



Public Health
Agency of Canada

Agence de la santé
publique du Canada

Canada

Update on COVID-19 in Canada: Epidemiology and Modelling

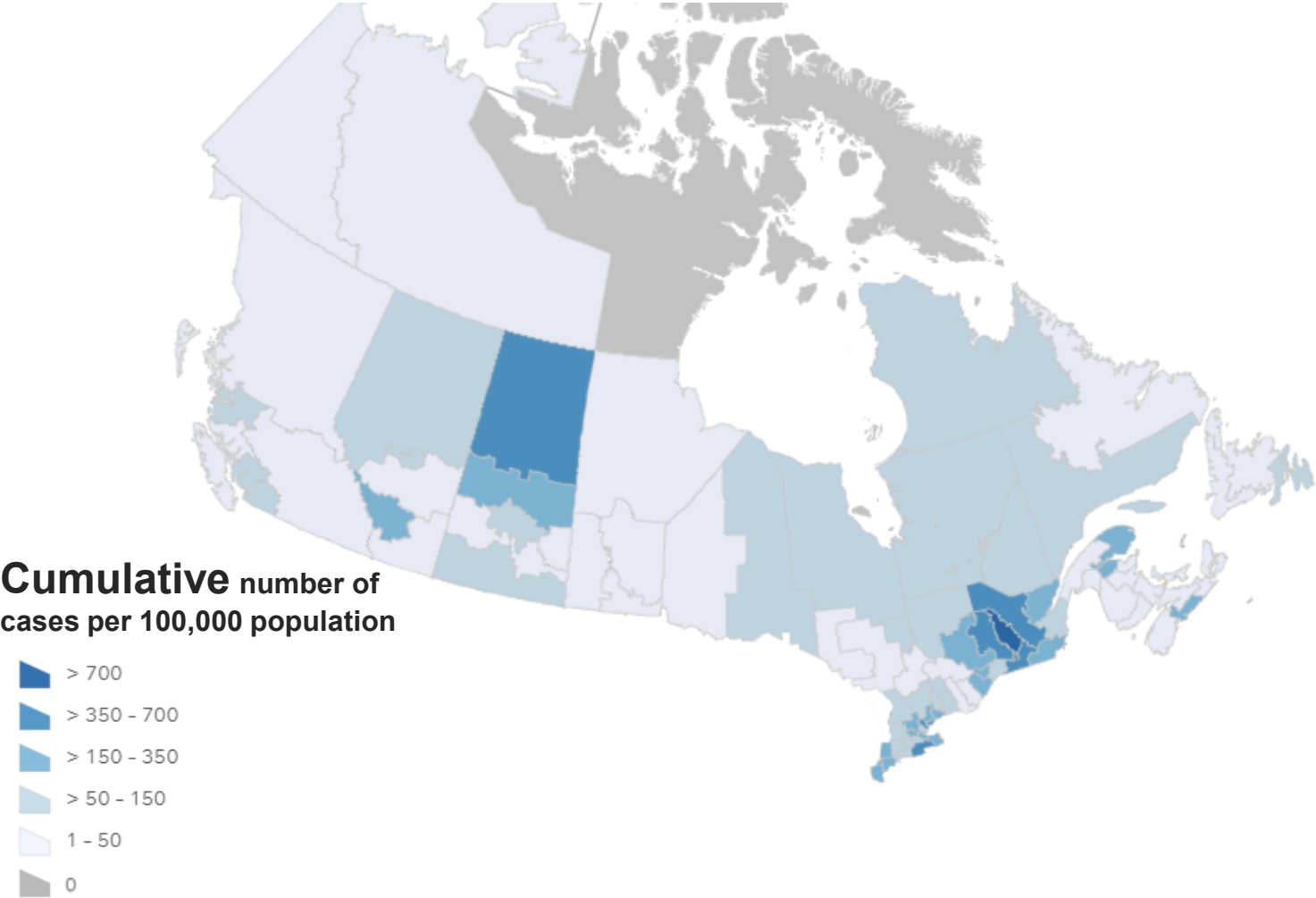
June 29, 2020

PROTECTING AND EMPOWERING CANADIANS
TO IMPROVE THEIR HEALTH



EPIDEMIOLOGY

COVID-19 has impacted some health regions more than others



Median age (range)	51 years (<1 to 112)
Females	57,332 (56%)
Males	44,658 (44%)
Other gender	15 (<1%)

Age and gender available for 102,341 and 102,005 cases, respectively.

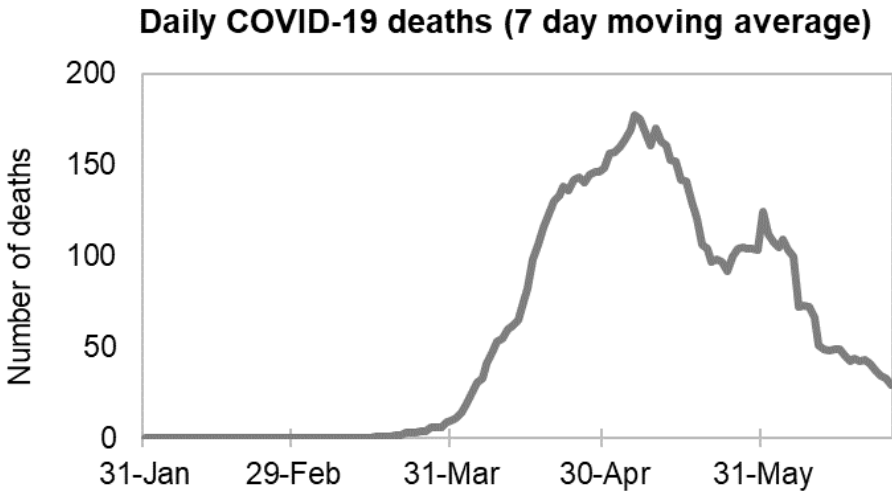
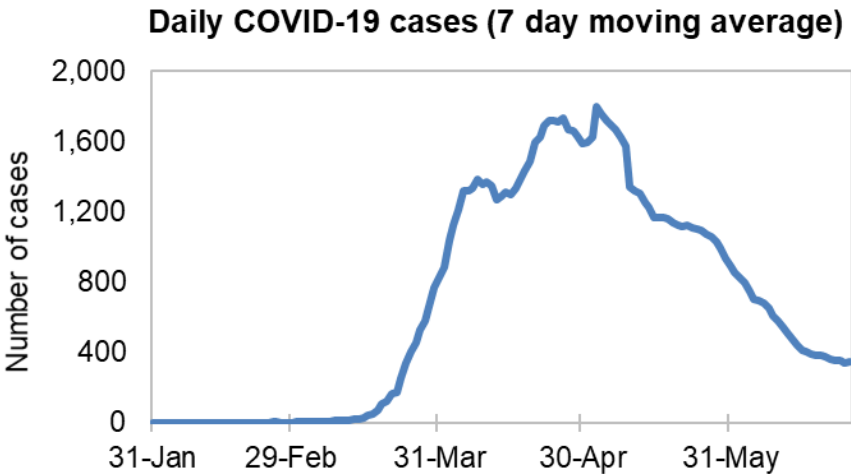
Deaths	8,508 (8.3%) [‡]
Hospitalizations	10,168 (15%)*
ICU Admissions	2,085 (3.1%)*

[‡] Of 102,794 total cases as of June 26.
^{*} Of 67,289 case reports for which the hospitalization fields were completed.

