

COVID Model Projections

October 25, 2021

[BC COVID-19 Modelling Group](#)

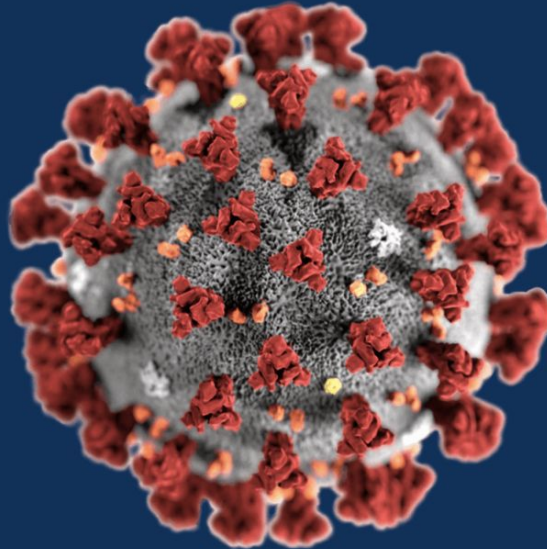
[@bcCOVID19group](#)



About BC COVID-19 Modelling Group

The BC COVID-19 Modelling Group works on rapid response modelling of the COVID-19 pandemic, with a special focus on British Columbia and Canada.

The interdisciplinary group, working independently from Government, includes experts in epidemiology, mathematics, and data analysis from UBC, SFU, UVic, and the private sector, with support from the Pacific Institute for the Mathematical Sciences.



<https://bccovid-19group.ca>

Contributors to report

Caroline Colijn (SFU, co-editor)
Sarah Otto (UBC, co-editor)
Eric Cytrynbaum (UBC, video producer)
Dean Karlen (UVic and TRIUMF)
Jens von Bergmann (MountainMath)
Rob James (evidently.ca)
James Colliander (UBC and PIMS)
Daniel McDonald (UBC)
Paul Tupper (SFU)
Daniel Coombs (UBC)
Elisha Are (SFU)
Bryn Wiley (UBC)

*Independent and freely offered advice,
using a diversity of modelling approaches.*

Overview

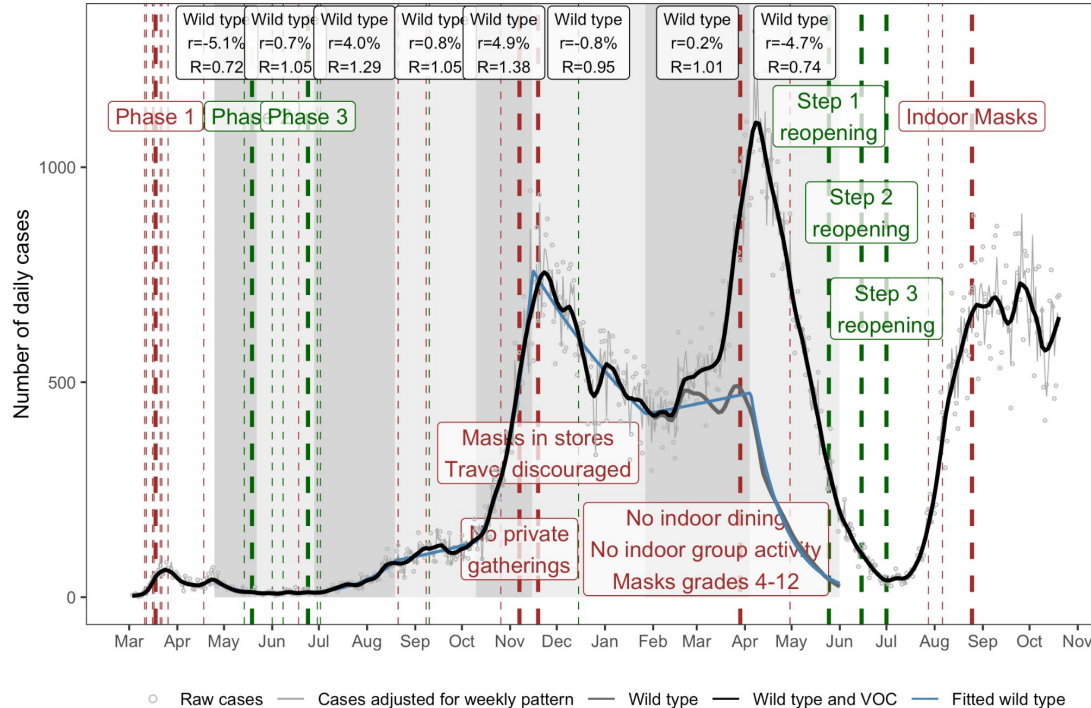
- State of the pandemic in BC
- Diagnosed COVID-19 cases in BC: in children aged 5-11 and adults, by health authority; model projections
- A new analysis sheds light on testing rates
- Hospitalizations and ICU
- Vaccination and its impact
- Vaccine uptake
- Impact of changing transmission in children
- Prospects for vaccinating children aged 5-11: direct and indirect impacts
- Situation update Alberta: Hospital admissions declining - good news

OLD SLIDE

State of the COVID-19 Pandemic in BC

Covid-19 daily new cases in British Columbia (up to Wed Oct 20)

