

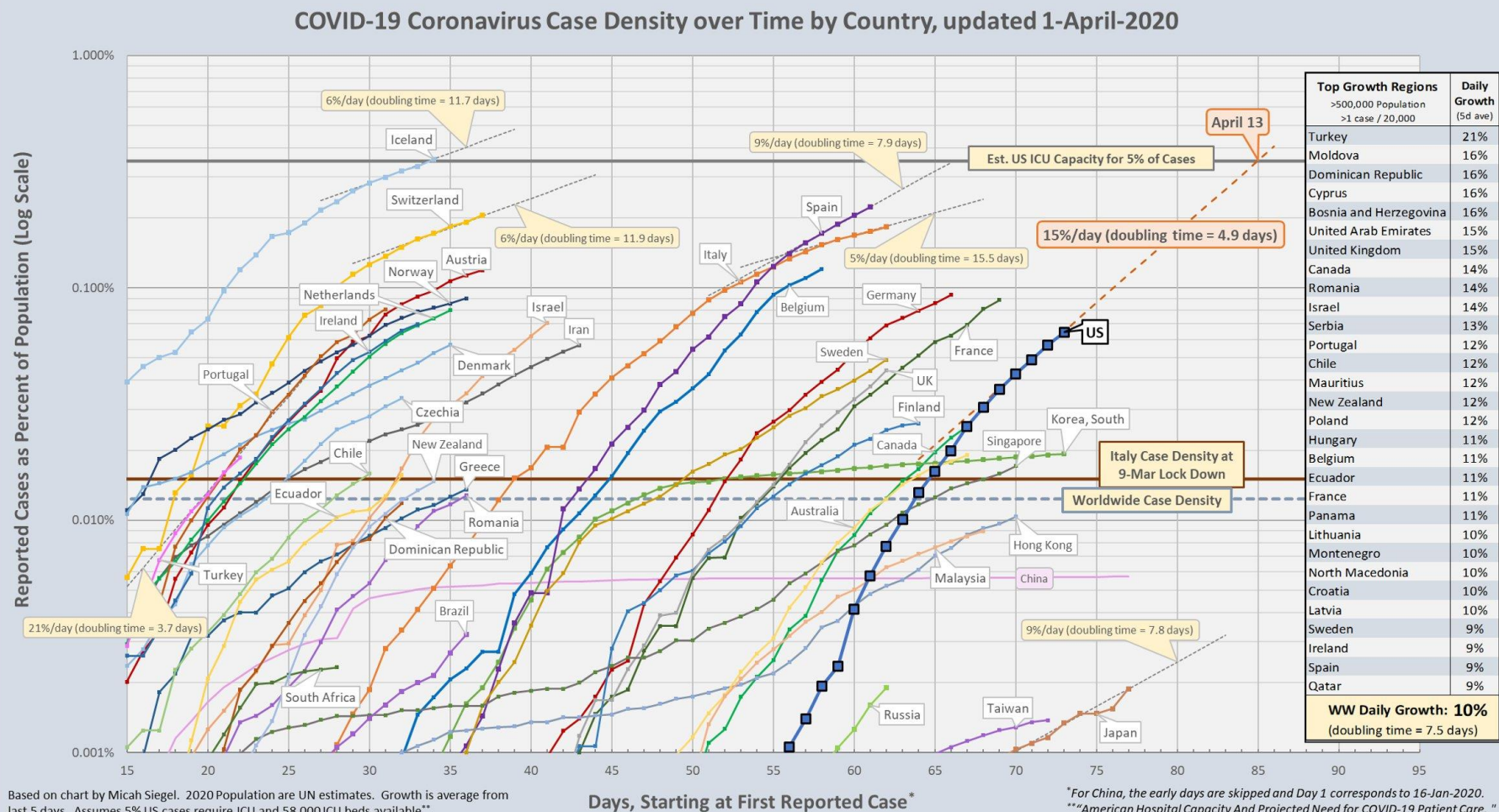
COVID-19 MODELING

April 2, 2020

Overview

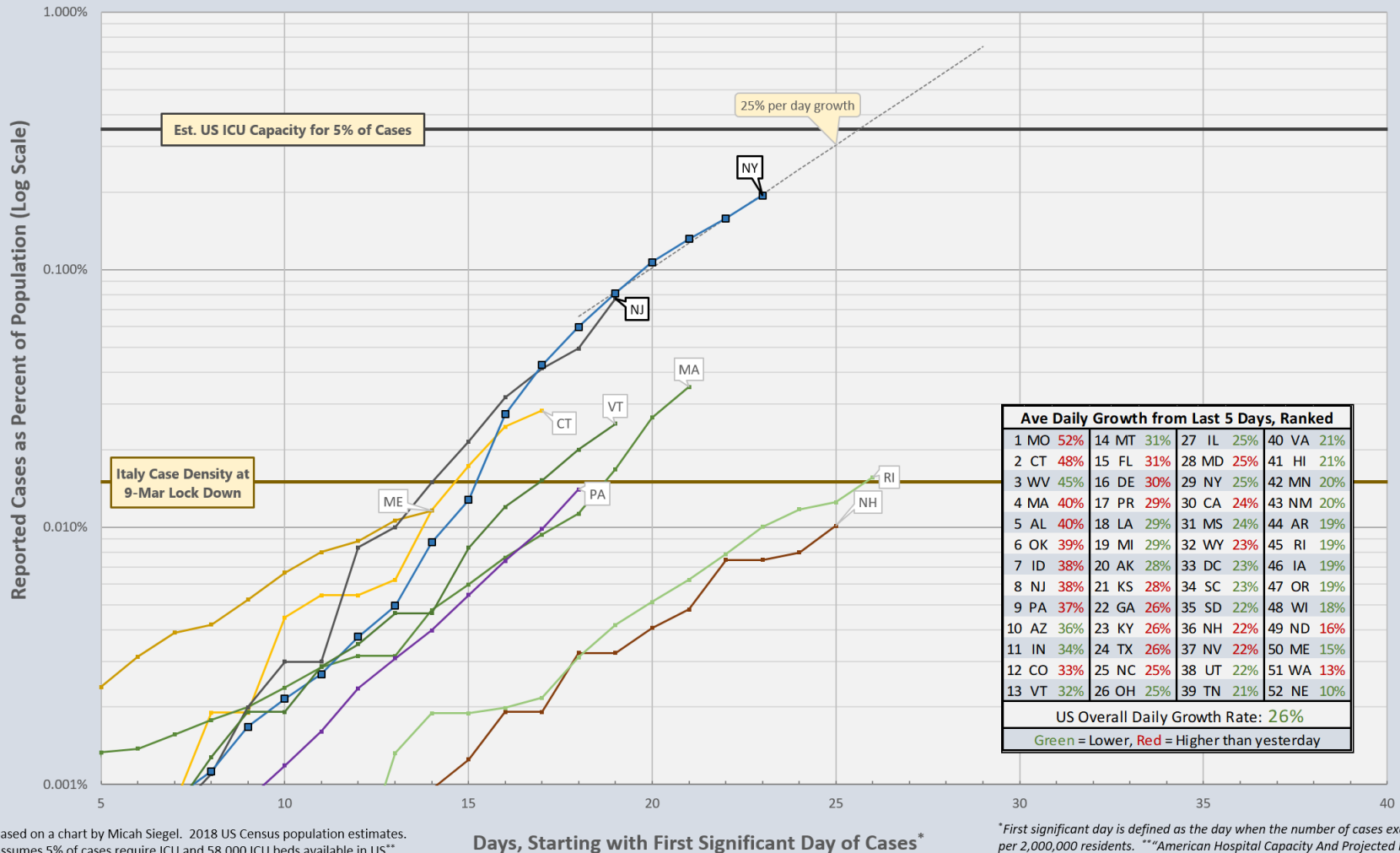
- **Goal:** Develop multiple forecasting perspectives
 - Oliver Wyman – Helen Leis
 - Columbia University – Professor Jeffrey Shaman, Ph.D.
 - Northeastern University – Professor Alessandro Vespignani, Ph.D.
- **Forecasting is imprecise:**
 - Focus on the near term: Forecasting is much less predictable the further out you model
 - Focus on ranges rather than specifics: Forecasts are represented as a range of possible outcomes (i.e., likely, best & worst)
 - Consistent refinement: Continually updating with new data and new assumptions
 - Appropriate Perspective: Ultimately forecasts are developed for planning purposes and are not representative of definitive outcomes
- **Ultimate Purpose of Forecasting: Medical Surge Planning**
 - Tracking the available staffed hospital beds
 - Tracking the available ICU beds
 - Tracking the available ventilators
 - Tracking the supply of PPE