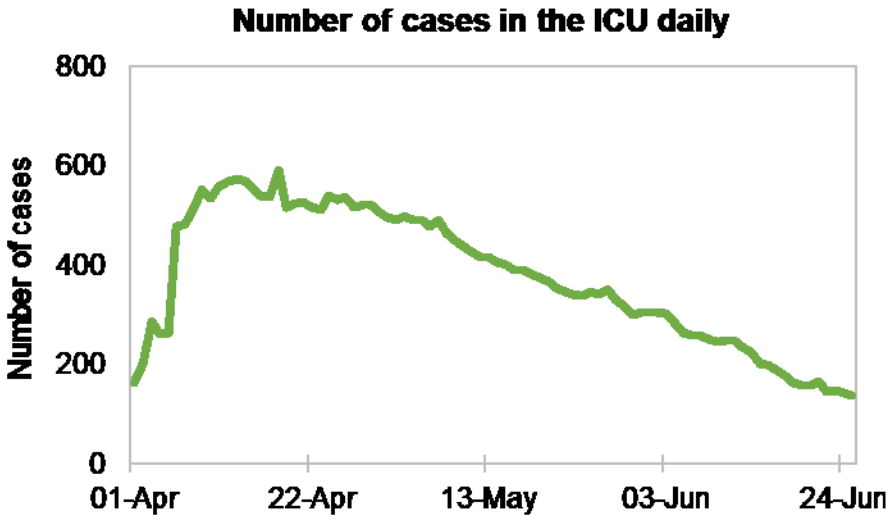
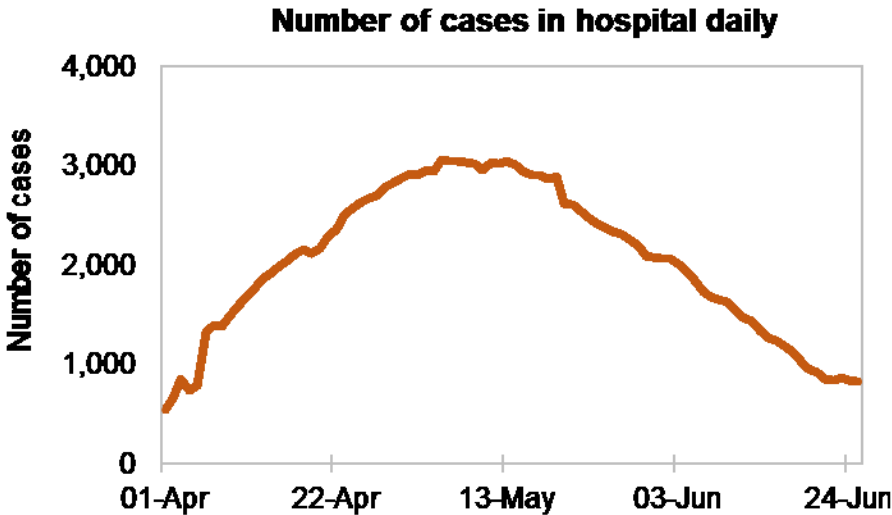
Data as of June 26, 2020 at 7pm
Credit: A collaboration between Public Health Agency of Canada, Statistics Canada & Natural Resources Canada. Powered by: ESRI Canada and Amazon Web Services (AWS). Data source: Berry I, Soucy J-PR, Tuite A, Fisman D. Open access epidemiologic data and an interactive dashboard to monitor the COVID-19 outbreak in Canada.

Indicators of COVID-19 transmission show steady decline nationally

- Daily new cases and deaths have been **steadily declining**

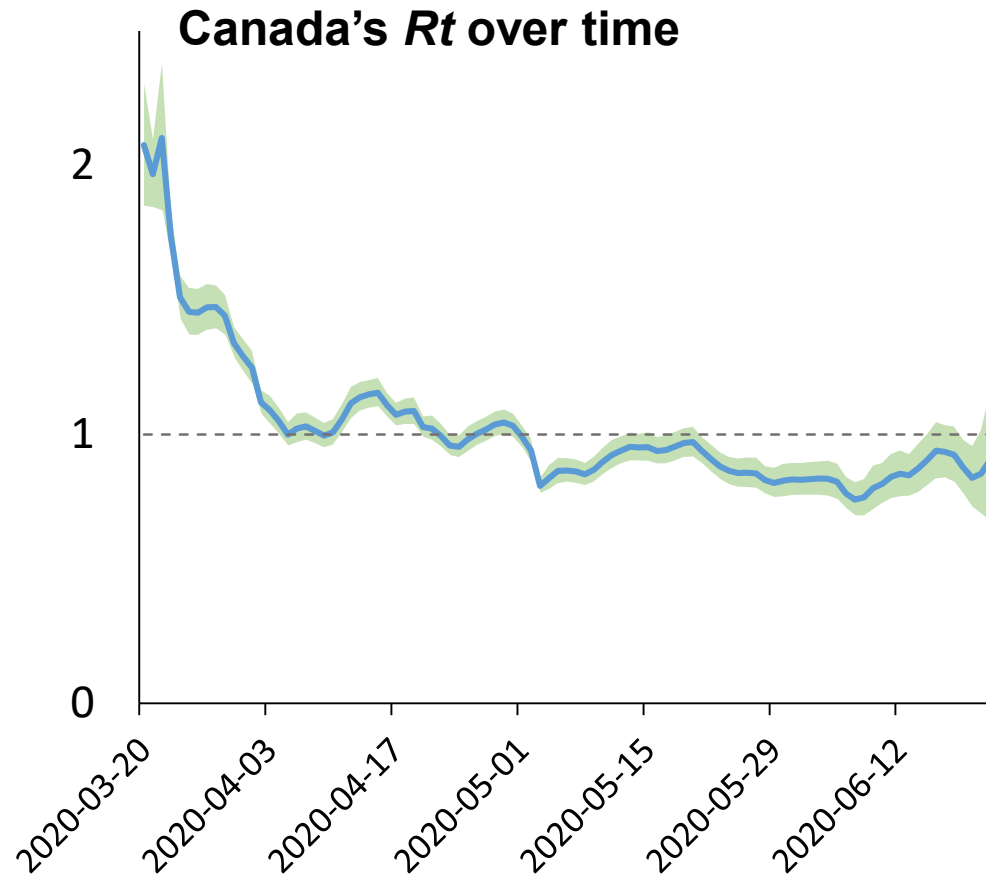


- Daily numbers of hospitalised and critical care cases also **steadily declining** as recoveries increase and admission rates decline



Data as of June 26, 2020, x-axes represent date of report

Canada's effective reproduction number (R_t) has been <1 for eight weeks



Data as of June 26, 2020
Calculations are based on date of case report

R_t , or the time varying effective reproduction number, represents the average number of people infected by each case

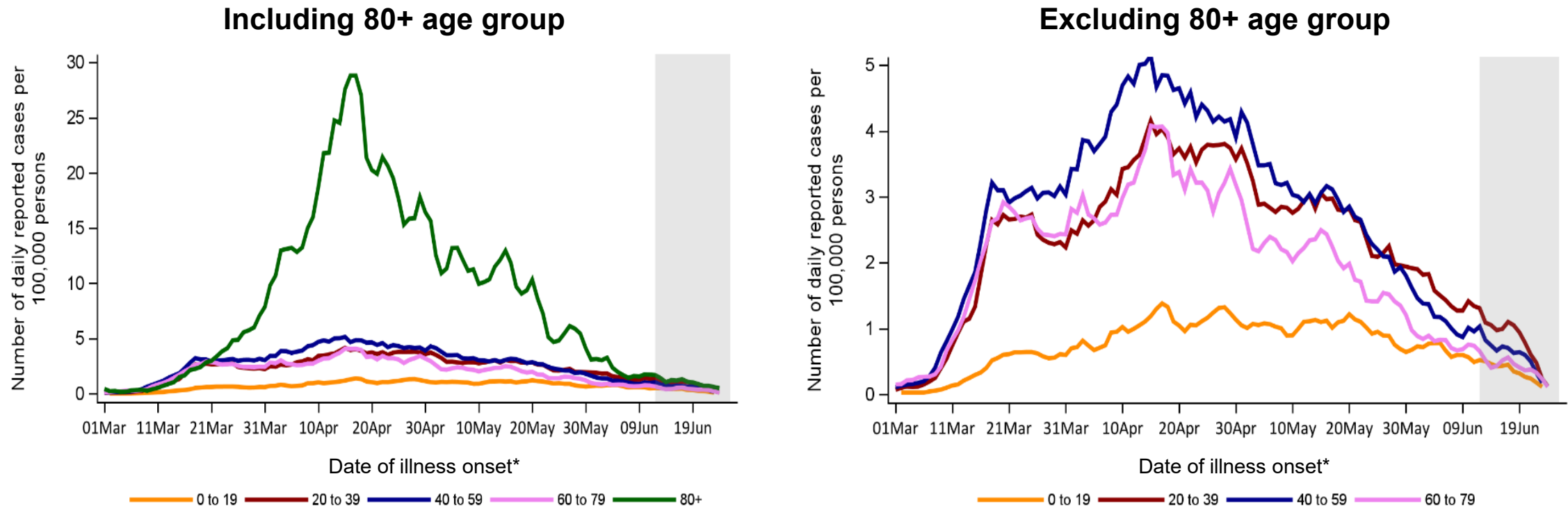
$R_t > 1$ is an indication the epidemic is growing