Timeline of **closure** and **reopening** events



MountainMath, Data: BCCDC

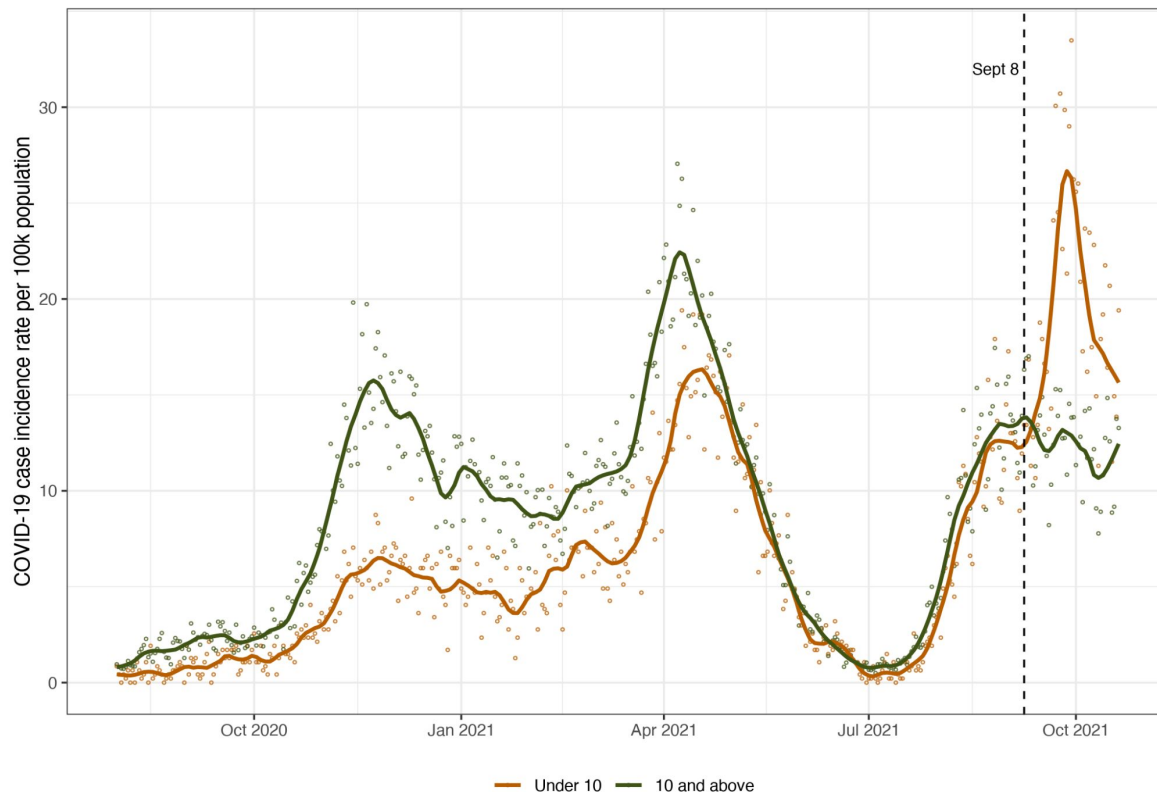
Indoor masking and localized measures in regions with high case counts (Interior and Northern Health Authorities) stabilized cases through September.

Source (J. von Bergmann) Case data from BC COVID-19 Database (<http://www.bccdc.ca/health-info/diseases-conditions/covid-19/data>). Vertical lines give dates of public health measures (major as thick lines, minor as thin lines). Grey dots are raw case counts, grey lines is cases abused for weekly pattern, black STL trend line and blue fitted periods of constant exponential growth. *Central Okanagan – July 29: masks, August 6: restrictions on group gatherings; [Interior](#) – August 21: masks; August 23: some restrictions on group gatherings. BC – August 25 mask mandate; BC's Vaccine Card to come into effect on September 13 (first dose) and October 24 (second dose)

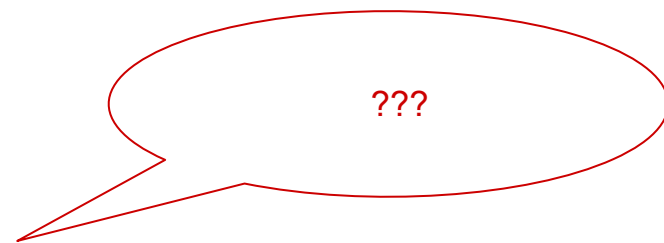
State of the COVID-19 Pandemic in BC

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BC Covid cases in BC (up to Oct 20, 2021)



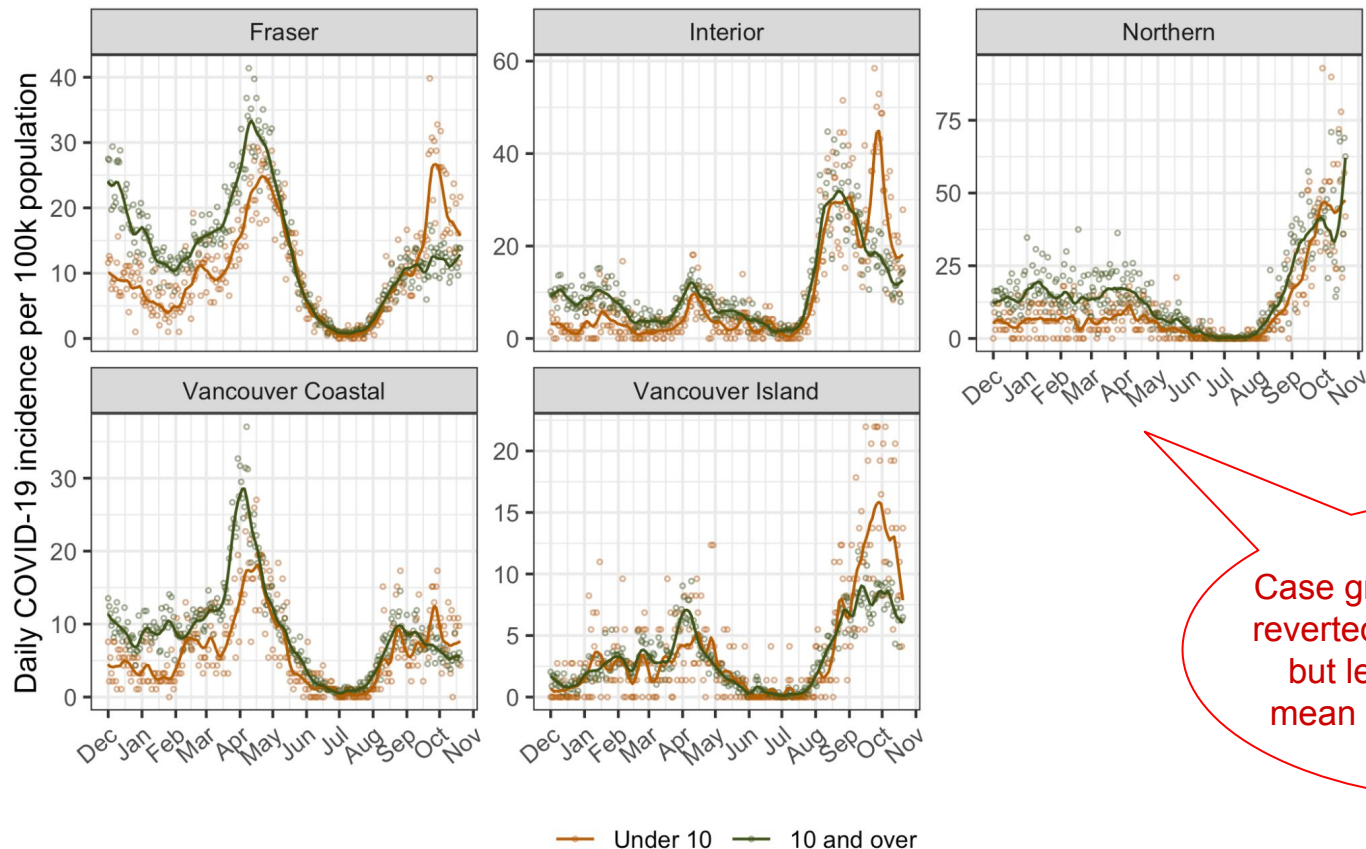
MountainMath, Data: BCCDC



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State of the COVID-19 Pandemic in BC

