

COVID-19: Modelling and Potential Scenarios

April 20, 2020

COVID-19 Update: Today's Presentation

- The information and analysis provided was developed by several experts at Ontario Health, Public Health Ontario and researchers at Ontario universities, led and coordinated by the COVID-19 Command Table.
- Today's presentation will share the most up-to-date modelling and projections that Ontario's COVID-19 Command Table is using to inform the province's ongoing response.
- The government believes the public deserves to have access to the same information as it receives in regular briefings.
- Providing this information is key to ensuring continued transparency with the public about the current challenges that Ontario faces in dealing with COVID-19 and where there has been progress in flattening the curve.

Current Situation in Ontario

COVID-19: Key Public Health Measures Timeline

Jan 24

Minister's Order made novel coronavirus a reportable disease

Jan 25 - February

Rapid testing ramp-up

Aggressive case and contact management of all confirmed cases

March 12

Closure of public schools

March 13

Essential visitors only in LTC and other congregate care settings

Stop cycling of intermittent inmates and personal visits in correctional facilities

Prohibit gatherings over 250 people

March 16

Practice physical distancing

Self-isolate for 14 days if travelled outside Canada

Prohibit gatherings over 50 people

Make virtual work arrangements where possible

March 17

Closure of public places and establishments

March 21

Work deployment for health services providers

March 23

Closure of non-essential workplaces

March 24

Work deployment for LTC homes

March 25

Prohibit gatherings greater than 5 people

March 30

Closure of parks and outdoor recreational amenities

Limit outings to essential needs

Self-isolation for those over 70, with compromised immune systems or underlying medical conditions

April 2

Enhance capacity for contact tracing

April 3

Revised essential workplaces list

April 9

Prohibit camping on crown land

April 11

Work deployment for service providers organizations, municipalities and DSSABs

April 14

Extension of Emergency Declaration for 28 days

April 15

Release of COVID-19 Action Plan for LTCH, including EO restricting staff from working in more than one setting

Jan 25

Ontario confirms first case of COVID-19

March 17

Ontario reports first COVID-19 death (from March 11)

Emergency Declaration

March 24

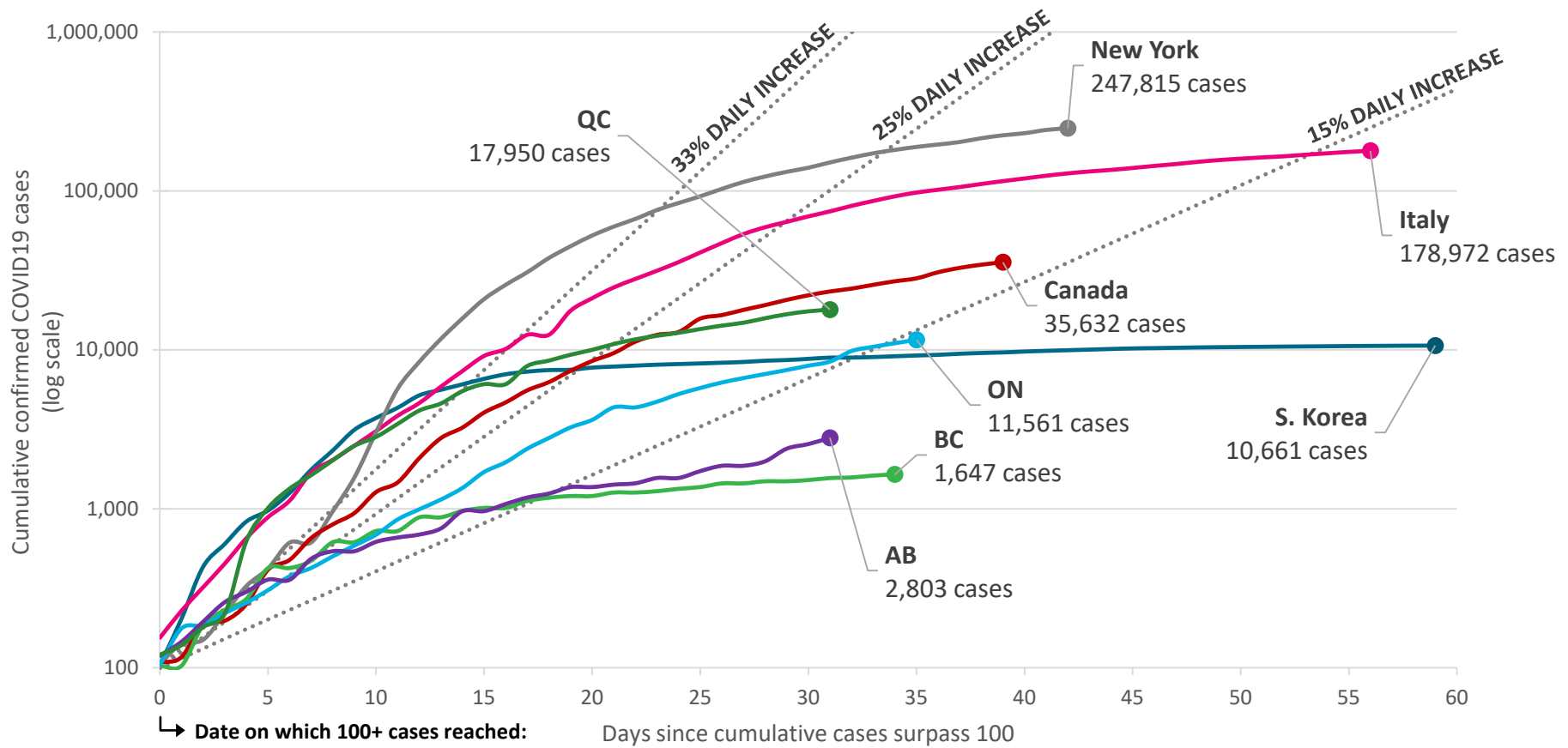
Ontario reports first deaths (2) in LTC homes

