COVID-19 MODELLING

Update

April 8, 2020

Introduction

- COVID-19 continues to spread rapidly across the globe.
- To date, Alberta has fared better than most.
- Albertans need to know what they can expect over the next 6 to 8 weeks:
    - How is COVID-19 expected to spread in Alberta?
    - What actions should Albertans take?
    - What is the Alberta plan?

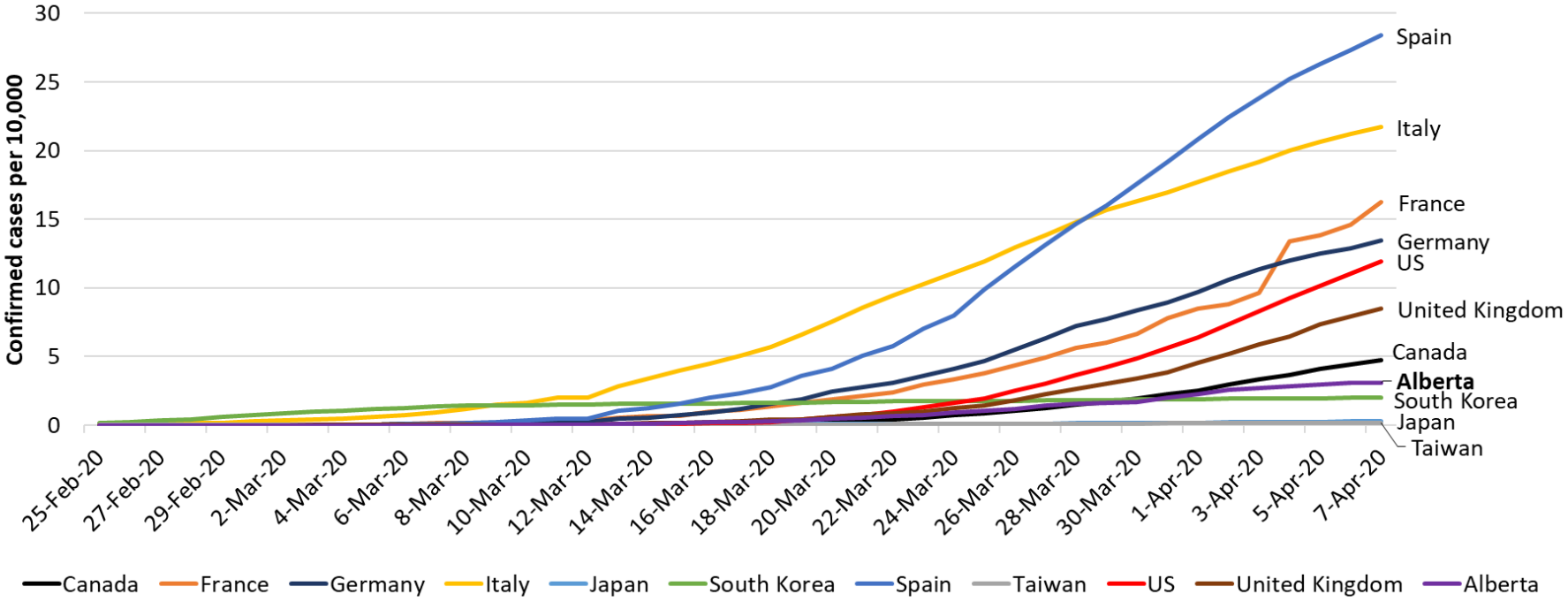
Alberta

Introduction

- Alberta continuously monitors the spread of COVID-19 – locally, across Canada and globally.
- Public health interventions that slow the spread have been developed based on what has worked elsewhere.
- Evidence gathered from other outbreaks informs the modelling of COVID scenarios in Alberta.
- The scenarios help the health system and Albertans plan for the potential impact of the pandemic and its peak.

