

## SUPPLEMENTARY MATERIALS

### The Changing Face of Cancer Surgery during Multiple Waves of COVID-19

Supplementary Table 1. Segmented negative binomial regression analysis with general parameterization

Parameters <sup>a</sup>	Rate ratio (95% CI)	<i>P</i>
Estimated mean volume at the beginning of the pre-pandemic period on January 7, 2018 (intercept of the first regression segment)	4,556 (4,192-4,950)	< 0.001
Weekly trend during the pre-pandemic period (January 7, 2018 to March 14, 2020)	1.000 (0.999-1.001)	> 0.99
Estimated mean volume at the beginning of March 15, 2020 (intercept of the second regression segment) <sup>b</sup>	1,940 (1,675-2,247)	< 0.001
Weekly trend during the first wave of the pandemic (March 15, 2020 to January 9, 2021)	1.025 (1.019-1.031)	< 0.001
Estimated mean volume at the beginning of January 10, 2021 (intercept of the third regression segment) <sup>b</sup>	4,310 (3,690-5,035)	< 0.001
Weekly trend during the second wave of the pandemic (January 10, 2021 until August 28, 2021)	0.995 (0.988-1.003)	0.25

- a. We defined three COVID-19 periods based on the two times Ontario government declared state of emergency amid the rising infection cases. As such, the pre-pandemic period was from January 7, 2018 to March 14, 2020; the first wave of the pandemic was from March 15, 2020 to January 9, 2021; and the second wave of the pandemic was from January 10, 2021 to August 28, 2021. For each weekly trend parameter, we report the ratio, the associated 95% confidence interval (in parenthesis) and the p-value testing whether the ratio equals to 1.
- b. We estimated the drop in mean surgical volume at the beginning of wave 1 (on March 15, 2020) by calculating the relative change in mean volume from a week prior (4556) to the first week of wave 1 (1940):  $(4556-1940)/4556*100\% = 57\%$ . The 95% CI of this point estimate (57%) was calculated in the standard parameterization model on the next page (footnote b).
- c. We estimated the drop in mean surgical volume at the beginning of wave 2 (on January 10, 2021) by calculating the relative change in mean volume from a week prior ( $\exp(7.5705+0.0244*43)=5540$ ) to the first week of wave 2 (4310):  $(5540-4310)/5540*100\% = 22\%$ . The 95% CI of this point estimate (22%) was calculated in the standard parameterization model on the next page (footnote <sup>d</sup>).

Supplementary Table 2. Segmented negative binomial regression analysis with standard parameterization

Parameters <sup>a</sup>	Rate ratio (95% CI)	<i>P</i>
Estimated mean volume at the beginning of the pre-pandemic period on January 7, 2018	4,556 (4,192-4,950)	< 0.001
Estimated weekly trend over the entire study period (January 7, 2018 to August 28, 2021)	1.000 (0.999-1.002)	> 0.99
Mean volume during the first week of the first wave of the pandemic compared to the week prior <sup>b</sup>	0.43 (0.36-0.50)	< 0.001
Relative change in weekly trend since the start of the pandemic (March 15, 2020 to August 28, 2021) compared to the overall trend <sup>c</sup>	1.025 (1.019-1.031)	< 0.001
Mean volume during the first week of the second wave of the pandemic compared to the week prior <sup>d</sup>	0.78 (0.63-0.96)	0.02
Relative change in weekly trend during the second wave of the pandemic (January 10, 2021 to August 28, 2021) compared to trend since the start of the pandemic <sup>e</sup>	0.97 (0.96-0.98)	<0.001

- a. We defined three COVID-19 periods based on the two times Ontario government declared state of emergency amid the rising infection cases. As such, the pre-pandemic period was from January 7, 2018 to March 14, 2020; the first wave of the pandemic was from March 15, 2020 to January 9, 2021; and the second wave of the pandemic was from January 10, 2021 to August 28, 2021. For each weekly trend parameter, we report the ratio, the associated 95% confidence interval (in parenthesis) and the p-value testing whether the ratio equals to 1.
- b. During the first week of wave 1, mean cancer surgical volume dropped by 57% (i.e.,  $1 - 0.43 = 0.57$ ) with associated 95% CI between 50%-64%.
- c. From March 15, 2020 to the end of study (August 28, 2021), cancer surgical volume changed by a ratio of  $1.025 * 1.000 = 1.025$  for each week.
- d. During the first week of wave 2, mean cancer surgical volume dropped by 22% (i.e.,  $1 - 0.78 = 0.22$ ) with associated 95% CI between 4%-37%.
- e. From January 10, 2021 to the end of study (August 28, 2021, i.e., second wave of COVID-19), cancer surgical volume changed by a ratio of  $0.97 * 1.025 = 0.99$  for each week.