

Modelling predicts COVID-19 resurgence if physical distancing relaxed

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Population medicine professor Amy Greer, Canada Research Chair in Population Disease Modelling, and University of Toronto researchers used a mathematical model for this study that they developed in early spring. Credit: University of Guelph

If physical distancing measures in Ontario are relaxed too much or too

quickly, the province could see hospitals overwhelmed with COVID-19 patients as well as exponential growth in deaths, concludes new research involving a University of Guelph infectious disease modeller.

The findings, contained in a research letter published in *Annals of Internal Medicine*, suggest that if Ontarians increase their contacts to [normal levels](#) in the coming weeks, the virus will quickly spread and result in cases exceeding hospital ICU ([intensive care unit](#)) capacity.

Population medicine professor Amy Greer, Canada Research Chair in Population Disease Modelling, and University of Toronto researchers used a [mathematical model](#) for this study that they developed in early spring.

"At that point, there were not a lot of cases and we were looking ahead to what could happen. This paper goes back, uses the same model, but updates it by calibrating it with observed Ontario data as well as data on what we now know about the biology of the disease," Greer said.

After including confirmed patients occupying ICU beds in Ontario between March 19 and May 3 as well as COVID-19 deaths among hospitalized patients, they found that had Ontario not imposed strict physical distancing measures in mid-March, the province would have seen five times as many deaths.

Deaths among hospitalized patients without intervention were projected to have been 12.7 deaths per 100,000, compared with 2.5 deaths per 100,000 with physical distancing.

"When you fit the model that we had to the data we observed, it does demonstrate that physical distancing has been impactful. We averted a large number of cases and were able to protect limited health infrastructure such as ICU beds and ventilators," she said.

The team also looked at how long it would take to exceed ICU capacity under relaxed physical distancing measures with no compensating steps.

Assuming that physical distancing measures reduced contacts in Ontario by 70 per cent, hospitals would be overwhelmed in only 35 days with no distancing measures.

Even if current restrictions stay in place until mid-June fully dropping distancing measures would lead to an overwhelmed health-care system in only 41 days, the researchers found.

Increasing contacts to anything greater than 50 per cent of pre-pandemic levels would lead to a spike in hospitalizations and deaths in the coming months, assuming that no other measures are implemented to control the spread of the virus.

"The amount of contact that happens as we begin to relax is a major factor for determining how quickly ICU capacity is exceeded," Greer said.

She said the only way to relax physical distancing safely is to vastly increase COVID-19 testing and to trace contacts of infected patients to urge them to self-isolate.

"If we let up on physical distancing without concurrent increases in testing and tracing, there is a rapid return to [exponential growth](#)."

More information: Ashleigh R. Tuite et al, Risk for COVID-19 Resurgence Related to Duration and Effectiveness of Physical Distancing in Ontario, Canada, *Annals of Internal Medicine* (2020). [DOI: 10.7326/M20-2945](https://doi.org/10.7326/M20-2945)

Provided by University of Guelph

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