

## Canada COVID-19 epidemic models situation report No 32 - 2022-02-04

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### Combine and visualize international periodically updated estimates of COVID-19 pandemic at the country level, countries with subnational level estimates Canada

Based on uptake 20220204 in <https://github.com/pourmalek/CovidVisualizedCountry>

Study update dates in uptake 20220204:

**DELP 20220204, IHME 20220204, IMPE NO, IMPE NO, PHAC 20220114**

**IMPE 20220102** is > one month old and is not included in the graphs.

**SRIV** Highly implausibly high estimate.

DELP: [model by Massachusetts Institute of Technology, Cambridge](#)

IHME: [model by Institute for Health Metrics and Evaluation, Seattle](#)

IMPE: [model by Imperial College, London](#)

SRIV: [model by Srivastava, Ajitesh, University of Southern California, Los Angeles](#)

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## What is this report, and where does it come from?

This report shows the trajectory of daily deaths, infections, bed needs, and ICU bed needs for Canada and its provinces, estimated by five international and periodically updating COVID-19 epidemic models.

**The graphs** (see the following pages) show the predictions for *when, where, and how much* increase/decrease in infections, deaths, and bed needs.

This report summarizes the results of a project named *CovidVisualizedCountry*, an online tool developed to function as an early warning tool for technical advisers and health decision-makers.

Pre-print Data Note manuscript on Research Square, titled “CovidVisualized: Visualized compilation of international updating models’ estimates of COVID-19 pandemic at global and country levels”, 02 August 2021, PRE-PRINT (Version 1) available at Research Square [<https://doi.org/10.21203/rs.3.rs-768714/v1>] describes the methods and results of CovidVisualized tools: [\*CovidVisualizedCountry\* \(for Canada\)](#), [\*CovidVisualizedGlobal\* \(for global level\)](#), and [\*covir2\* \(for Iran\)](#).

Farshad Pourmalek MD MPH PhD, who has created the [\*CovidVisualizedCountry\*](#) tool (and [\*covir2\*](#) tool for Iran and [\*CovidVisualizedGlobal\*](#) tool for global level) and this report is a physician and epidemiologist who worked in the [School of Population and Public Health of University of British Columbia](#) and Vancouver General Hospital, [University of Washington](#), WHO, UNDEP, and UNICEF. ORCID ID <https://orcid.org/0000-0002-2134-0771>, PubMed.

**This report** is the **32nd** situation report of predictions of five international and periodically updating COVID-19 epidemic models about the future trajectory of the epidemic in Canada and its provinces. The report is based on the “[CovidVisualizedCountry](#)” online tool, that is a GitHub repository for sharing data and codes, available at

<https://github.com/pourmalek/CovidVisualizedCountry>

This report is meant to serve as an offline and stand-alone version of the online tool. Situation Reports are available online at

<https://github.com/pourmalek/CovidVisualizedCountry/tree/main/situation%20reports>

**Objectives** of the “CovidVisualizedCountry” tool are to identify international and periodically updated models of the COVID-19 epidemic, compile and visualize their estimation results, and regularly update the compilations.

**The ultimate objective** is to provide an ***early warning system*** for technical advisors to the decision-makers. When the predictions of one or more models show an increase in daily cases or infections, hospitalizations, or deaths in the near future of ***one to three months***, ***technical advisors to the national and subnational decision-makers*** may consider suggesting augmentation of non-pharmacologic preventive interventions and vaccination. In doing so, the strengths and weaknesses of individual models need to be considered and those of this work. Models’ estimates demonstrate the trajectory of COVID-19 deaths, cases or infections, and hospital-related outcomes in one to three months into the future.

The “CovidVisualized” project includes <https://github.com/pourmalek/CovidVisualizedCountry> for Canada and its provinces, <https://github.com/pourmalek/covir2> for Iran, and <https://github.com/pourmalek/CovidVisualizedGlobal> for the global level.

**Methods and technical details** of this work are available in a pre-print Data Note manuscript on Research Square, titled “CovidVisualized: Visualized compilation of international updating models’ estimates of COVID-19 pandemic at global and country levels”, 02 August 2021, PRE-PRINT (Version 1) available at Research Square [<https://doi.org/10.21203/rs.3.rs-768714/v1>] describes the methods and results of CovidVisualized tools: [CovidVisualizedCountry](#) (for Canada), [CovidVisualizedGlobal](#) (for global level), and [covir2](#) (for Iran).

Strengths and weaknesses of international and periodically updating COVID-19 epidemic models are discussed in [Pourmalek F, Rezaei Hemami M, Janani L, Moradi-Lakeh M. Rapid review of COVID-19 epidemic estimation studies for Iran. BMC Public Health. 2021 Feb 1;21\(1\):257. doi: 10.1186/s12889-021-10183-3. PMID: 33522928.](#)

Stata codes written and used for this whole work can be examined online and/or downloaded and re-run to check, securitize, verify, or flag any mistakes.

<https://github.com/pourmalek/CovidVisualizedCountry#iii-inner-works-of-this-repository-1>

### **The five international and periodically updating COVID-19 epidemic models:**

DELP, IHME, IMPE, (LANL), SRIV; JOHN (these abbreviations are used in the graphs)

**DELP:** DELPHI. Differential Equations Lead to Predictions of Hospitalizations and Infections. COVID-19 pandemic model named DELPHI by Massachusetts Institute of Technology, Cambridge. *Reference:* COVID Analytics. DELPHI epidemiological case predictions. Cambridge: Operations Research Center, Massachusetts Institute of Technology.

<https://www.covidanalytics.io/projections> and  
<https://github.com/COVIDAnalytics/website/tree/master/data/predicted>

**IHME:** Institute for Health Metrics and Evaluation. COVID-19 pandemic model by Institute for Health Metrics and Evaluation, Seattle. *Reference:* Institute for Health Metrics and Evaluation (IHME). COVID-19 mortality, infection, testing, hospital resource use, and social distancing projections. Seattle: Institute for Health Metrics and Evaluation (IHME), University of Washington. <http://www.healthdata.org/covid/> AND <http://www.healthdata.org/covid/data-downloads>

**IMPE:** Imperial. COVID-19 pandemic model by Imperial College, London. *Reference:* MRC Centre for Global Infectious Disease Analysis (MRC GIDA). Future scenarios of the healthcare burden of COVID-19 in low- or middle-income countries. London: MRC Centre for Global Infectious Disease Analysis, Imperial College London. <https://mrc-ide.github.io/global-lmic-reports/> AND <https://github.com/mrc-ide/global-lmic-reports/tree/master/data>

**SRIV:** Srivastava, Ajitesh. COVID-19 pandemic model by University of Southern California, Los Angeles. *Reference:* Srivastava, Ajitesh. University of Southern California (USC). COVID-19 forecast. Los Angeles: University of Southern California. <https://scc-usc.github.io/ReCOVER-COVID-19> AND [https://github.com/scc-usc/ReCOVER-COVID-19/tree/master/results/historical\\_forecasts](https://github.com/scc-usc/ReCOVER-COVID-19/tree/master/results/historical_forecasts)

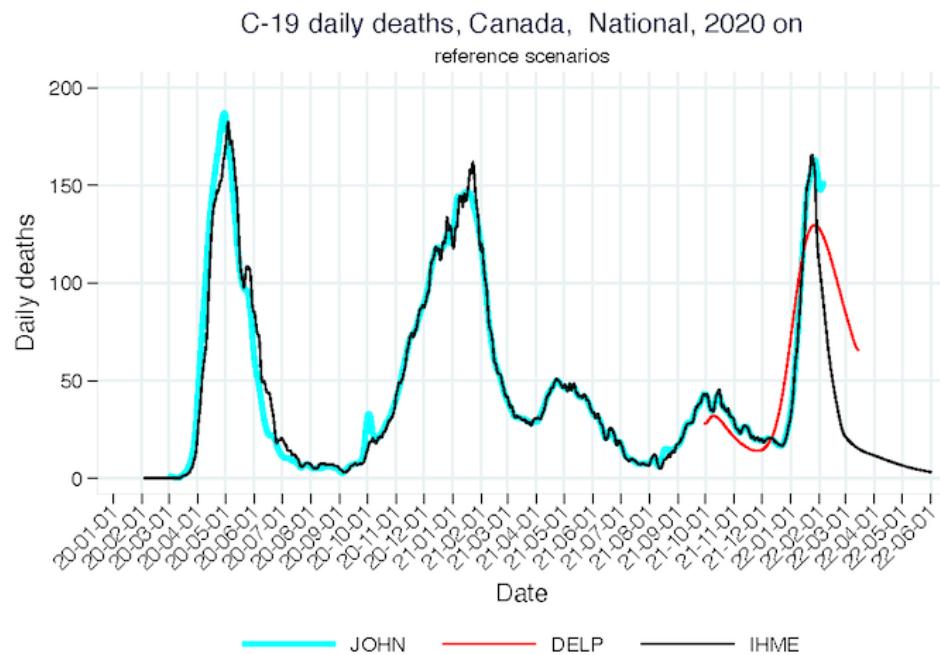
\*

**JOHN:** Johns Hopkins. Coronavirus resource center, Johns Hopkins University, Baltimore. Curation of official reports of countries to World Health Organization. **Ground truth for comparison.** *Reference:* Johns Hopkins University. Coronavirus resource center.  
<https://coronavirus.jhu.edu/map.html> AND <https://github.com/CSSEGISandData/COVID-19>

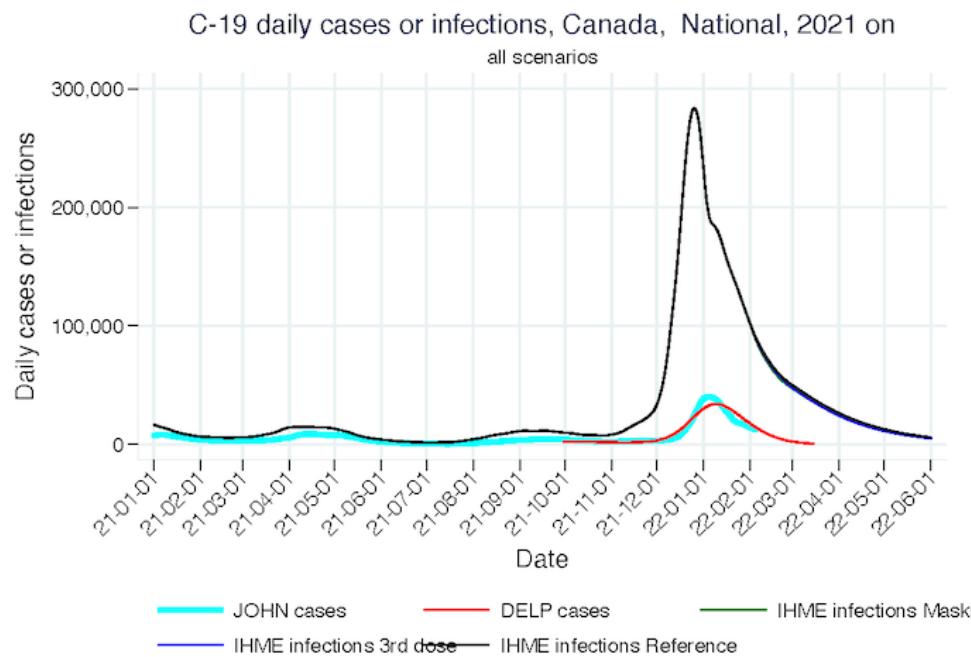
\*

## Selected graphs - Canada, National

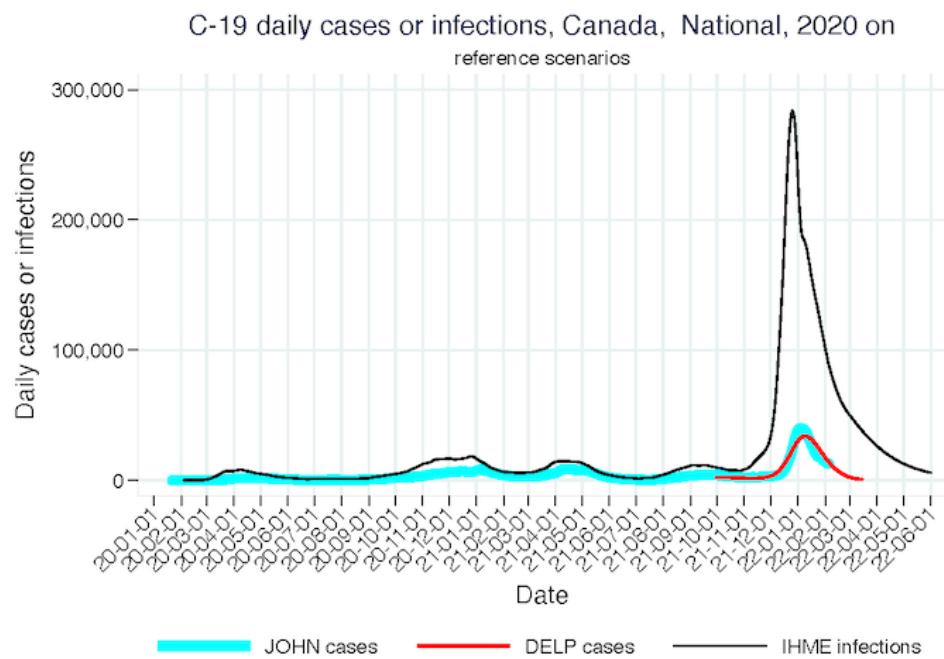
### (1) Canada [Daily deaths, Reference scenarios, 2021 on](#)



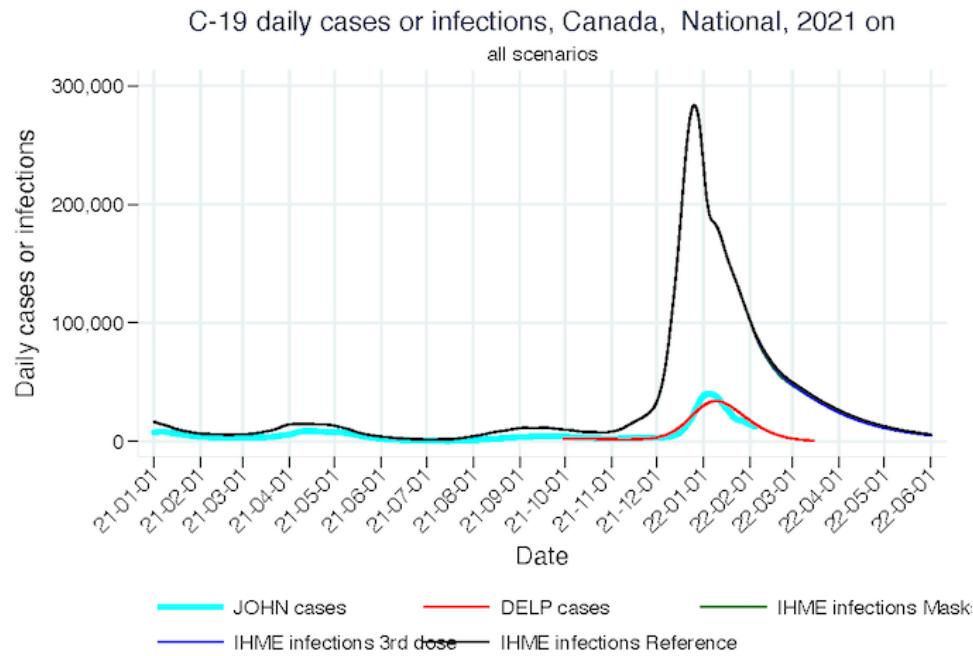
(2) Canada National [Daily deaths, All scenarios, 2021 on](#)