Comparison of Growth by Country



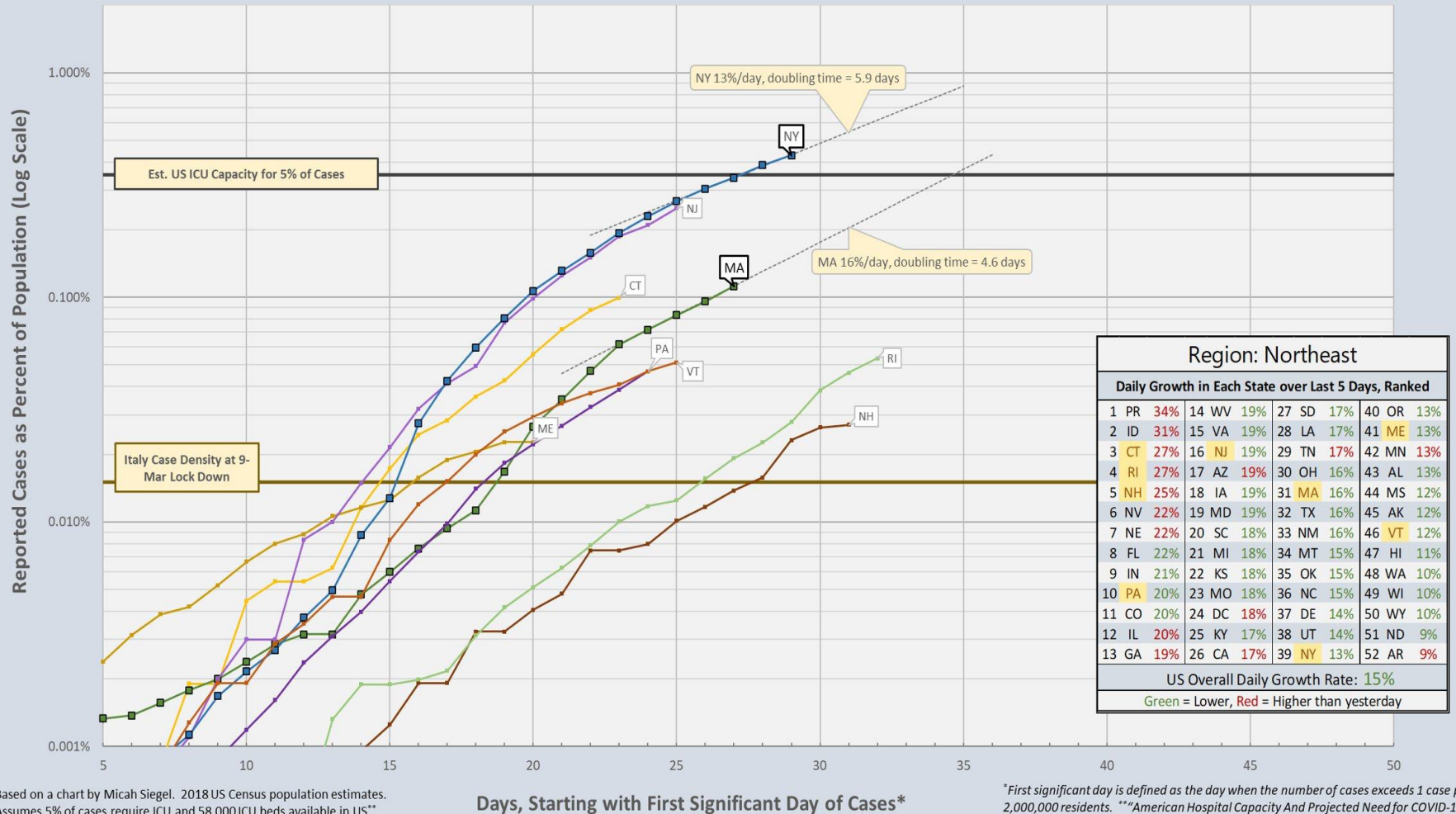
VT's Growth Rate Compared to Northeast States

