Wastewater Modelling Report: Forecasting the State of the Pandemic using Wastewater Data

Public Health Agency of Canada | Agence de la santé publique du Canada | Statistics Canada | Statistique Canada

Wastewater based forecasting using data up to: 2022-03-15

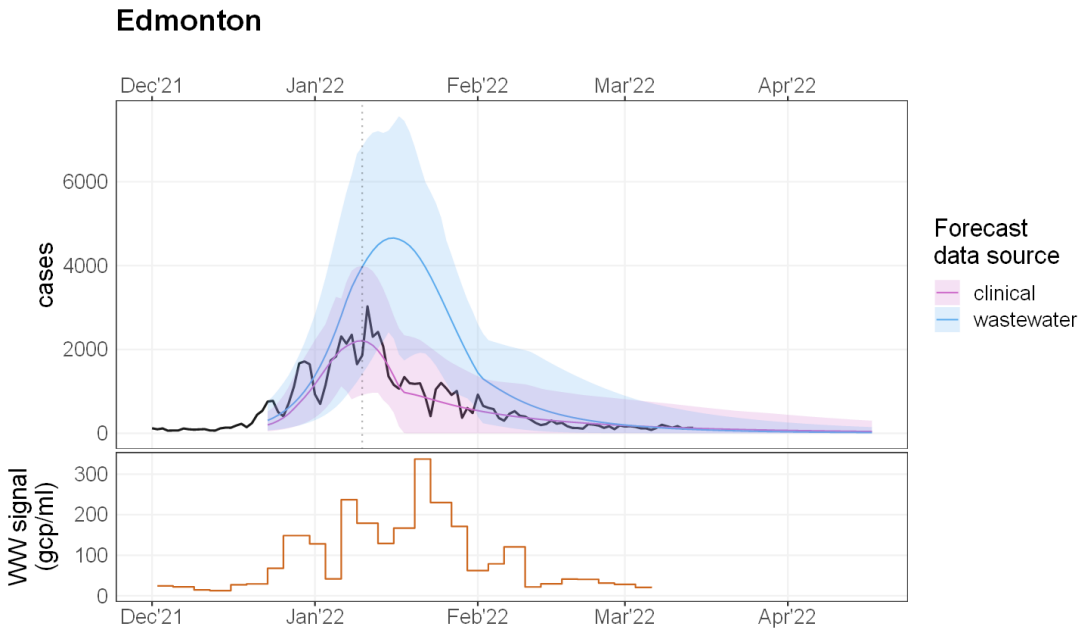
Public Health Agency of Canada has developed a mathematical model (insert link to the paper) for conducting wastewater based forecasting that describes infections of COVID-19 in the community and also considers how infected people shed the COVID-19 virus into the sewer systems and how that shed virus signal is detected and reported. The clinical case and wastewater surveillance data are used to inform the mathematical model, which can then be used to generate forecasts and understand what is happening in the community. The next figures, for each city and during the Omicron wave, show the traditional reported human clinical case data is shown in black, model forecasts using only clinical data is shown in pink, and model forecasts using only wastewater data is shown in blue.

Clinical surveillance data up to March 15th

Wastewater data up to March 6th (Toronto, Vancouver, Edmonton), March 5th (Montreal), March 2nd (Halifax)