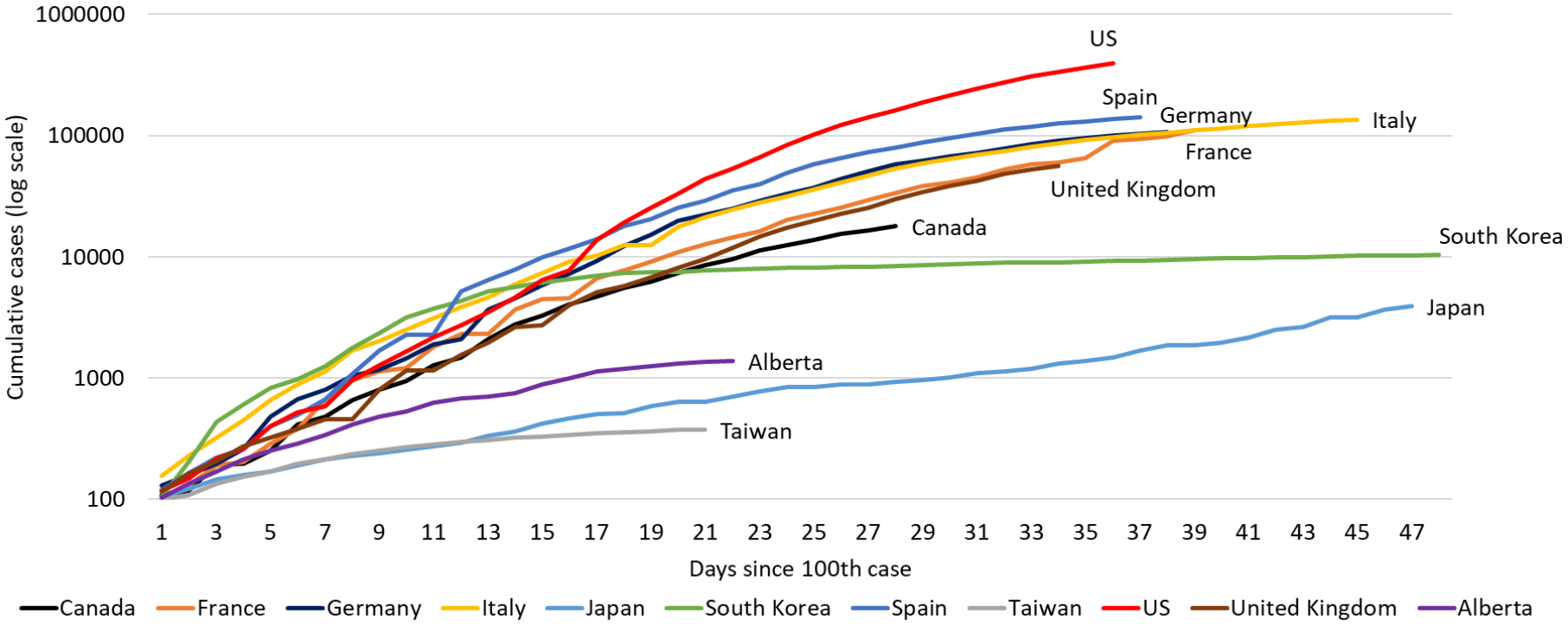
Current State

Comparison of Alberta to countries



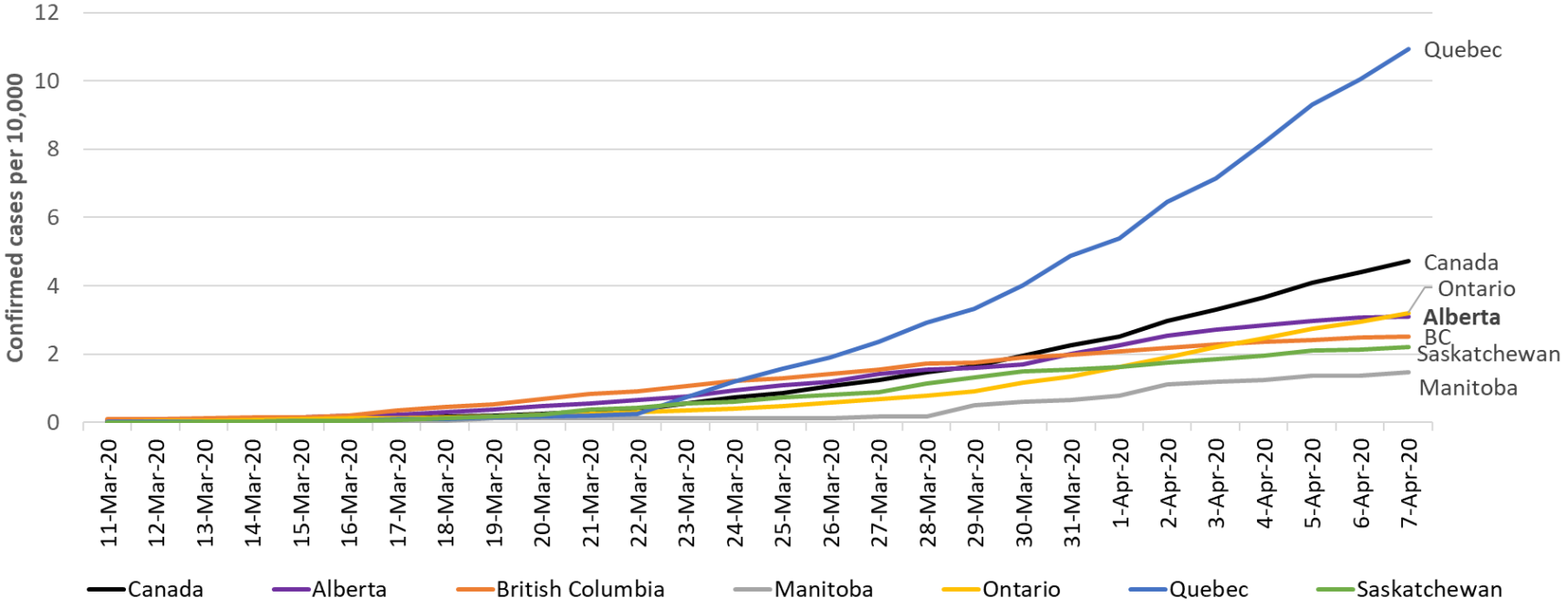
Data as of April 7, 2020, respective country websites. When not available Johns Hopkins CSSE github repository

Comparison of Alberta to countries (log scale)