COVID-19 Coronavirus US Case Density over Time by State, updated 26-Mar-2020



VT's Growth Rate Compared to Northeast States

COVID-19 Coronavirus US Case Density over Time by State, updated 1-April-2020

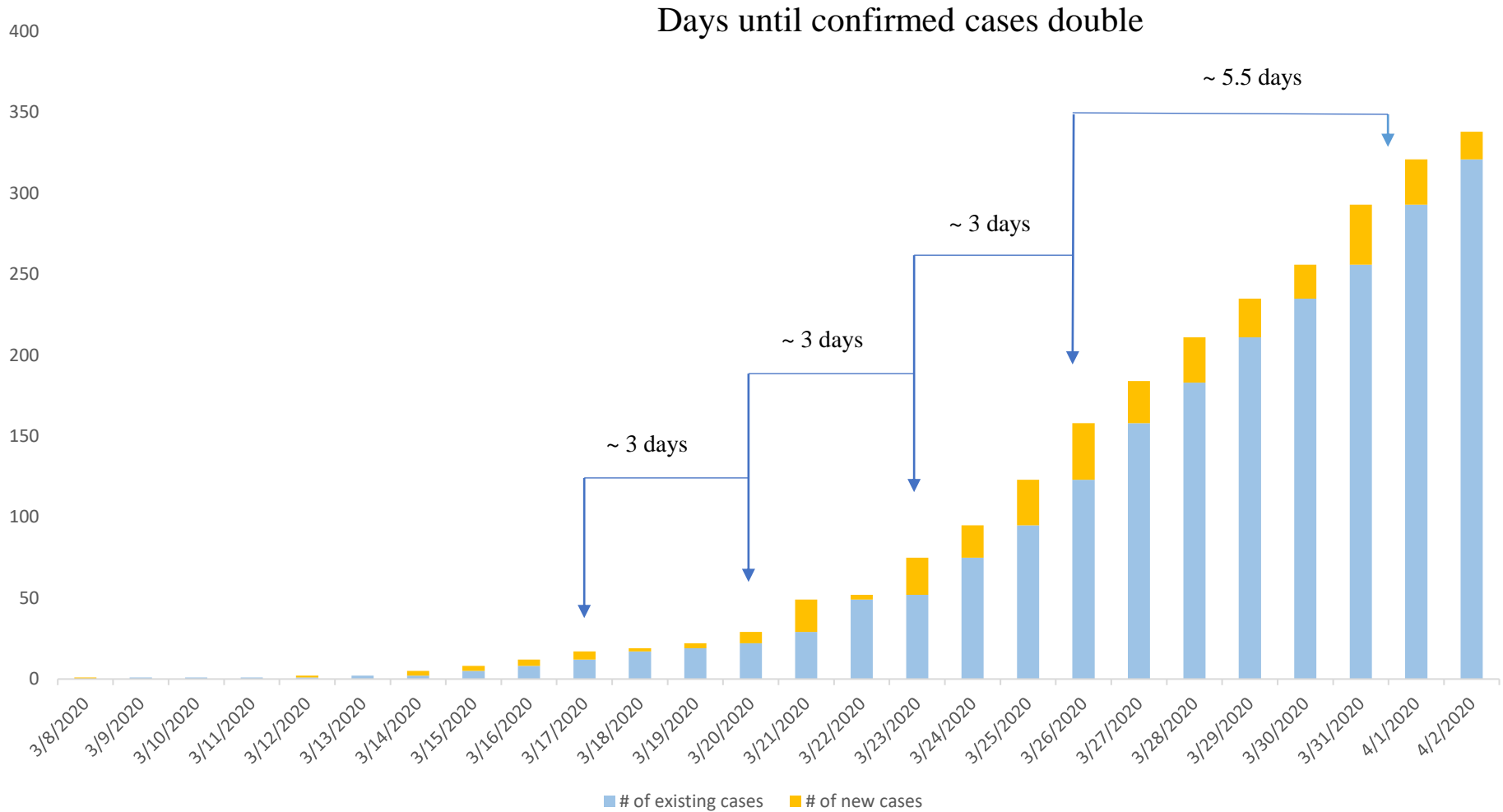


Based on a chart by Micah Siegel. 2018 US Census population estimates. Assumes 5% of cases require ICU and 58,000 ICU beds available in US*. Source Data: JHU CSSE (<https://github.com/CSSEGISandData/COVID-19>)

*First significant day is defined as the day when the number of cases exceeds 1 case per 2,000,000 residents. ***American Hospital Capacity And Projected Need for COVID-19 Patient Care, "Health Affairs Blog, March 17, 2020.DOI: 10.1377/hblog20200317.457910