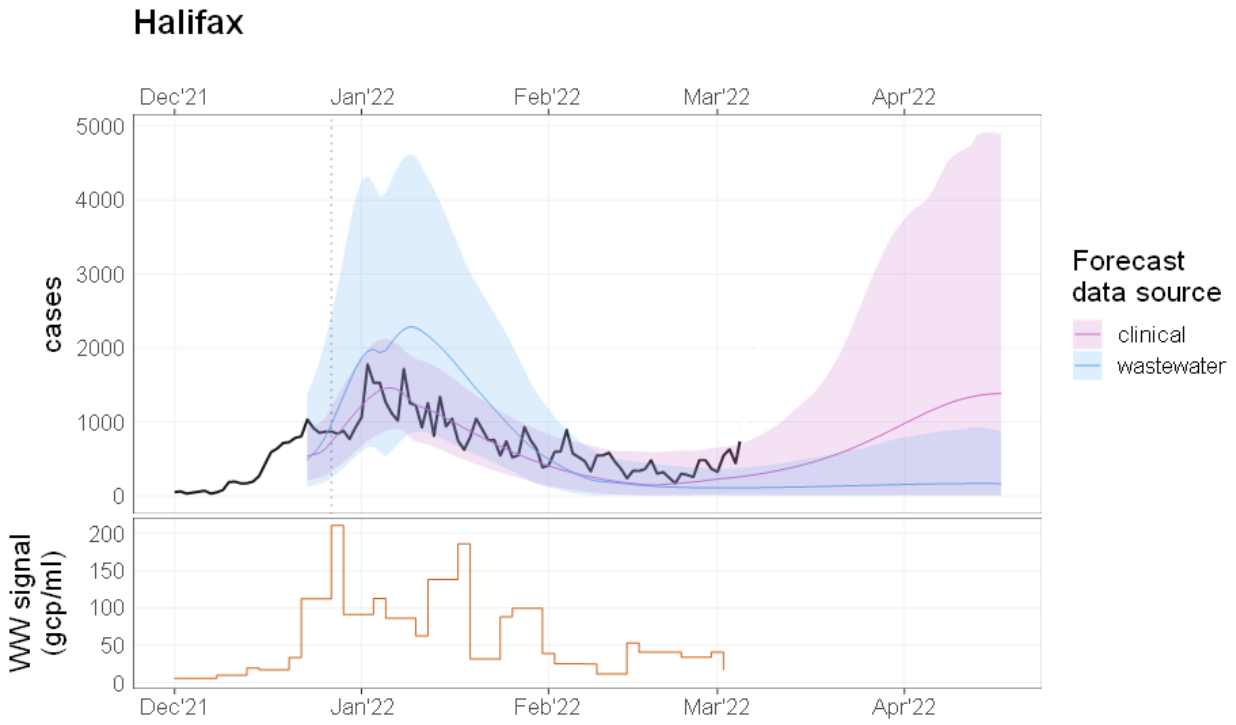
Edmonton

The plot shows good agreement between the wastewater based forecast and clinical based forecast up to early January 2022. The dotted line in early January indicates the point at which testing rules in Edmonton changed, reducing the reliability of clinical data. The wastewater data and model are not impacted by human testing changes so this forecast shows a continued rise in cases till mid January 2022 followed by a decline thereafter. The difference between the black/pink lines and the blue lines provides some indication of the underreporting that could have occurred over this period in Edmonton. The forecasts show a decline into March.