$R_t < 1$ is an indication the epidemic is being brought under control

Recent fluctuations in Canada's R_t are driven by localised outbreaks and ongoing transmission in some communities

Steepest declines in transmission observed among oldest age groups with relative increase in 20 to 39 year-olds since late May

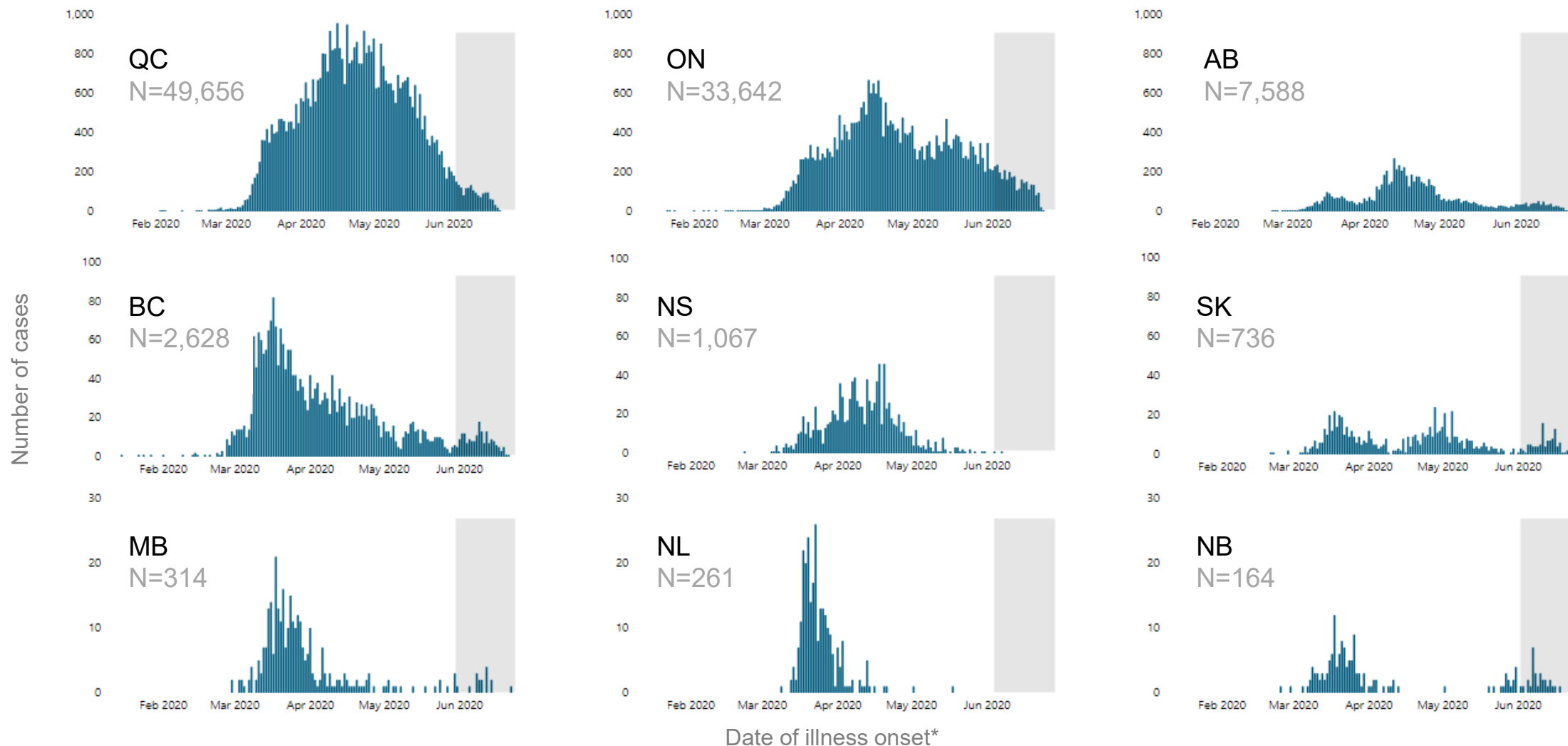
Number of cases by date of illness onset and age group



Data as of June 26, 2020

*First available of illness onset, specimen collection, laboratory test date; cases may not yet be reported in shaded area due to reporting lag

National trends reflect a series of regional epidemics



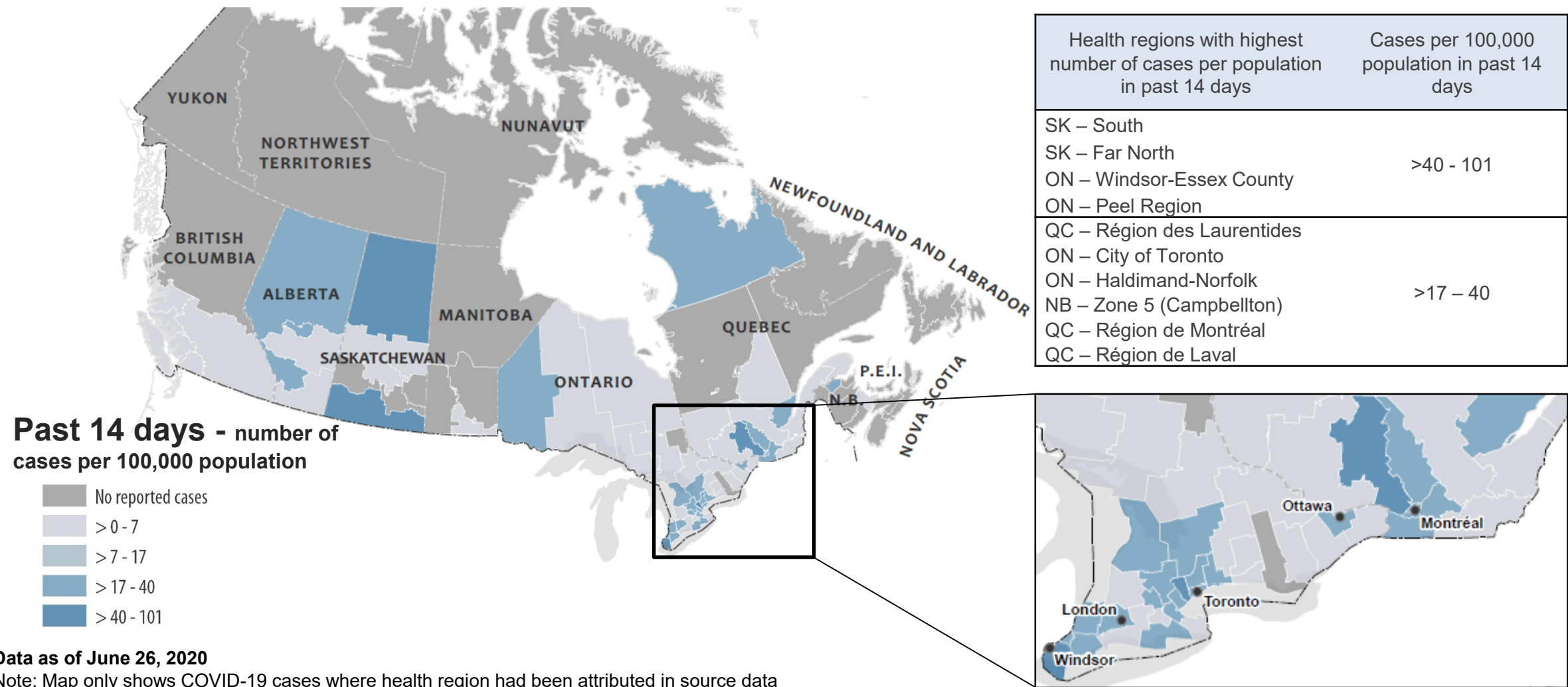
Data as of June 25, 2020

There has been no community transmission in Prince Edward Island, the Yukon and the Northwest Territories and no cases reported in Nunavut to date.