Current Status

- The wave of new community spread cases of COVID-19 in Ontario appears to have peaked.
- While earlier models predicted a peak in cases in May, public health interventions, including widespread adherence to physical distancing, have accelerated the peak to now. The sacrifices people are making to stay home and wash their hands are making a difference.
 - Peak is important because epidemics follow what is called Farr's Law, where epidemics have a symmetrical shape.
 - Total cumulative cases for span of the outbreak now likely less than 20,000, substantially lower than worst case (300,000) or even expected case (80,000) projected by previous models.
 - Projections now show Ontario's COVID-19 outbreak behaving more like best case.
- However, data shows that province is facing two different disease processes.
 - Community spread of COVID-19 seems to have peaked and is coming under control.
 - Spread in long-term care and other congregate settings seems to be growing.

Epidemic Curve: Cumulative confirmed COVID-19 cases, number of days since the 100th case

By country, including the Canadian provinces of Ontario, Alberta, British Columbia and Quebec



↳ Date on which 100+ cases reached:

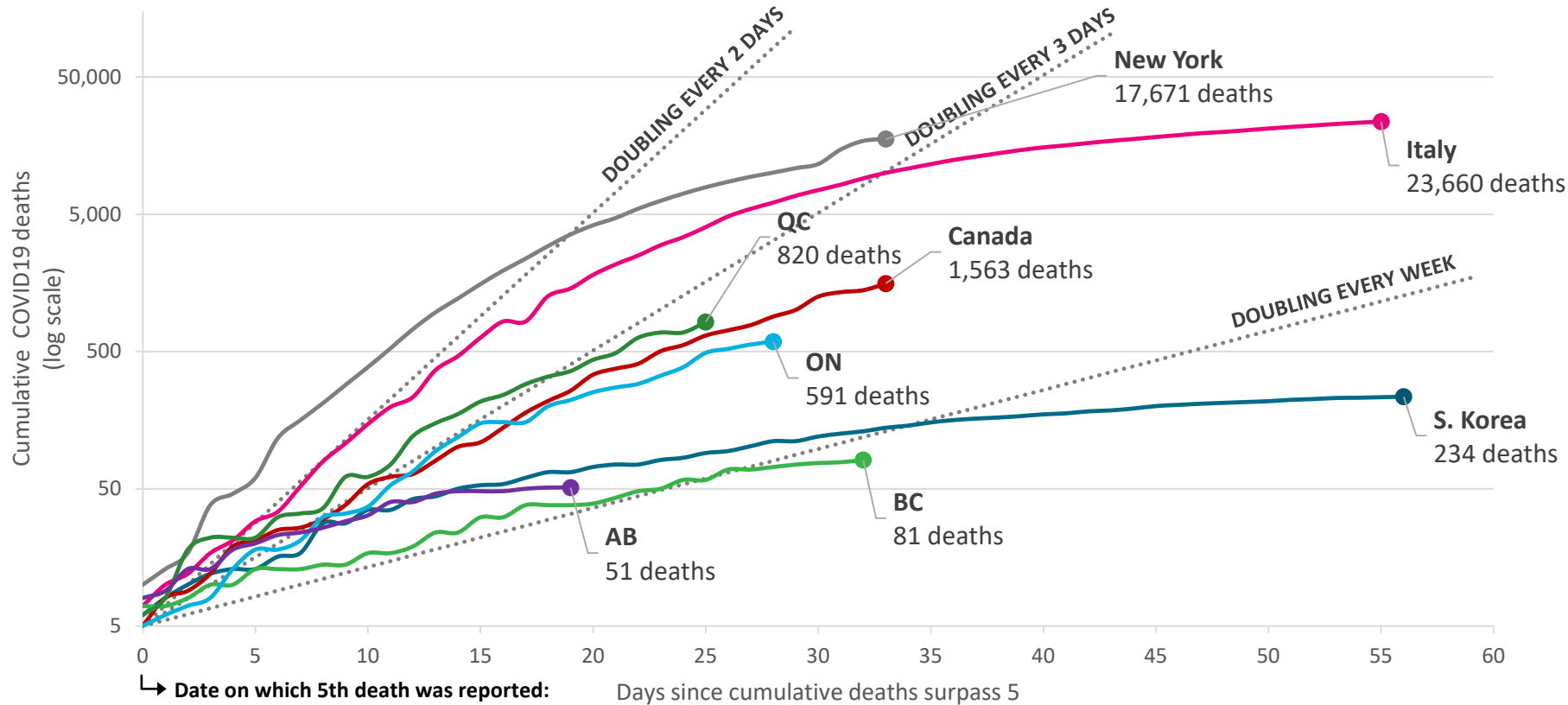
- Canada - March 11
- Ontario - March 15
- British Columbia - March 16
- Alberta and Quebec - March 19

