

Impact of COVID 19 on the provision of surgical services in Ontario, Canada: population-based analysis

D. Gomez ^{1,2,3,4,*}, F. Dossa^{1,5}, C. Sue-Chue-Lam^{1,5}, A. S. Wilton⁴, C. de Mestral ^{1,3,4,5,6}, D. Urbach^{1,4,5} and N. Baxter^{3,4,5,7}

¹Department of Surgery, Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada

²Division of General Surgery, St Michael's Hospital, Unity Health Toronto, Toronto, Ontario, Canada

³Li Ka Shing Knowledge Institute, St Michael's Hospital, Unity Health Toronto, Toronto, Ontario, Canada

⁴ICES, Toronto, Ontario, Canada

⁵Institute of Health Policy, Management and Evaluation, Dalla Lana School of Public Health, University of Toronto, Toronto, Ontario, Canada

⁶Division of Vascular Surgery, St Michael's Hospital, Unity Health Toronto, Toronto, Ontario, Canada

⁷Melbourne School of Population and Global Health, University of Melbourne, Melbourne, Victoria, Australia

*Correspondence to: Department of Surgery, Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada (e-mail: GomezDa@smh.ca)

Editor

Coronavirus disease (COVID-19) has caused unprecedented global surgical disruption given concerns about aerosolizing medical procedures, limited human resources, and critical shortages of personal protective equipment¹. The WHO declared COVID-19 a pandemic on 11 March 2020. Shortly afterwards (15 and 19 March 2020), the Ontario government directed the ramping down of ambulatory and elective surgery; however, implementation was left to the discretion of individual hospitals^{2,3}. Our population-based study aimed to characterize the impact of COVID-19 on the provision of scheduled and urgent surgical services, and to explore interhospital variation in responses to government directives.

We conducted a time series analysis utilizing linked health administrative data sets. All hospital-based scheduled and urgent surgical procedures (open, laparoscopic, endoscopic and endovascular approaches), identified using the Canadian Classification of Interventions⁴, from 1 January to 31 March 2020 in Ontario, Canada, were included (*Appendix S1*). This time interval was divided into a pre-COVID period (before 10 March 2020, the date of the first reported COVID-19 death in Ontario) and a COVID period (11–31 March 2020). This is the most current population-based data available. Procedures performed from 1 January 2019 to 1 April 2019 were captured to serve as a historical control. Weekly rates of procedures (per 100 000 person-weeks) were examined. Surgical procedure rate ratios (SRRs) with 95 per cent c.i. were used to compare the relative change in the weekly rate of surgical procedures in the historical cohort and pre-COVID period with the weekly rate during the COVID period⁵. Changes during the COVID period across hospitals were

examined in response to provincial directives to ramp down non-urgent procedures. Observed to expected (O : E) ratios with 95 per cent c.i. intervals were calculated as the number of procedures at each hospital for each week of the COVID period (observed events) over the number of procedures during the equivalent week in 2019 (expected events)⁶. All analyses were stratified by admission category (ambulatory, inpatient elective, inpatient urgent). More details of the methods employed can be found in *Appendix S2*.

A total of 384 518 824 person-weeks were evaluated. In the 2020 pre-COVID period, 255 501 surgical procedures were performed (average 172.3 (95 per cent c.i. 171.6 to 172.9) per 100 000 person-weeks). During the COVID period, there were 30 033 surgical procedures (average 67.3 (66.6 to 68.1) per 100 000 person-weeks). Weekly surgical procedure rates in the pre-COVID period in 2020 and the equivalent period in 2019 were similar. When comparing the COVID period with the equivalent period in 2019, the weekly rate of surgical procedures did not decrease significantly during week 1, decreased by 78 per cent (SRR 0.22, 95 per cent c.i. 0.21 to 0.22) by week 2, and by 83 per cent (SRR 0.17, 0.16 to 0.17) by week 3 (*Fig. 1*). As expected, ambulatory procedures saw the largest decrease (84 per cent by week 2 and 88 per cent by week 3) compared with 2019. Although the provincial directive did not include urgent procedures, these declined by 36 per cent by week 2 and 49 per cent by week 3 of the COVID period (*Table 1*).

