

Editorial

National Stroke Surveillance in Canada: Are We There Yet?

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Stroke is among the leading causes of death and disability worldwide, with an estimated 12.2 million new strokes around the world in the year 2021.¹ Although the burden of stroke is disproportionately higher in low-income countries compared to high-income countries, a recent study suggests that the number of annual strokes in high-income countries, including Canada, has been rising over the past few decades.² An ageing population and a longer life expectancy have led to a demographic shift such that more people are at risk of developing a stroke.² Environmental factors such as air and noise pollution have also been implicated.^{3,4} From a public health perspective, focusing on primary stroke preventative strategies to reduce stroke incidence as well as developing and disseminating life-saving interventions that reduce stroke-related disability is predicated on a better understanding of the overall burden of stroke. Stroke surveillance, which includes tracking the number of strokes and its trends, can help with allocation and/or mobilization of scarce resources and help understand if preventive efforts are effective at a population level. In Canada, it has been challenging to implement a national stroke surveillance system due to disparate methods of identifying stroke across different provinces and territories. As such, national estimates of stroke using different methodologies have reported varying estimates of total number of strokes in Canada.^{5,6}

In this issue of the *Canadian Journal of Neurological Sciences*, Holodinsky and colleagues (2022) estimated the absolute number of strokes seen in the emergency department (ED) or admitted to an acute care hospital in Canada during the 2017–2018 fiscal year.⁷ To do so, the authors sourced administrative data, including inpatient records from every province and territory and ED visits from Alberta and Ontario only, defining clinically different stroke diagnoses [ischemic stroke, intracerebral hemorrhage (ICH), subarachnoid hemorrhage (SAH), and transient ischemic attack (TIA)], and eliminating redundancy by accounting for non-distinct stroke events based on timing and type. The latter was done to avoid over-estimating stroke events. This meant that a diagnosis of ischemic stroke within 28 days of a TIA would only count as one ischemic stroke.

There were an estimated 108,707 distinct strokes in Canada in the 2017–2018, equating to an incidence of about 300 events/100,000 people. To our knowledge, this study is the first to provide estimates for absolute number of stroke events in Canada using a

common methodology across all provinces, while also evaluating the different types of strokes. This better reflects the current burden of stroke on the Canadian healthcare system, as opposed to only reporting incidence of first-ever strokes and overcomes limitations of previous estimates.⁵ The authors also acknowledged one caveat – estimates of ED visits for stroke in the rest of Canada was based on the data available in Alberta and Ontario.

In the current study, about 1000 patients with SAH seen in the ED were not admitted to an inpatient unit, which is surprising considering that SAH is a life-threatening condition requiring aggressive acute management, often as an inpatient. To note, traumatic SAH were excluded in this estimation, raising concerns about the validity of including ED visits for SAH in the overall estimation of stroke burden. Further, when the “query” diagnoses (i.e., ED visits in which the diagnostic codes were not definitive) were excluded, the estimated total number of strokes in 2017–2018 went down to 83,549 (a 13% drop). While the authors argued that the inclusion of these cases is important as they undergo much of the same work-up and resource use during the ED visit as true strokes, ‘stroke mimics’ that often present as a code stroke using similar resources as query strokes were not included in the estimation. Thus, when reviewing the results of a surveillance study, it is important to understand the definitions of the events and the data sources.

Conceptually, the utility of translating the 108,707 stroke events into an estimation of one stroke event every 5 minutes is purely illustrative. Although the authors made a comparison to a prior study which estimated one stroke every 9 minutes, readers should be aware that the latter included only inpatient strokes, and it is unclear if query events were included.⁸ Stating that our healthcare system provides acute inpatient or emergency care to an adult with stroke every 5 minutes is more accurate, though less headline-grabbing. Further, epidemiological data presented as number of events over a selected timescale (e.g., a child dies from starvation every 15 seconds⁹) is not ideal for evaluating disease trends.

Due to data availability, the stroke burden estimated by the authors is about 6 years old by the time of publication. In a prior study, the incidence of ischemic stroke and ICH in Ontario decreased between 2003 and 2011, but subsequently increased until 2017.⁶ The current study is the first step in transforming such passive surveillance into active surveillance, with the goal of understanding the trends of stroke in Canada in real time. An ideal next

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step is for both the federal and provincial governments to come together to create a national stroke surveillance system that helps with accurate estimation of the burden of stroke in Canada, which in fact has been discussed since the early 2000s.¹⁰ National stroke surveillance systems exist in other countries such as Finland,¹¹ Singapore,¹² and Denmark¹³ and provide valuable insights when planning health resource utilization. In contrast, Canada has a well-developed national cancer surveillance system which can be used as a model.¹⁴

The current study is a comprehensive update on the burden of stroke in Canada. It highlights the importance of knowing the true burden of stroke in order to better respond to public health needs. This work hopes to encourage development of a national stroke surveillance system to help know the burden and potentially forecast it for future years. As with any surveillance system, the goal is not only to see where we are now, but also where we are going.¹⁵

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