Diagnosing post-COVID-19 condition (long COVID) in adults

Kieran L. Quinn MD PhD, Fahad Razak MD MSc, Angela M. Cheung MD PhD

■ Cite as: *CMAJ* 2023 January 17;195:E78-9. doi: 10.1503/cmaj.220818

See related articles at www.cmaj.ca/lookup/doi/10.1503/cmaj.220823 and www.cmaj.ca/lookup/doi/10.1503/cmaj.220824

1 The World Health Organization has proposed a case definition for post-COVID-19 condition (long COVID)

The World Health Organization used a Delphi consensus method that involved people with lived experience and clinicians to provide a case definition for long COVID: symptoms that linger beyond 3 months of a probable or confirmed SARS-CoV-2 infection, which last at least 2 months and cannot be explained by an alternative diagnosis.[1] However, the sensitivity, specificity and positive and negative predictive value of definitive diagnostic criteria have yet to be determined.

2 About 1.4 million people in Canada have been affected by long COVID

The 2022 Canadian COVID-19 Antibody and Health Survey reported that nearly 15% of adults in Canada with suspected or confirmed SARS-CoV-2 infection had symptoms beyond 3 months.[2] Females (18.0%) were more likely than males (11.6%) to report lingering symptoms.[2] A 2022 meta-analysis and systematic review of early pandemic experiences with more severe variants reported an overall global prevalence of 43%, which differed among people who were admitted to hospital (54%) and those who were not (34%).[3] Consequently, contemporary prevalence may be far lower owing to high vaccination rates, evolving therapies and less virulent variants, resulting in less severe disease overall.[3]

3 Long COVID is systemic in nature

This may be related to the expression of angiotensin-converting-enzyme 2 (ACE2) receptors in different organ systems, through which SARS-CoV-2 enters a cell.[4] Several pathophysiological mechanisms may contribute differentially to long COVID, including cellular damage, persistent inflammation or viremia, autoimmunity and a procoagulant state.[4]

4 Long COVID can affect most organ systems in the body

The condition has substantial effects on patients' daily well-being and functioning.[3,4] More than 100 symptoms have been reported in people with long COVID, and female sex appears to be an independent risk factor. The most common potentially modifiable symptoms include fatigue (23%–63%), anxiety and depression (23%–46%), dyspnea (11%–43%), sleep disturbances (11%–31%) and palpitations (6%–22%).[3,4]

5 Many people with long COVID have lingering symptoms

Although many people recover from long COVID, some continue to have symptoms and are unable to return to full-time work at 1 year after infection.[2,5] In a 2022 longitudinal cohort study[5] involving 1192 people who were admitted to hospital in Wuhan, China, and who survived COVID-19, 68% had at least 1 symptom at 6 months after infection, which decreased to 55% at 2 years. A total of 21% of people who were previously employed had not returned to work,[5] and the same proportion of people in Canada reported that their symptoms often or always limited their daily activities.[2]

References

1. Soriano JB, Murthy S, Marshall JC, et al. Condition WCCDWG on PC 19. A clinical case definition of post-COVID-19 condition by a Delphi consensus. *Lancet Infect Dis* 2022;22:e102-7.
2. Frequency and impact of longer-term symptoms following COVID-19 in Canadian adults. Ottawa: Government of Canada; 2022. Available: https://health-infobase.canada.ca/covid-19/post-covid-condition/results.html (accessed 2022 Oct. 24).
3. Chen C, Haupert SR, Zimmermann L, et al. Global prevalence of post COVID-19 condition or long COVID: a meta-analysis and systematic review. *J Infect Dis* 2022 2022;226:1593-1607.
4. Nalbandian A, Sehgal K, Gupta A, et al. Post-acute COVID-19 syndrome. *Nat Med* 2021;27:601-15.
5. Huang L, Li X, Gu X, et al. Health outcomes in people 2 years after surviving hospitalisation with COVID-19: a longitudinal cohort study. *Lancet Respir Med* 2022;10:863-76.

Competing interests: Kieran Quinn is a former assistant scientific director of the Ontario COVID-19 Science Advisory Table from Aug. 8, 2022, to Sept. 30, 2022. He is the current assistant scientific director of the Ontario Public Health Emergencies Science Advisory Committee and has received Canadian Institutes of Health Research (CIHR) grants (awarded to his institution) to study the long-term effects of COVID-19. He has served as an advisor for the chief science advisor of the Canada Task Force on Post-COVID-19 Condition. Fahad Razak holds a salary award as the Graham Farquharson knowledge translation fellow from the PSI Foundation and is an employee of Ontario Health. He was also an employee of Public Health Ontario during the writing of this manuscript. Fahad Razak has received grants (outside the current article) to study COVID-19 from CIHR, Canadian Frailty Network, University of Toronto (including the Department of Medicine, St. Michael's Hospital and the Sunnybrook Health Sciences Centre), Digital Research Alliance of Canada (Data Champions Pilot Project) and Royal College of Physicians and Surgeons of Canada. Angela Cheung has received CIHR grants (awarded to her institution) for CANCOV (platform observational study of COVID-19 in Canada) and RECLAIM (adaptive platform randomized controlled trials for long COVID interventions). MediciNova is providing a study drug and placebo for the RECLAIM trial, a multicentre study across Canada. Angela Cheung has served as an advisor for the Ontario COVID-19 Science Advisory Table, Public Health Agency of Canada, Canadian Agency for Drugs and Technologies in Health, COVID-19 Immunity Task Force and chief science advisor of the Canada Task Force on Post-COVID-19 Condition. No other competing interests were declared.

This article has been peer reviewed.

Affiliations: Department of Medicine and Institute of Health Policy, Management, and Evaluation (Quinn, Razak, Cheung), University of Toronto; ICES Central (Quinn); Department of Medicine (Quinn, Cheung), Sinai Health System and University Health Network; Temmy Latner Centre for Palliative Care (Quinn); Department of Medicine (Razak), Li Ka Shing Knowledge Institute, Unity Health Toronto; Department of Medicine (Razak), St. Michael's Hospital, Unity Health Toronto; Toronto General Hospital Research Institute and Schroeder Arthritic Institute (Cheung), University Health Network, Toronto, Ont.

Correspondence to: Kieran Quinn, kieran.quinn@sinaihealth.ca