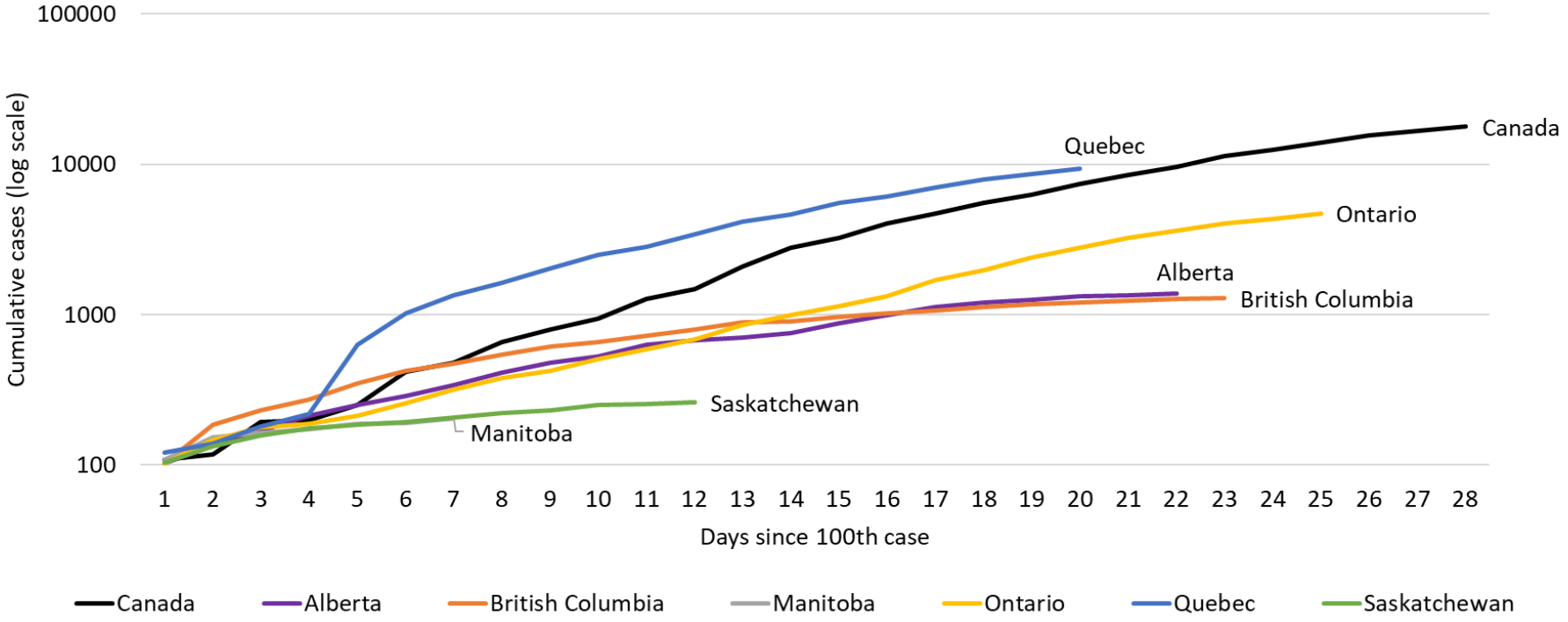
Data as of April 7, 2020, respective country websites. When not available Johns Hopkins CSSE github repository

Comparison of Alberta to other provinces



Data as of April 7, 2020, source PHAC: https://health-infobase.canada.ca/covid-19/

Comparison of Alberta to other provinces (log scale)



Data as of April 7, 2020, PHAC: source https://health-infobase.canada.ca/covid-19/

Confirmed cases, hospitalization, ICU, and deaths for Canada's 6 largest provinces

	Confirmed cases		Hospitalization		ICU		Deaths	
	# Cases	Per 10,000	# Cases	Per 10,000	# Cases	Per 10,000	# Deaths	Per 10,000
AB	1348	3.05	90	0.2	31	0.07	24	0.05
QC	9340	11.00	902	1.06	286	0.34	121	0.14
ON	4726	3.24	614	0.45	216	0.15	132	0.09
BC	1291	2.58	290	0.57	72	0.14	39	0.08
SK	260	2.21	4	0.03	2	0.02	3	0.03
MB	217	1.58	11	0.08	7	0.05	2	0.01

Data as of April 7, 2020, source PHAC :Epi summary, health-infobase.canada.ca and provincial dashboards
* Reporting of ICU, hospitalizations and deaths has a lag in Ontario, which would understate severity