Sample size (N) reflects the number of cases for which dates have been provided through detailed case reports.

*First available of illness onset, specimen collection, laboratory test date; cases may not yet be reported in shaded area due to reporting lag

Recent trends reflect community transmission hot spots and localised outbreaks



Outbreaks point to vulnerabilities in closed and crowded settings

Outbreak Setting	Reported Number of		
	Outbreaks	Cases	Deaths
Long-term care and seniors' homes	1 052	20 604	6 920
Hospitals	124	1 644	184
Correctional facilities	26	818	5
Meat and poultry plants	13	3 025	6
Agricultural work settings including those with congregate living for workers	21	954	3
Workplaces including those with congregate living for workers	83	977	4
Shelters	31	581	3

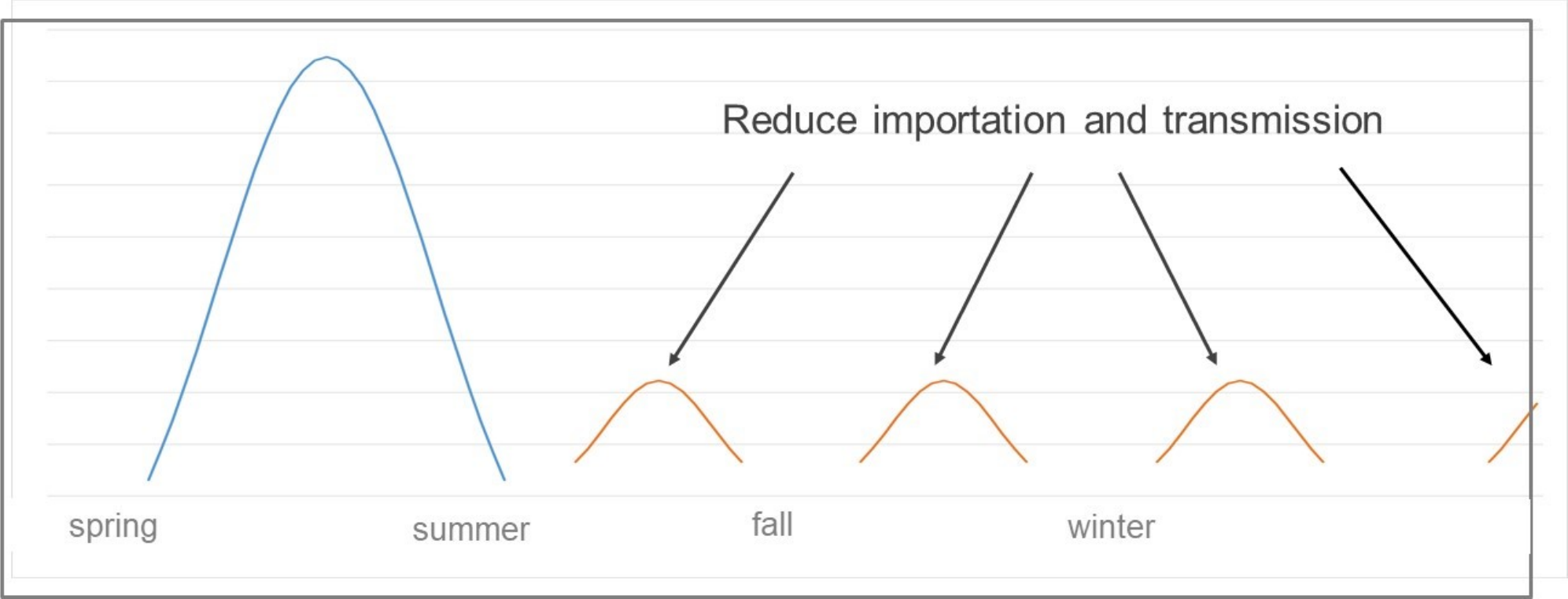
In addition, outbreaks have also recently been linked to social gatherings, particularly in closed settings with close contacts (e.g., funerals, indoor family gatherings)

Data as of June 26, 2020

*Estimates are based on public information sources and likely underestimate the true number of outbreaks and cases in these settings.