BC COVID-19 cases (up to Oct 20, 2021)



— Under 10 — 10 and over

Source (J. von Bergmann) Case data from BC COVID-19 Database

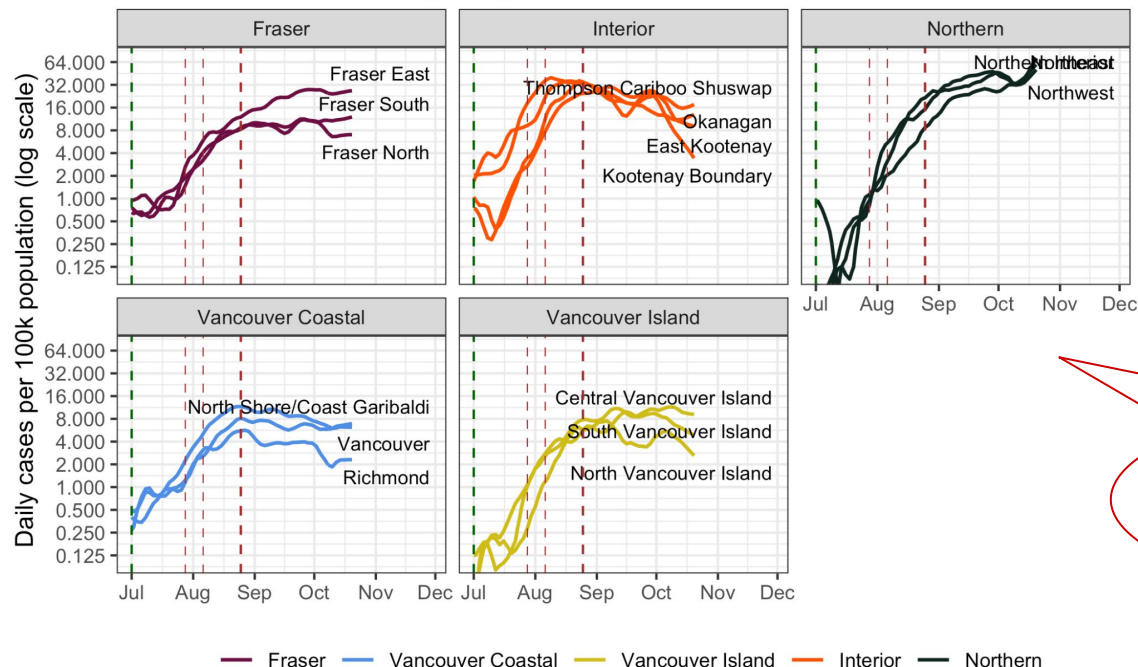
(<http://www.bccdc.ca/health-info/diseases-conditions/covid-19/data>).

MountainMath, Data: BCCDC

State of the COVID-19 Pandemic in BC

Covid-19 daily new cases trend lines in British Columbia (up to Wed Oct 20)