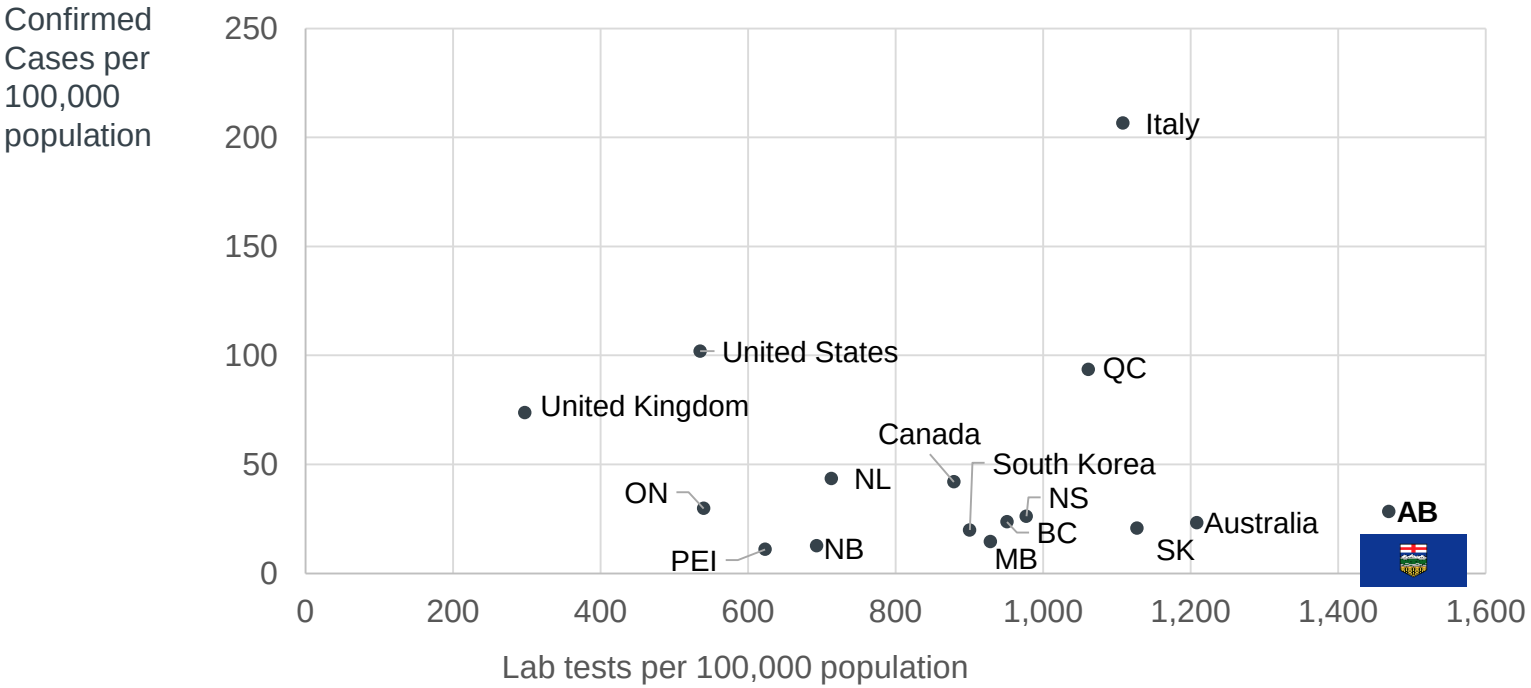
Alberta

Cases and deaths by age group in Alberta

Age Group	Cases	Death	Case Fatality Ratio
19 and under	149	0	-
20-39	446	2	0.45%
40-59	446	1	0.22%
60-79	256	4	1.56%
80+	76	19	25.0%
Total	1,373	26	1.89%

Data as of April 6, 2020, source https://www.alberta.ca/covid-19-alberta-data

Comparison of testing rates across jurisdictions



Data as of April 6, 2020, source https://ourworldindata.org/covid-testing

Modelling

Modelling

- Many jurisdictions use data from other countries, like China or Italy, to model the spread of COVID-19.
- Due to its extensive testing and surveillance program, Alberta case data is used to develop more accurate model scenarios.
- The modelling is updated as new data becomes available.
- Alberta has modelled two core scenarios – Probable and Elevated.

Scenarios

Probable Scenario

- For every case, 1-2 more people are infected.
- This scenario is comparable to the more moderate growth seen in the UK and countries that have had some success in “containing” growth.
- Given our early and aggressive interventions and contact tracing to limit spread, this is expected to be the most likely scenario for Alberta.

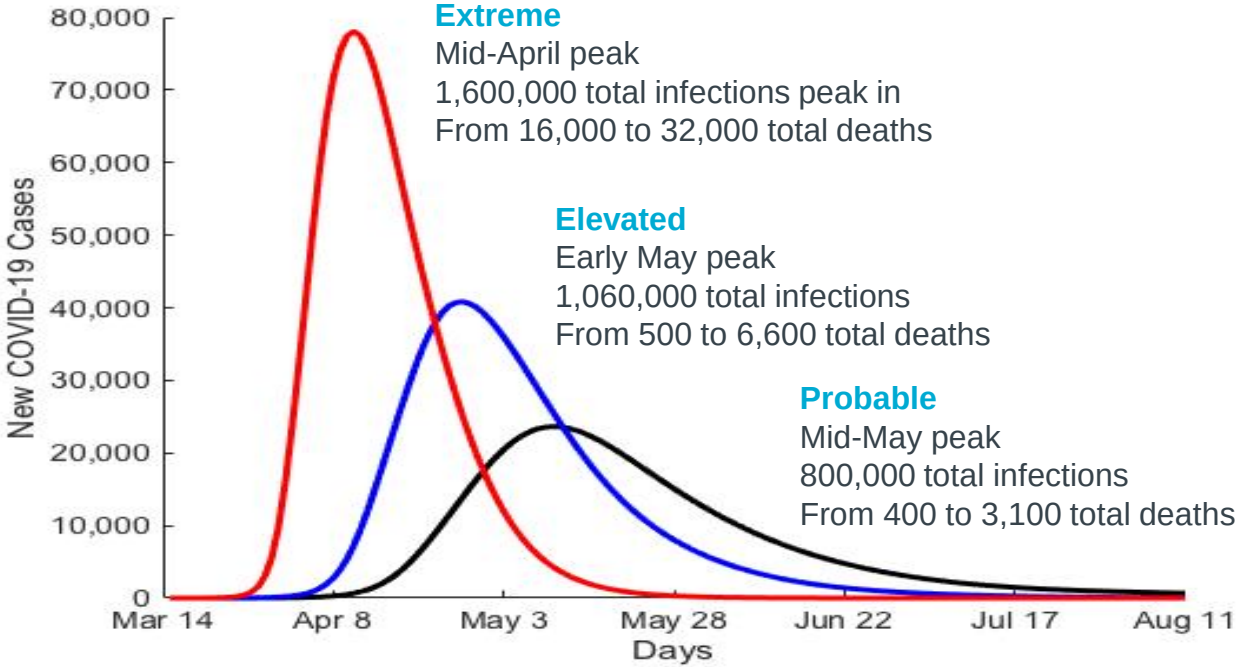
Elevated Scenario

- For every case, 2 people are infected.
- This is comparable to the more rapid growth initially seen in Hubei.
- Planning for this scenario is prudent and responsible given the catastrophic impacts should the health system become overwhelmed.

Extreme Scenario

- For every case, 3 more people are infected.
- This scenario assumes limited and late interventions so that COVID-19 rapidly spreads through the population.
- This scenario shows what would have happened if Alberta did not undertake early and aggressive interventions and contact tracing to limit spread.