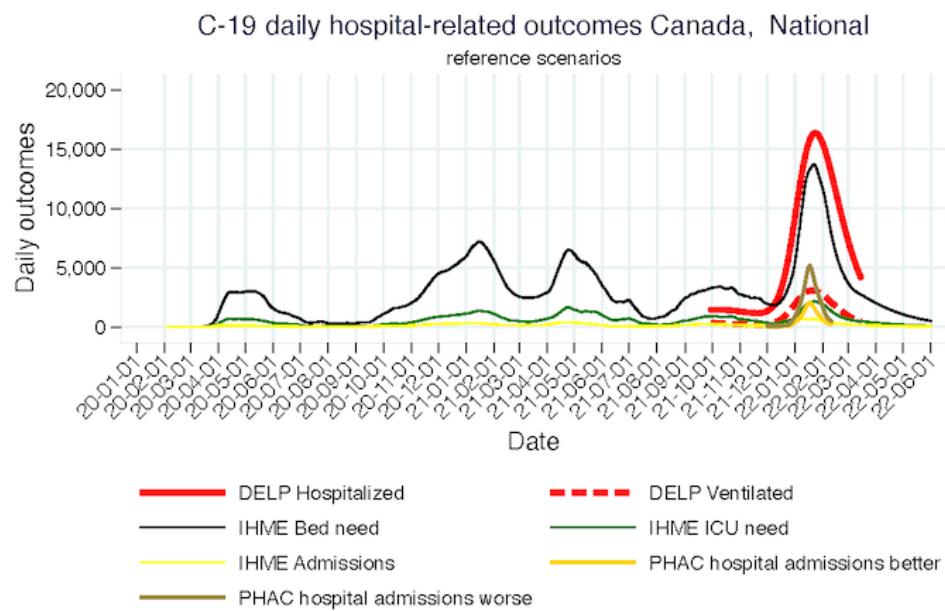
(3) Canada National [Daily cases or infections, Reference scenarios, 2020 on](#)



(4) Canada National [Daily cases or infections, All scenarios, 2021 on](#)

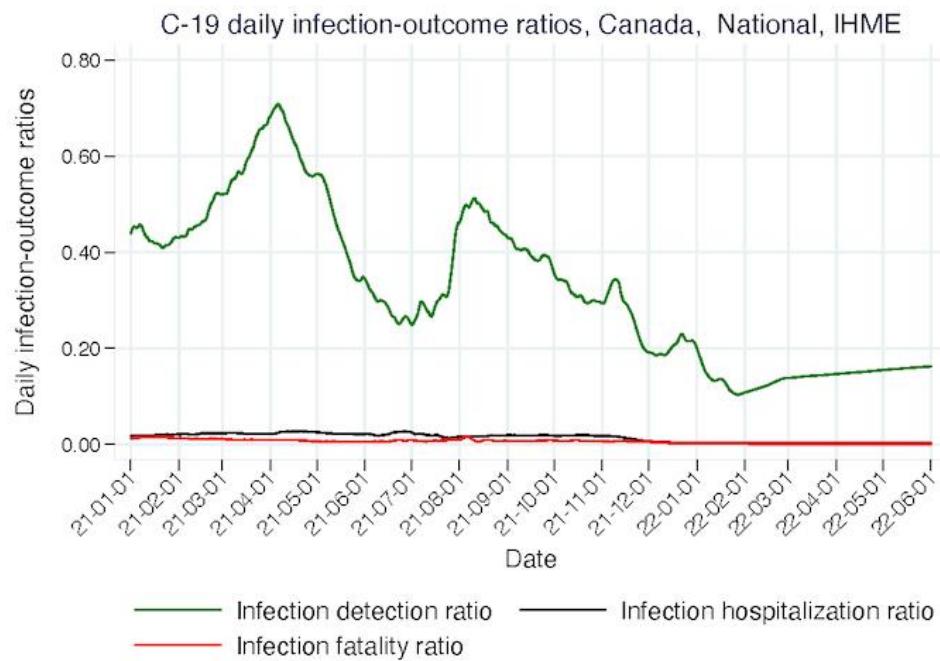


(5) Canada National [Daily hospital-related outcomes, Reference scenarios, 2020 on](#)

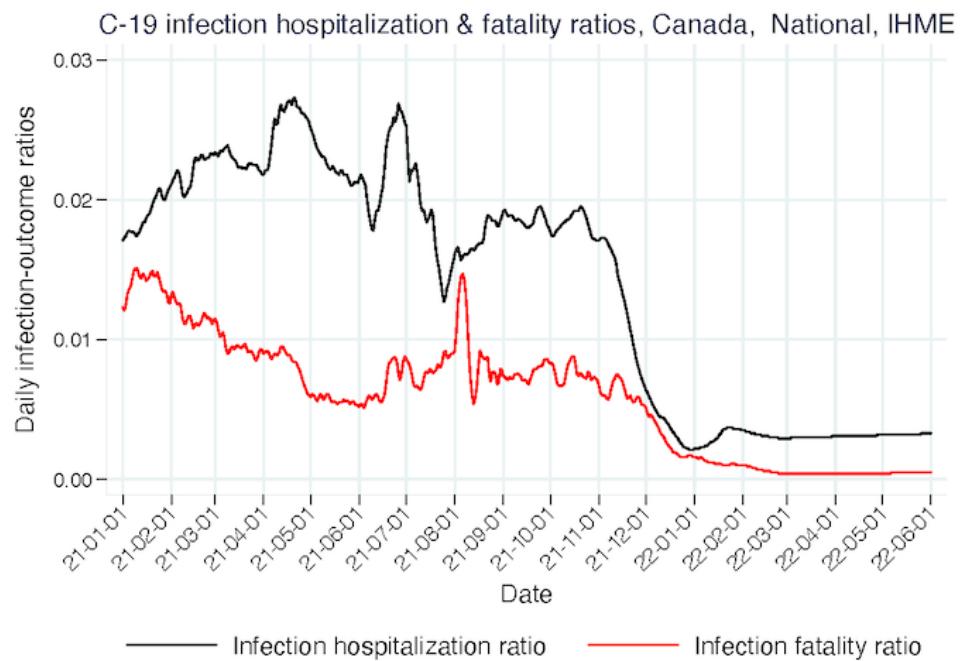


PHAC better scenario: Assuming hospitalization rate of Omicron is 40% that of Delta variant  
PHAC worse scenario: Assuming hospitalization rate of Omicron is the same as Delta variant

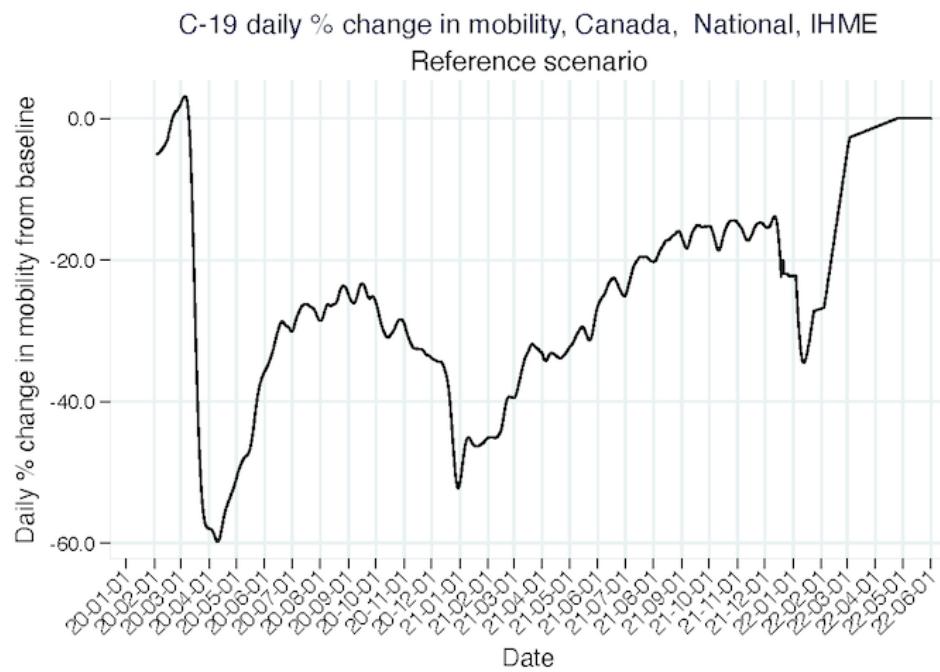
(6) Canada National [Daily Infection outcomes ratios, Reference scenarios, IHME, 2021 on](#)



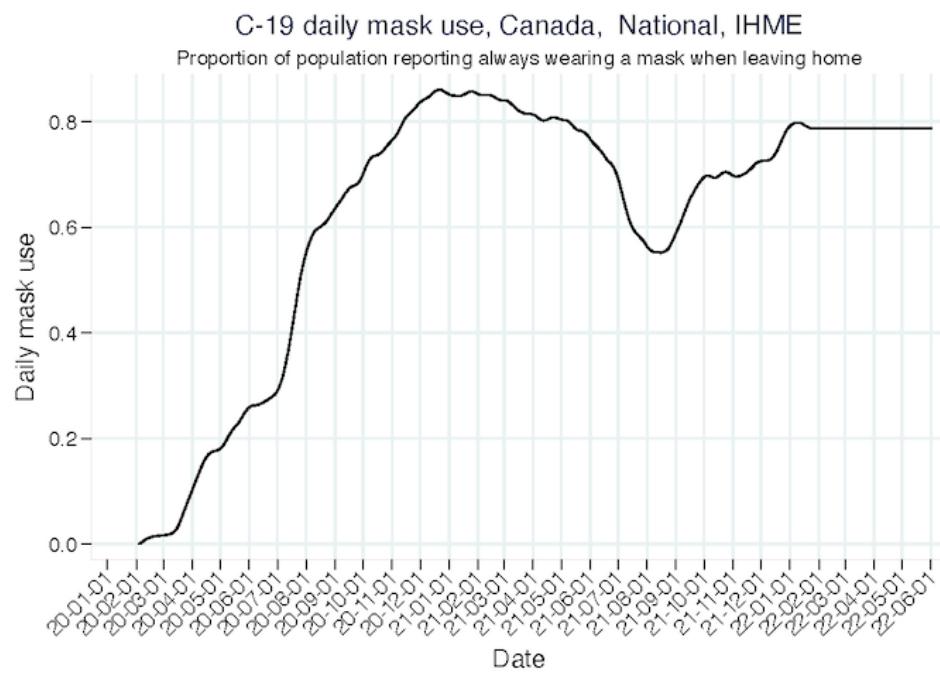
(7) Canada National [Daily Infection hospitalization and fatality ratios, Reference scenario, IHME, 2021 on](#)



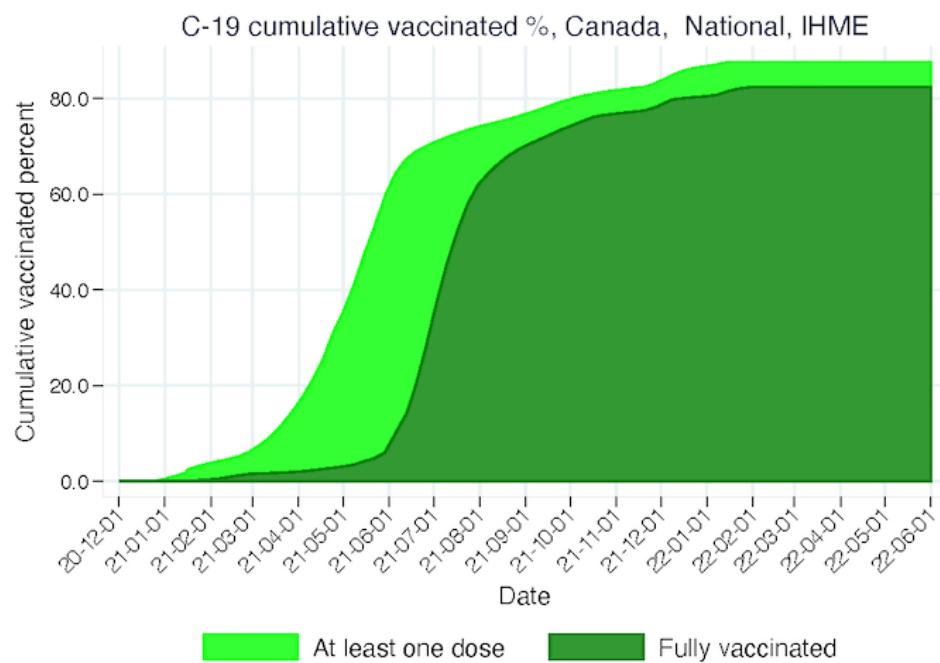
(8) Canada National [Daily percent change in mobility, Reference scenario, IHME, 2020 on](#)



(9) Canada National [Daily mask use, IHME, 2020 on](#)



(10) Canada National [Percent cumulative vaccinated, IHME, 2020 on](#)

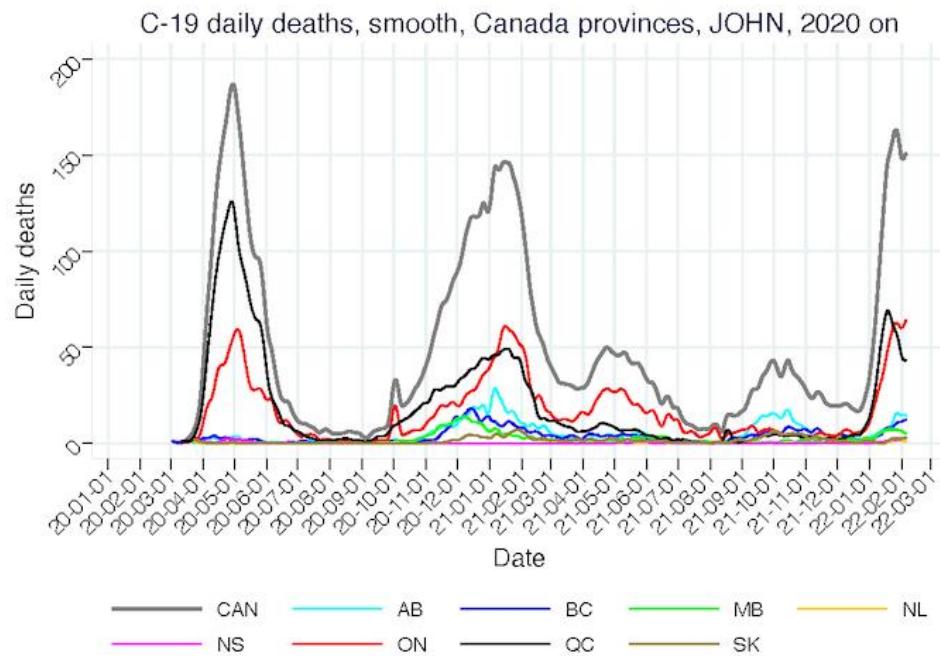


## Selected graphs - Canada, Provinces together

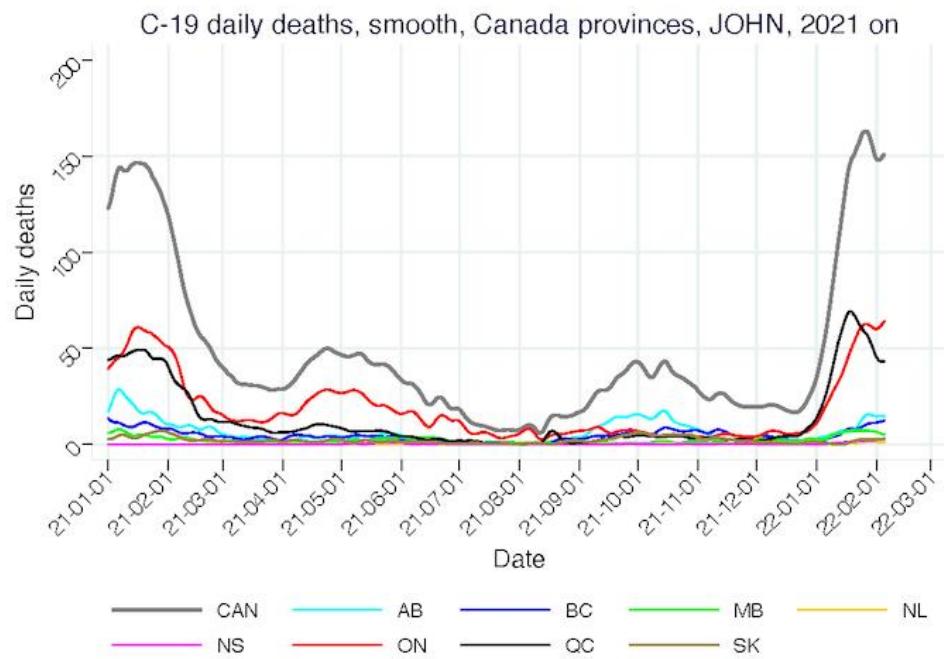
(a) Official reports to WHO, via JOHN || (b) Models: IHME || (c) Models: PHAC