Timeline of **closure** and **reopening** events

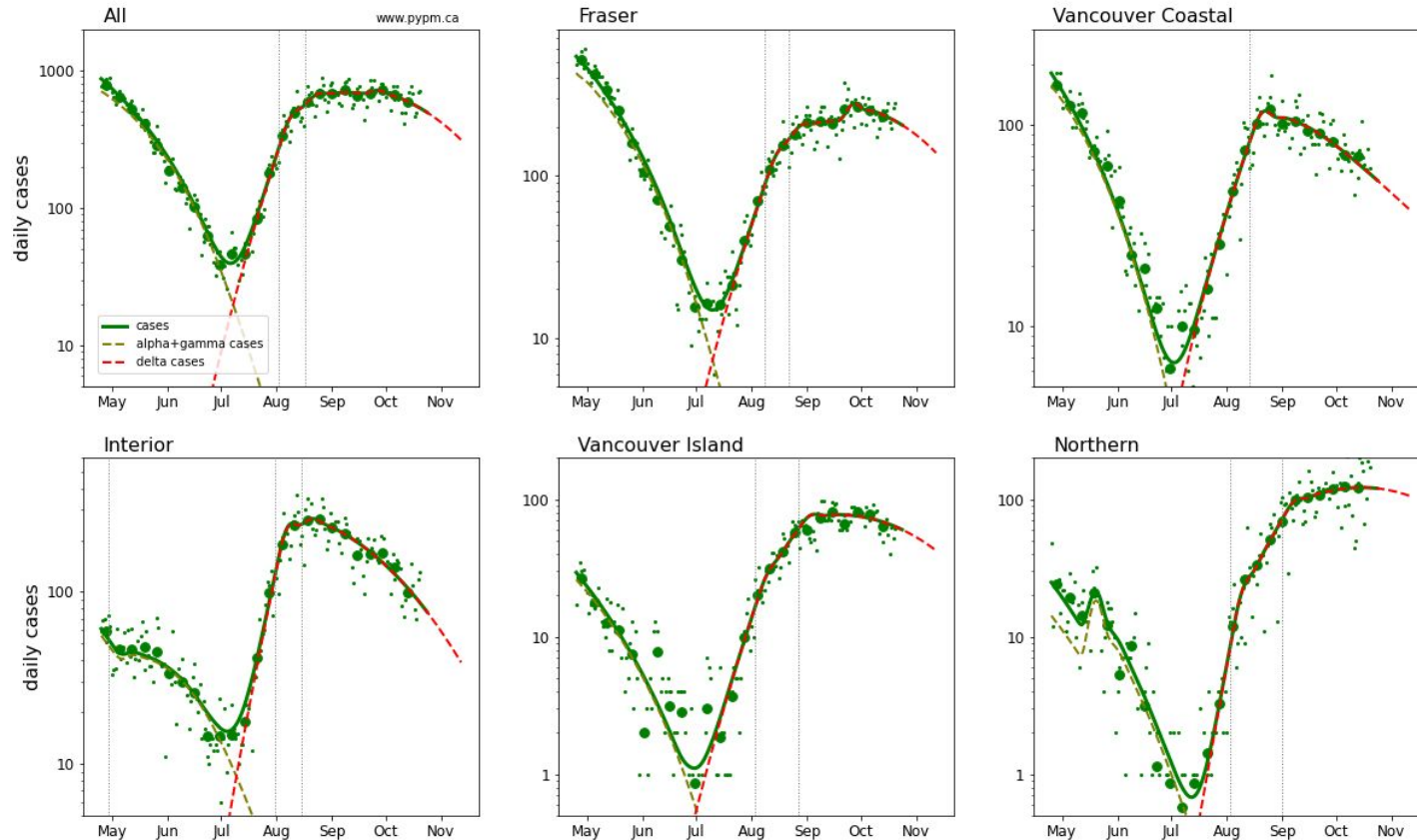


Health Service Delivery Areas (HSDA) follow similar trends within a Health Authority. Cases have stabilized, with the exception of Northern Health.

MountainMath, Data: BCCDC, BC Stats

Source (J. von Bergmann) Case data from BC COVID-19 Database (<http://www.bccdc.ca/health-info/diseases-conditions/covid-19/data>). Vertical lines give dates of public health measures (major as thick lines, minor as thin lines). STL trend lines on log scale.

Model fits to BC data



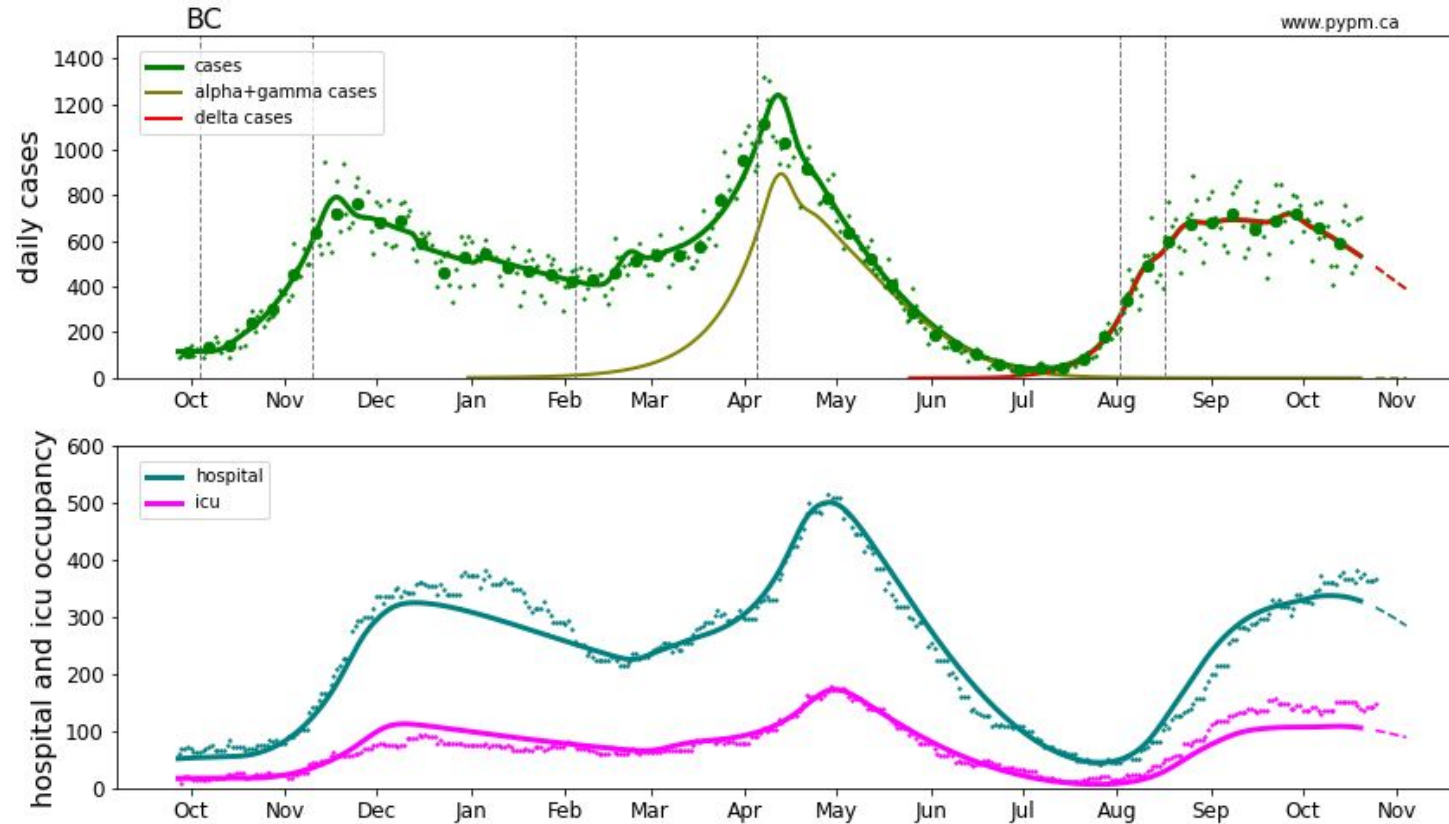
The measures taken in August and the public's response significantly reduced transmission.

Case rates are declining in all Health Authorities.

Fraser HA model includes a burst of infections in early September.

Source (D. Karlen). See www.pypm.ca. These models have no age structure. Fits include past vaccination schedule. Growth in BC is currently -2% per day but seasonal effects may increase transmission, as it did in Fall 2020. Vertical lines show fitted dates for transmission rate changes. The larger dots show weekly averages.

Estimating demands on health care



The COVID-19 pandemic is tracked using positive tests (cases), yielding an infection model (green curve).