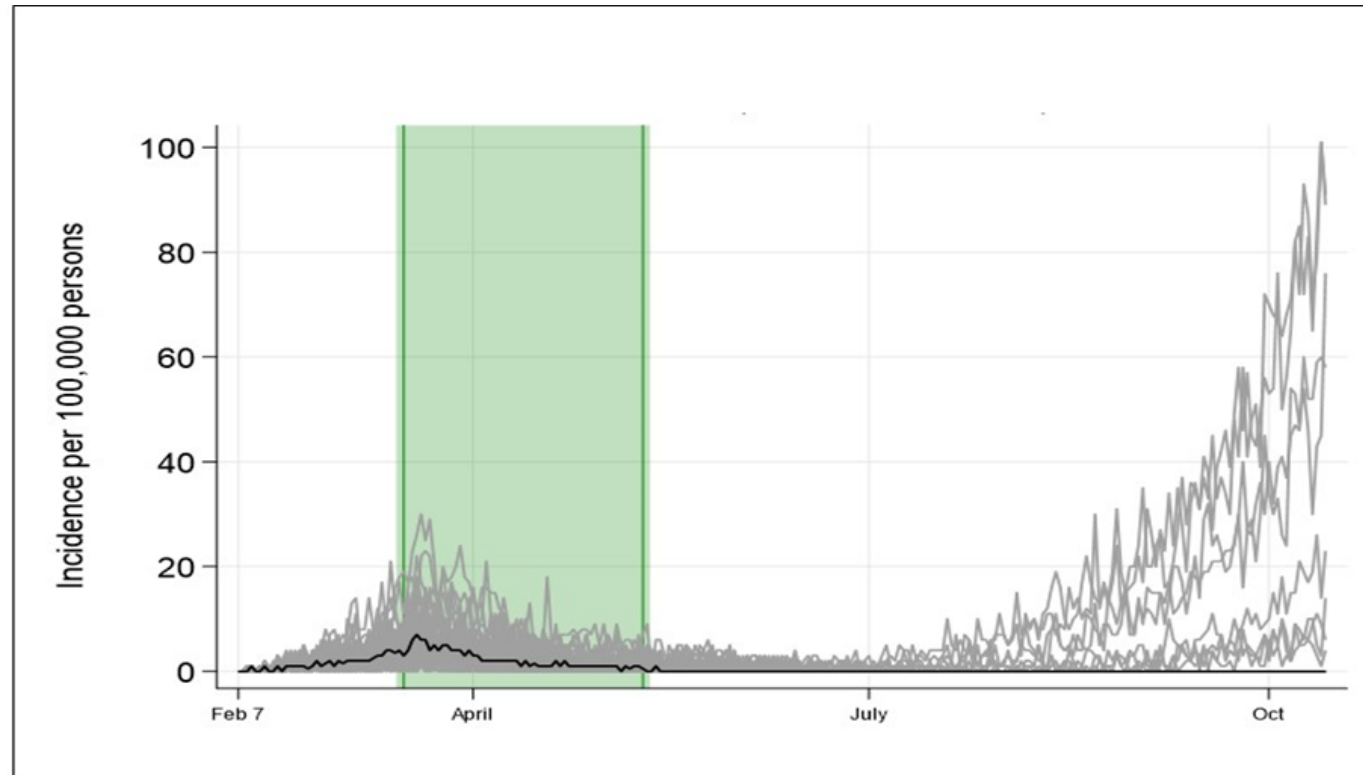
MODELLING UPDATE

Canada is aiming for strong epidemic control over the course of the pandemic



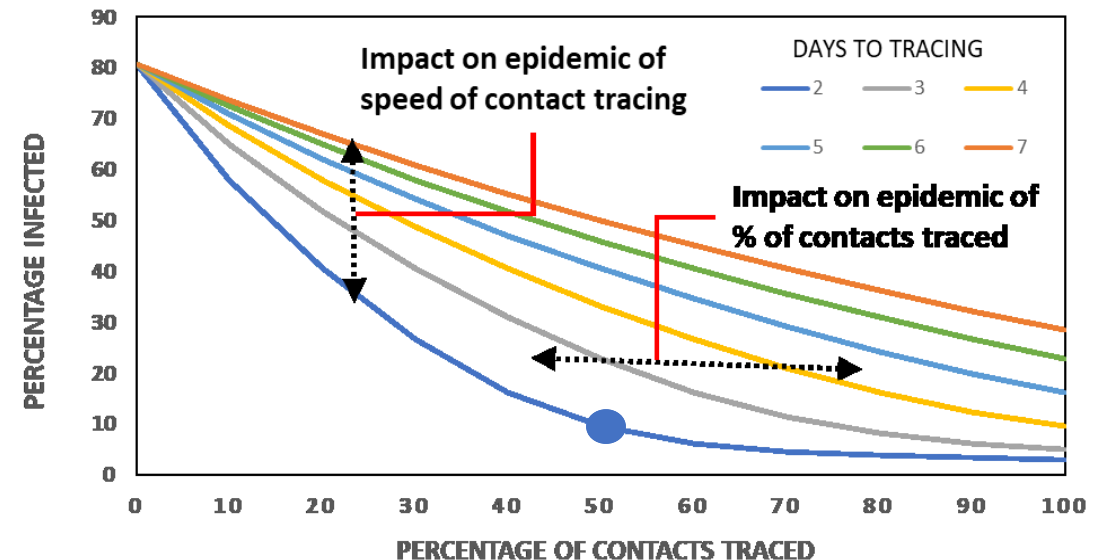
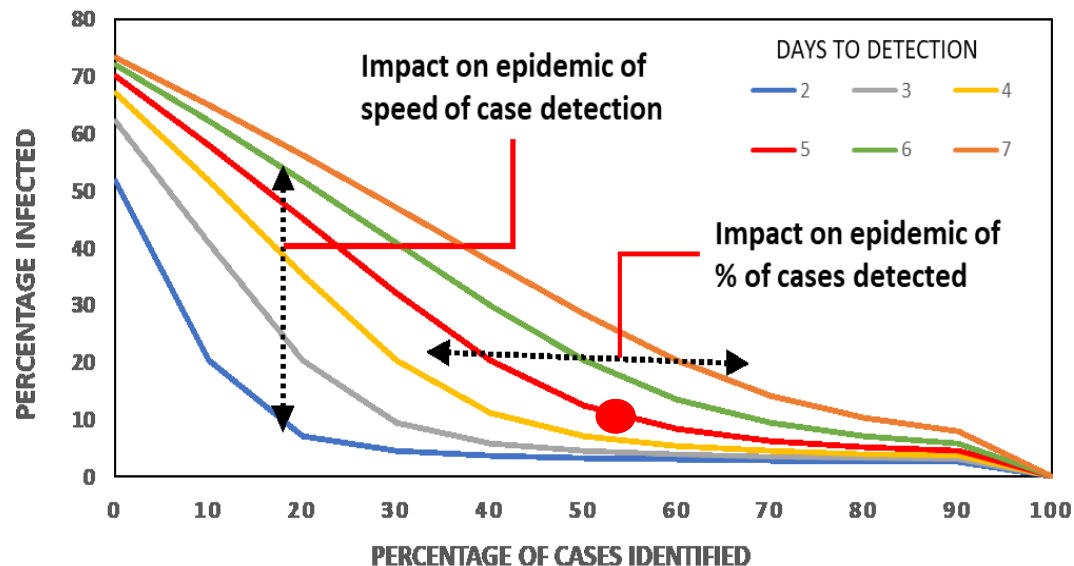
Public health measures remain essential to control the epidemic

- Dynamic models show lifting population-based measures (e.g., business and school closures, stay-at-home requirements) without strengthening other controls (e.g., personal public health practices, detect and isolate cases, trace and quarantine contacts) will likely cause the epidemic to rebound



Fast and thorough case detection and contact tracing are key to limit spread

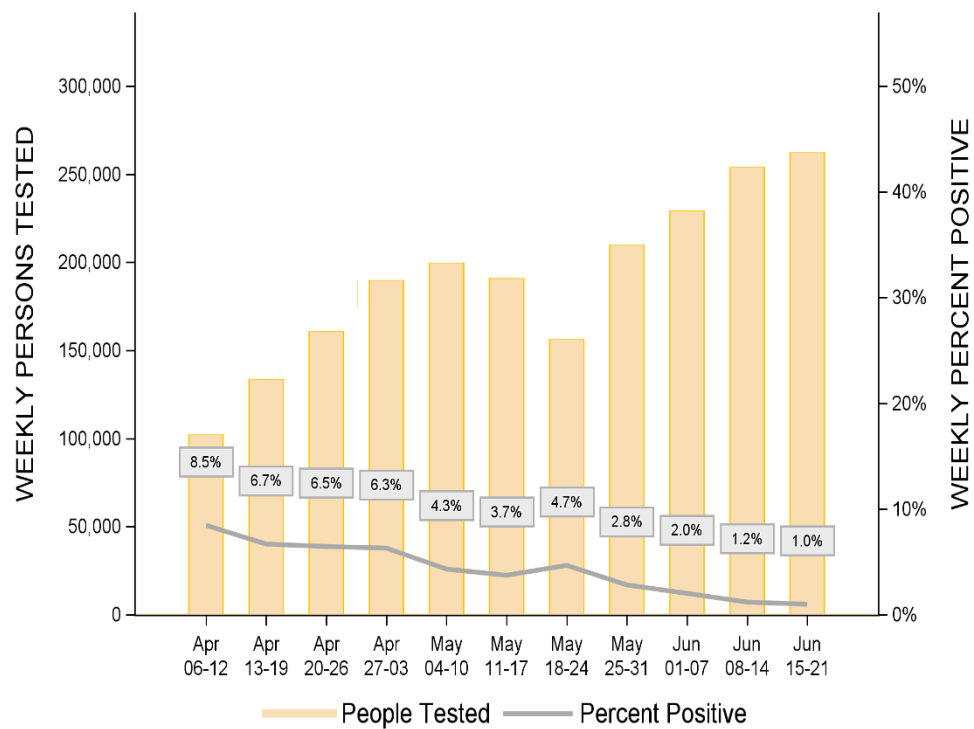
- To maintain epidemic control, public health authorities are continuing to build capacity to:
 - > **Detect and isolate** as many **cases** as possible early in their infectious period
 - > **Identify (trace) and quarantine** as **many** contacts as possible and as soon as possible after exposure
- Fast and thorough case detection and contact tracing means cases (including contacts that become cases) will be less likely to spread infection to others