(a) Official reports to WHO, via JOHN

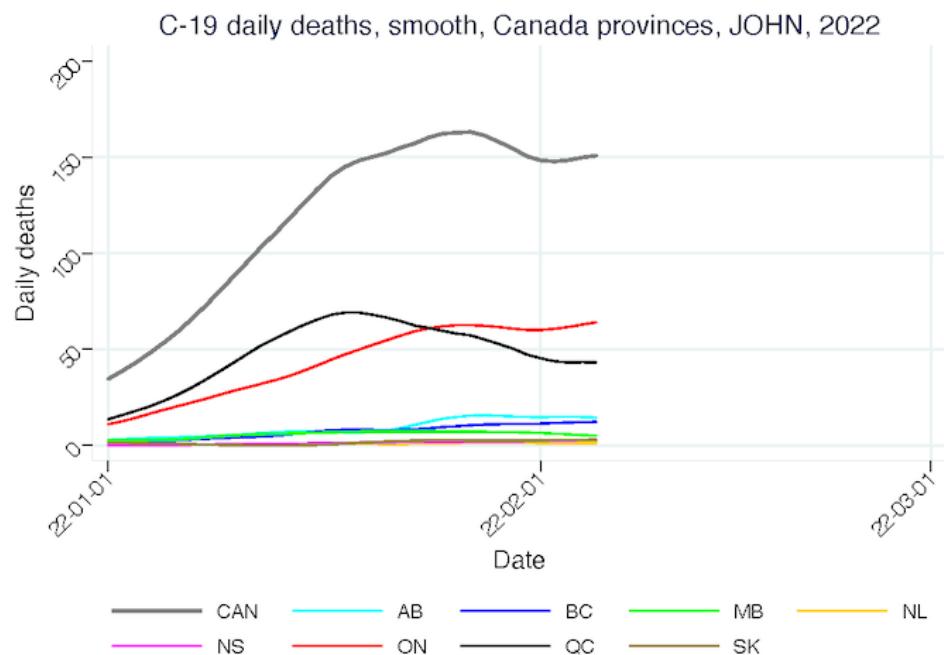
(1) Canada Provinces [Daily reported deaths, JOHN, 2020 on](#)



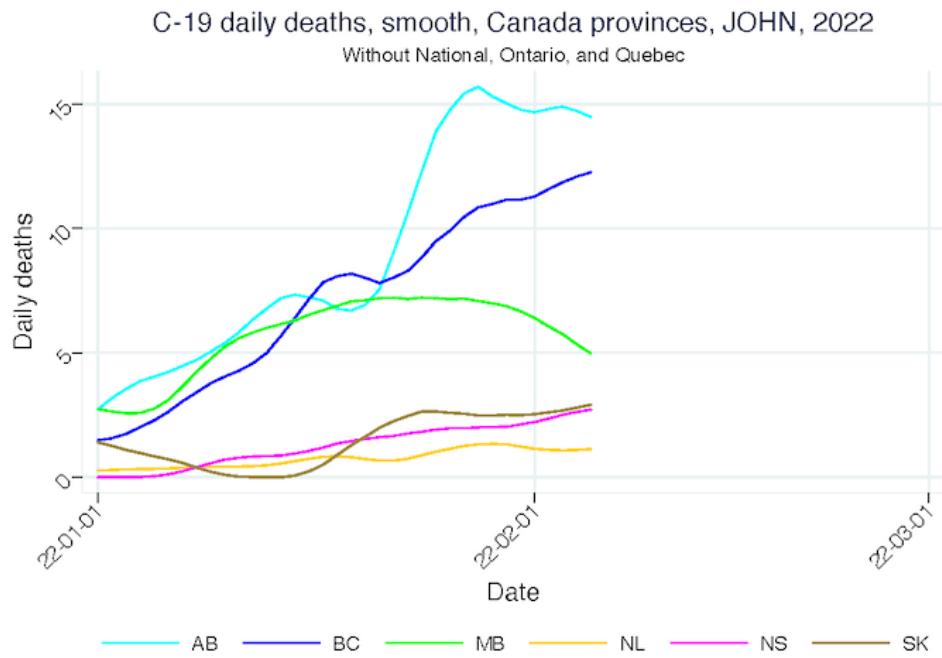
(2) Canada Provinces [Daily reported deaths, JOHN, 2021 on](#)



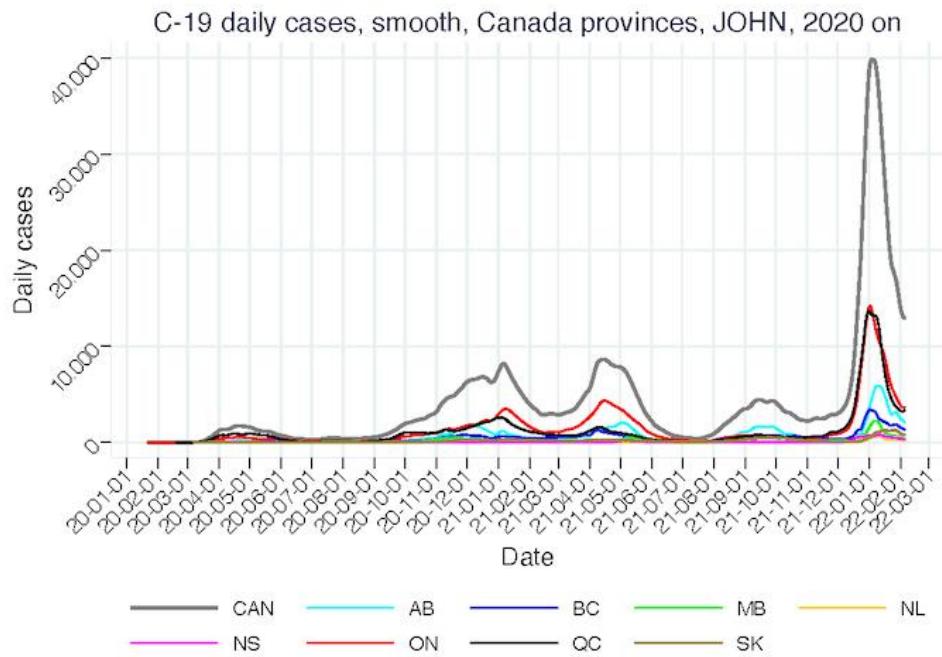
(3) Canada Provinces [Daily reported deaths, JOHN, 2022](#)



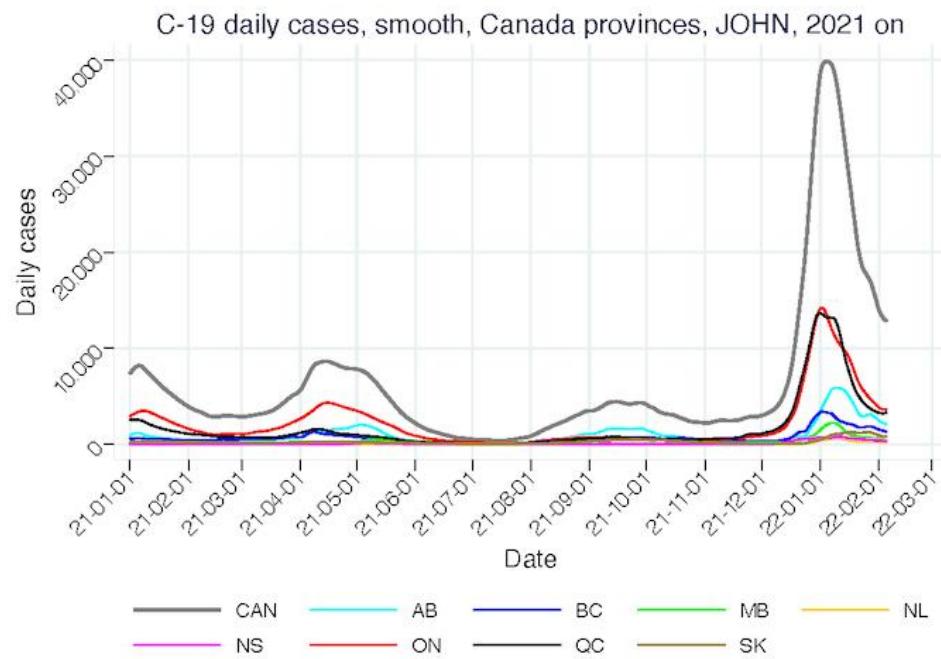
(4) Canada Provinces [Daily reported deaths, without National, Ontario, and Quebec, JOHN, 2022](#)



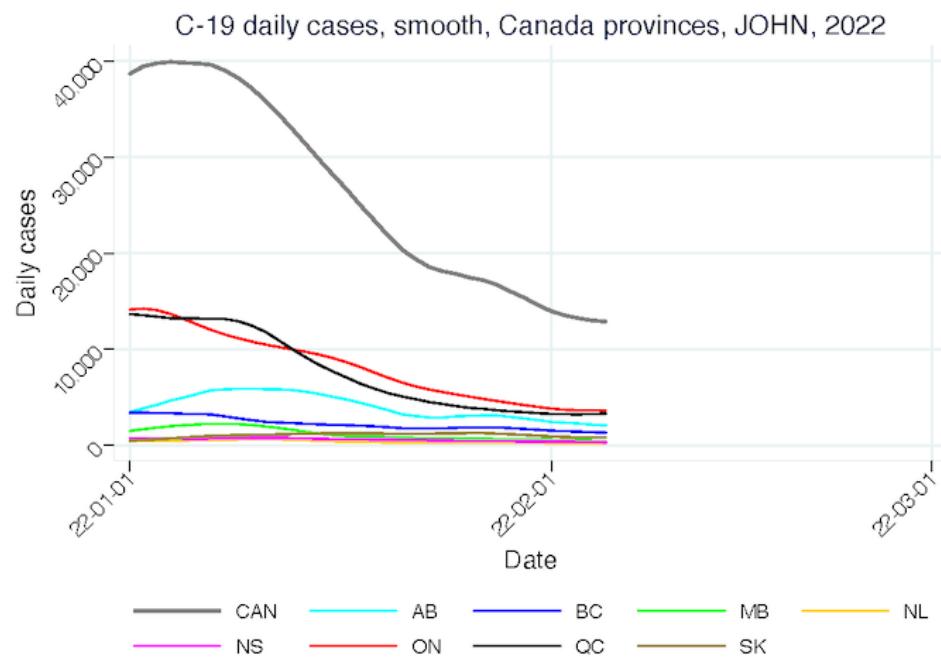
(5) Canada Provinces [Daily reported cases, JOHN, 2020 on](#)



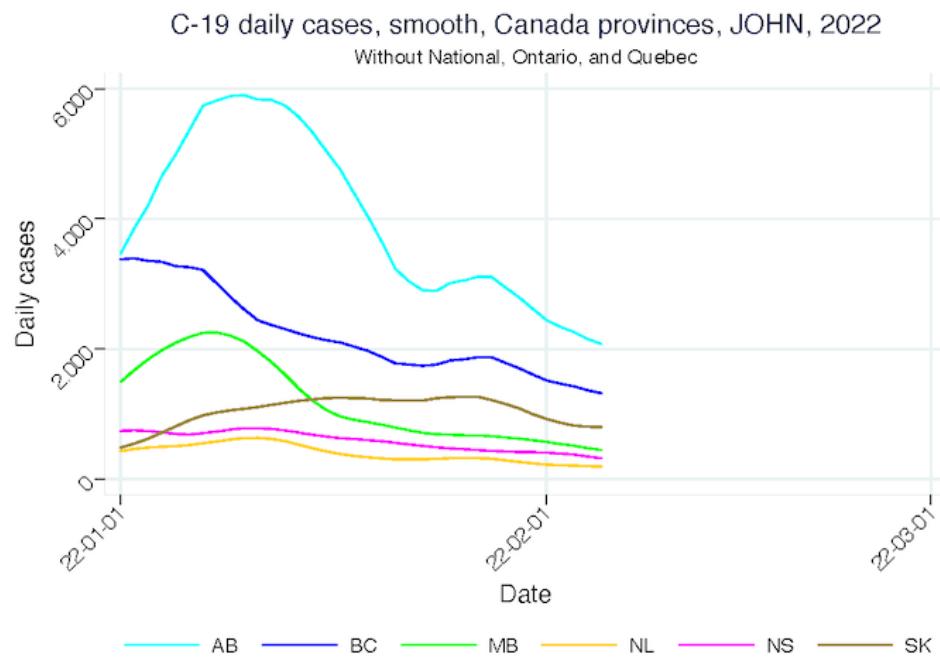
(6) Canada Provinces [Daily reported cases, JOHN, 2021 on](#)



(7) Canada Provinces [Daily reported cases, JOHN, 2022](#)

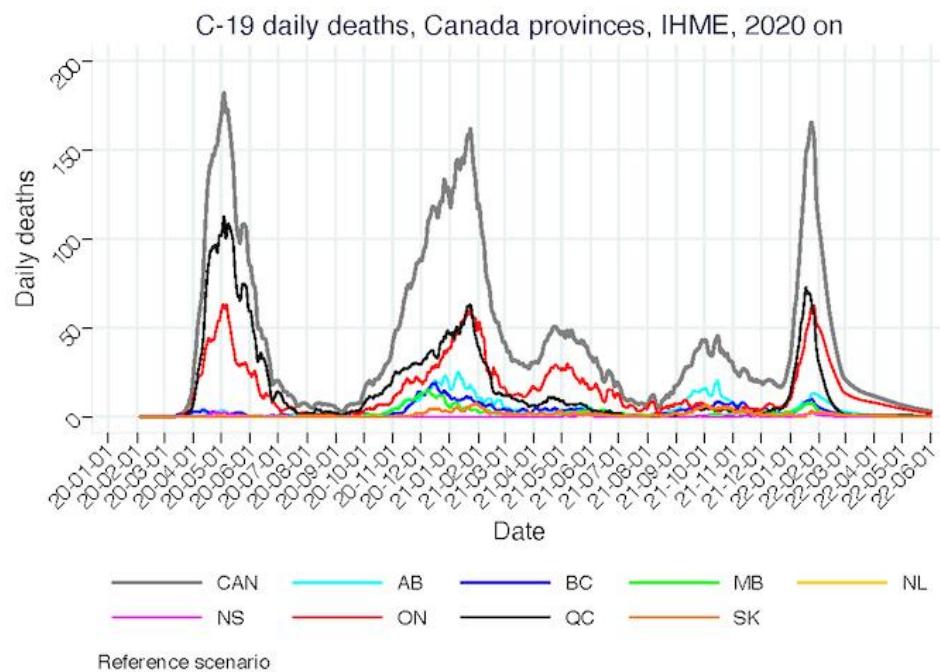


(8) Canada Provinces [Daily reported cases, without National, Ontario, and Quebec, JOHN, 2022](#)