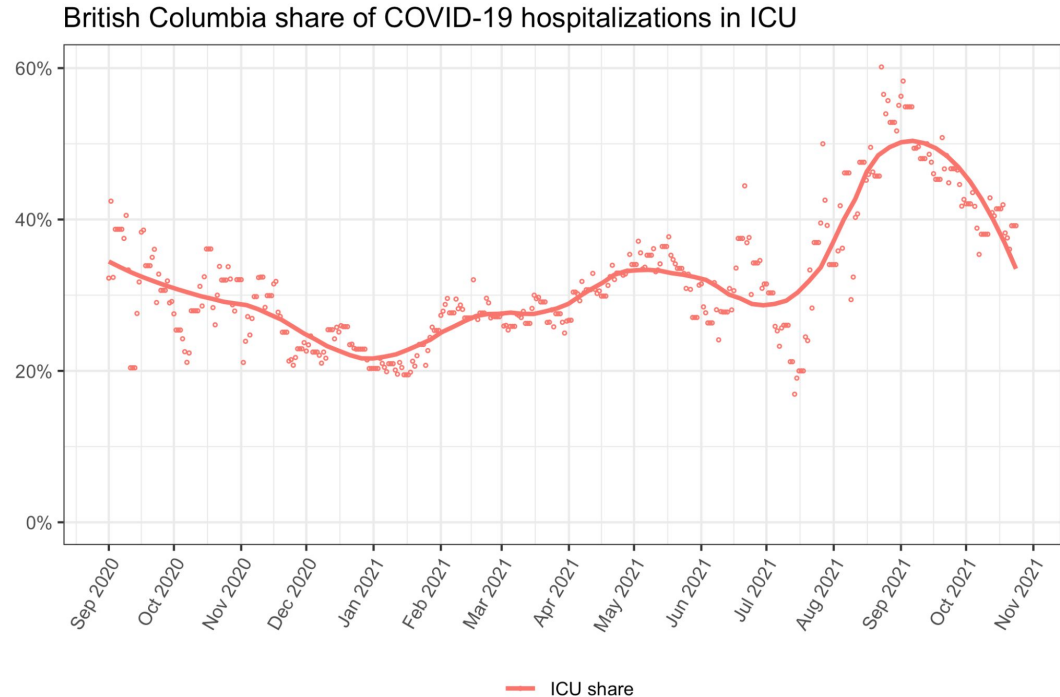
The infection model well describes past hospital occupancy.

Recent hospital and ICU occupancies exceed projections calibrated to the third wave.

Hospital and ICU occupancy over time

Of those patients in hospital, the recent increase of the fraction in ICU has stabilized and reverted.

Although many factors may contribute, the Delta variant that now predominates (98% of BC cases) has been found to be more severe in other jurisdictions*.



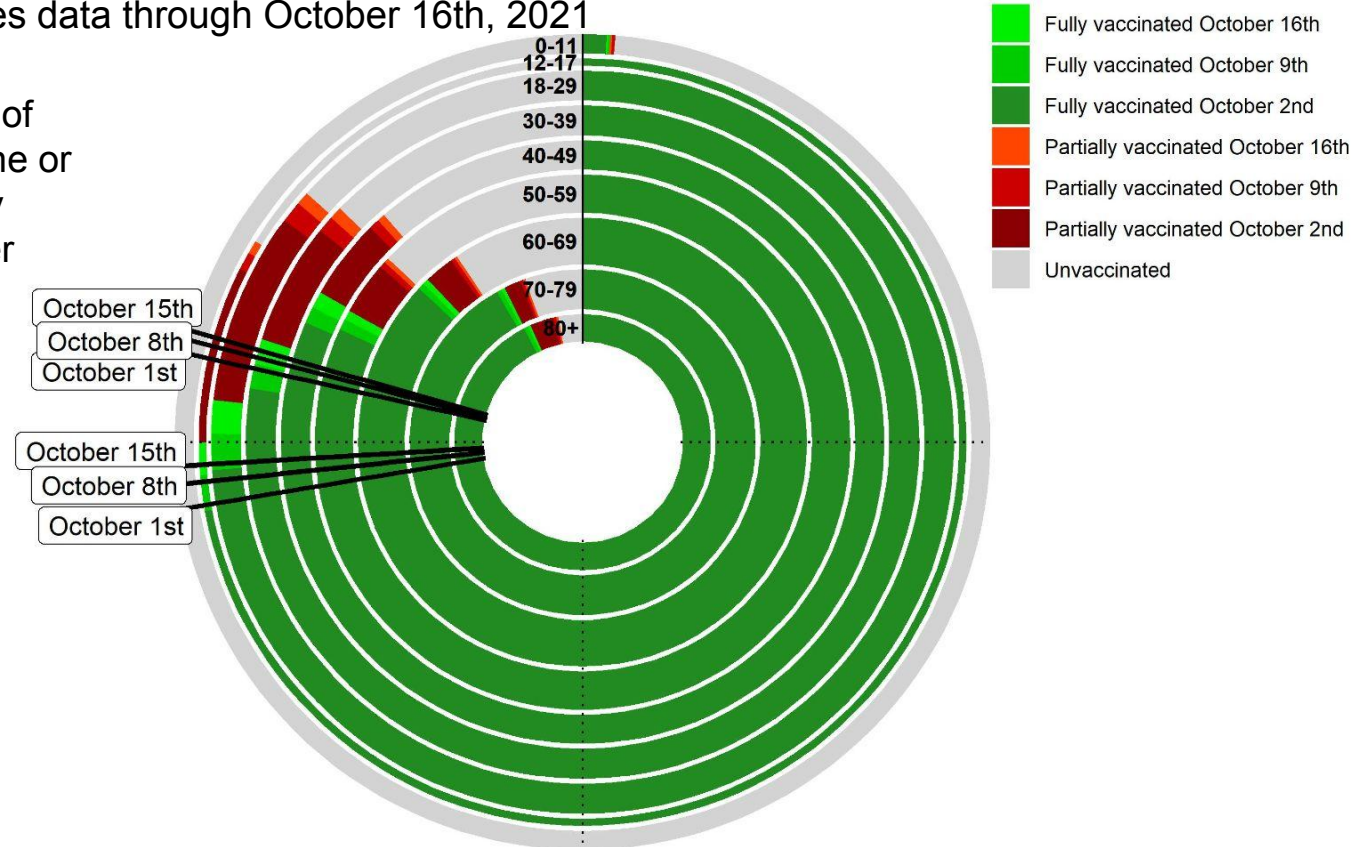
Data: BCCDC for cases, Canada Covid-19 tracker for hospital and ICU census

Source (J. von Bergmann) Case data from BC COVID-19 Database (<http://www.bccdc.ca/health-info/diseases-conditions/covid-19/data>). STL trend lines on linear scale. *[Singapore study](#) found that Delta was 4.9 times more likely to lead to an oxygen requirement, ICU admission, or death among unvaccinated hospitalized patients; see overview of Delta severity in [CBC article](#).

Closing the circle: Vaccination status by age

October 22nd update includes data through October 16th, 2021

Slow progress: The fraction of BC's entire population with one or two doses is rising, but slowly (0.3% and 0.7% increase over the past week, respectively).