Data from: Dong, E., Du, H., & Gardner, L. (2020). An interactive web-based dashboard to track COVID-19 in real time. *The Lancet Infectious Diseases*, as of April 19, 2020.

Data compiled by Johns Hopkins University from the following sources: [WHO](#), [CDC](#), [ECDC](#), [NHC](#), [DXY](#), [1point3acres](#), [Worldometers.info](#), [BNO](#), state and national government health department, and local media reports.

Epidemic Curve: Cumulative COVID-19 deaths, number of days since the 5th death

By country, including the Canadian provinces of Ontario, Alberta, British Columbia and Quebec



↳ Date on which 5th death was reported:

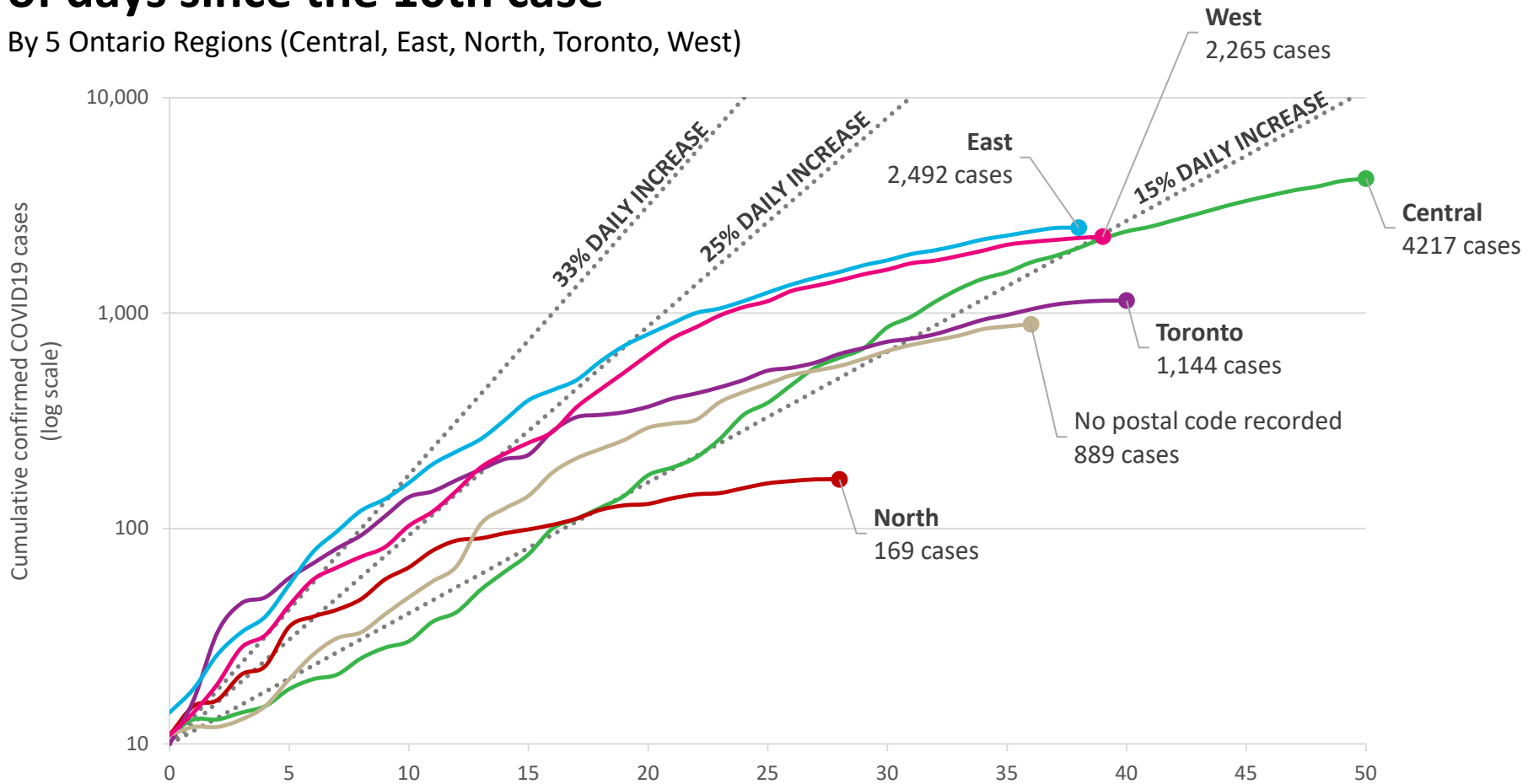
- Canada - March 17
- Ontario - March 22
- British Columbia - March 18
- Quebec - March 25
- Alberta - March 31