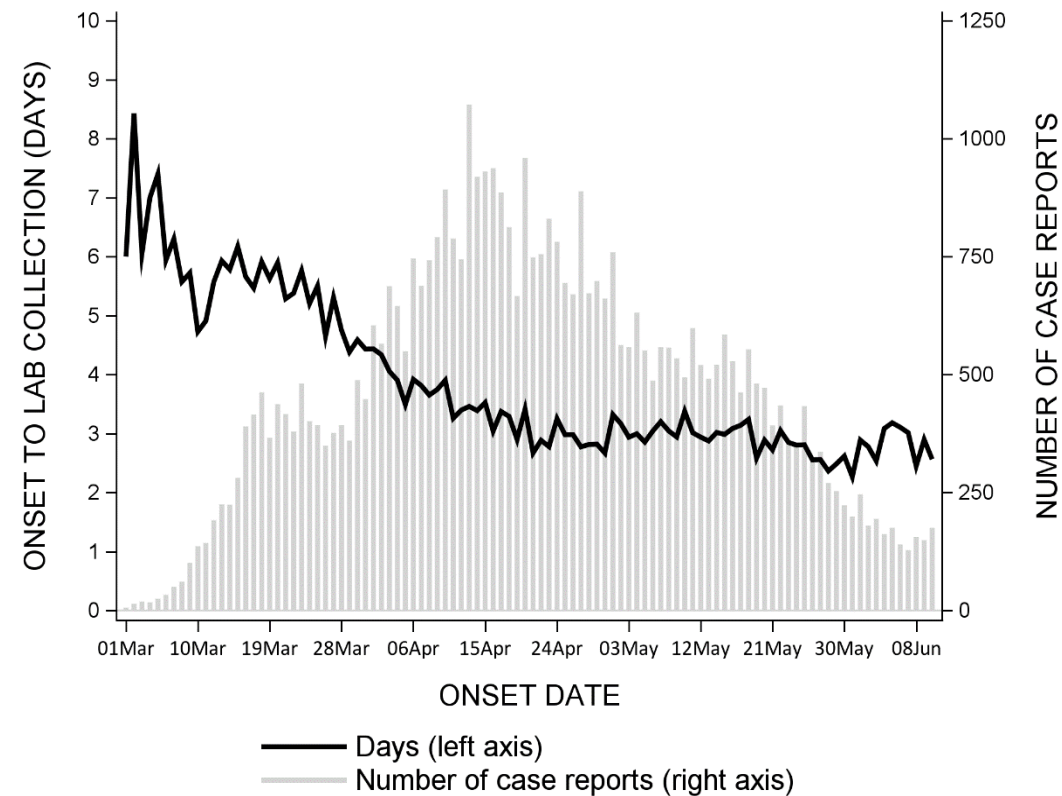
Figures are for illustration purposes. The actual figures needed to maintain control of the epidemic will vary in different jurisdictions and communities.

Speed and completeness of case detection improving over time

Number of people tested and the percentage that tested positive, April 6 to June 21, 2020



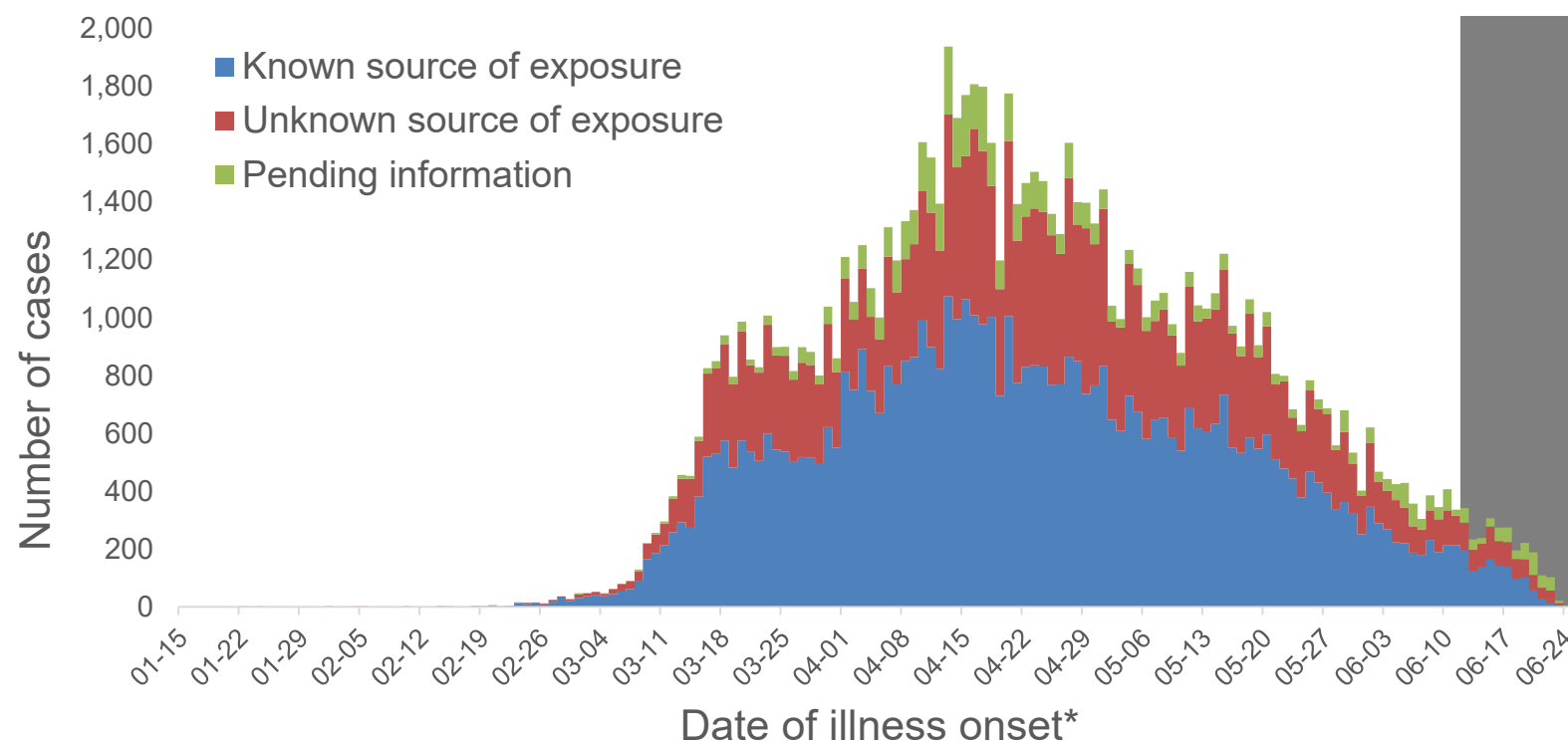
Average number of days from symptom onset to lab specimen collection, March 1 to June 10, 2020



Effective contact tracing means we know how people were exposed to the virus

- Lower daily case counts facilitate contact tracing to link cases and break chains of transmission
- The more cases that are unlinked (i.e. we don't know how they were exposed) the harder it is to stop community spread

Number of cases by date of illness onset* and exposure status as of June 25, 2020 (n=102,315)



* Specimen collection date or laboratory testing date was used if illness onset not available.
Note: Cases that occurred during the shaded time period may not yet be reported.