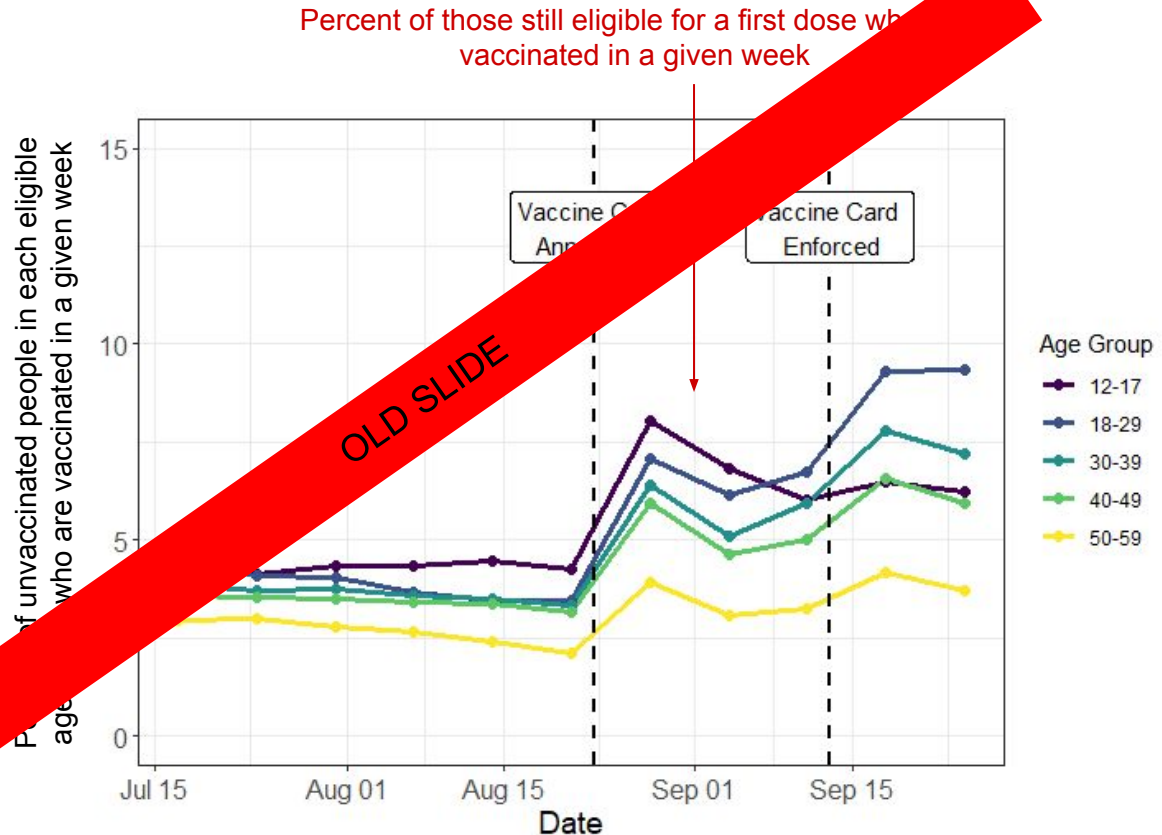


Source (B. Wiley). Design by Blake Shaffer (https://blakeshaffer.shinyapps.io/app_vaccines/) BC Vaccination data from <https://health-infobase.canada.ca/covid-19/vaccination-coverage/>, with area of each circle segment proportional to BC's population in that age class. BC 2021 Population projections for vaccination percentages from BC Stats: <https://www2.gov.bc.ca/gov/content/data/statistics/people-population-community/population/population-projections>

Slow movement on vaccinations in BC

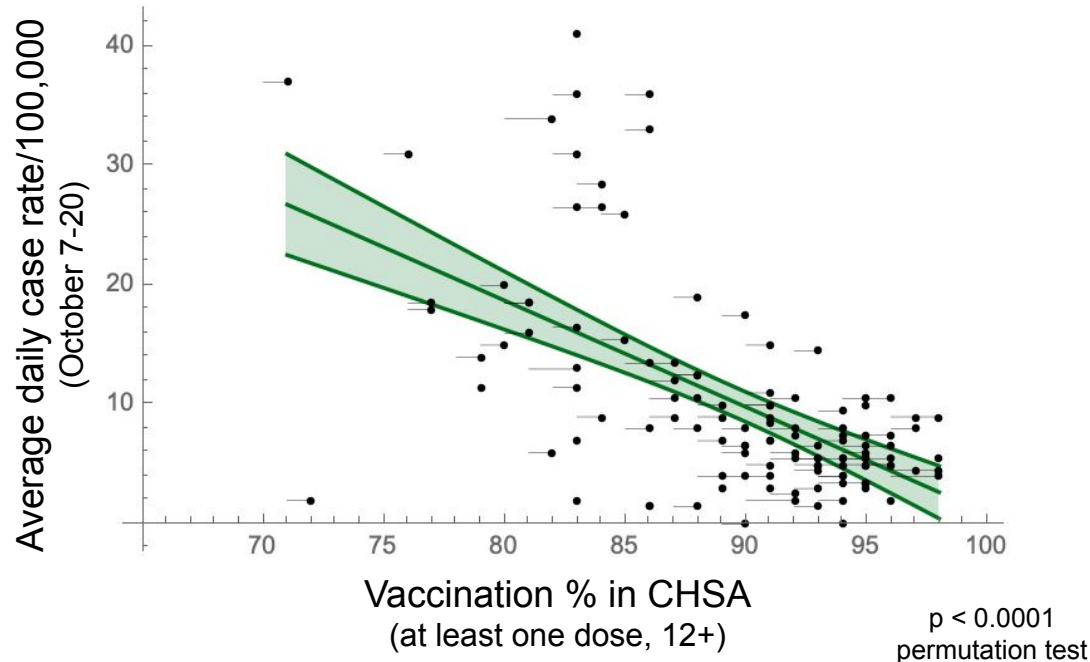
Slow progress:

The Vaccine Card announced on August 23 (dashed line) has helped increase the rate of vaccinations, but at this rate, it would take **~14 weeks** to vaccinate half of the remaining 50-59 age group and **~6 weeks** for the 18-29 age group.



A pandemic of the unvaccinated: Communities at risk

We continue to see a major effect of vaccination levels across Community Health Service Areas (CHSA). For the most recent two-weeks of cases, communities with 95% of eligible people vaccinated have **4.3 times** fewer COVID-19 cases than those with 75% vaccination.