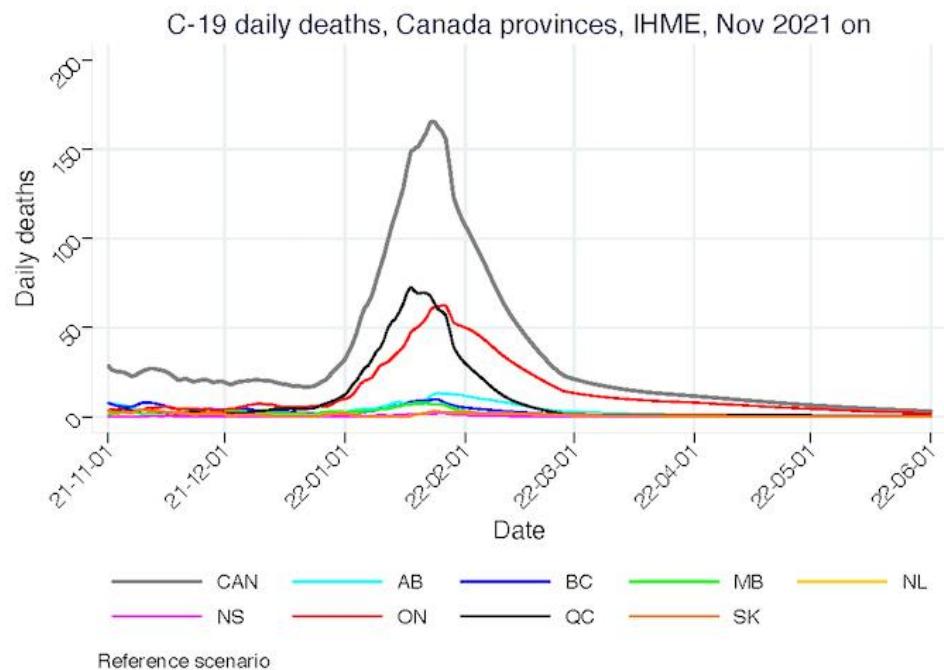


**(b) Models: IHME**

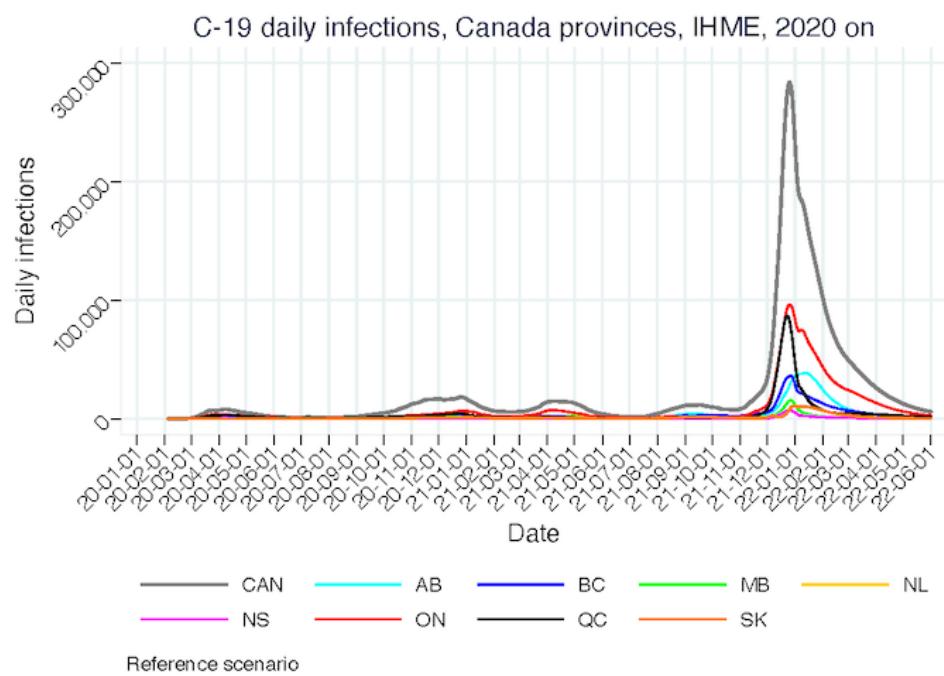
(9) Canada Provinces [Daily deaths, Reference scenario, IHME, 2020 on](#)



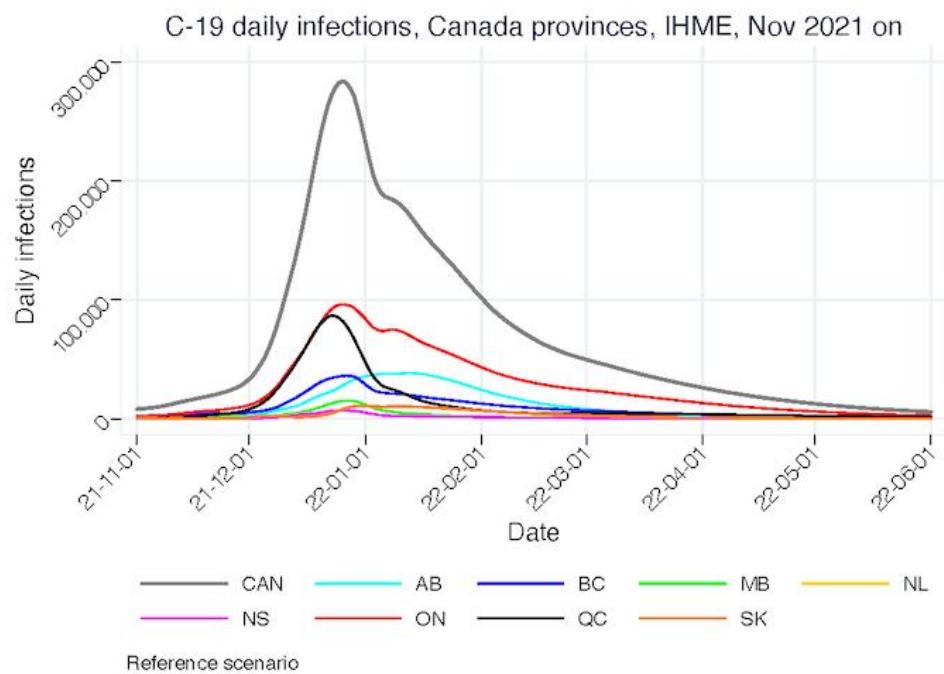
(10) Canada Provinces [Daily deaths, Reference scenario, IHME, Nov 2021 on](#)



(11) Canada Provinces [Daily infections, Reference scenario, IHME, 2020 on](#)

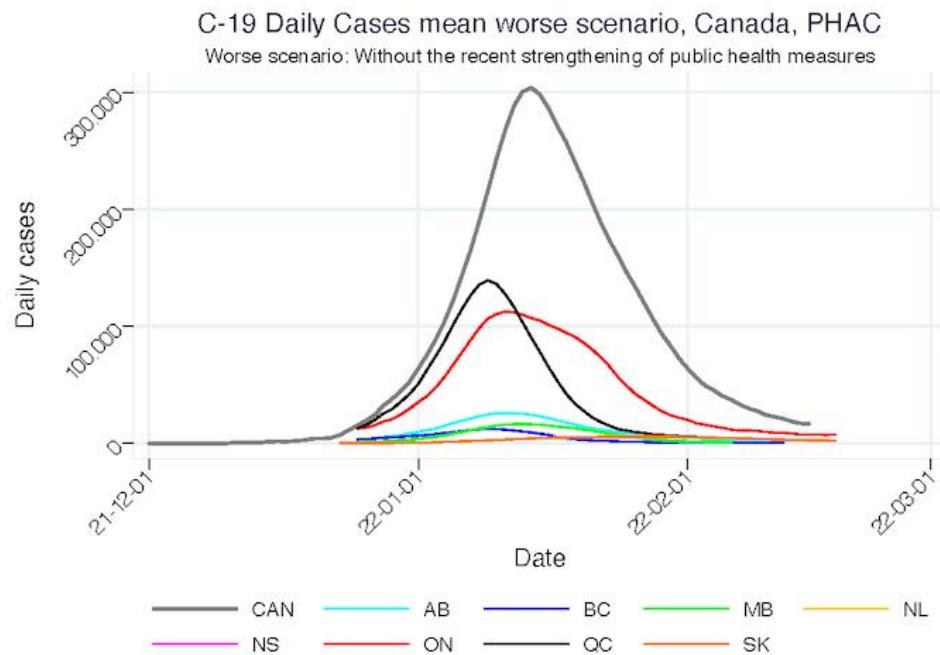


(12) Canada Provinces [Daily infections, Reference scenario, IHME, Nov 2021 on](#)

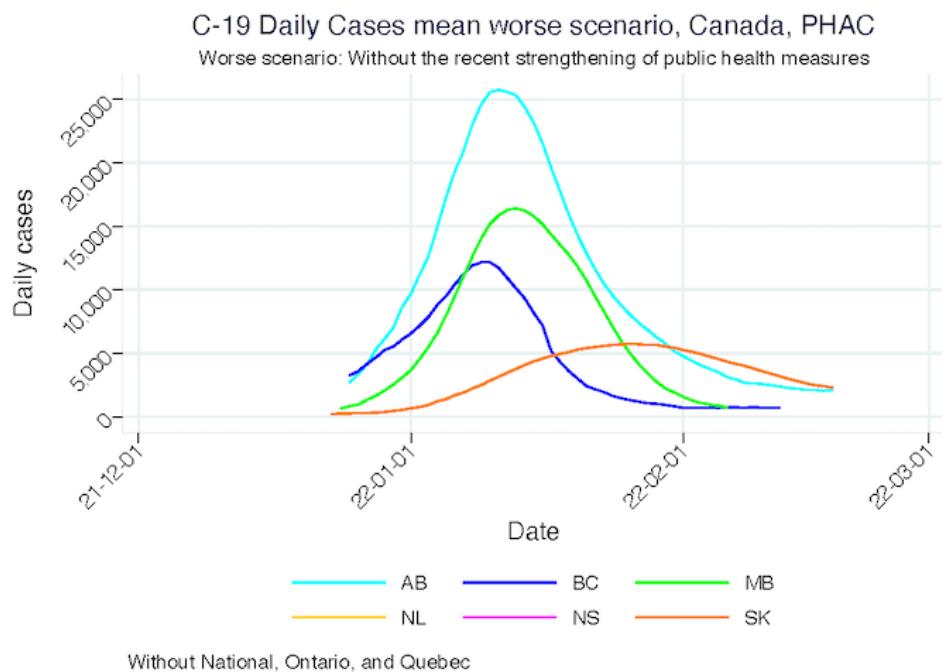


**(C) Models: PHAC**

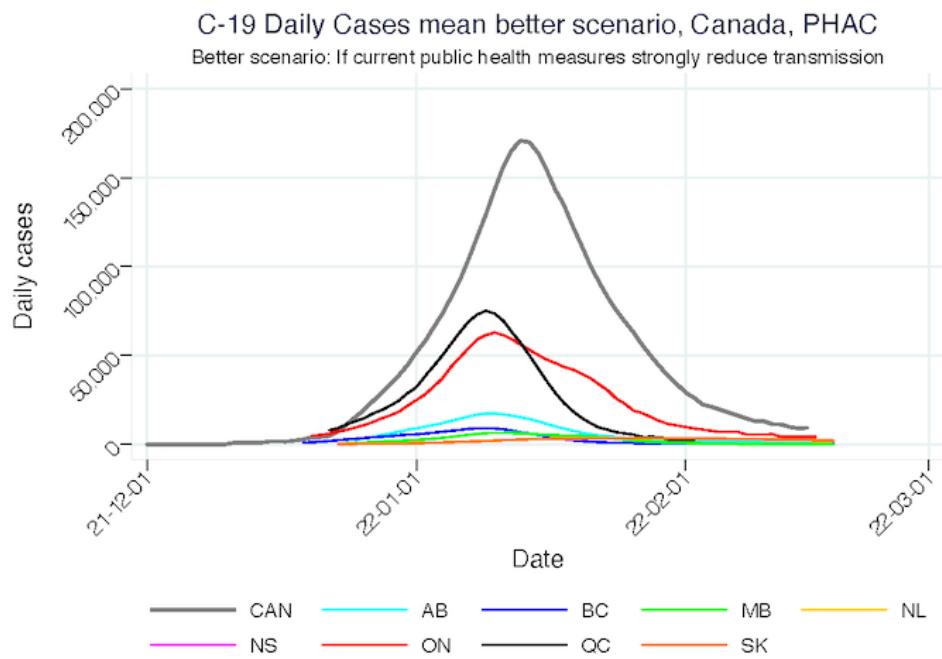
(13) Canada Provinces [Daily cases mean, worse scenario, with National, PHAC](#)



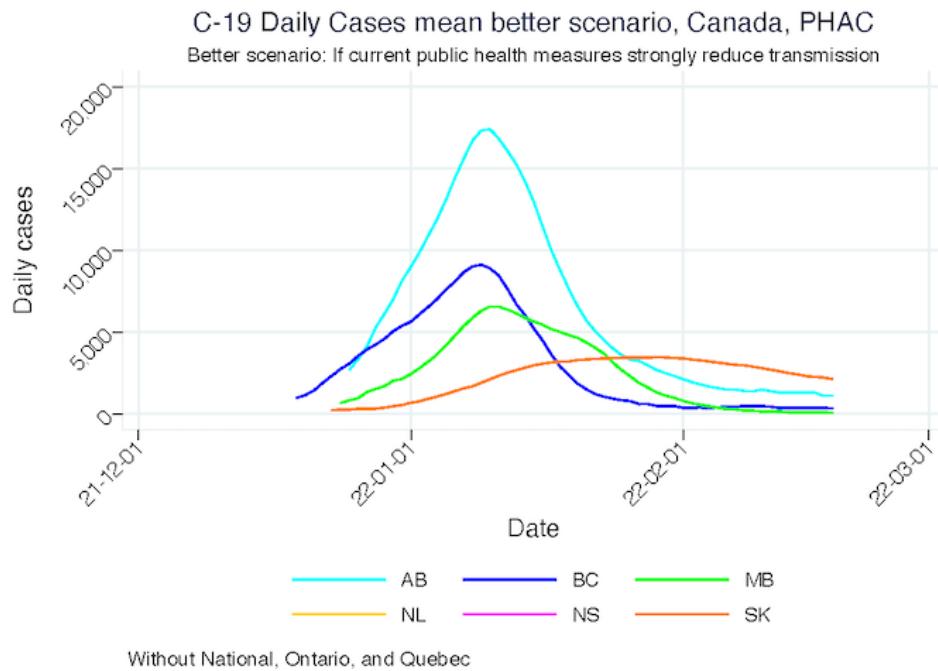
(14) Canada Provinces [Daily cases mean, worse scenario, without National, Ontario, and Quebec, PHAC](#)



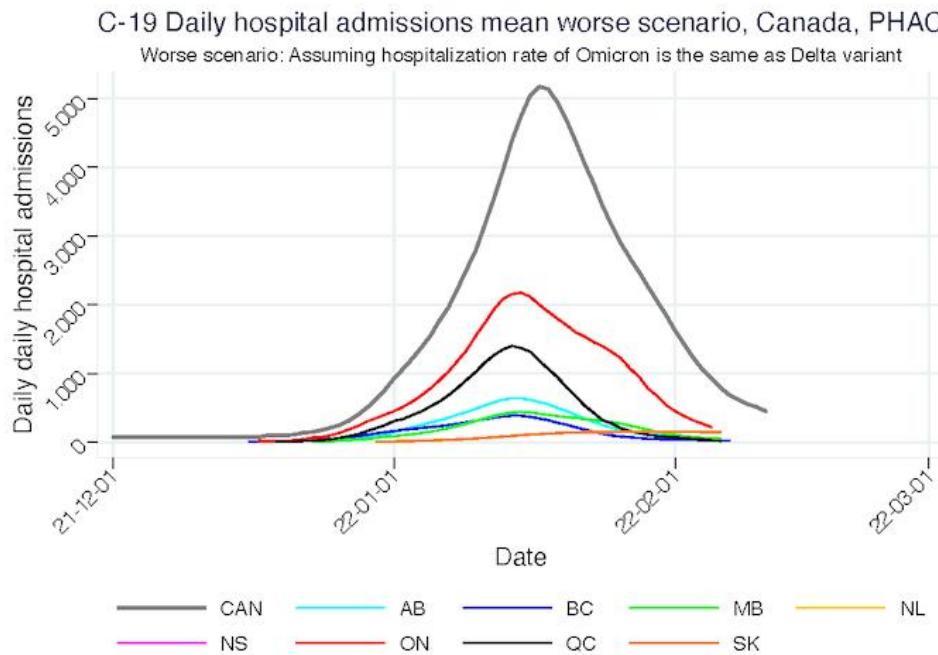
(15) Canada Provinces [Daily cases mean, better scenario, with National, PHAC](#)