Vermont's Daily COVID-19 Confirmed Case Growth

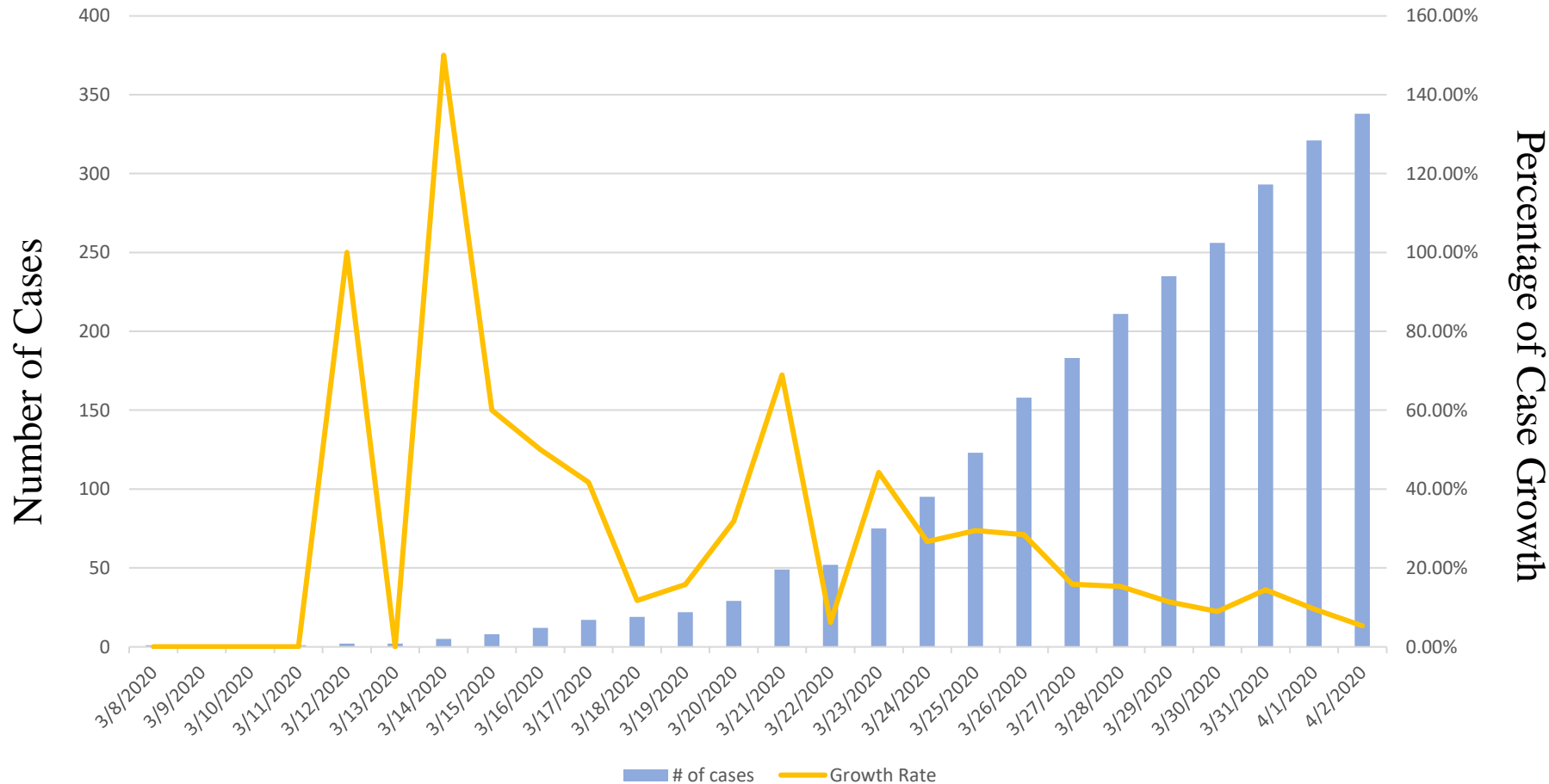
Source: Vermont Department of Health



Vermont's Daily Growth Rate Compared to Total Cases

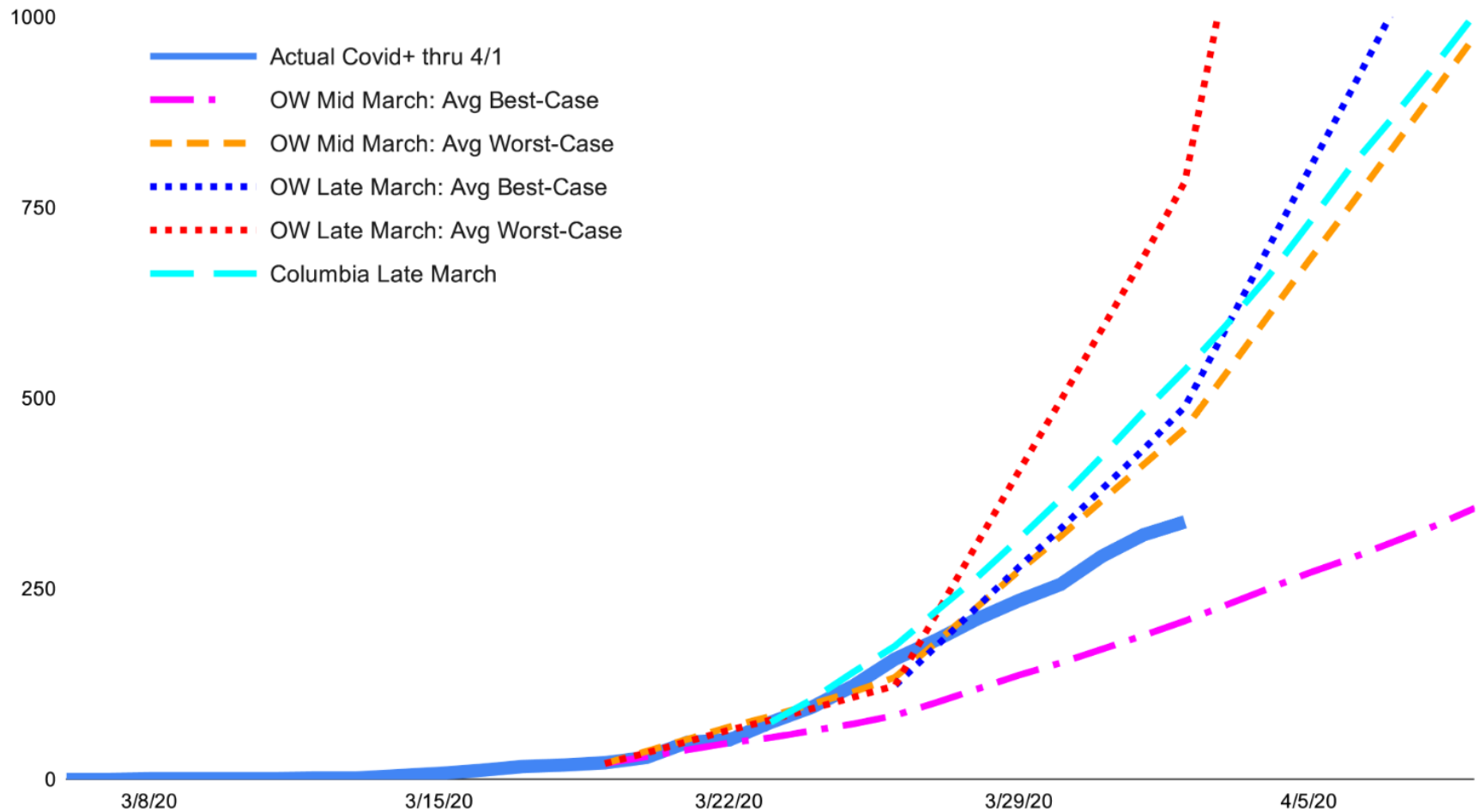
Source: Vermont Department of Health

Note: This chart notes the stability of Vermont's case growth rate as we approached and surpassed 100 confirmed cases.



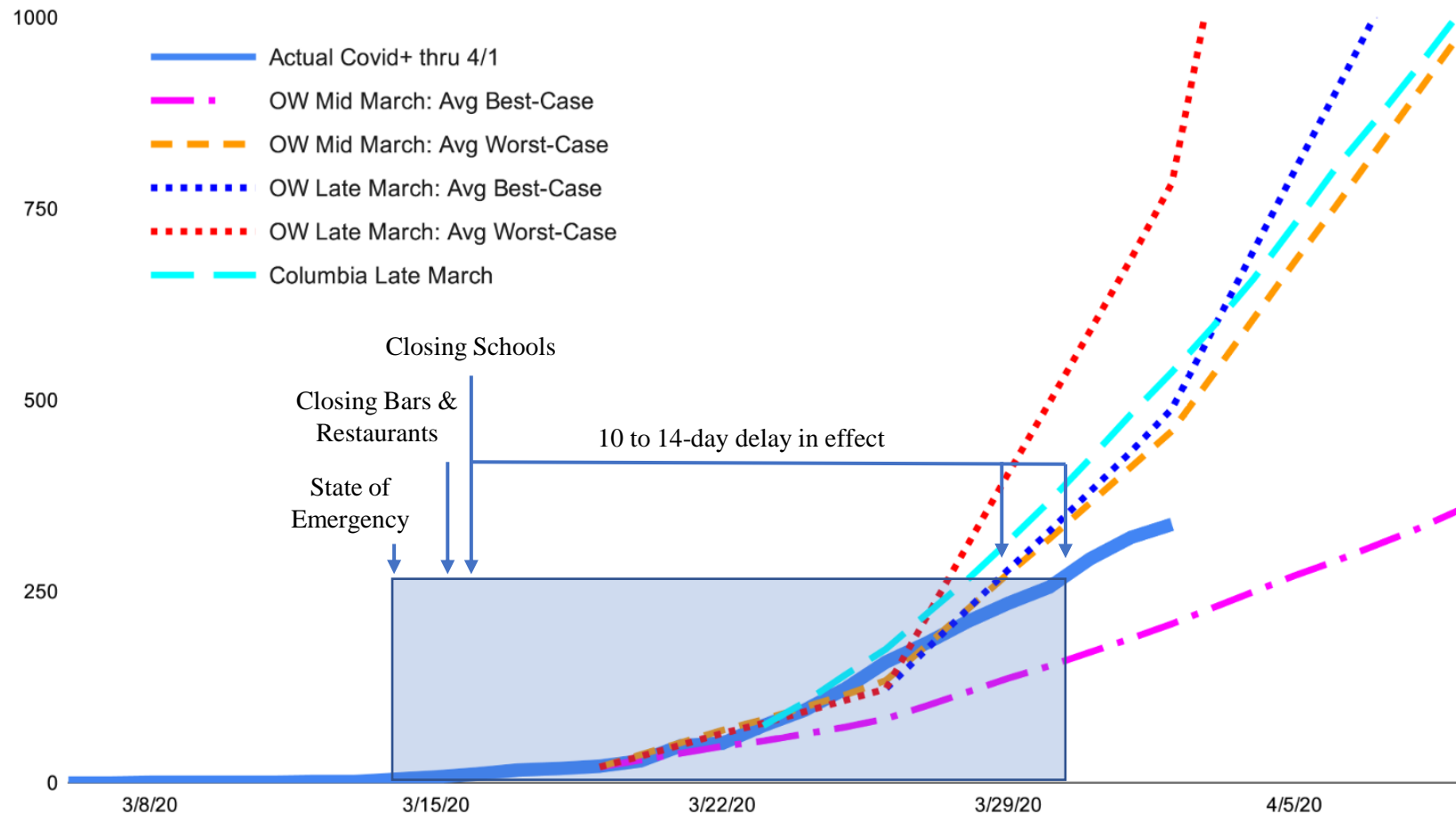
Close Look at Forecasting vs. Actual Case Count