Thin lines show vaccination progress over the past two weeks.

Vaccinations protect communities, as well as protecting individuals.

Source (S. Otto). BCCDC data portal's surveillance dashboard [data](#); see [maps](#) for regions that would most benefit from community vaccination drives (accessed October 25, 2021). ^aBC COVID-19 Modelling Report ([September 1, 2021](#)), consistent with BCCDC findings for age-corrected analyses.

<http://www.getvaccinated.gov.bc.ca>

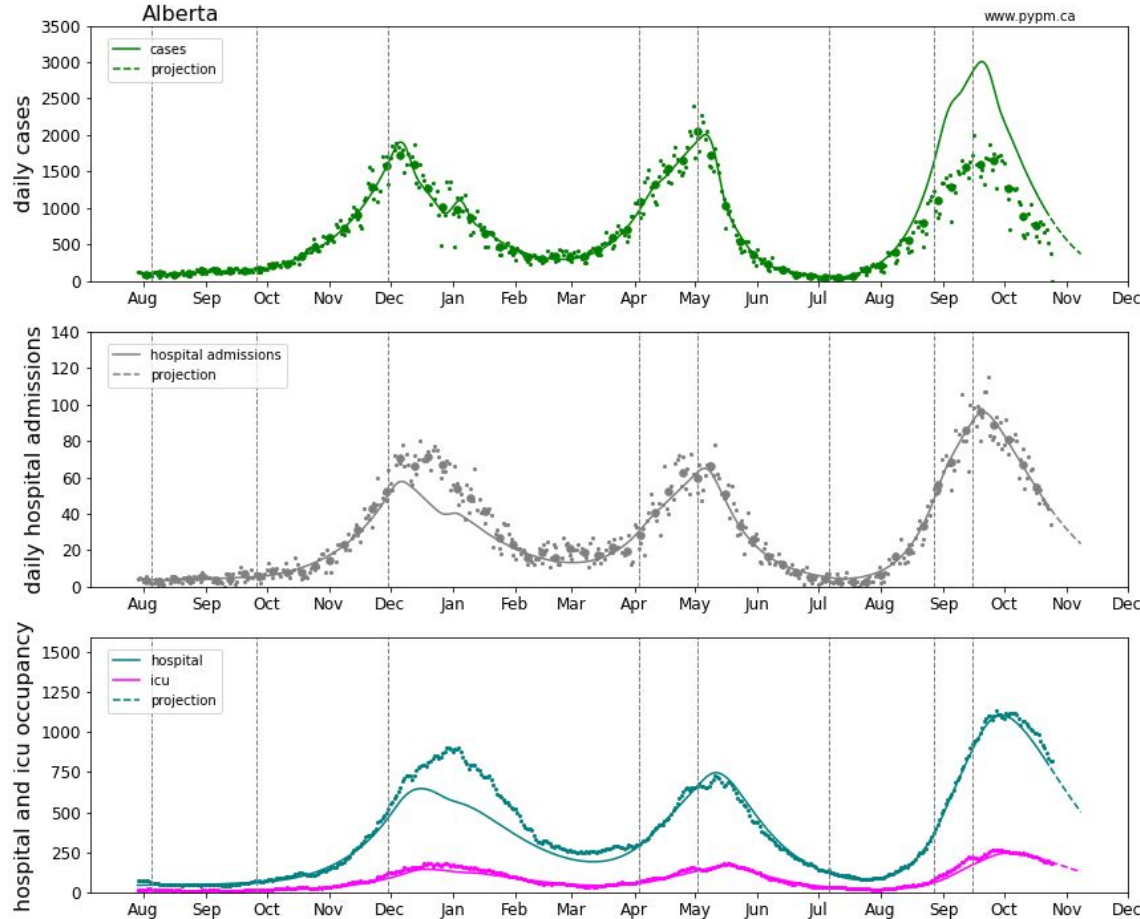
Vaccinating children 5-11: indirect benefits

- Children have a unique need for the adults in their lives to remain healthy and well
- Children have contact with parents, grandparents and other adults
- Preventing transmission in children has direct and **indirect benefits** for older adults
- Preventing transmission in children has broader indirect benefits, too



Source (Y. Song [SFU], C. Colijn). **NOTE:** These are illustrative of the benefits of vaccination in this age group in a BC-like pandemic. Simulations are built upon a fit to BC's demographic and earlier pandemic data followed by growth in cases in coming weeks before child vaccination can begin. Methodology: [Mulberry et al 2021](#)

Alberta update



Fits hospital admission data (grey) rather than case data.