Illustrative comparison of the scenarios

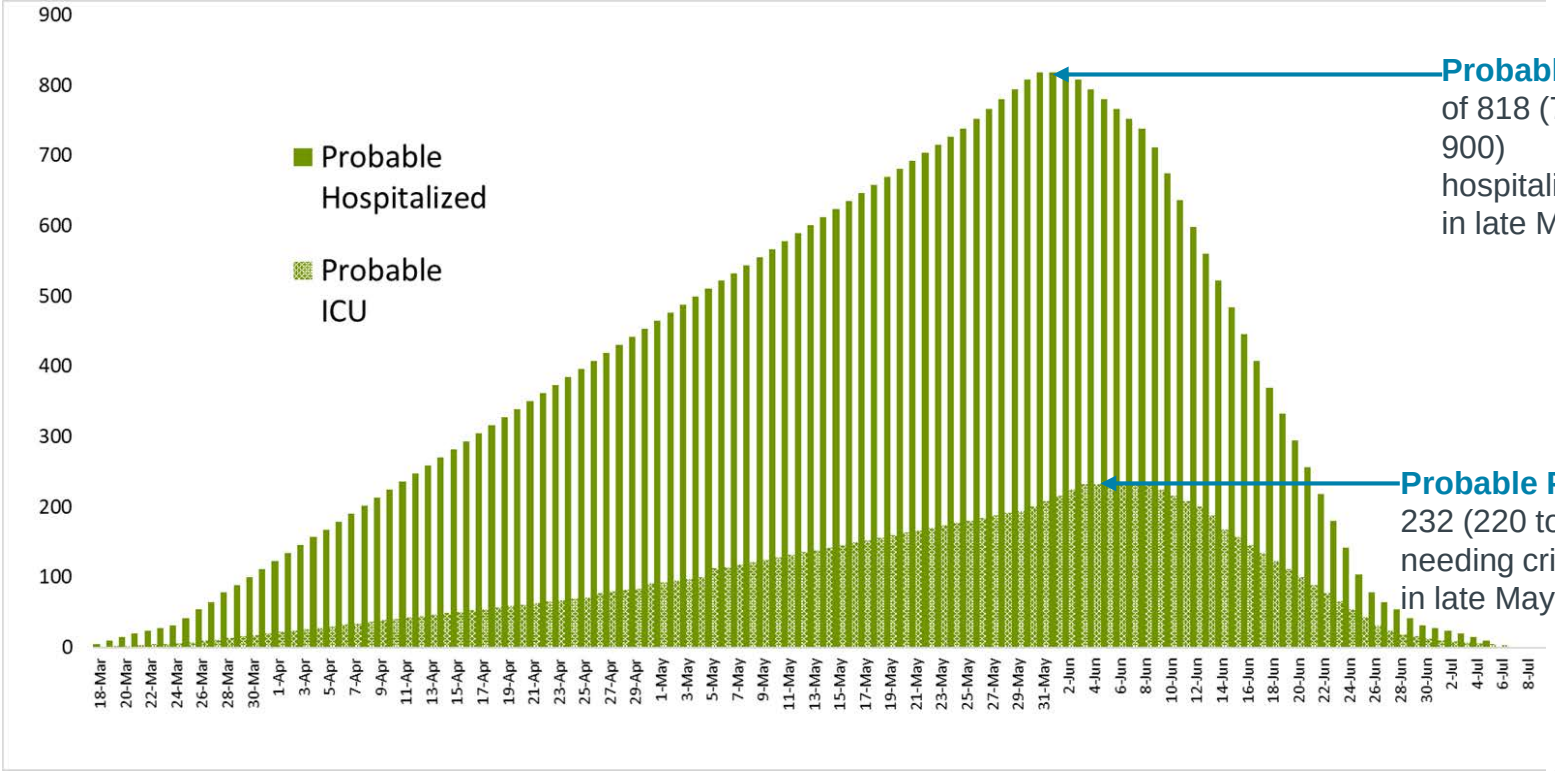


Extreme
Mid-April peak
1,600,000 total infections peak in
From 16,000 to 32,000 total deaths

Elevated
Early May peak
1,060,000 total infections
From 500 to 6,600 total deaths