Actual Cases vs. Projections (March 8th to April 9th // 0-1,000 Cases)



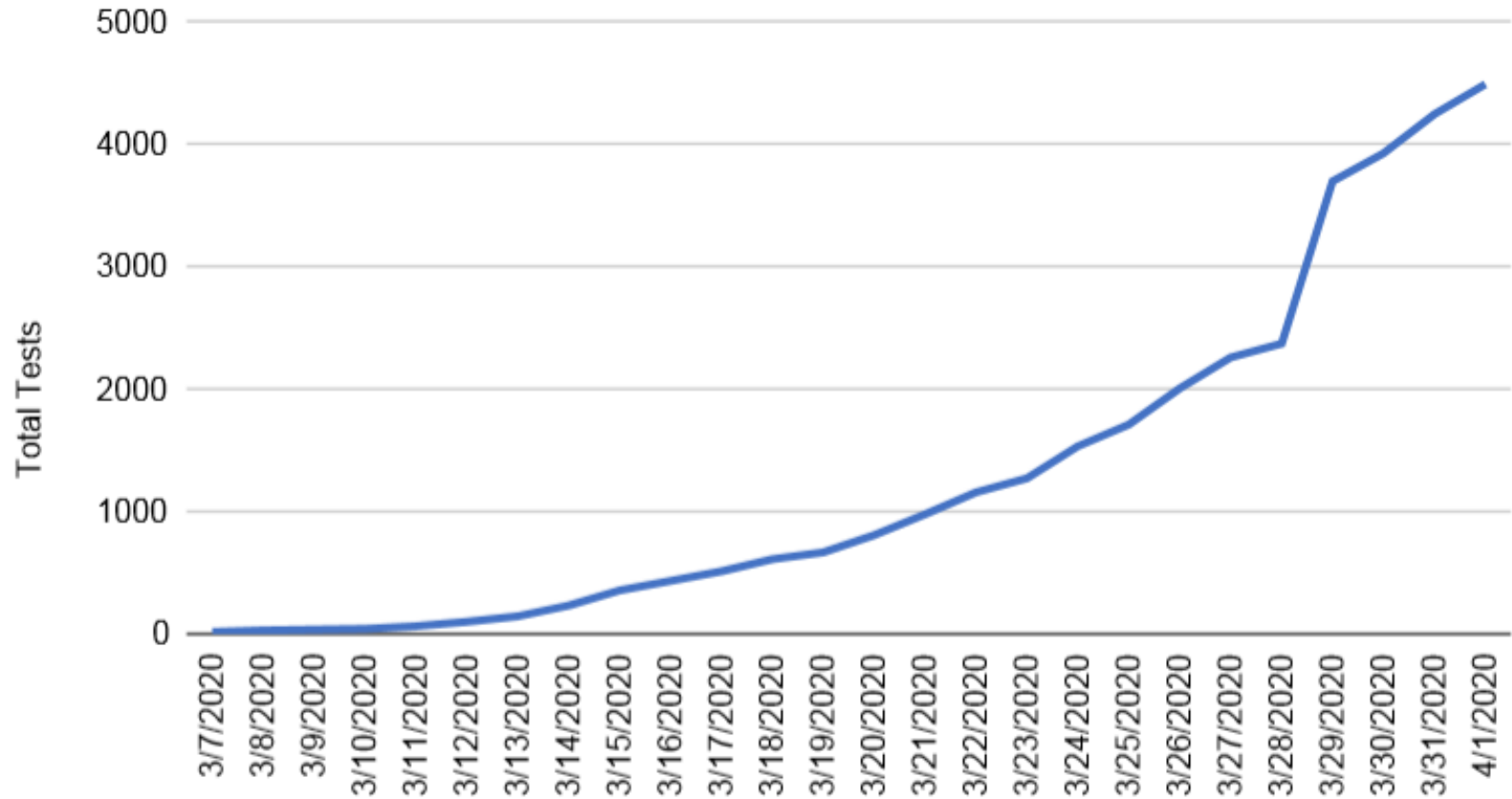
Days Until the Impact of Social Distancing is Seen

Actual Cases vs. Projections (March 8th to April 9th // 0-1,000 Cases)