Important to minimise number of contacts between people to maintain epidemic control

Average number of contacts with other individuals per person per day

<6

Reflects restrictive community-based public health measures such as business and school closures

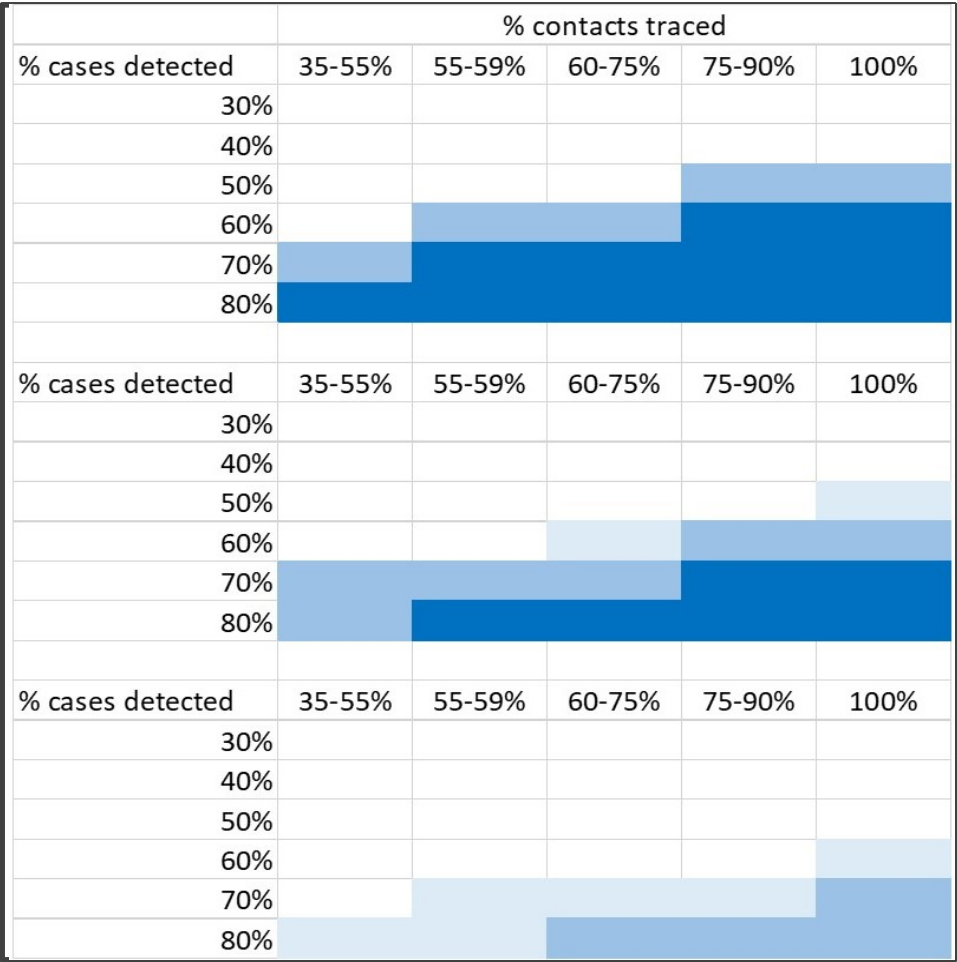
8

Reflects reopening of some social and economic spaces with appropriate controls and conditions in place

10

Reflects reopening of more social spaces and larger gatherings

Proportion of cases detected and contacts traced to maintain infection rate of <10%



COVID-19 control depends on the actions of individuals

Increasing the average number of close contacts between individuals makes it much more difficult to control spread:

- Higher number of cases and contacts to detect/trace
- Higher proportion must be completed to maintain control

Shades of blue represent combinations that are likely to result in <10% of the population being infected overall
(darker = more likely)

Protect yourself, your loved ones and help control COVID-19 in Canada

- Be aware of local COVID-19 activity to make informed decisions and reduce your risk
- Take precautions to lower your risk of exposure
 - **Maintain good hygiene practices:** handwashing, cough/sneeze etiquette, avoiding contaminated surfaces and objects
 - **Keep 2-metres physical distance from others** when outside your home/bubble or wear a non-medical mask or face covering when you can't
 - **Minimise your number of close contacts**
- **Avoid high-risk settings and situations**
 - Avoid or strictly limit your exposure to **closed spaces, crowded places, close contact** with others
- **If you have symptoms, no matter how mild, stay home**
 - Stay at home and isolate yourself from others to prevent spread to others
 - Consult your local health authority to be assessed and guided safely to care

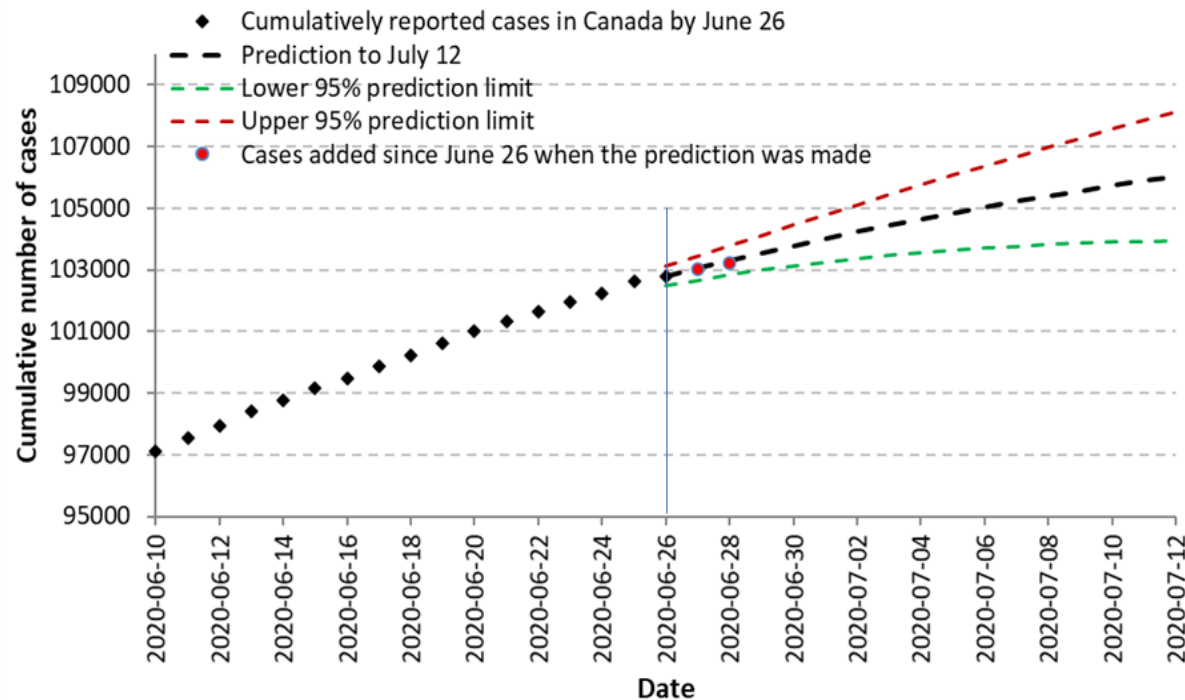
Consider:

- *If you test positive, **how long would your list of close contacts be?***
- ***No one is immune to severe illness due to COVID-19***
- *You or **your contacts** may be at high risk*
- ***Keeping COVID-19 controlled and away from vulnerable populations is a shared responsibility of all Canadians***