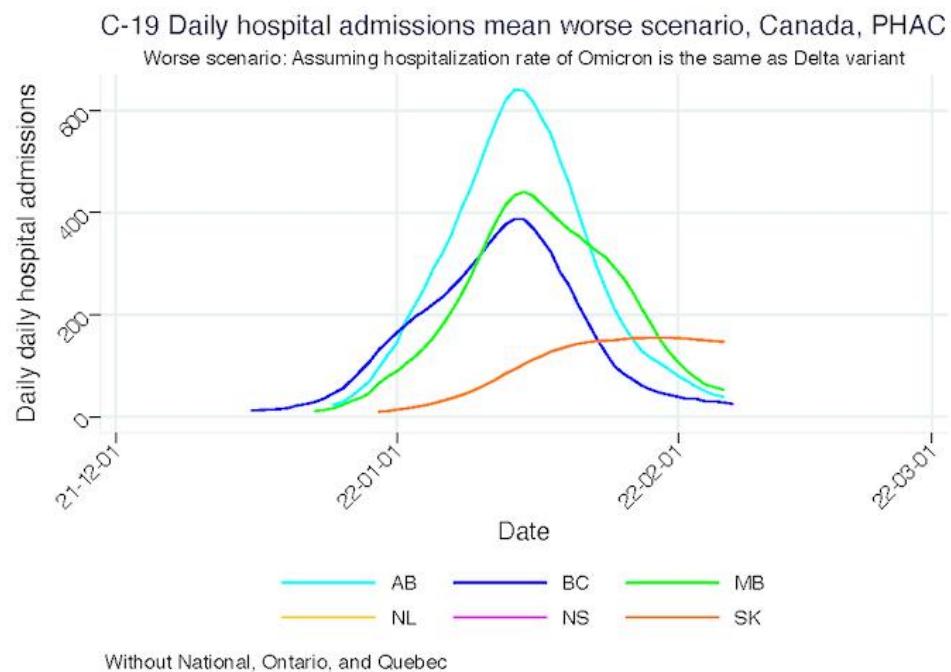
(16) Canada Provinces [Daily cases mean, better scenario, without National, Ontario, and Quebec, PHAC](#)



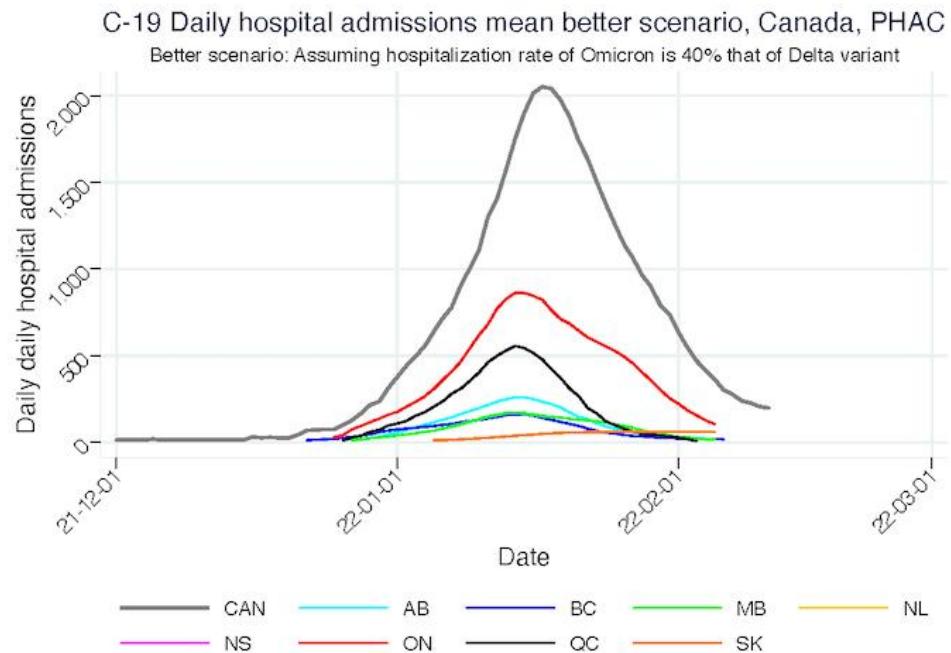
(17) Canada Provinces [Daily hospital admissions mean, worse scenario, with national, PHAC](#)



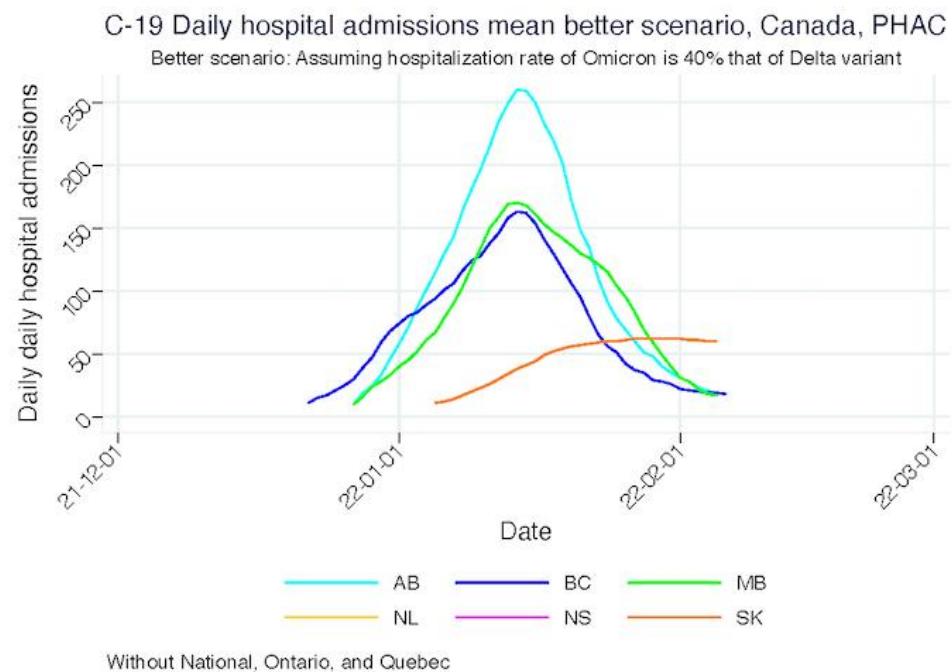
(18) Canada Provinces [Daily hospital admissions mean, worse scenario, without National, Ontario, and Quebec, PHAC](#)



(19) Canada Provinces [Daily hospital admissions mean, better scenario, with national, PHAC](#)

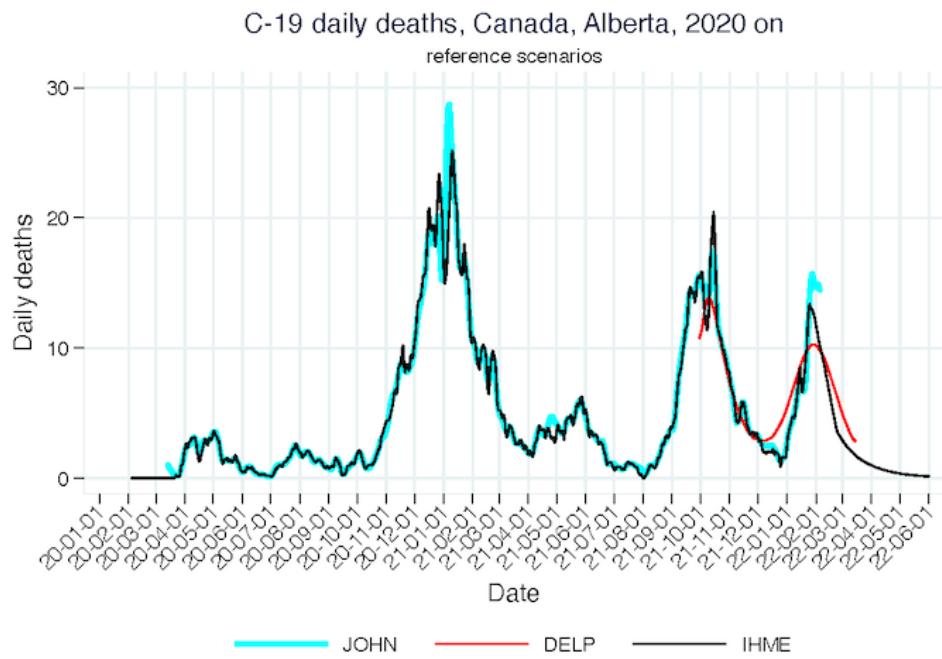


(20) Canada Provinces [Daily hospital admissions mean, better scenario, without National, Ontario, and Quebec, PHAC](#)

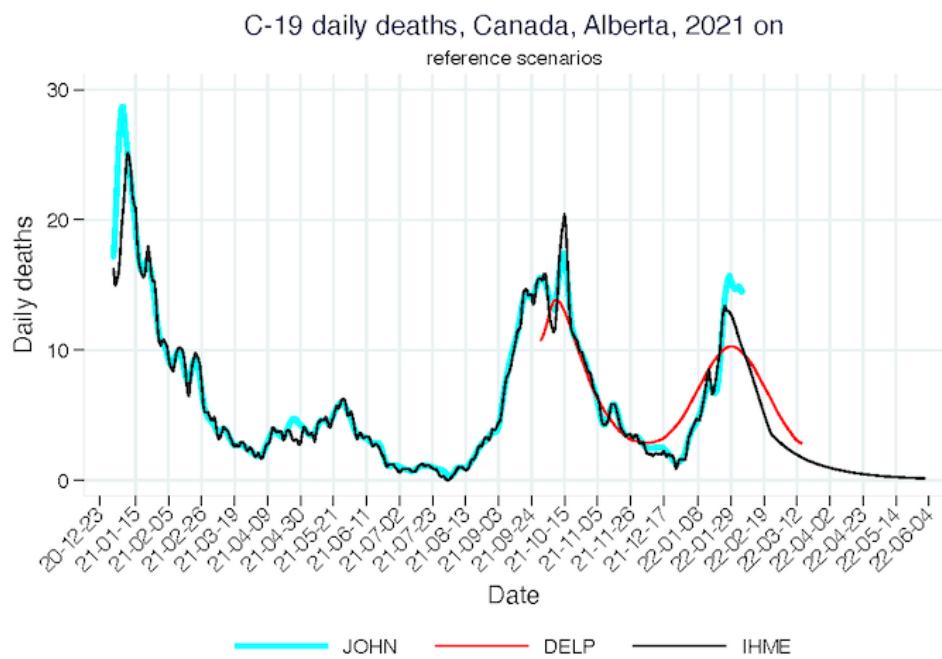


## Selected graphs - Alberta

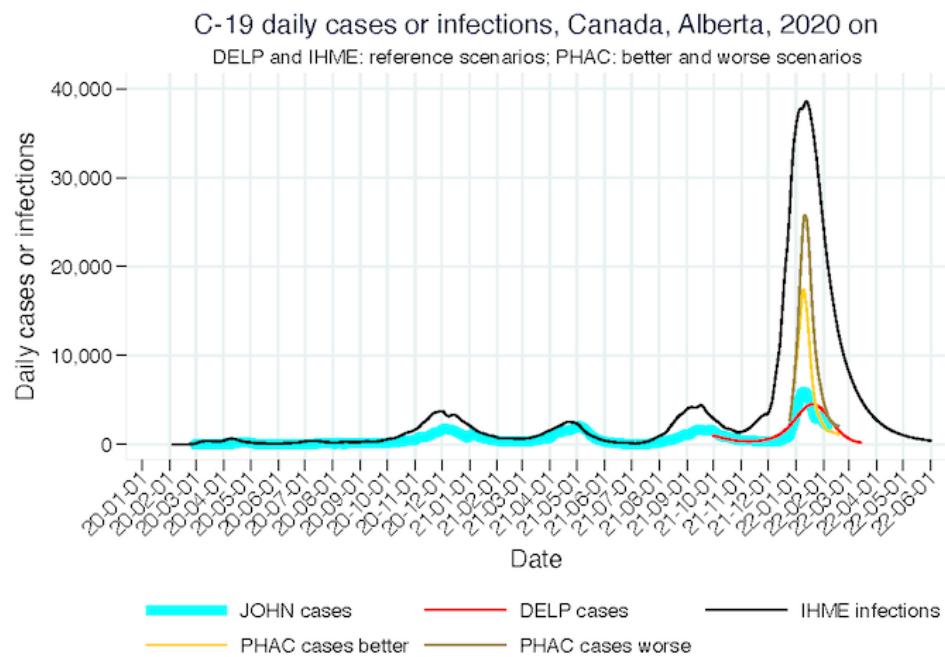
### (1) Alberta Daily deaths, Reference scenario, 2020 on



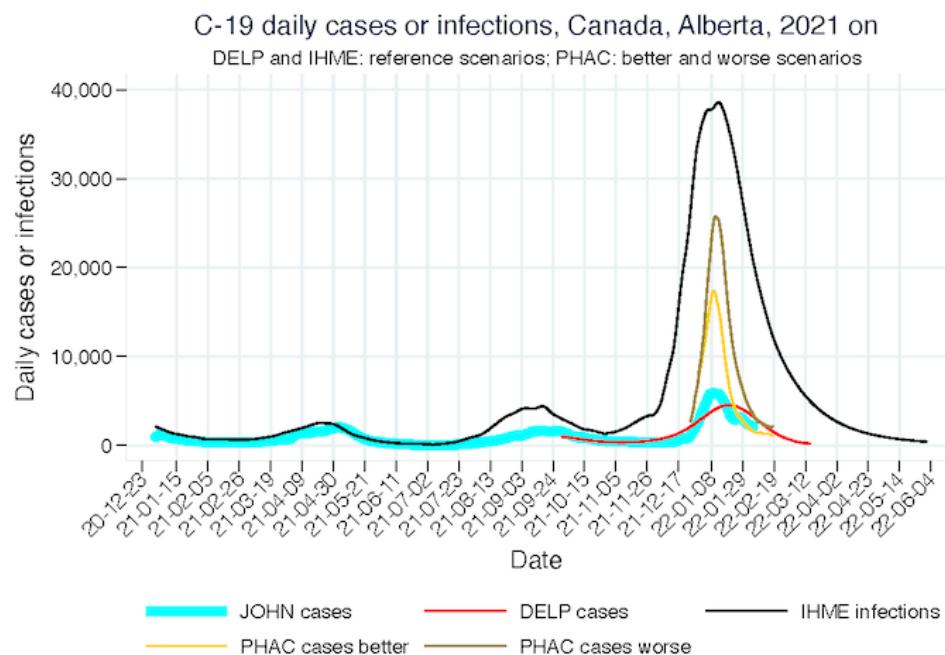
### (2) Alberta Daily deaths, Reference scenario, 2021 on