Total Vermont Testing Over Time

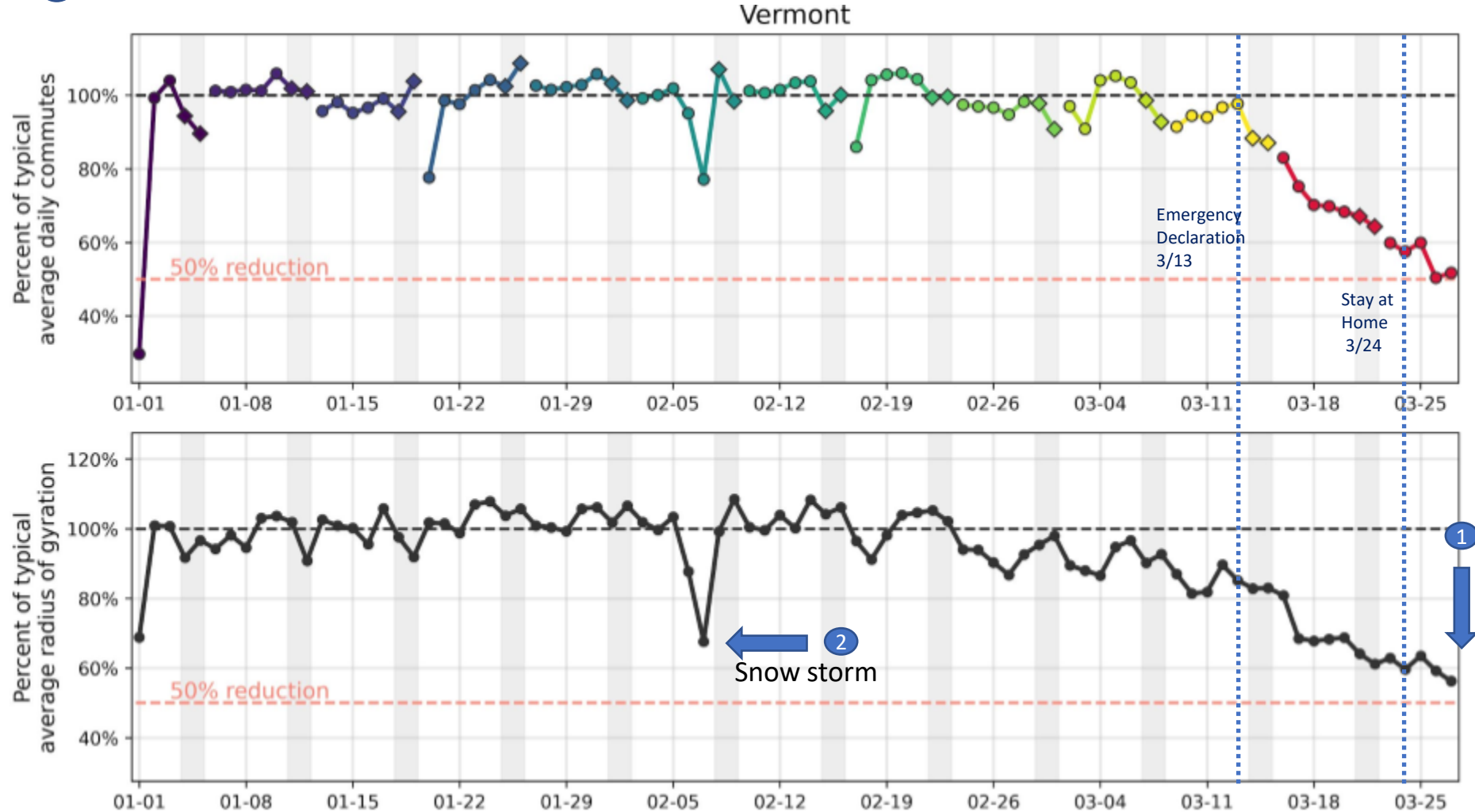
Total COVID-19 Testing - Vermont



Vermont's Mobility Reductions

Key Points:

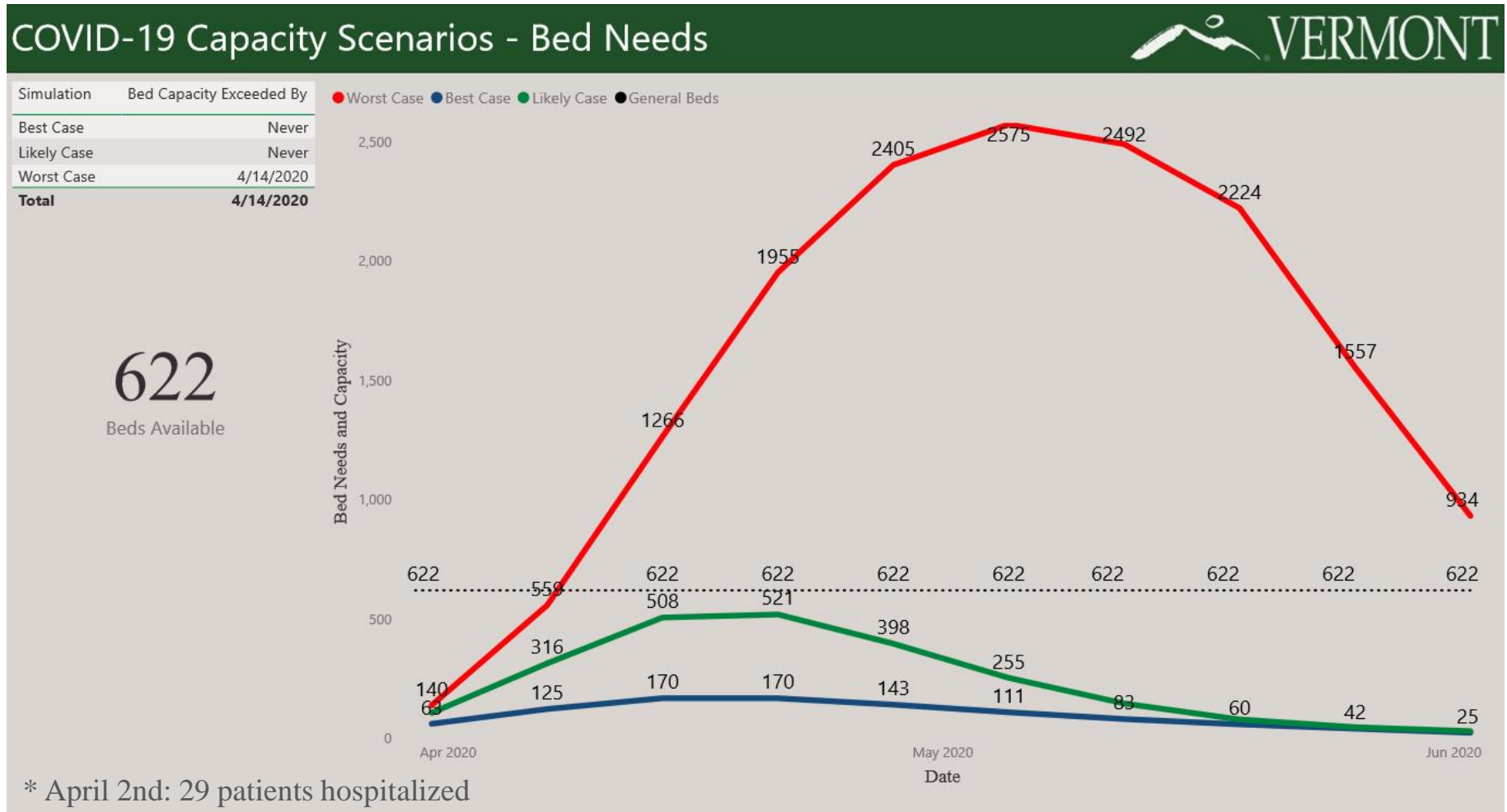
- 1 50% Reduction in physical movement with mitigation policies in place
- 2 Dip on Feb 7 is the snowstorm; this means people are moving around LESS than they did during the big snowstorm → this is very good