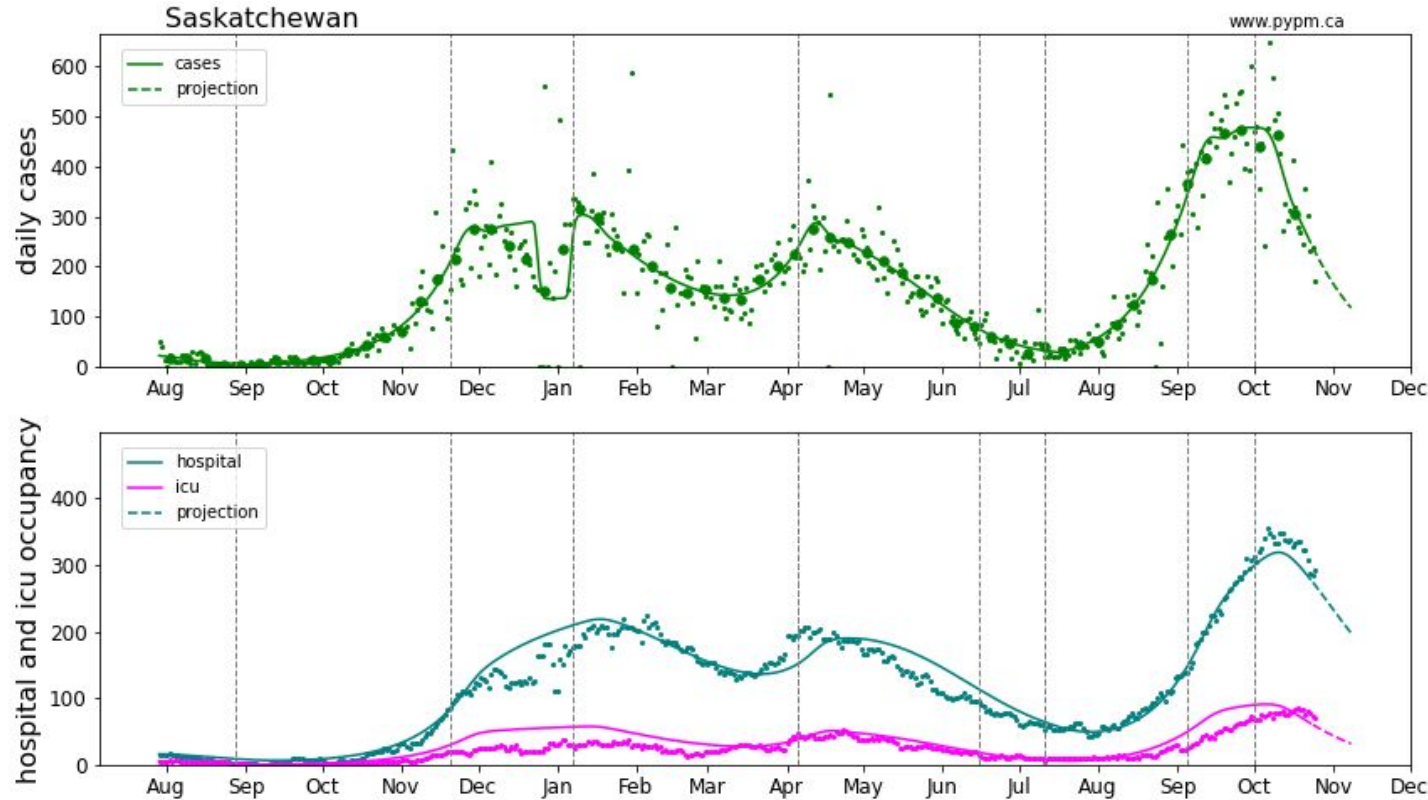
The previous report showed that case rates could no longer be relied upon to track infection rates, due to changes in testing practice. Hospital admission data indicated a significant reversal in growth, due to measures announced on September 15.

With additional data, the turnaround is confirmed.

Many more cases would have been reported had testing practice not changed.

Source (D. Karlen): COVID-19 Alberta Statistics,
www.pympm.ca

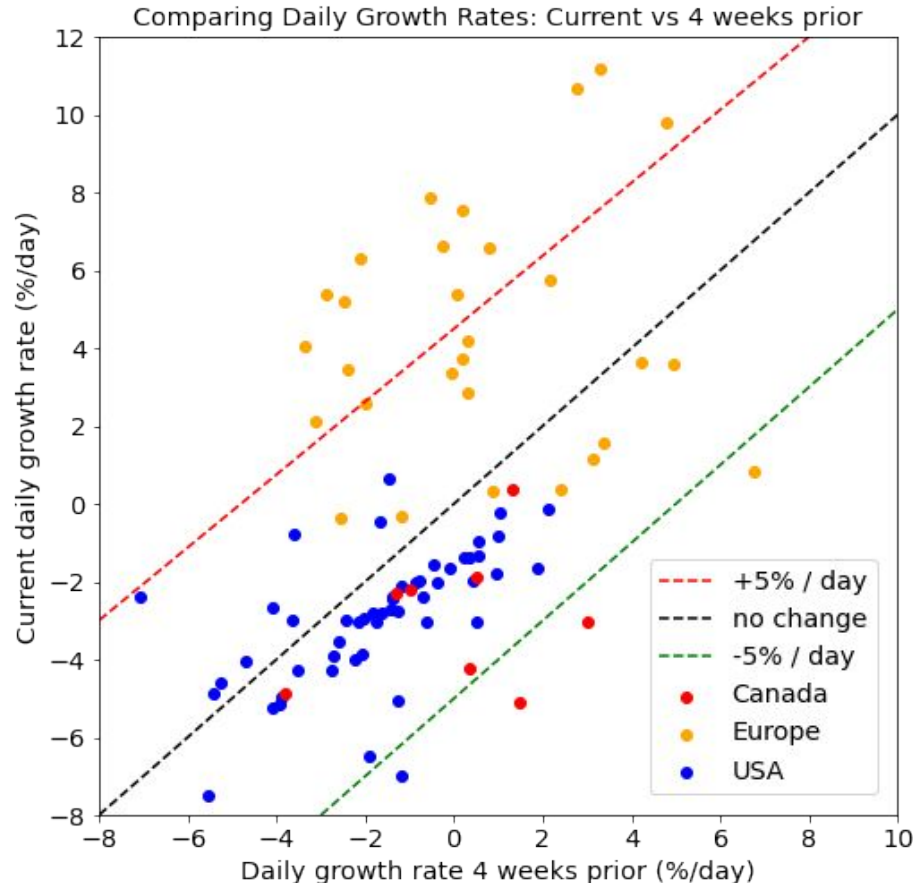
Saskatchewan update



The rapid growth in infections in August has been reversed.

Hospital occupancy is now in decline, as projected.

Recent trends in Europe and USA



Over the past 4 weeks, growth rates have reduced in all Provinces and most US states.

- The daily growth rates are now typically about 2%/day less than they were a month ago, consistent with the effect of increasing immunity of the populations.

In the past few weeks, most European countries have seen dramatic increases in growth rates.

- Cases now growing 5%/day (or more) faster than they were a month ago.
- This serves as a warning that our situation could rapidly take a turn for the worse.

Source (D. Karlen): www.pyppm.ca

Key messages

State of the pandemic:

- BC's COVID-19 cases stabilized through September due to masking, other non-pharmaceutical health measures and vaccination.
- Cases in children rose steeply in Fraser Health, Interior Health and Vancouver Island.
- ICU demand remains near peak levels, but hospital and ICU occupancy have begun to stabilize.
- A new analysis reveals that the number of tests performed is a multiple of the number of cases plus a constant background number. The multiplicative factor depends on the health authority.
- Recent testing rates in ages 0-4 are higher than expected given the number of cases.

Vaccination:

- Vaccine uptake continues but at a low rate.
- Areas with high vaccination levels have seen a decrease in case numbers.
- Children account for nearly 50% of cases in some health authorities in BC. Changes in transmission in children affect the cases' growth rate more than changes in other groups because children are less vaccinated and have high contacts.
- Vaccinating children 5-11 may bring benefits to children if the Pfizer vaccine is approved.
- This would have both direct benefits to children, and indirect benefits to adults.

Alberta: Hospital and case data disagreement suggests a smaller fraction of infections are being detected than previously. Cases, hospital admissions and occupancy have all begun to decline.