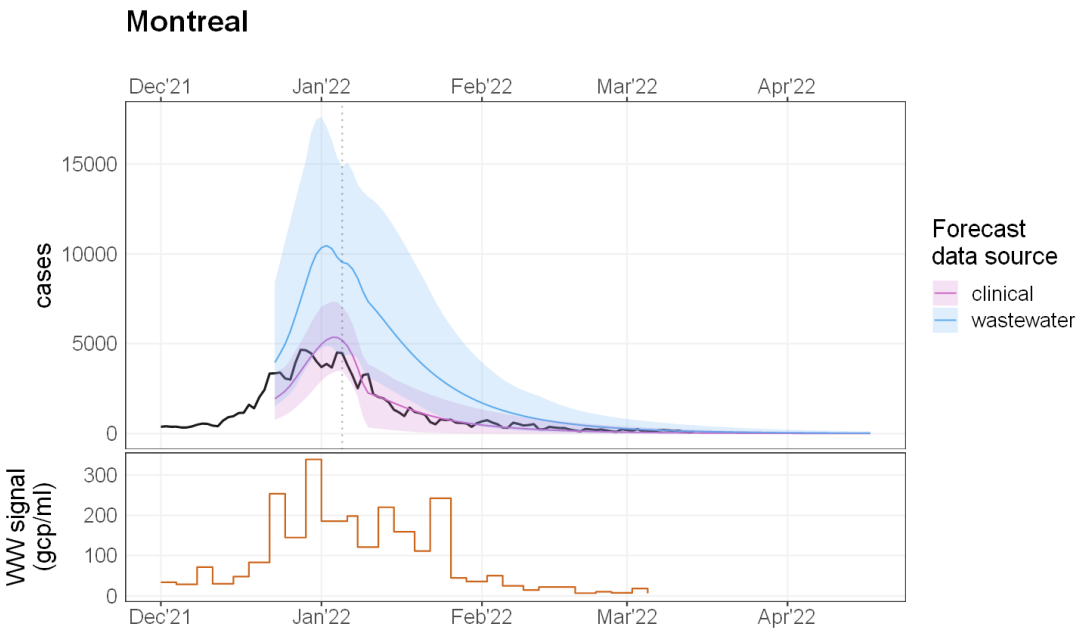
Halifax

The plot shows good agreement between the wastewater based forecast and clinical based forecast over this entire period. Human testing did not seem to hit capacity limits in Halifax. Therefore, there is a good correlation between both clinical data- and wastewater data-based forecasts indicating that the peak has occurred in early January with a gradual decline into March.



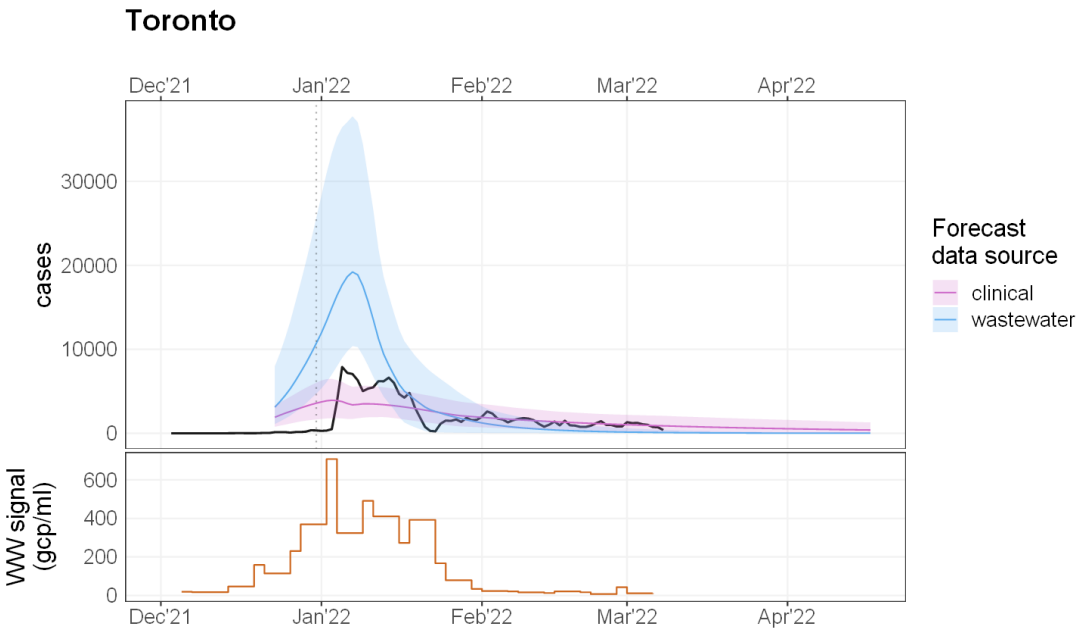
Montreal

The plot shows that both clinical data- and wastewater data-based forecasts estimated a peak in early January / late December and that wastewater forecasts estimated a higher number of cases occurring in the community than captured by clinical testing. Both forecasts show a gradual decline into March.



Toronto

The plot shows a change between wastewater data- and clinical data-based forecasts in early January. The dotted line in early January indicates the point at which testing rules in Toronto changed, reducing the reliability of clinical data. The wastewater data and model are not impacted by human testing changes so this forecast shows a continued rise in cases till mid January followed by a decline thereafter. The difference between the black/pink lines and the blue lines provides some indication of the under reporting of clinical cases that could have occurred over this period in Toronto. Both forecasts show a gradual decline in cases into March. Note: because of temporary technical issues with the Toronto Public Health website, reported clinical cases are not fully accurate.



Vancouver

The plot shows a change between wastewater data- and clinical data-based forecasts in late December. The dotted line in late December indicates the point at which testing rules in Vancouver changed, reducing the reliability of clinical data. The wastewater data and model are not impacted by human testing changes so this forecast shows a continued rise in cases till early to mid January followed by a decline thereafter. The difference between the black/pink lines and the blue lines provides some indication of the underreporting that could have occurred over this period in Vancouver. Both forecasts show a gradual decline in cases into March.