Source: Dr. Vespignani, Northeastern University

Hospitalization Needs – Likely, Best & Worst

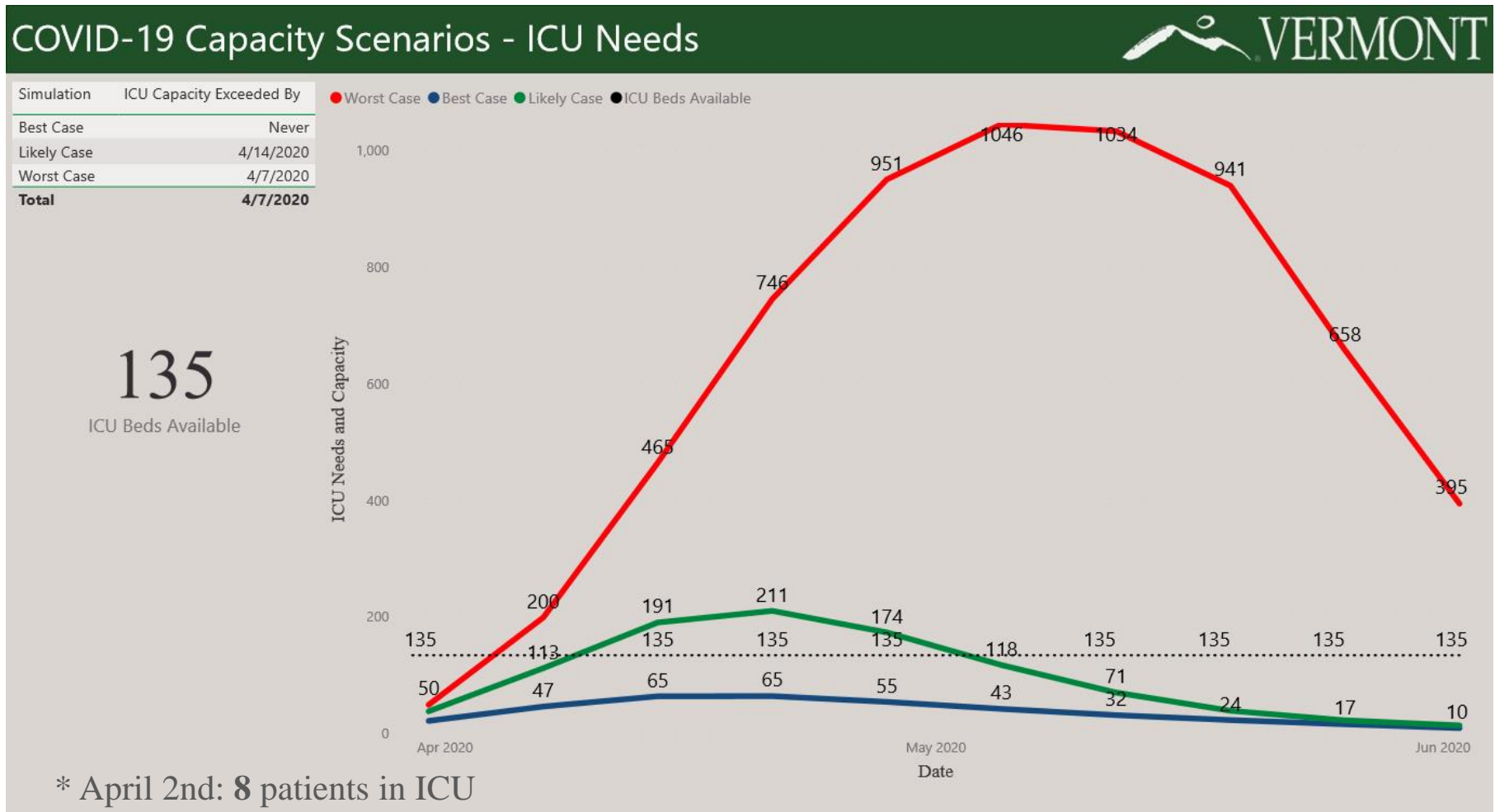
Note – Late March Trajectory



Modeling is for planning purposes only
Not representative of definitive outcomes.

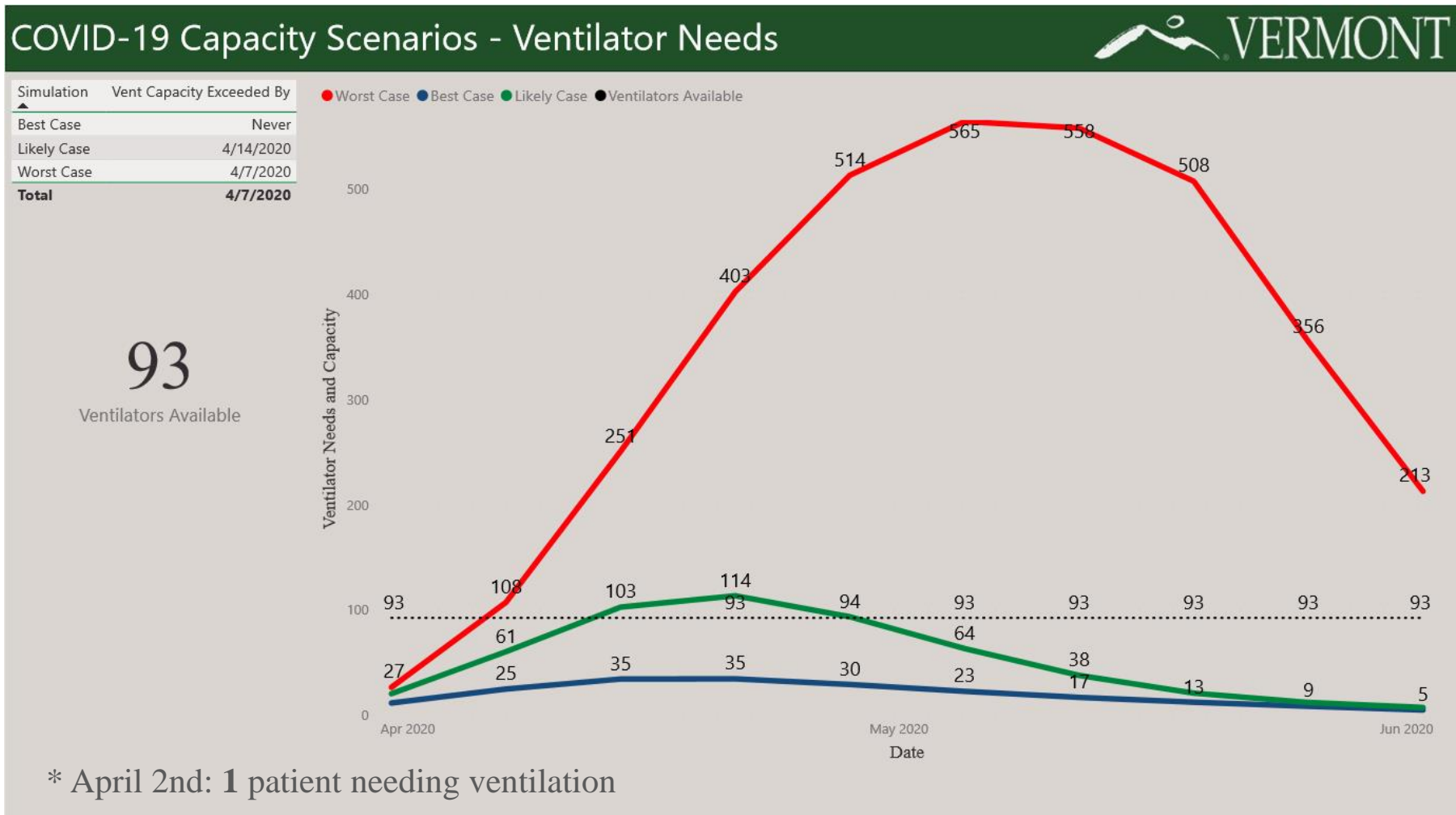
ICU Needs – Likely, Best & Worst

Note – Late March Trajectory



Modeling is for planning purposes only
Not representative of definitive outcomes.