Data from: Dong, E., Du, H., & Gardner, L. (2020). An interactive web-based dashboard to track COVID-19 in real time. *The Lancet Infectious Diseases*, as of April 19, 2020.

Data compiled by Johns Hopkins University from the following sources: [WHO](#), [CDC](#), [ECDC](#), [NHC](#), [DXY](#), [1point3acres](#), [Worldometers.info](#), [BNO](#), state and national government health department, and local media reports.

Epidemic Curve: Cumulative confirmed cases, number of days since the 10th case

By 5 Ontario Regions (Central, East, North, Toronto, West)



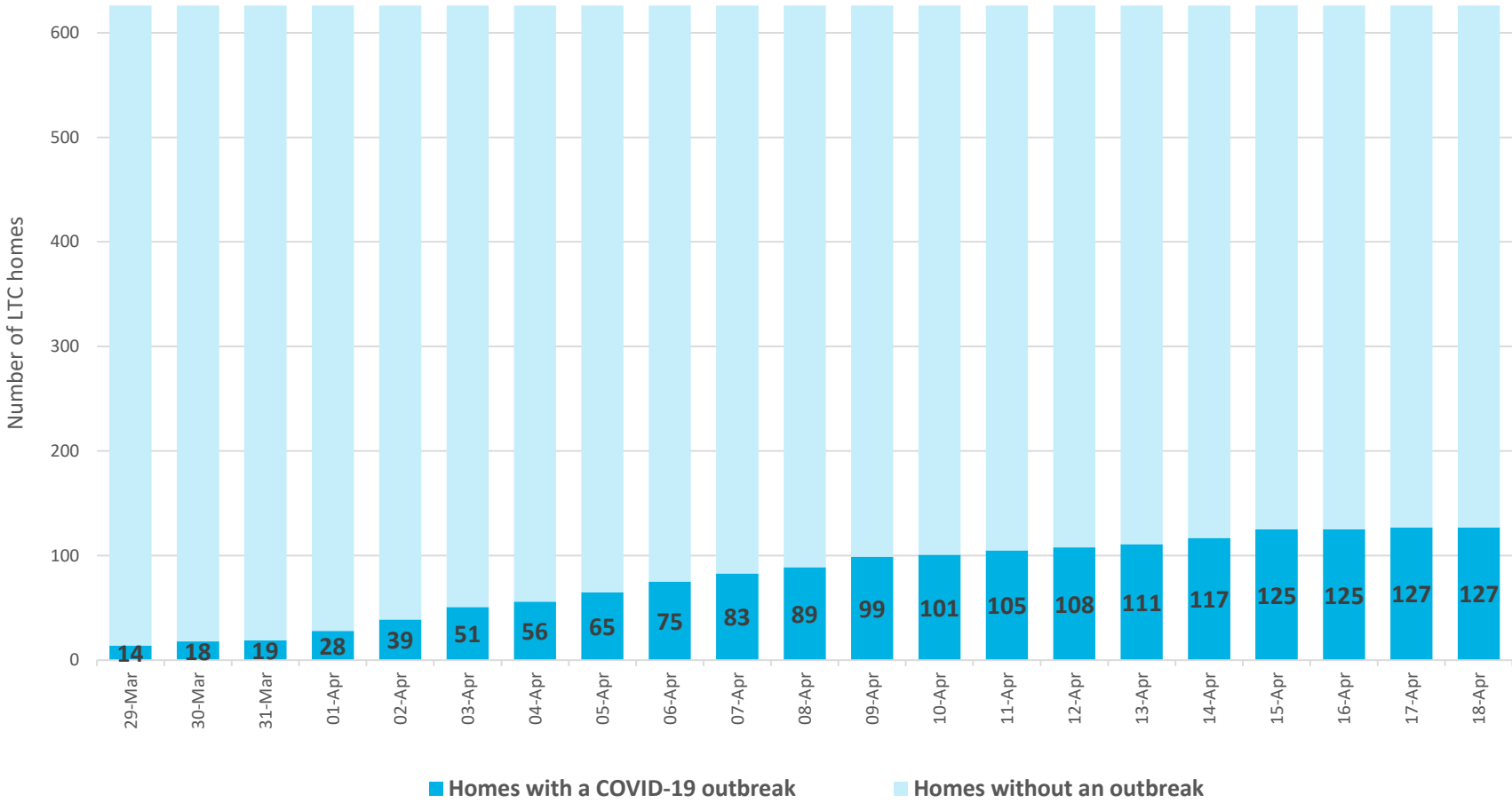
↳ **Date on which 10+ cases reached:**

- Central - February 29
- East - March 12
- North - March 23
- Toronto - March 11
- West - March 11
- Ontario - February 28