Probable
Mid-May peak
800,000 total infections
From 400 to 3,100 total deaths

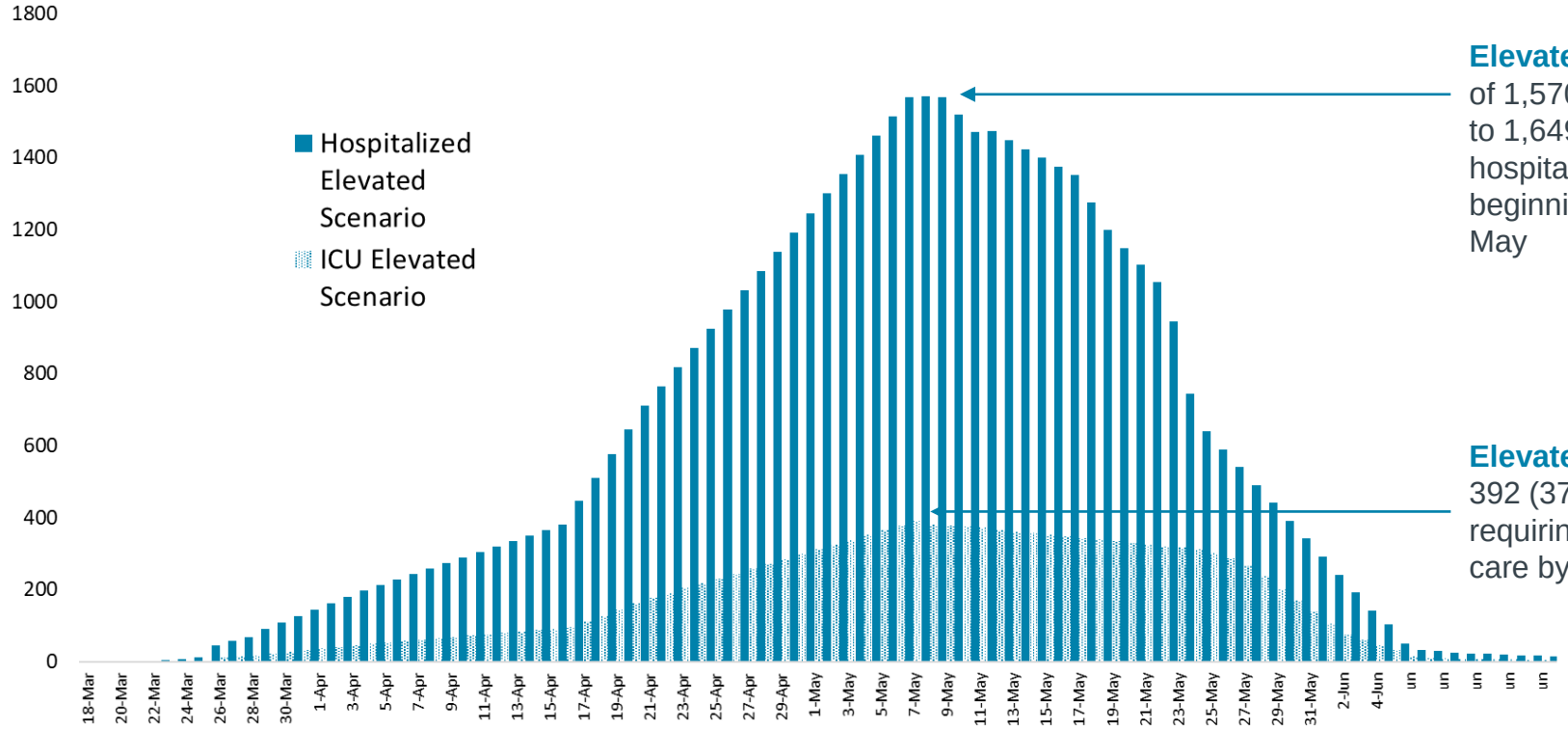
Hospitalizations and ICU - Probable



Probable Peak of 818 (736 to 900) hospitalizations in late May

Probable Peak of 232 (220 to 244) needing critical care in late May-June

Hospitalizations and ICU – Elevated Scenario



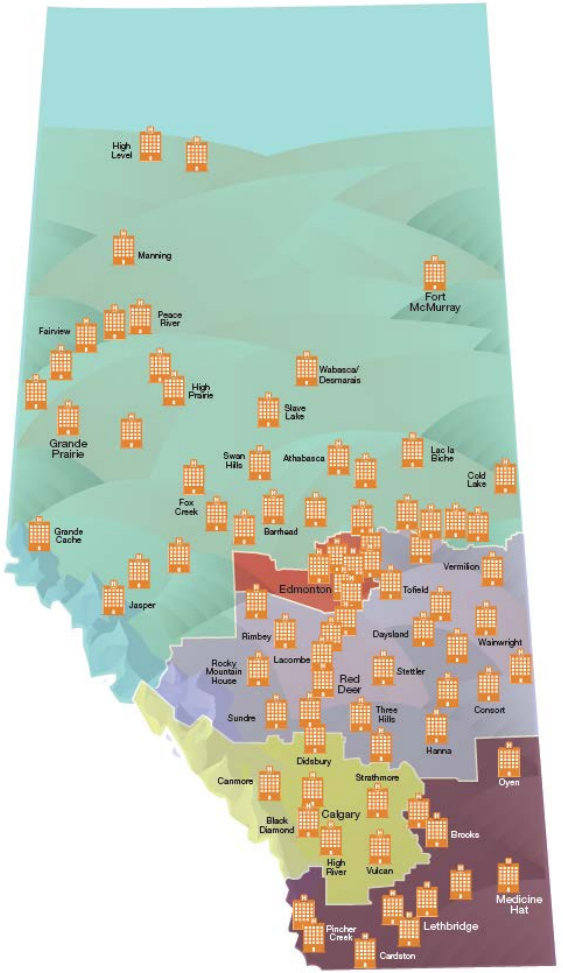
Elevated Peak of 1,570 (1,491 to 1,649) hospitalizations beginning of May

Elevated Peak of 392 (372 to 412) requiring critical care by early-May

Health System Capacity

Existing Capacity

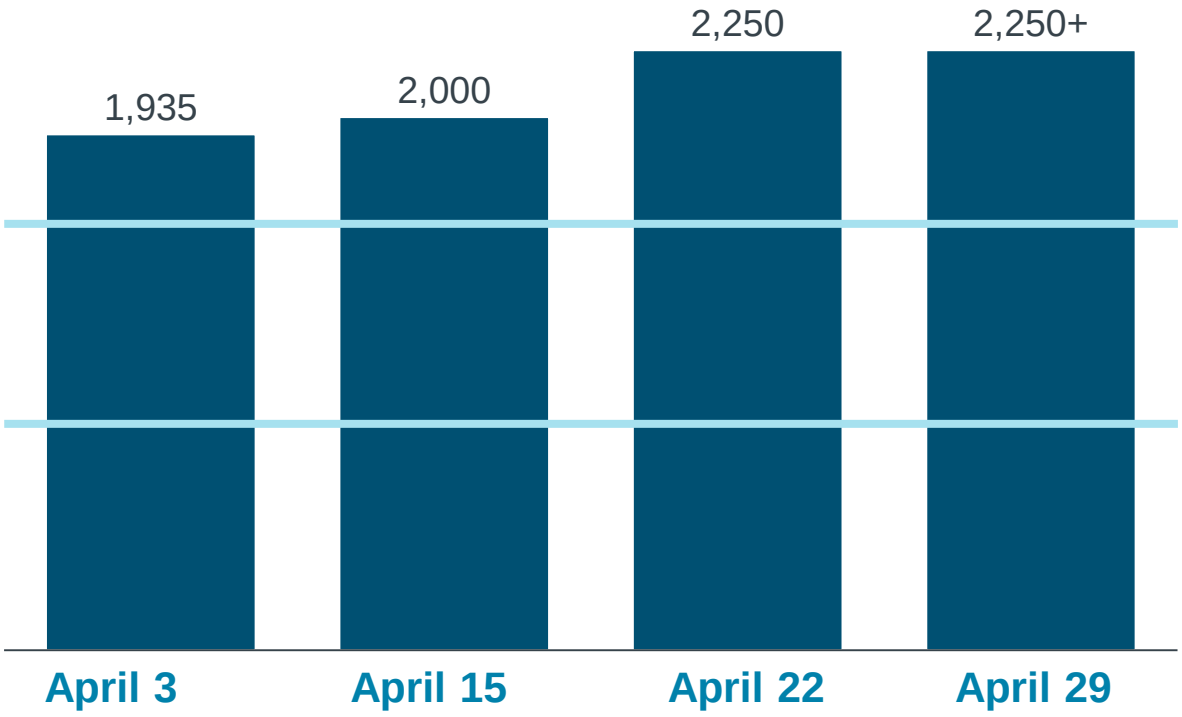
	North	Edm.	Central	Cgy.	South	Total
Hospitals	33	12	30	13	12	100
Hospital Beds	929	3,020	1,098	2,791	645	8,483
ICU beds	12	150	12	97	24	295
Ventilators	33	205	27	213	31	509