(3) Alberta Daily cases or infections, Reference scenario, 2020 on

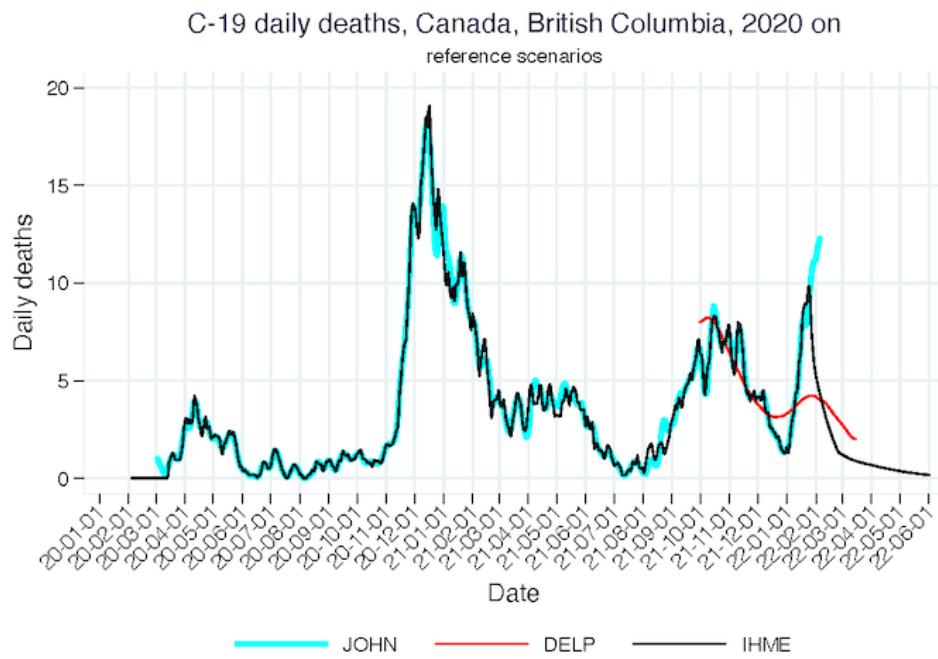


(4) Alberta Daily cases or infections, Reference scenario, 2021 on

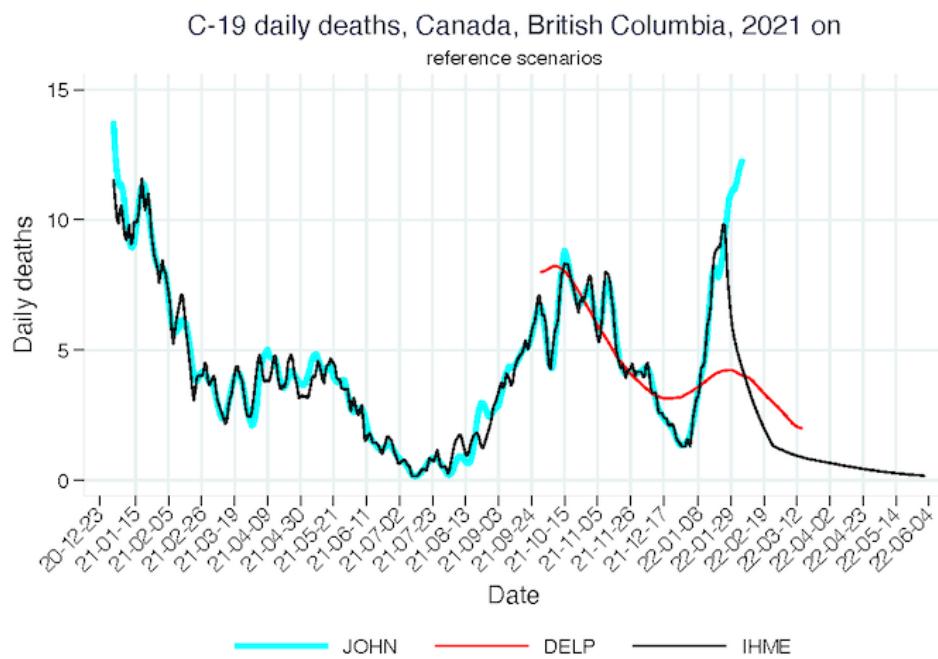


## Selected graphs - British Columbia

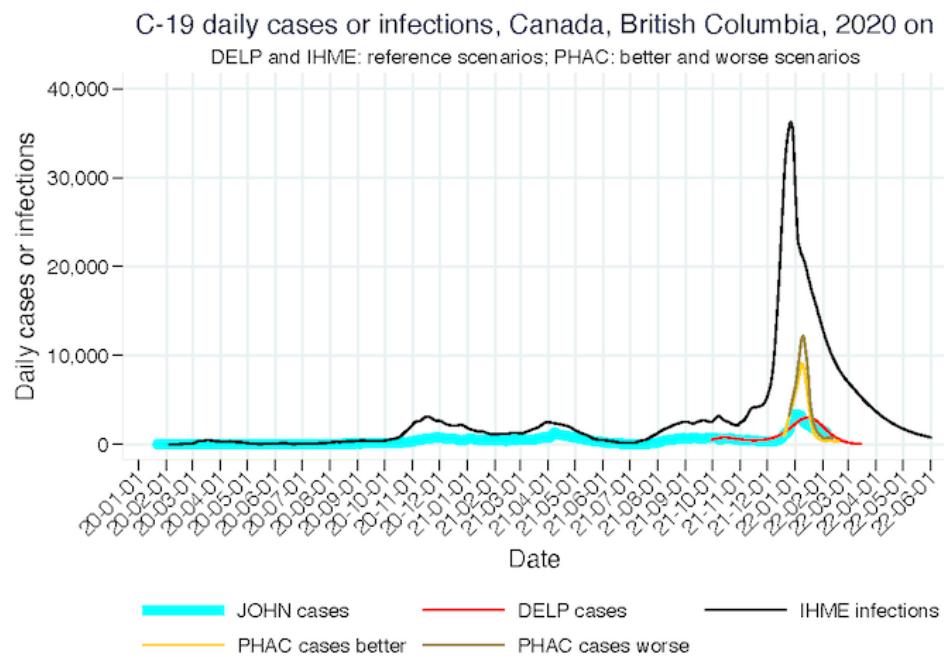
### (1) British Columbia [Daily deaths, Reference scenario, 2020 on](#)



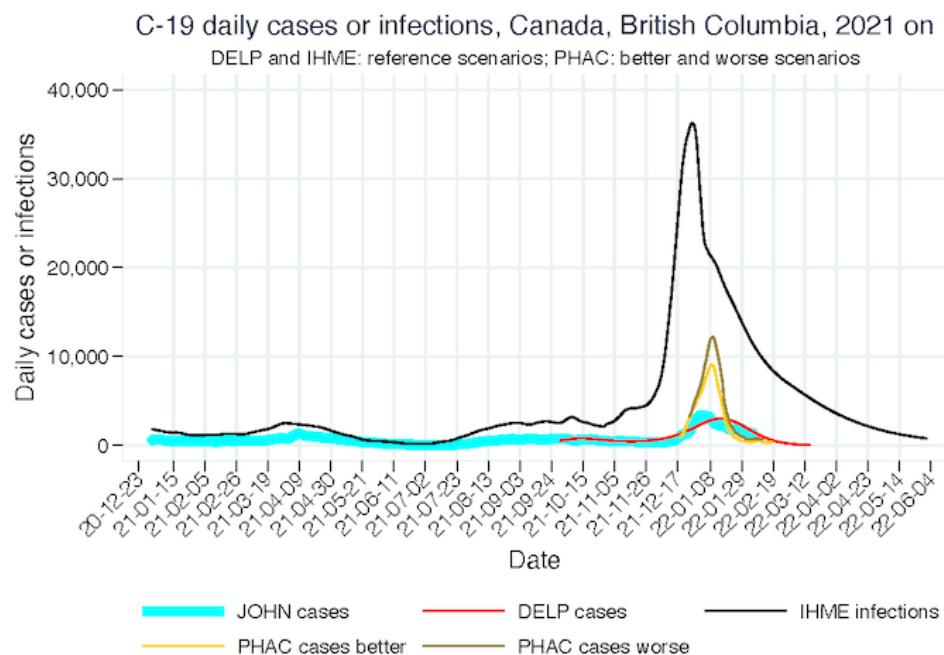
### (2) British Columbia [Daily deaths, Reference scenario, 2021 on](#)



(3) British Columbia [Daily cases or infections, Reference scenario, 2020 on](#)

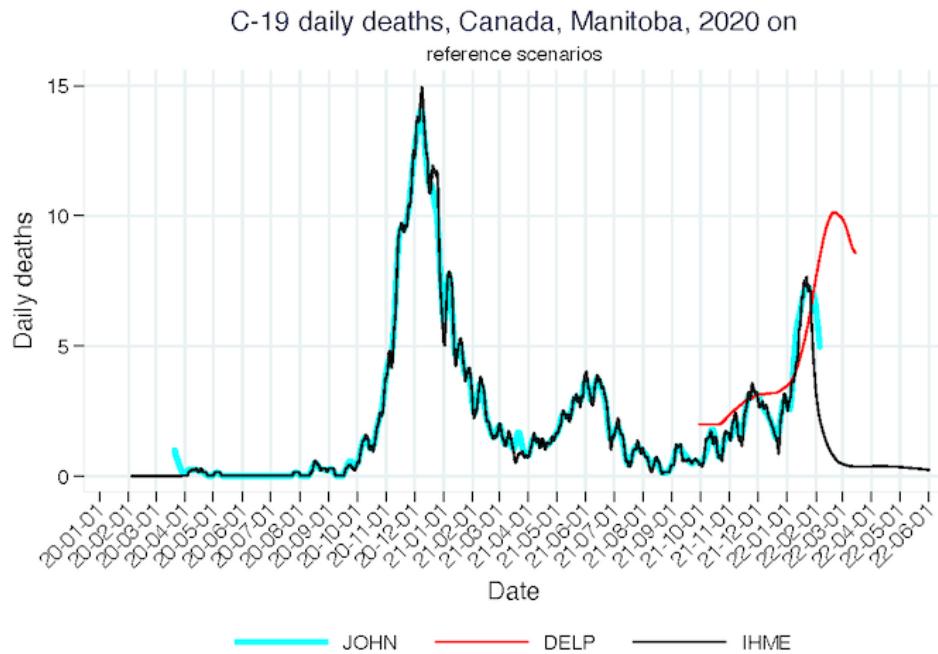


(4) British Columbia [Daily cases or infections, Reference scenario, 2021 on](#)

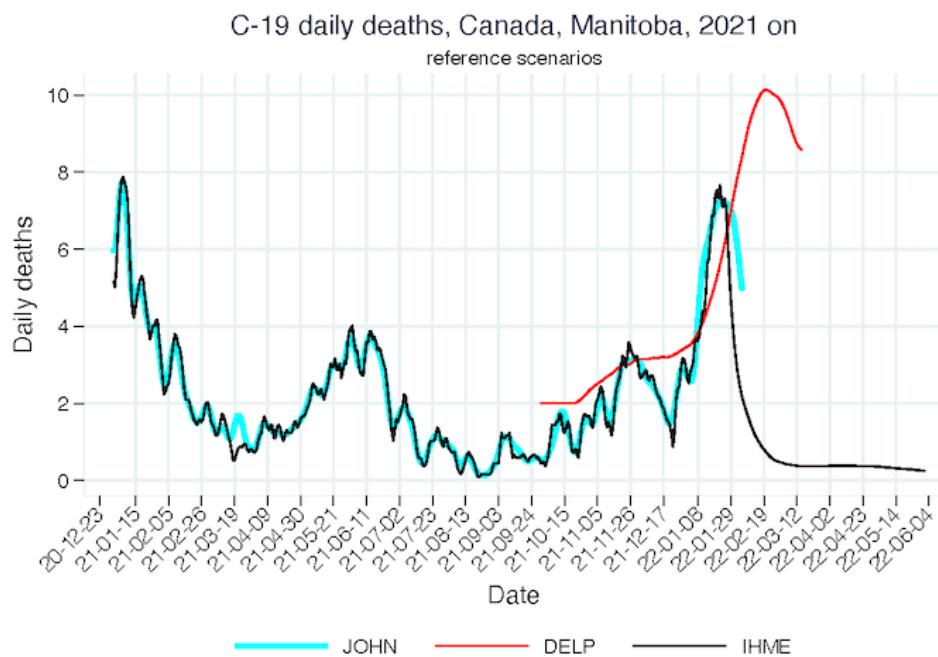


## Selected graphs - Manitoba

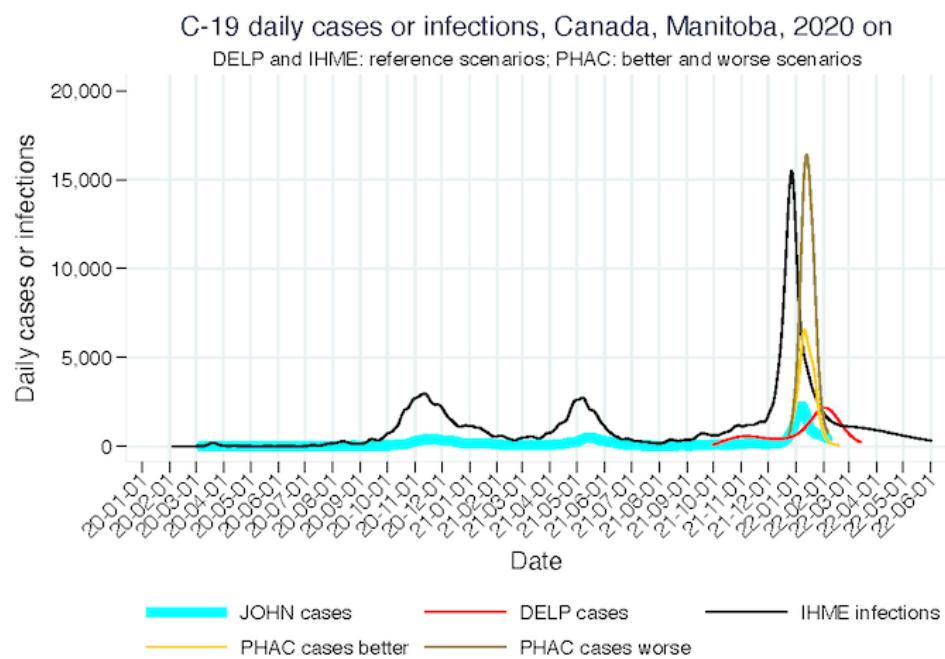
(1) Manitoba [Daily deaths, Reference scenario, 2020 on](#)



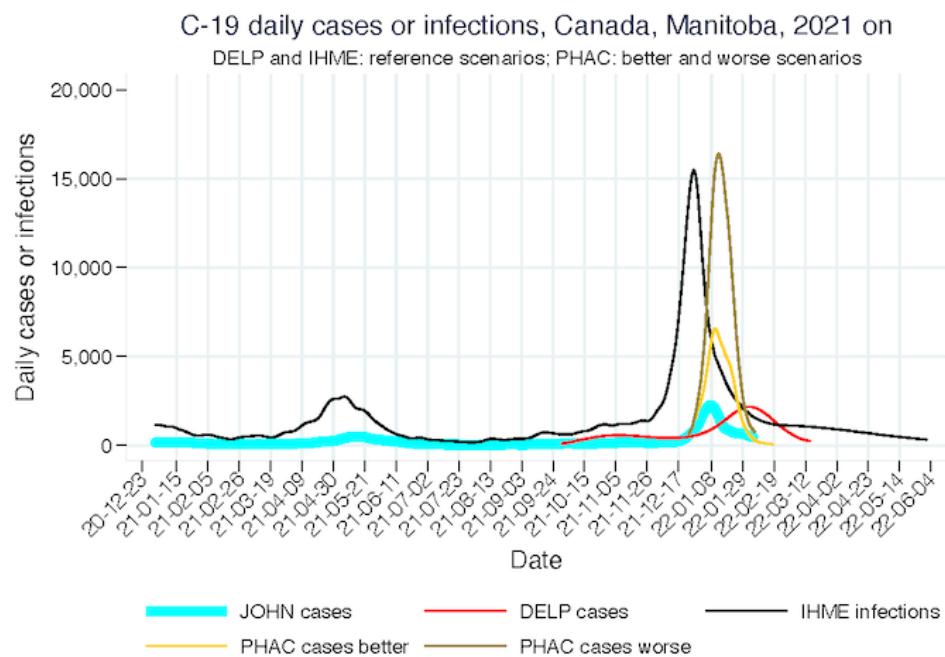
(2) Manitoba [Daily deaths, Reference scenario, 2021 on](#)