Days since cumulative cases surpass 10

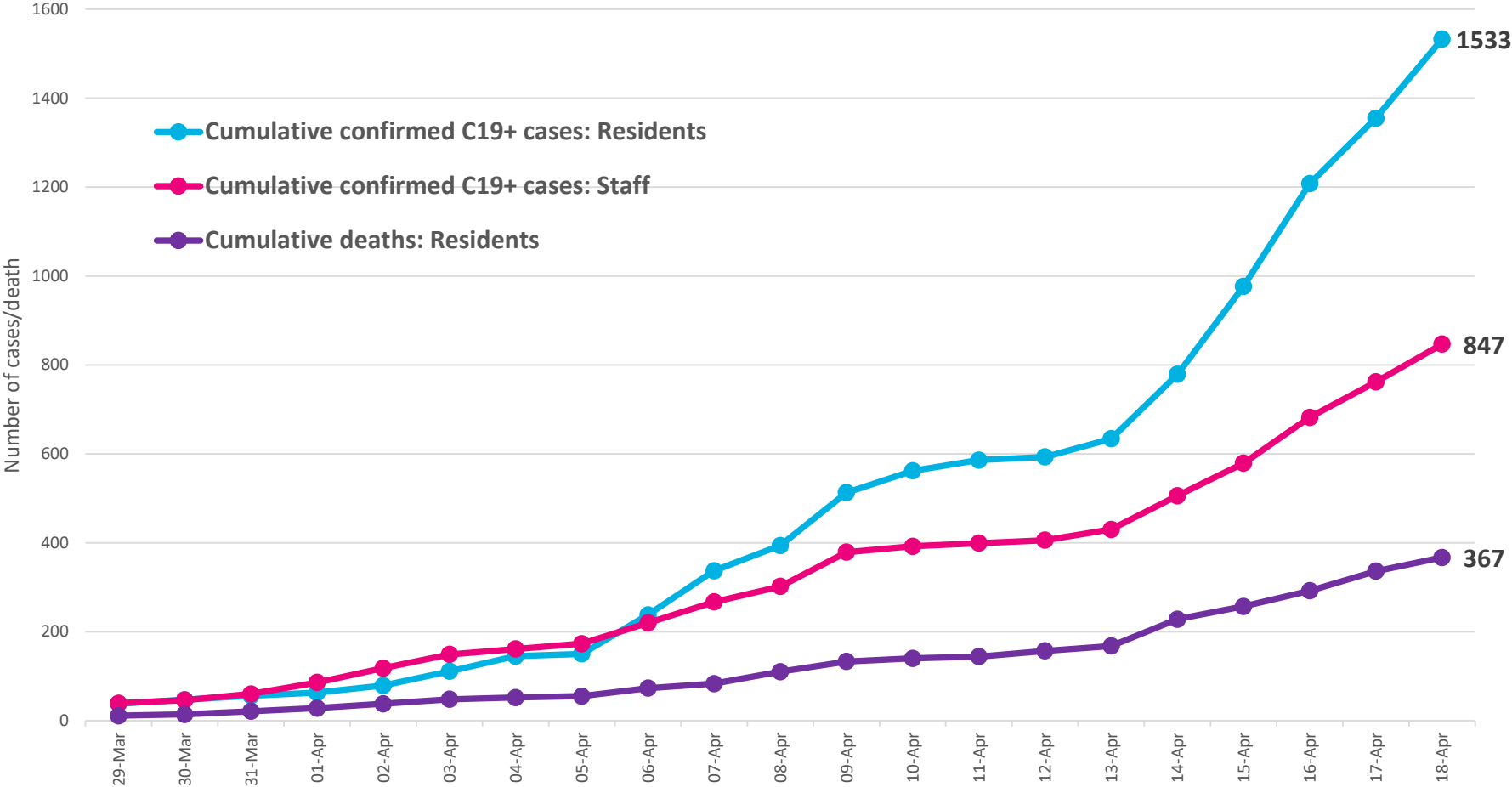
LTC Snapshot:

Cumulative long-term care homes with a COVID-19 outbreak



LTC Snapshot:

Cumulative resident COVID-19 cases, staff COVID-19 cases and resident deaths



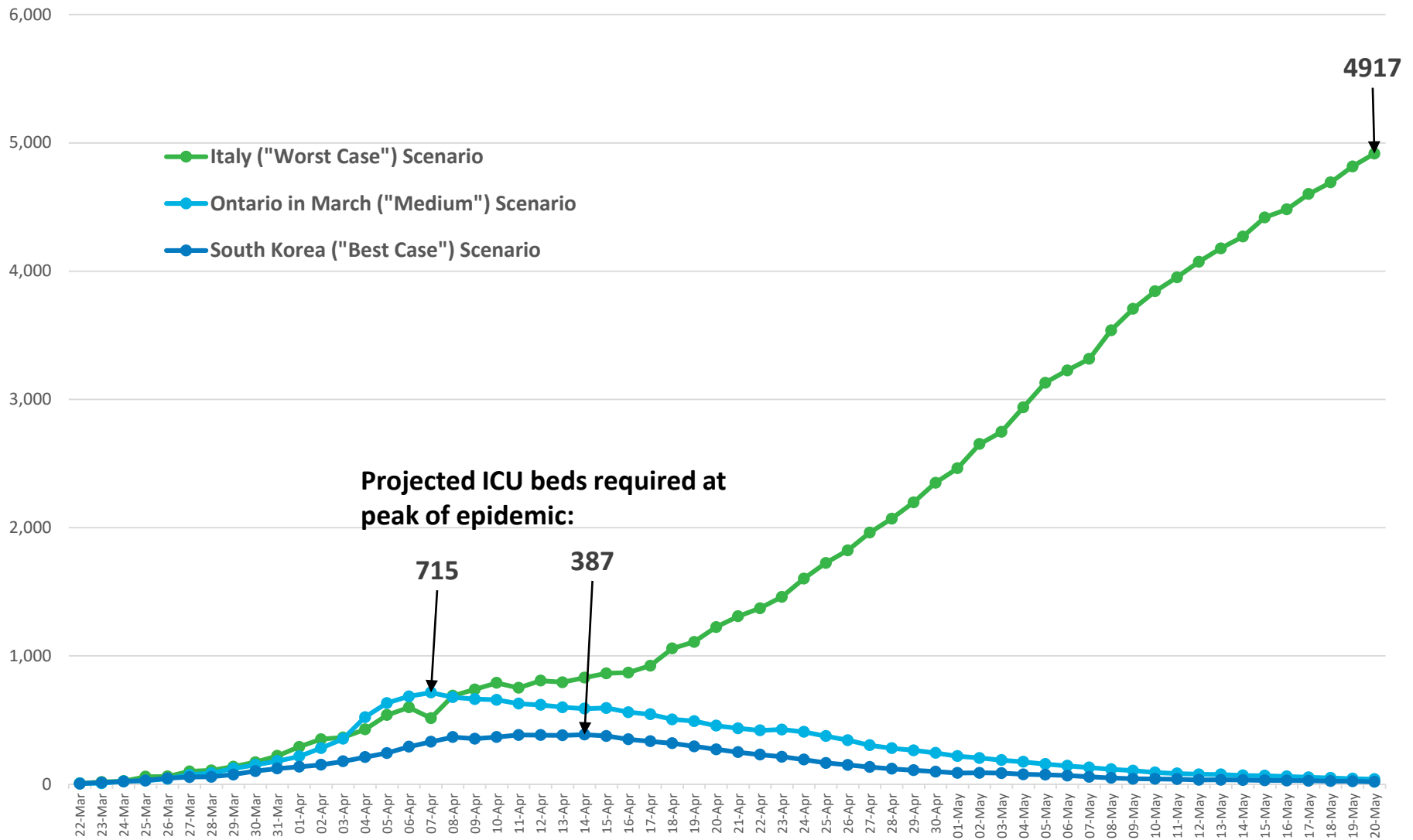


Modelling: Continuing to Inform Ontario's Planning

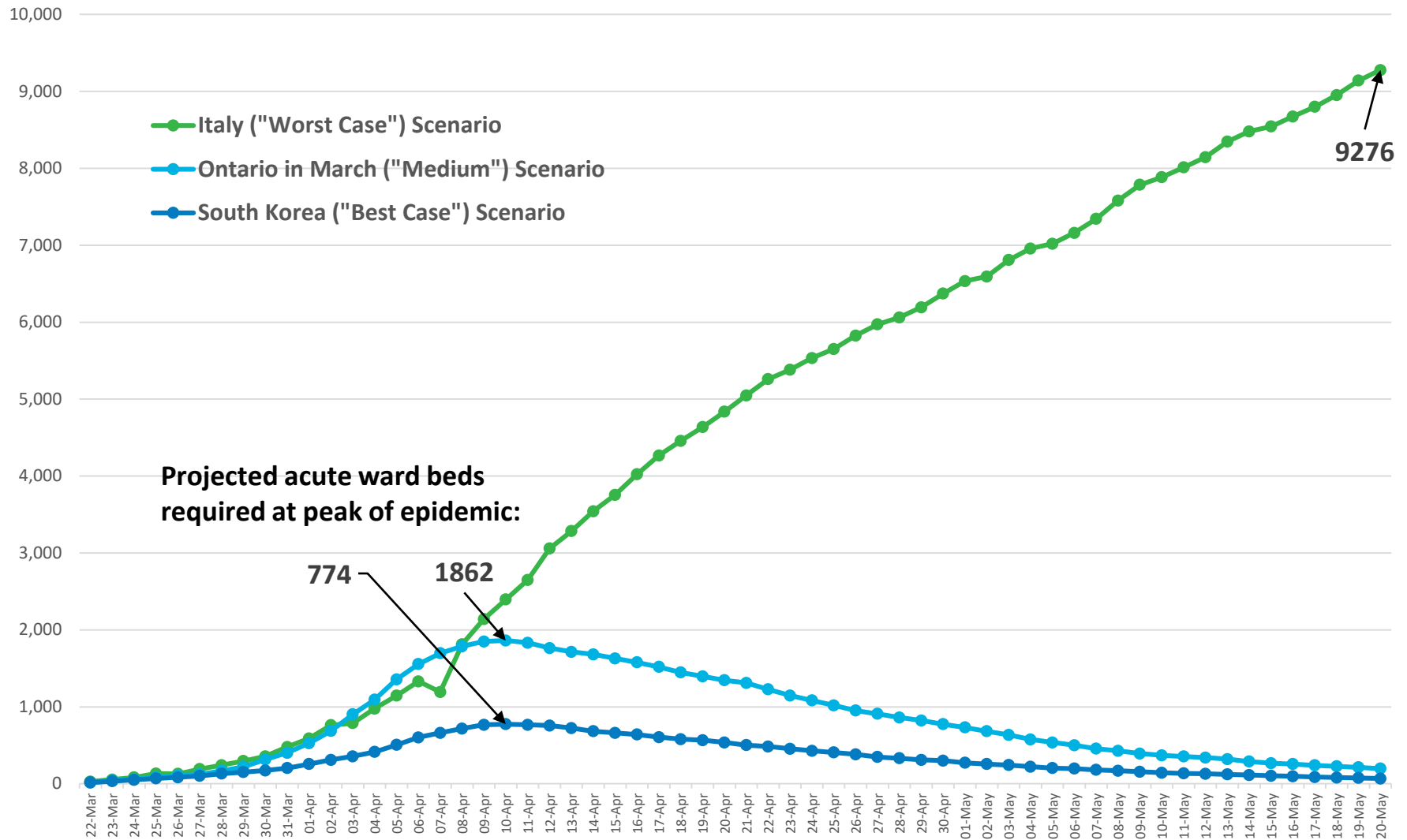
Hospital Demand Modeling Scenarios

- The projections presented here draw from COVID-19 health system impact models developed by a multidisciplinary collaborative of researchers and clinician scientists.
- Three scenarios were modeled:
 - **South Korea (“Best Case”)**: Restrained growth in infected cases slowed early through impact of public health measures.
 - **Ontario in March (“Medium Case”)**: Moderate growth in infected cases slowed later on through impact of public health measures.
 - **Italy (“Worst Case”)**: Moderate then rapid growth in COVID-19 cases that continue to climb at an exponential rate without public health measures.
- Based on recent data, if current measures restricting spread of the disease remain in place, **Ontario appears to be tracking toward the South Korea (“best case”) scenario.**
- The rate of growth in COVID-19 hospitalizations has slowed, while the number of COVID-19 patients in intensive care units has remained relatively constant over the past week.
- These models focus on predicting COVID-19 requirements for hospital intensive care unit and ward beds. They are not designed to predict impacts on community services such as long-term care and retirement homes.
- The recent experience in long-term care demonstrates that the disease multiplies rapidly in congregate settings, emphasizing the need for redoubled efforts to restrict spread of COVID-19.

Projecting COVID-19 Demand for Health Care Resources in Ontario: ICU Beds Required



Projecting COVID-19 Demand for Health Care Resources in Ontario: Acute Ward Beds Required



Projected acute ward beds required at peak of epidemic:

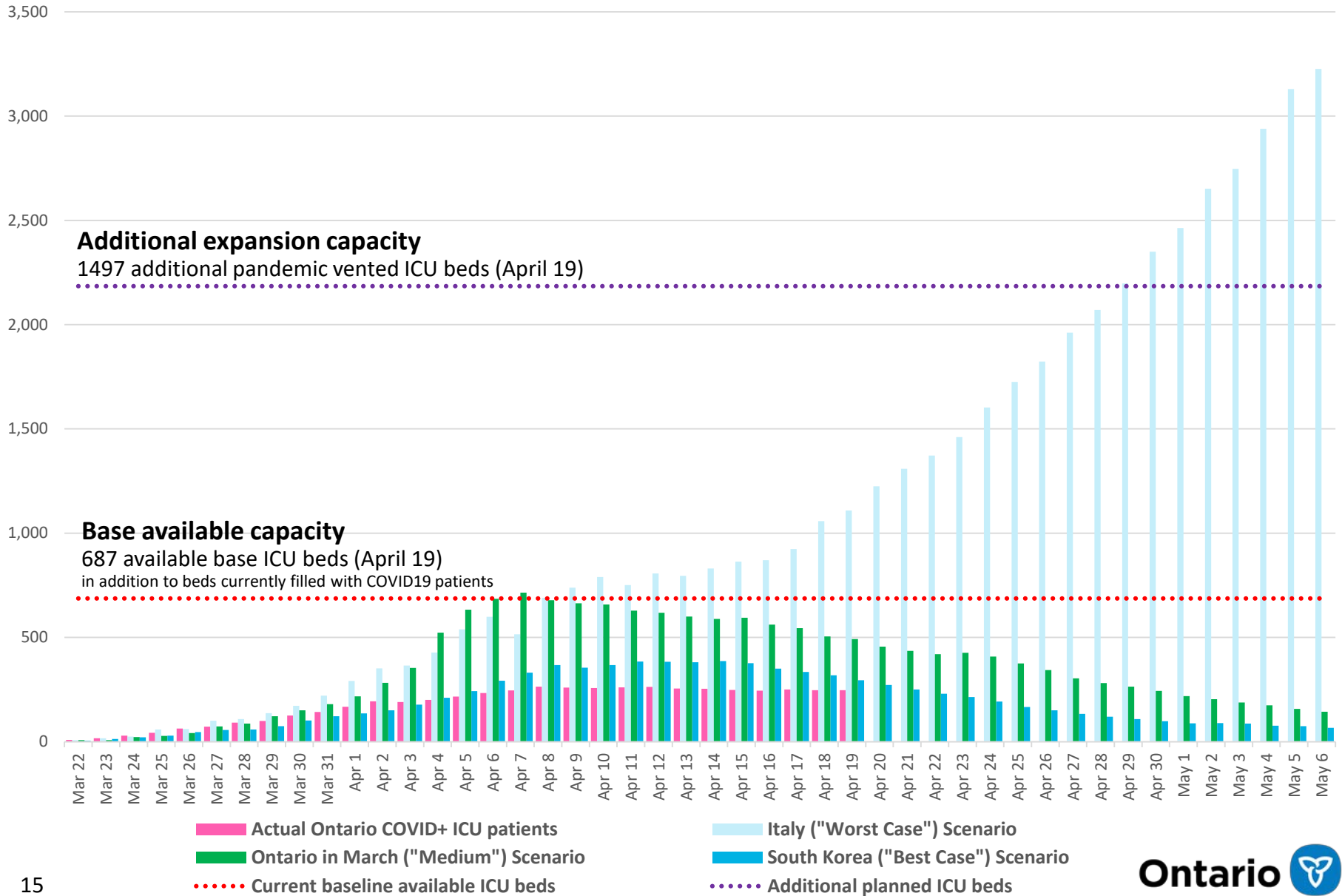
774

1862

9276

How are we doing so far?

COVID-19 patients in Ontario ICU beds each day vs. predicted ICU bed demands in 3 model scenarios



Looking Ahead

Prevention and Disease Management in Long-Term Care Homes

- Ontario is urgently implementing the COVID-19 Action Plan for Protecting Long-Term Care Homes:
 - **Aggressive Testing, Screening, and Surveillance:** Enhancing testing for symptomatic residents and staff and those who have been in contact with persons confirmed to have COVID-19; expanding screening to include more asymptomatic contacts of confirmed cases; and leveraging surveillance tools to enable care providers to move proactively against the disease.
 - **Managing Outbreaks and Spread of the Disease:** Supporting long-term care homes with public health and infection control expertise to contain and prevent outbreaks; providing additional training and support for current staff working in outbreak conditions.
 - **Growing our Heroic Long-Term Care Workforce:** Redeploying staff from hospitals and home and community care to support the long-term care home workforce and respond to outbreaks, alongside intensive on-going recruitment initiatives.
- Issued an emergency order directing long-term care employers to ensure their employees, including registered nurses, registered practical nurses, personal support workers, kitchen and cleaning staff only work in one long-term care home.
- Enhanced guidance on personal protective equipment requiring staff to always wear appropriate protection, supporting by priority distribution to homes.

Continued Adherence to Public Health Measures

- Continued implementation of enhanced public health measures to stop the spread of COVID-19 and flatten the curve:
 - Extended the declaration of emergency to at least May 12 to support existing public health measures in place, including restricting social gatherings to five people and the closure of all non-essential workplaces, outdoor recreational amenities, public places and bars and restaurants, except those that provide takeout and delivery.
 - Implementing the next phase of the testing strategy to expand testing to include several priority groups to identify and contain new cases, especially among vulnerable populations.
 - Extending actions taken in long-term care homes to retirement homes and other congregate settings, including group homes and homeless shelters, to further protect vulnerable populations.
- Public should continue to stay home and maintain physical distancing to ensure the province continues to stop the spread of COVID-19 and flatten the curve. These actions are making a difference and people need to stay the course and stay strong in order to save lives.