Building Acute Care Capacity

- **AHS plans to have 2,250 COVID-19 designated acute care beds by the end of April:**
  - As of April 3, 2020, 1,935 are available for COVID patients; and
  - New COVID dedicated spaces are being brought online.
- **COVID-19 acute care capacity is being achieved by:**
  - Postponing scheduled surgeries, tests and procedures while ensuring urgent, emergent and oncology surgeries continue;
  - Transferring patients who no longer require acute care to a community setting;
  - Increasing occupancy while maintaining physical distance between patients; and
  - Opening overcapacity, and new and decommissioned spaces.

Building acute care capacity



Peak of 1,570 (1,491 to 1,649) hospitalizations in **elevated** scenario, which is projected start of May

Peak of 818 (736 to 900) hospitalizations in **probable** scenario, which is projected late May

Building ICU Capacity

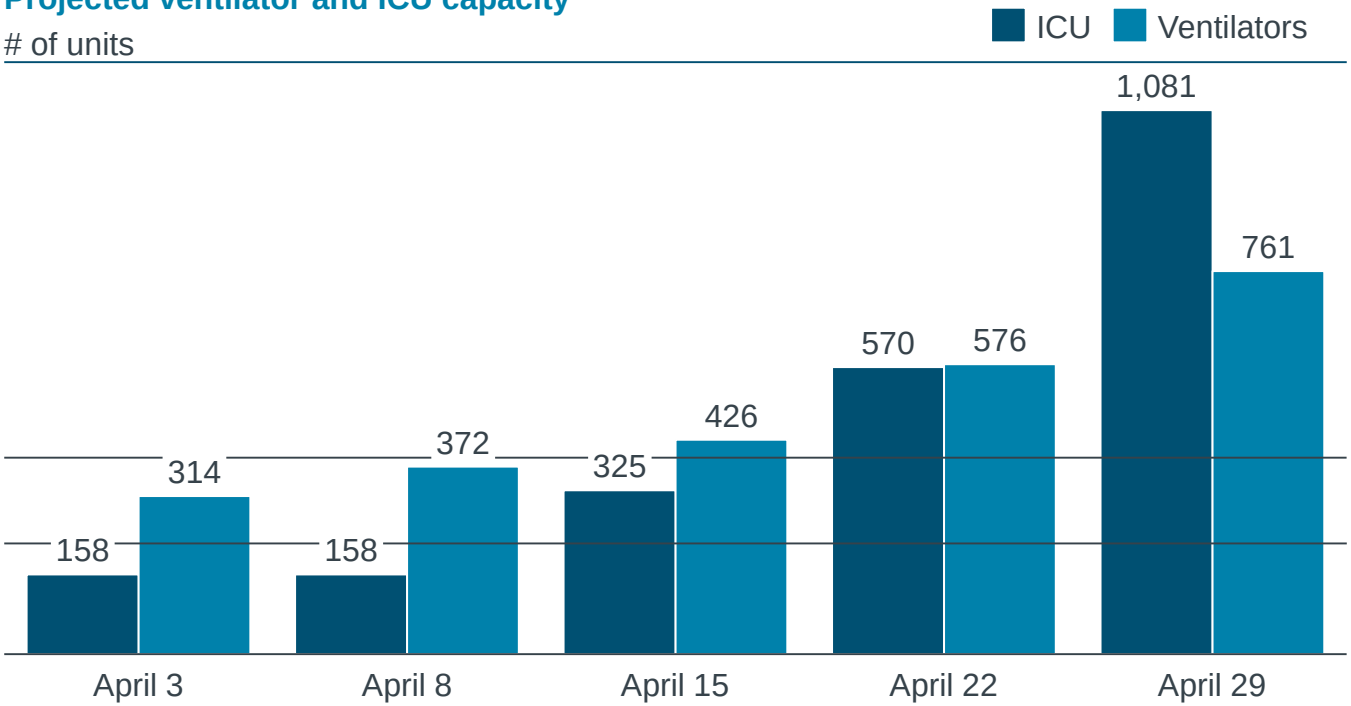
- **AHS plans to be able to increase ICU capacity by 1081 beds for COVID-19 patients by the end of April, if necessary.**
- **ICU capacity will be increased by:**
  - Adding ICU beds to existing ICU rooms;
  - Converting operating rooms and recovery rooms to ICU capacity;
  - Converting procedure and treatment rooms to ICU capacity; and
  - New models of care (e.g. more aggressive use of step down care).

Building Ventilator Capacity

- **AHS plans to have 761 ventilators available by the end of April for COVID-19 patients, if necessary, to respond to severe a scenario.**
- **314 ventilators are currently dedicated to COVID-19 patients and the capacity will be increased by:**
  - Purchased ventilators on order (35 that have arrived and another 30 in May);
  - Ventilators from NAIT and SAIT Respiratory Therapy program (40), STARS (6) and AADL Respiratory Outreach Program (25);
  - Repurposed from Chartered Surgical Facilities (30);
  - Alternative devices capable of mechanical ventilation including transport, anaesthetic and pediatric devices (305); and
  - Ventilators from Public Health Agency of Canada (6).