(3) Manitoba [Daily cases or infections, Reference scenario, 2020 on](#)

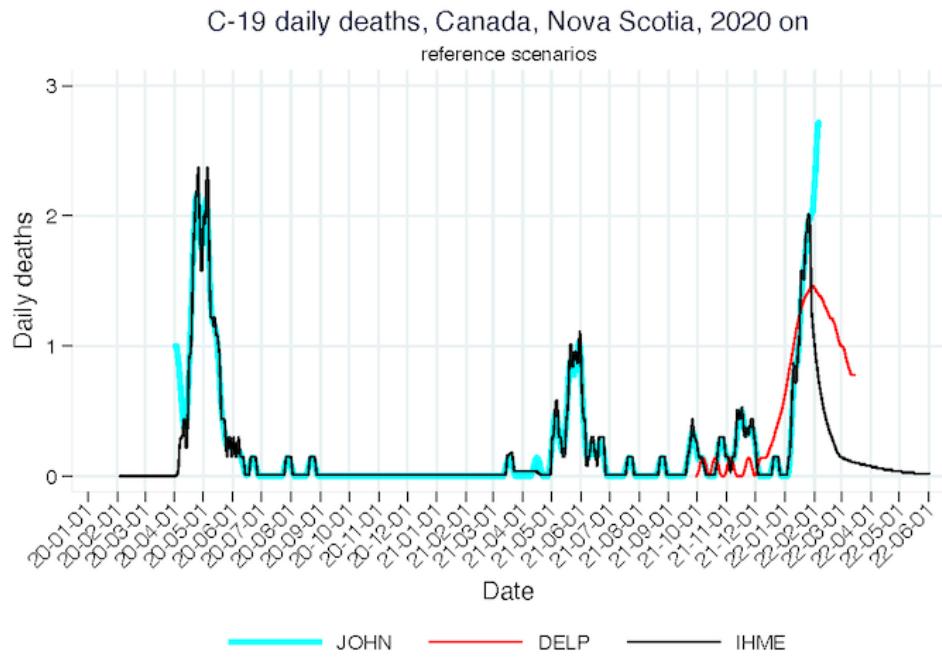


(4) Manitoba [Daily cases or infections, Reference scenario, 2021 on](#)

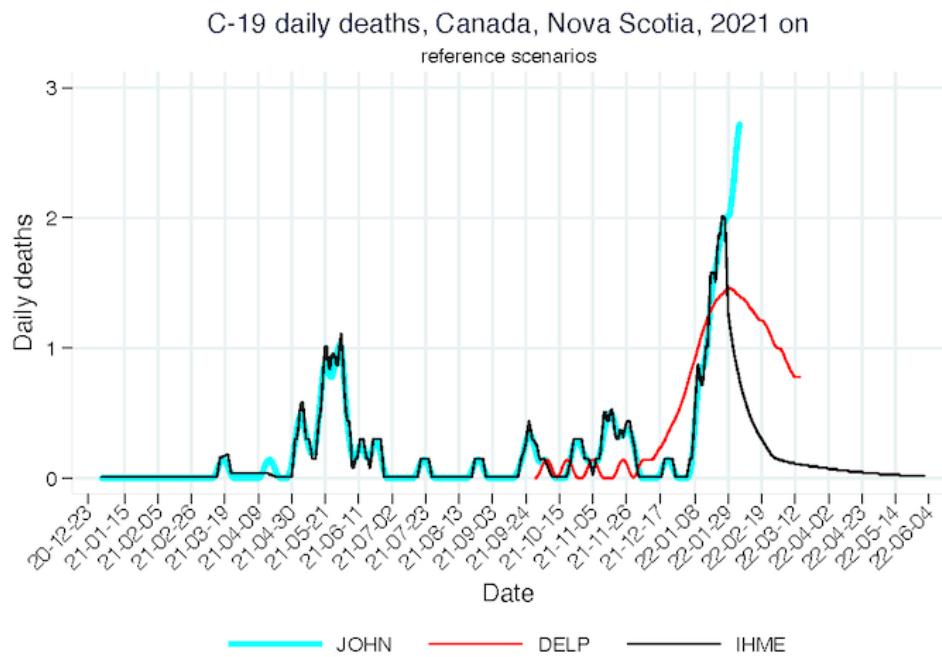


## Selected graphs - Nova Scotia

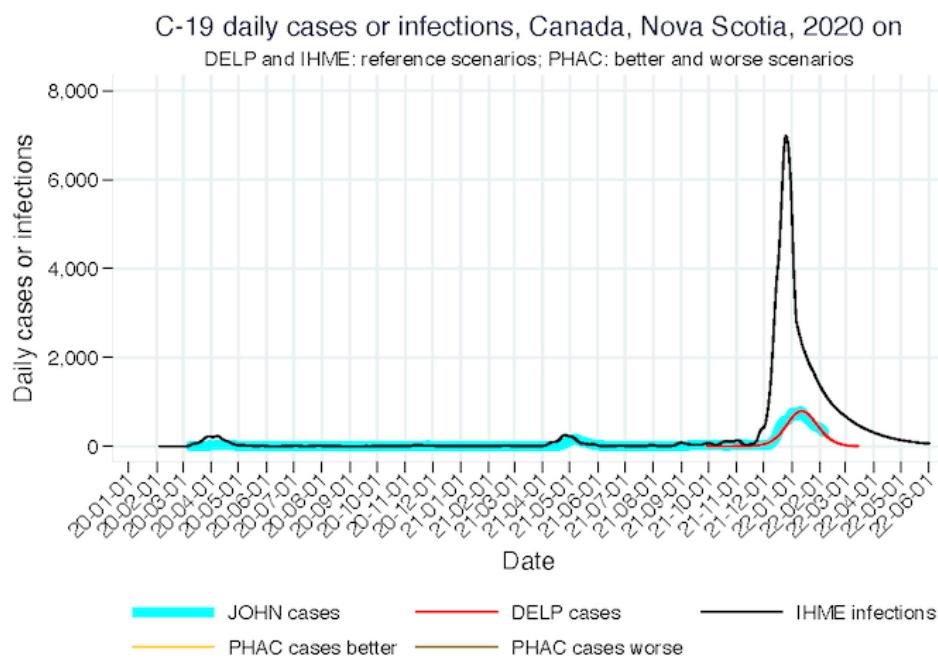
(1) Nova Scotia [Daily deaths, Reference scenario, 2020 on](#)



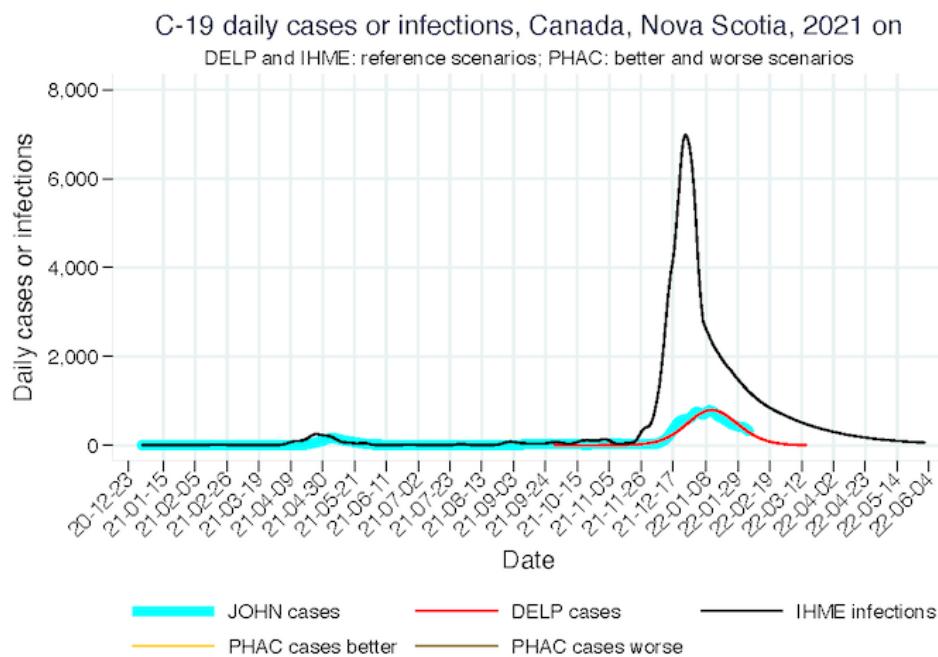
(2) Nova Scotia [Daily deaths, Reference scenario, 2021 on](#)



(3) Nova Scotia [Daily cases or infections, Reference scenario, 2020 on](#)

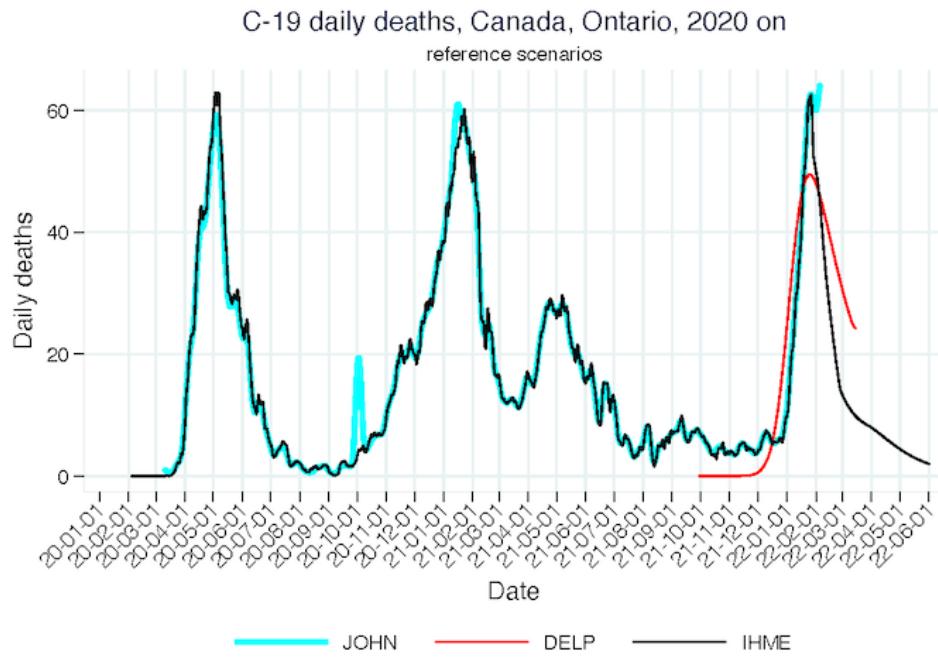


(4) Nova Scotia [Daily cases or infections, Reference scenario, 2021 on](#)

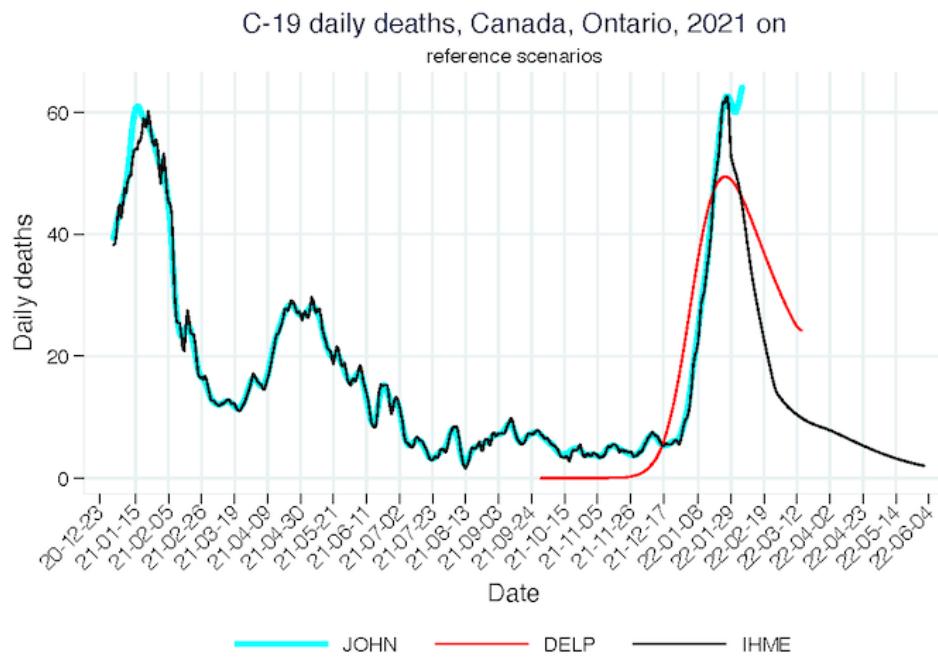


## Selected graphs - Ontario

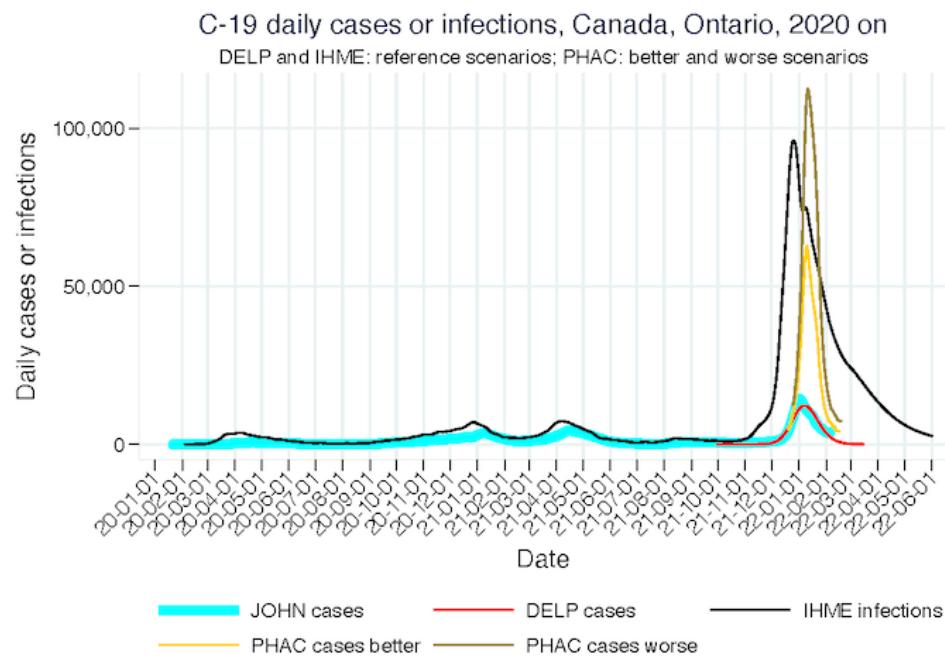
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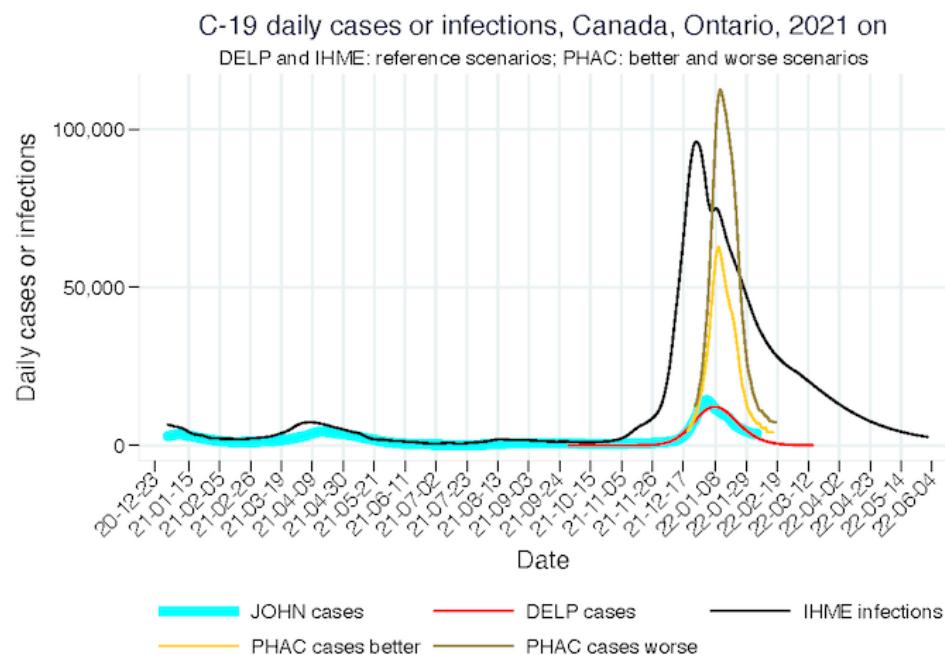
### (2) Ontario [Daily deaths, Reference scenario, 2021 on](#)