During the first week of the COVID period, 34 per cent of hospitals had lower than expected procedure numbers compared with 2019; this had risen to 98 per cent of hospitals by week 3. Disaggregating O : E ratios by procedure type, more than 95 per cent of hospitals reduced their ambulatory and inpatient elective procedures in response to government directives during weeks 2

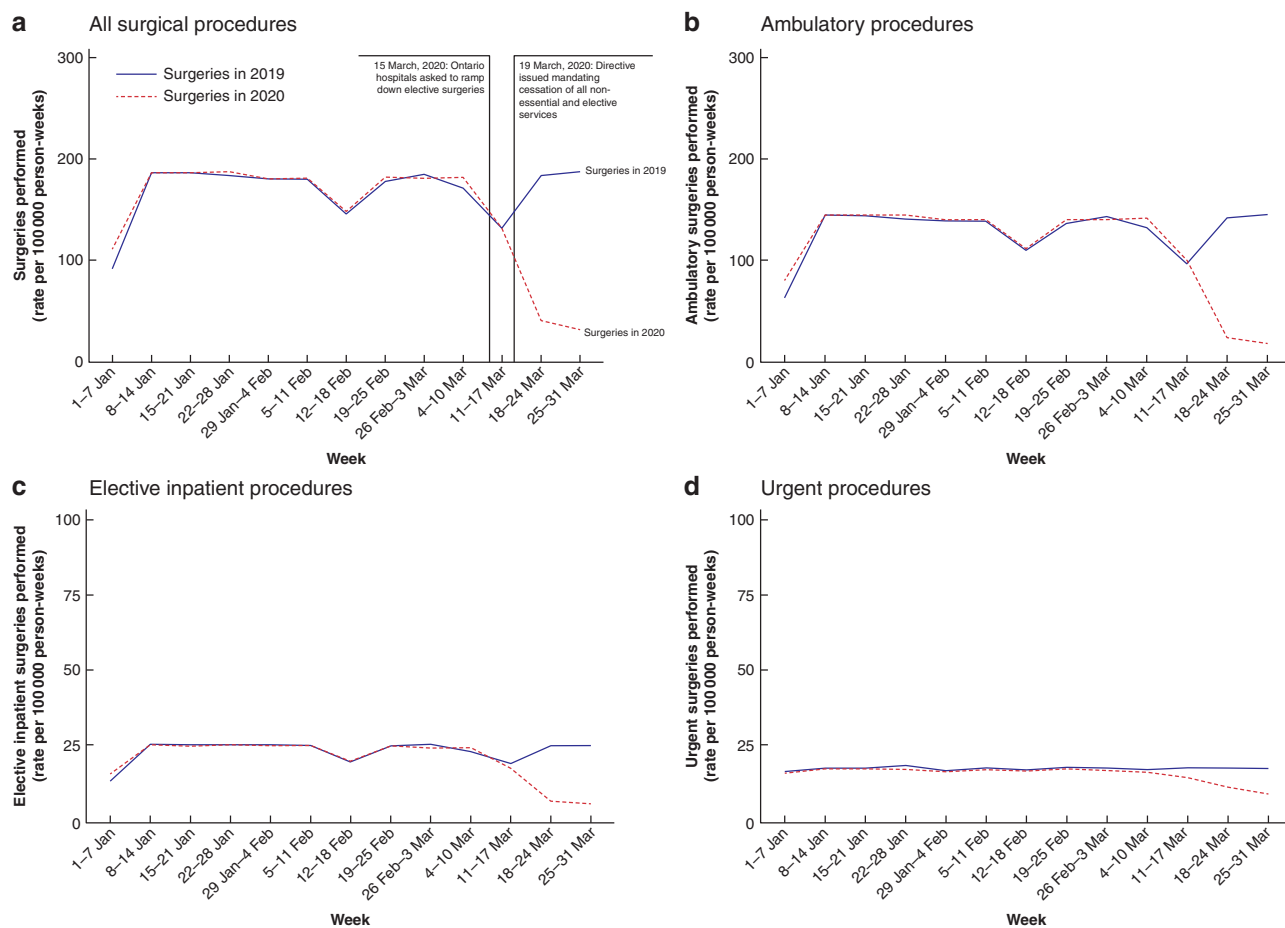


Fig. 1 Weekly rates of surgical procedures per 100 000 patient-weeks during 1 January to 31 March 2019 and 2020

a All surgical procedures; **b** ambulatory procedures; **c** elective inpatient procedures; **d** urgent procedures.

and 3 of the COVID period compared with 2019. Two-thirds of hospitals also had lower than expected inpatient urgent procedures during weeks 2 and 3 of the COVID period (Table 1).

In this population-based analysis, the rate of surgical procedures decreased during the COVID period, with hospitals rapidly reducing ambulatory and elective procedures. However, the observed and unexpected large reduction in urgent surgical procedures highlights the need to prioritize access to care for patients with emergency surgical conditions as part of pandemic planning.

Disclosure. The authors declare no conflict of interest.

Supplementary material

Supplementary material is available at *BJS* online.

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