Building ICU & Ventilator Capacity

Projected ventilator and ICU capacity



Peak of 392 (372 to 412) needing critical care in **elevated** scenario, which is projected early May

Peak of 232 (220 to 244) needing critical care in **probable** scenario , which is projected May-June

Note: assumes that 195 of existing 295 ICU with ventilators are available to non-COVID cases

Workforce

- **Preparing for COVID-19 is about more than beds and equipment – it is about health care providers.**
- **To ensure Alberta has the highly skilled staff to respond to the pandemic the following is being developed:**
  - Accelerated training for ICU nurses;
  - New models of care to expand the reach of existing ICU nurses;
  - Working with the faculties of nursing to complete senior practicums to enable the nurses to enter the workforce;
  - Contacting former RNs with ICU experience and other recently retired staff; and
  - Redeployment of anesthesiologists, other physicians, other nurses, respiratory therapists, other allied health professionals and other staff with appropriate skills to work in a critical care environment.

Personal Protective Equipment (PPE)

	Forecast days of supplies inventory at end of April		Forecast days of supplies inventory at end of June	
Category of critical PPE	**Probable[1]**	**Elevated[2]**	**Probable[1]**	**Elevated[2]**
Face shields (single use)	12	5	-11	-13
Goggles	50	29	1	-5
Gowns/coveralls	39	19	19	7
Gloves	110	85	79	63
Procedural masks	76	51	26	15
N95 masks	32	7	-4	-12

Increasing PPE Stocks

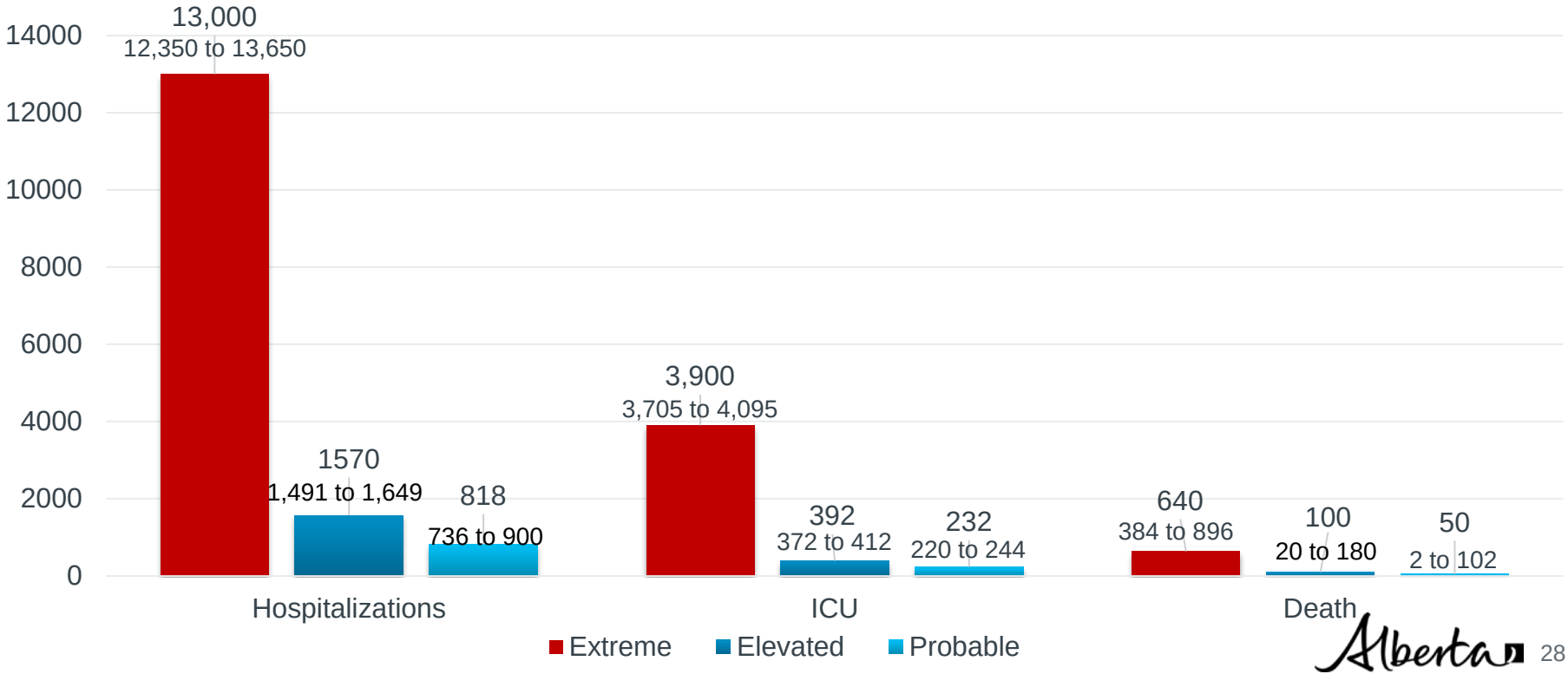
Demand levers

- Tracking PPE inventory and distribution across non-health sites
- Ensuring appropriate PPE according to recommended guidelines
- PPE reuse where safe and appropriate – e.g. sterilizing N95 masks for multiple use

Supply levers

- Increasing number of domestic and global suppliers to meet PPE demands
- Creating and working with local companies to increase production of supplies (e.g. face shields, scrubs, gowns and hand sanitizer)
- Virtual trade show April 8, 2020

Comparison of All Scenarios at the Peak



The Plan

Alberta’s Plan – the next 6 to 8 weeks

- World class testing and surveillance
- Aggressive contact tracing and containment
- Public health Interventions based on evidence of what works
- Supporting Albertans in pushing the peak down
- Supporting fellow Canadians in a time of crisis

What’s next?

- Relaunch Strategy
  - Aggressive system of mass testing, including serological testing
  - Strong tracing and tracking of contacts leveraging technology
  - Strong border screening
  - Use of masks