Source: Deloitte Access Economics.

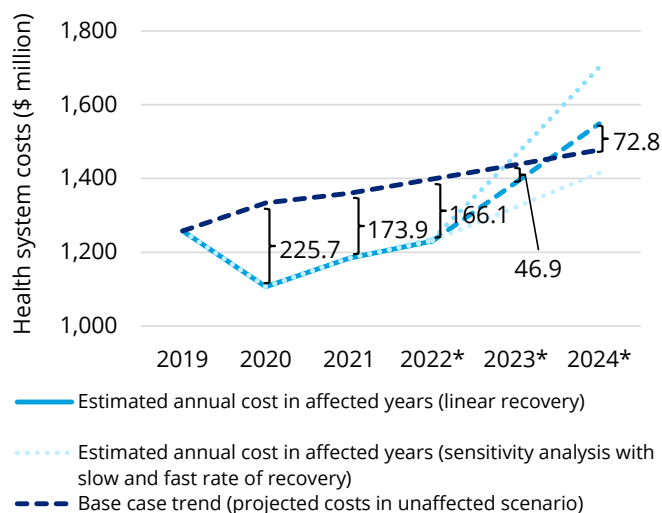
This study estimated that changes in the provision of health services between 2020 and 2022 **reduced MS-related health expenditure by \$566 million** (Chart ii). This represents a 13% reduction compared to the expenditure that would have been expected (“base case” in Chart ii) in these years had COVID-related disruptions not occurred.

This not only includes individuals who missed services during the impacted period but also those who received virtual rather than in-person care. The proportion of the Canadian population that received virtual care between March 2020 and March 2021 was estimated to be in the range of 24% to 42%.¹⁰ The backlog in health service provision impacted on MS treatment and diagnosis and led

to an overall worsening in the health state of many people with MS. This is likely to have long-term consequences for people with MS and create considerable strain on the health system during the post-pandemic recovery, leading to additional costs in future years.

It was found that the reduction in health system costs (relative to expected “base case” costs) was likely to persist until mid-2023 due to the time required for the health system to recalibrate from the impacts of the pandemic. Beyond this point, **health system costs related to MS are estimated to rise to \$1.47 billion in 2024, representing an incremental cost of \$72.8 million compared to the base case of an unaffected year.** Projections also indicate that this effect is likely to extend beyond the timeframe modelled in this study due to the lasting effects of the backlog in health services.

Chart ii: Incremental health system costs, estimated actual vs base trend, 2019 to 2024



Source: Deloitte Access Economics analysis.

Notes: *Figures for 2022, 2023 and 2024 in affected years are projected.

Sensitivity analysis was applied with fast (1.5 times) and slow (0.5 times) rate of recovery.

Timely and effective treatment of MS is important in managing disease activity to maintain function and wellbeing of people with MS. While management and treatment of MS symptoms, complications and progression involve a multidisciplinary health care team, in terms of the impact of the pandemic, this study specifically explored the **impacts of changes to DMT schedules and delayed diagnosis on the health outcomes** of people living with MS and attempted to quantify the associated costs. Analysis found that delays and changes to existing DMT courses were estimated to lead to an additional **\$35 million** in costs to the Canadian health system, \$89 million in productivity loss, and \$401 million in loss of wellbeing between 2020 and 2024. Delayed diagnosis of MS during the pandemic was estimated to cost a total of **\$5.3 million** to the Canadian health system, \$8.9 million in productivity losses and \$40.2 million in lost wellbeing between 2020 and 2024.

Consultations with MS clinicians and review of research literature validated findings from this modelling analysis: evidence suggested that delays and changes to DMT schedule can lead to irreversible disease progression.¹¹ The additional costs associated with these alterations are widely thought to persist into the future.

Reduction in rehabilitation, coupled with a lack of social and cognitive stimulation during the pandemic, are also expected to result in increased disability progression.¹² While there was insufficient data available to allow quantitative modelling, the effects of rehabilitation and social interaction were assessed qualitatively through literature review and stakeholder engagement. According to several MS clinicians interviewed in this study, the impact was particularly significant for people with a moderate disability level who were at risk of progressing to a high disability level.

Where to from here?

This study provided an updated estimate of the socioeconomic costs of MS in Canada in 2019, along with a modelled estimate of the impact of the pandemic on those costs. As these events are ongoing, the assessment of the impact of the pandemic was based on best available evidence at the time of report preparation (May 2023). This study highlighted the significant reduction in health service access among people with MS during the pandemic. As a chronic disease that requires consistent treatment and management, unmet health needs of people with MS accumulated during the pandemic-affected years, primarily between 2020 and 2022. Based on findings from this study, these impacts will have a long-lasting impact on the health outcomes of people with MS.

Findings presented here are expected to provide a framework to understand and assess the potential consequences of the pandemic on people with MS. Informed predictions on these potential consequences may guide swift and timely policy decisions related to MS health care services to mitigate “snowballing” of negative outcomes. Policymakers and advocacy groups can utilise findings from this report to identify areas of MS health care that require further investments and/or changes for the benefit of both people with MS and their families, and the broader society in Canada.

Further data collection and evidence generation are required to uncover the true extent of the impact of the pandemic on MS in Canada for years to come. This study identified several gaps in data collection, including utilization of neurologist visits, utilization of rehabilitation and a more comprehensive and complete pharmaceutical data. The approach and results from this study should serve as a guide for researchers to expand and update the model as more data becomes available.

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