Ventilator Needs – Likely, Best & Worst Note – Late March Trajectory



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Not representative of definitive outcomes.



State Surge Framework

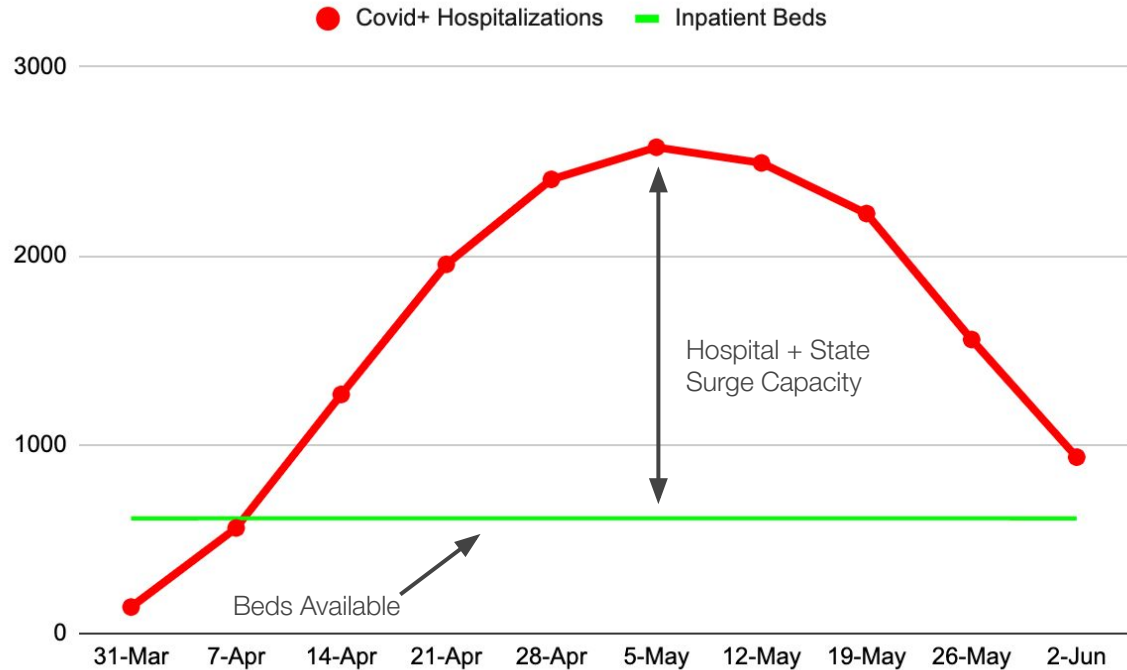
April 2, 2020



Inpatient Bed Gap - Planning for Worst Case

Current **worst case** estimates suggest Vermont will need 100s of additional beds at the height of surge.

However, current modeling does not point to worst case; flexibility is required



Modeling is for planning purposes only | Not representative of definitive outcomes

Overall Surge Capacity Framework



Steps	Description	Lead
1	Hospital Maximum: Hospitals plan for their maximum capacity for staffed beds, ICUs, vents, PPE, etc, within their health service area.	Hospitals
2	State Medical Maximum: Working with hospitals, State establishes targeted alternate care sites to address the projected state medical maximum surge.	State
3	Special Populations: Special consideration for COVID-19 care is needed for some populations, e.g., mental health. State is determining what additional resources are needed with some plans already underway, such as Woodside.	State
4	Isolation Sites: These facilities are for certain vulnerable populations such as homeless or others with special needs; those who are Covid-19+, recovering or exposed, but do not require hospitalization; and those that do not have a safe place to remain isolated (e.g., Goddard College). The State is working with municipalities and partners to decide the best options for Isolation Sites.	State Munis Community Partners

Medical Surge Facilities



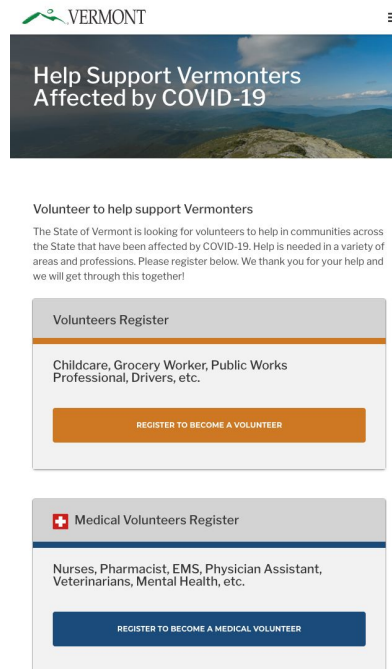
Location	Type	Beds	Med Lead	Support Lead
Essex Junction: Champlain Valley Expo	State	400	VTNG	VTNG
Rutland: Spartan Arena	State	150	RRMC	VTNG
Barre: Barre Civic Center	Regional	50	CVMC	State
St. Albans: Collins Perley	Regional	50	NMC	State
Burlington: UVM Patrick Gymnasium	Regional	150	UVMCMC	State
Brattleboro: Brattleboro Memorial	Staged Surge Trailer	50	BMH	State
Windsor: Mt. Ascutney	Staged Surge Trailer	50	MAH	State
+ State has two portable hospital units to be deployed as needed.				

Site Staffing Needs



Type	Options
Medical	FQHCs; Medical Reserve Corp; medical and nursing faculty from higher ed; student health staff and school nurses; VTNG; med or nursing students
Mental health	FQHCs; Medical Reserve Corp; social service workers
Security	Retired LEOs; VTNG; State personnel; volunteers
Buildings & grounds	State BGS; VTNG; volunteers
Logistics & food	VTNG; State personnel; volunteers

<https://www.vermont.gov/volunteer>

A screenshot of the Vermont Volunteer website. At the top, the Vermont state logo is on the left and a hamburger menu icon is on the right. Below the logo is a banner image of a mountain landscape with the text "Help Support Vermonters Affected by COVID-19". Under the banner, there is a section titled "Volunteer to help support Vermonters" with a paragraph explaining the need for volunteers. Below this are two registration boxes: "Volunteers Register" for general roles like childcare and public works, and "Medical Volunteers Register" for healthcare roles like nurses and pharmacists. Both boxes have an orange button labeled "REGISTER TO BECOME A VOLUNTEER".

VERMONT

Help Support Vermonters Affected by COVID-19

Volunteer to help support Vermonters

The State of Vermont is looking for volunteers to help in communities across the State that have been affected by COVID-19. Help is needed in a variety of areas and professions. Please register below. We thank you for your help and we will get through this together!

Volunteers Register

Childcare, Grocery Worker, Public Works Professional, Drivers, etc.

REGISTER TO BECOME A VOLUNTEER

Medical Volunteers Register

Nurses, Pharmacist, EMS, Physician Assistant, Veterinarians, Mental Health, etc.

REGISTER TO BECOME A MEDICAL VOLUNTEER