(3) Ontario [Daily cases or infections, Reference scenario, 2020 on](#)

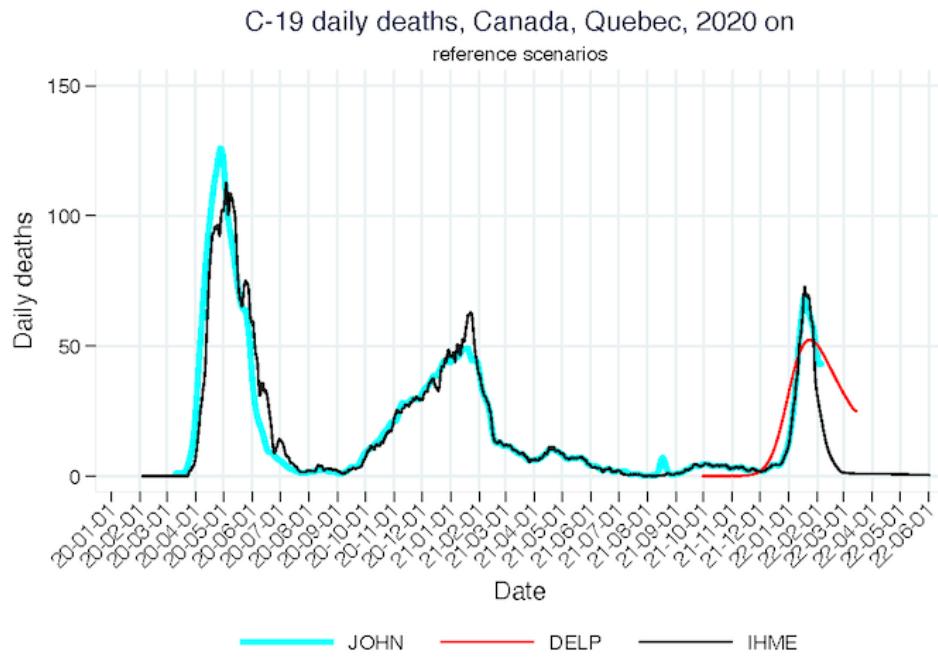


(4) Ontario [Daily cases or infections, Reference scenario, 2021 on](#)

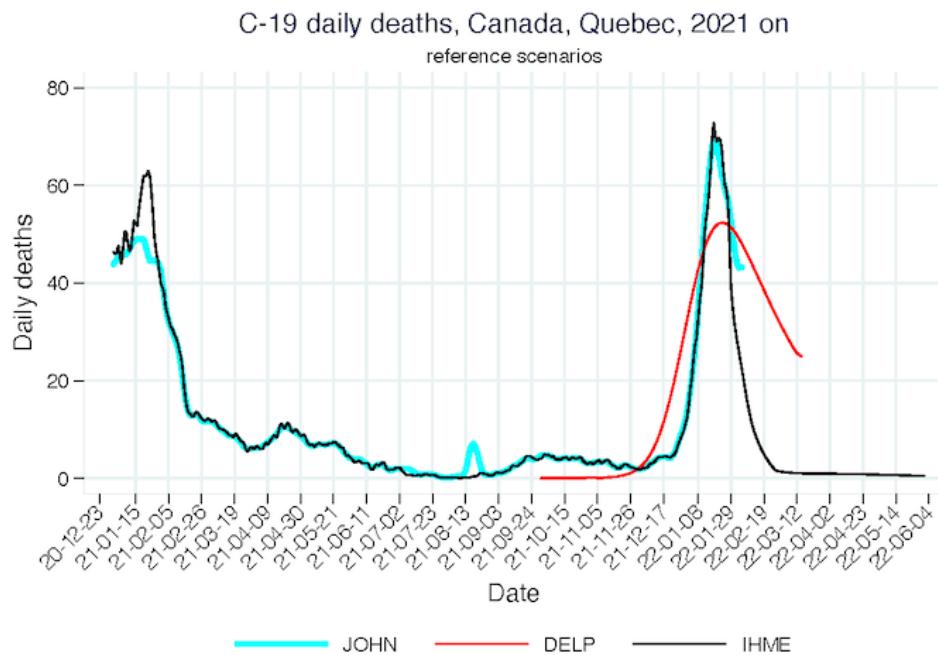


## Selected graphs - Quebec

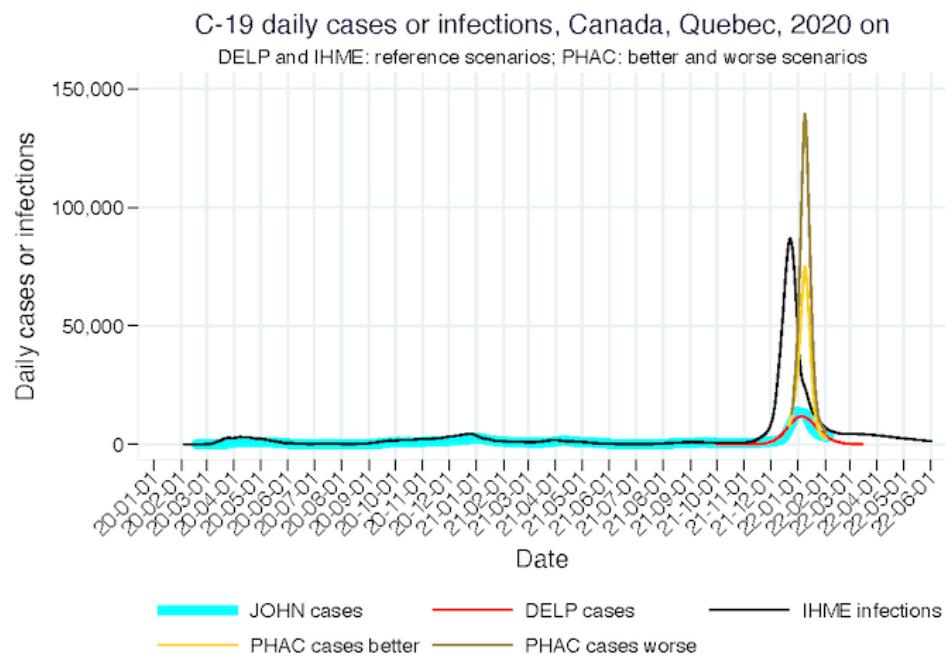
### (1) Quebec [Daily deaths, Reference scenario, 2020 on](#)



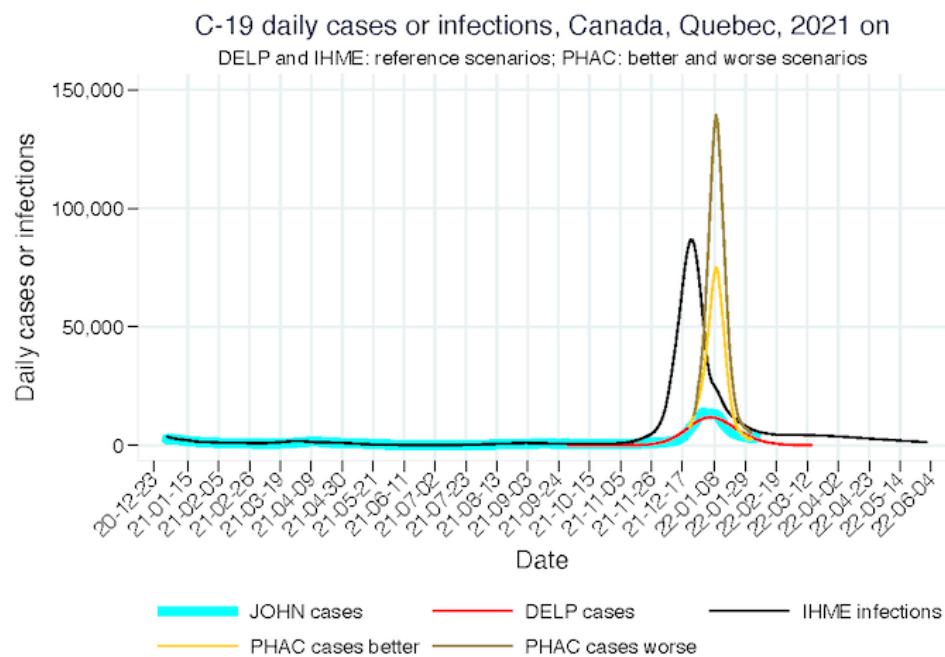
### (2) Quebec [Daily deaths, Reference scenario, 2021 on](#)



(3) Quebec [Daily cases or infections, Reference scenario, 2020 on](#)

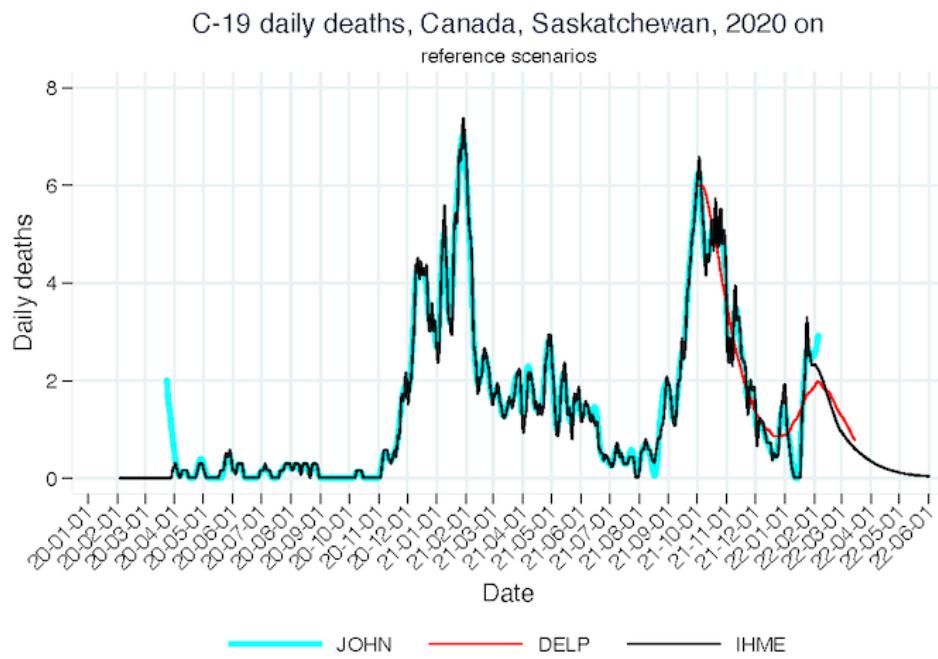


(4) Quebec [Daily cases or infections, Reference scenario, 2021 on](#)

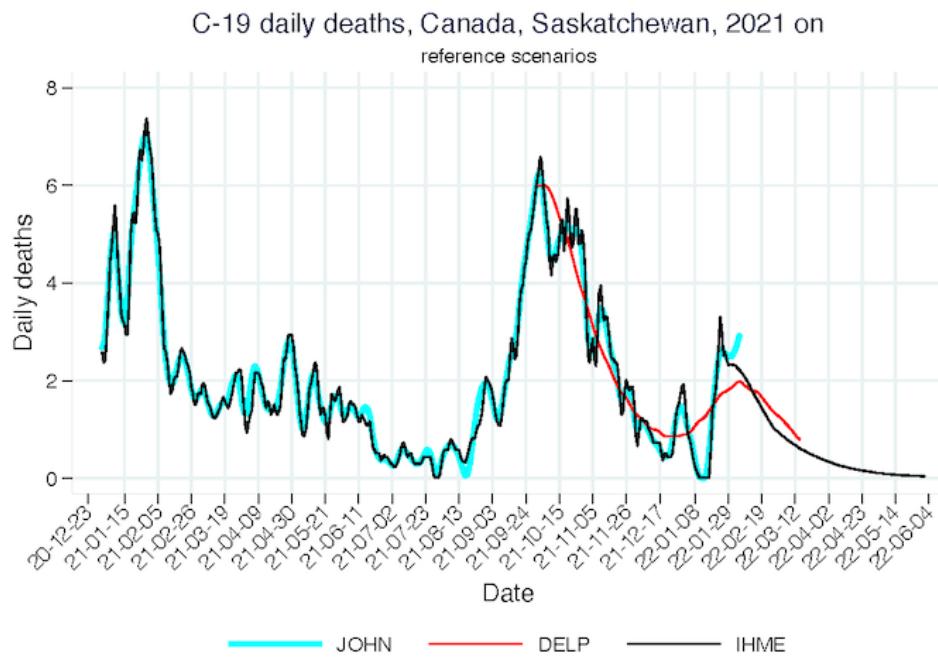


## Selected graphs - Saskatchewan

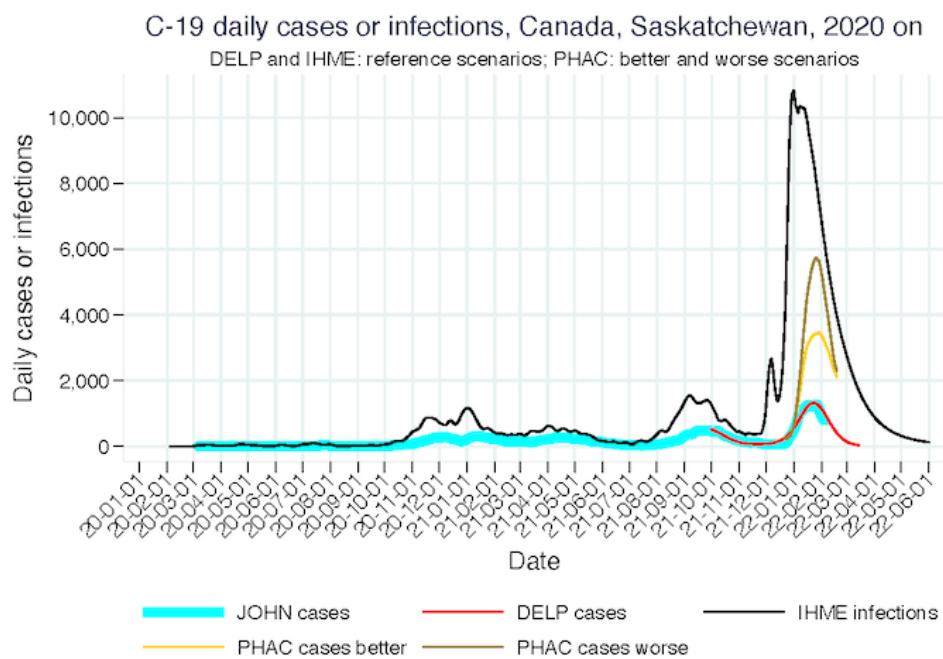
### (1) Saskatchewan [Daily deaths, Reference scenario, 2020 on](#)



### (2) Saskatchewan [Daily deaths, Reference scenario, 2021 on](#)



(3) Saskatchewan [Daily cases or infections, Reference scenario, 2020 on](#)



(4) Saskatchewan [Daily cases or infections, Reference scenario, 2021 on](#)