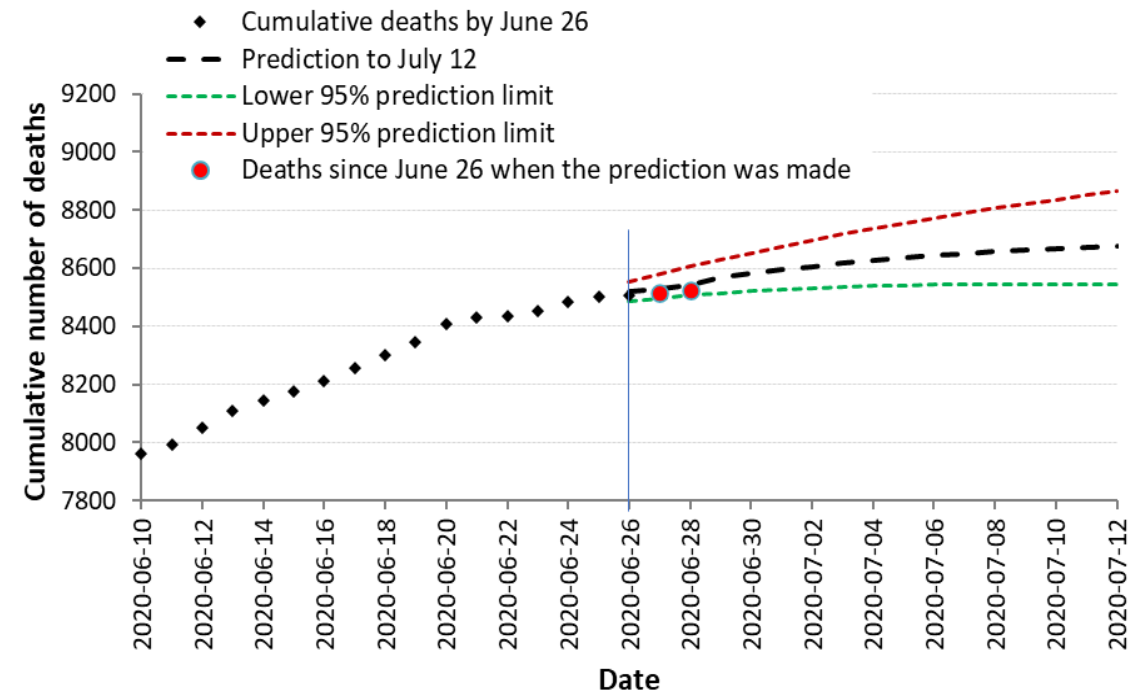
APPENDIX

Data driven models forecast short-term epidemic trajectory

Cumulative cases by July 12: from 103,940 to 108,130
based on data by June 26



Cumulative deaths by July 12: from 8,545 to 8,865
based on data by June 26



Extrapolation based on recent trends using a forecasting model (with ranges of uncertainty)

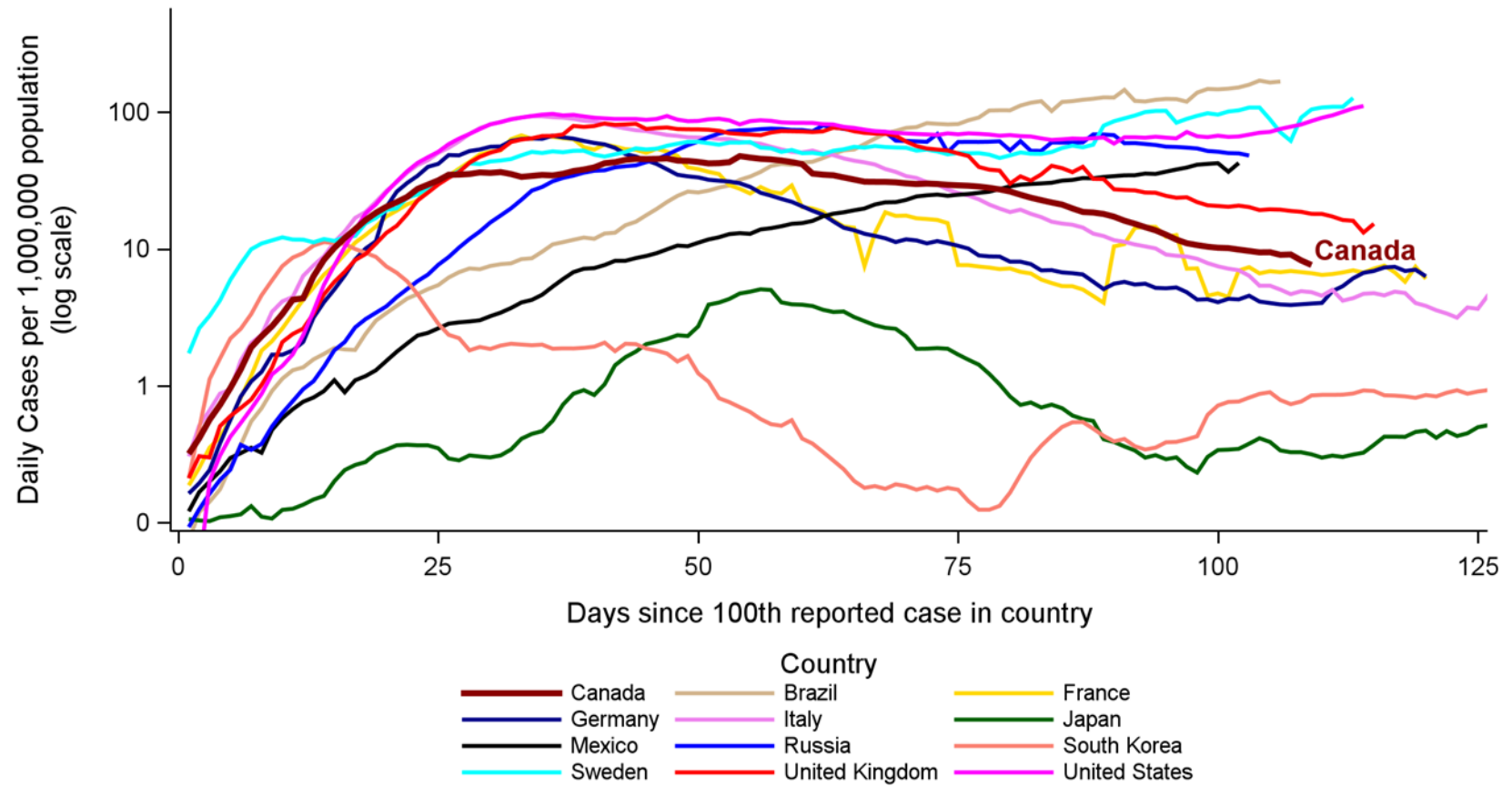
We are learning from the experience of the global community

Canada flattened the curve sooner than a number of countries such as the UK, Italy and US.

Other countries such as South Korea and Japan demonstrated strong epidemic control to keep their curves smaller overall.

All countries realise this is an ongoing effort, requiring sustained public health measures to avoid resurgent transmission.

Daily cases by country (7-day moving average, population adjusted)



Data as of June 26, 2020

Dynamic models of scenarios

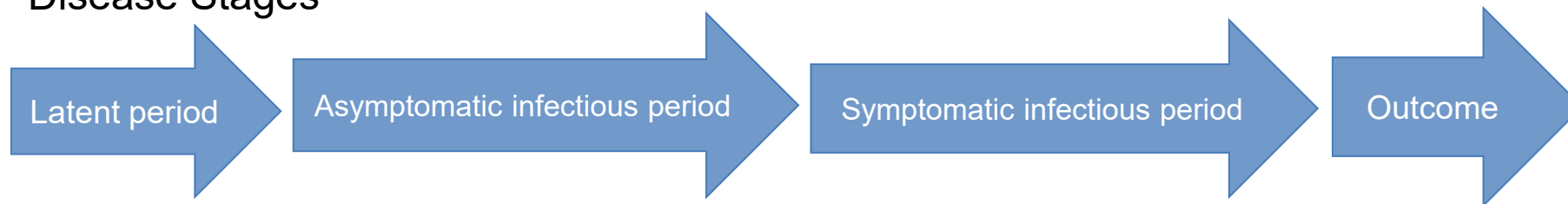
Model moves people through different states of infection. All start out as susceptible.



Individuals are then exposed. They either become infected, or remain susceptible.



Disease Stages



The duration of each stage has an impact on the speed of spread of the disease. The models are run with different values for these periods.

Mitigating factors

Model includes factors that reduce transmission, with different scenarios for different levels of public health measures possible. Hospitalization in the models is also assumed to include no further transmission.



Exacerbating factors

Model includes factors that increase transmission, i.e., the movement of infectious (symptomatic / asymptomatic) people, where contacts take place (e.g., school, work, etc.).

