# COVID-19 MODELING
April 10, 2020

Overview
Presentation Updated Through April 9, 2020

- **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

Vermont's Daily COVID-19 Confirmed Case Growth

Source: Vermont Department of Health

Days until confirmed cases double
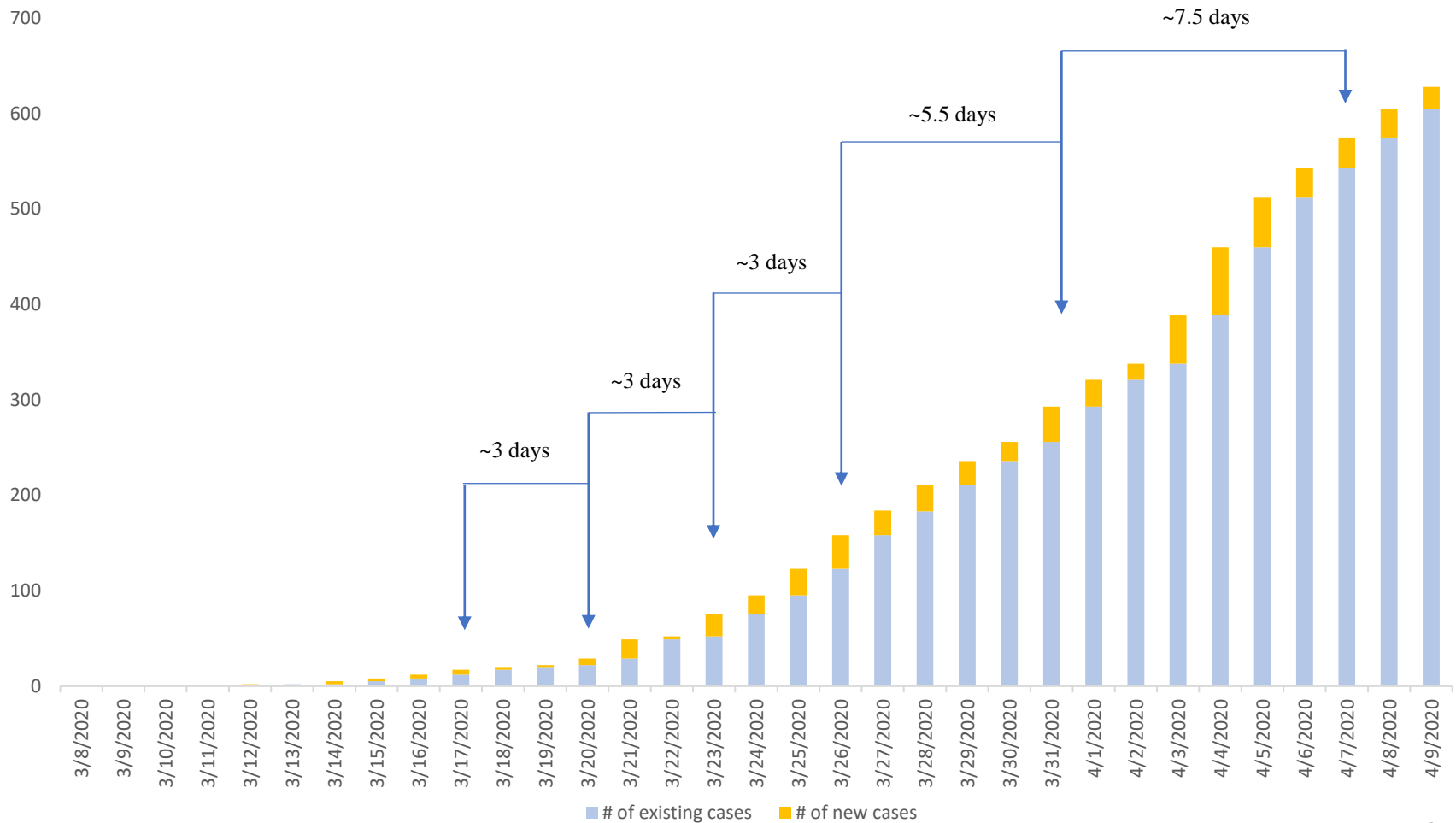
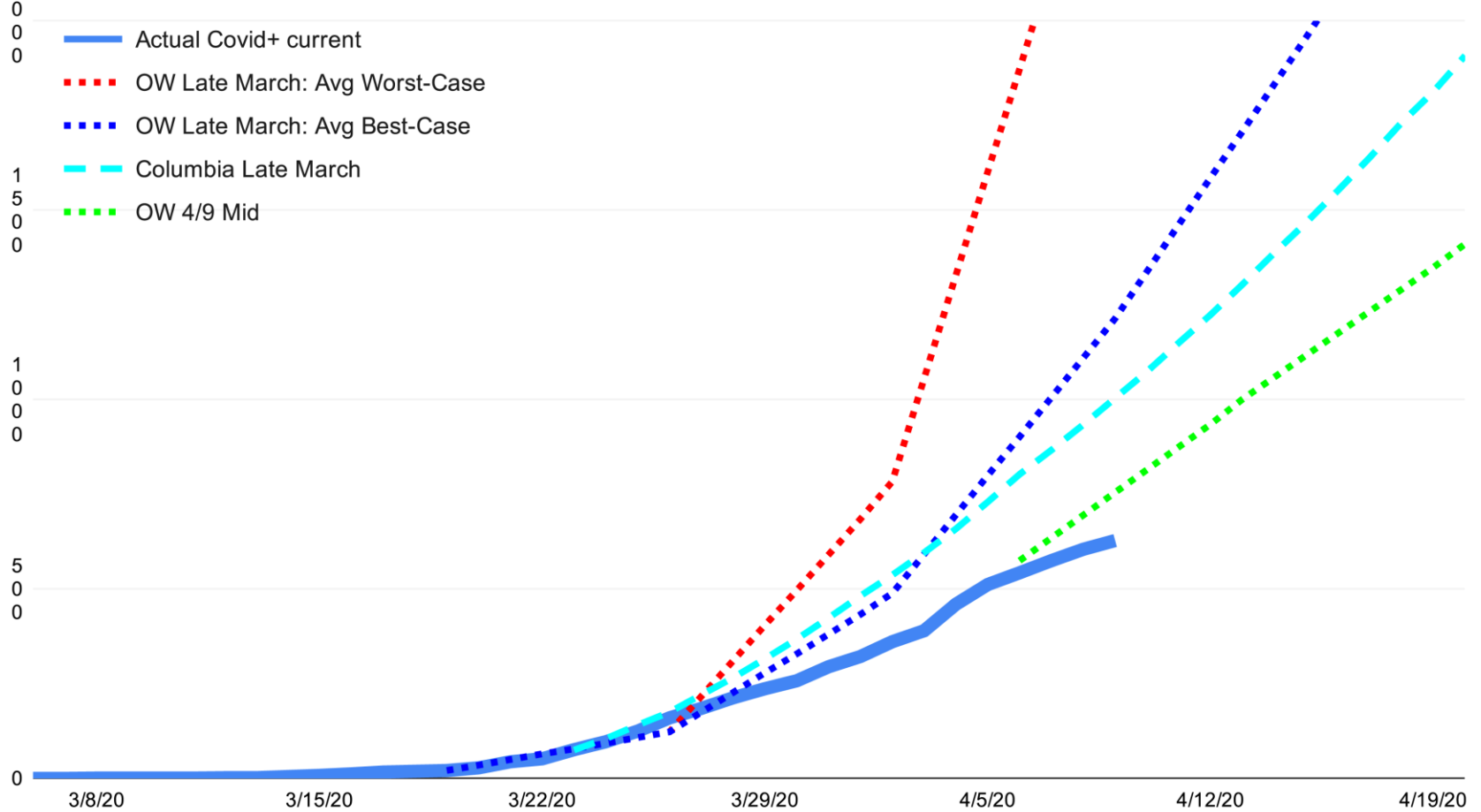# Vermont's Daily Growth Rate Compared to Total Cases

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.
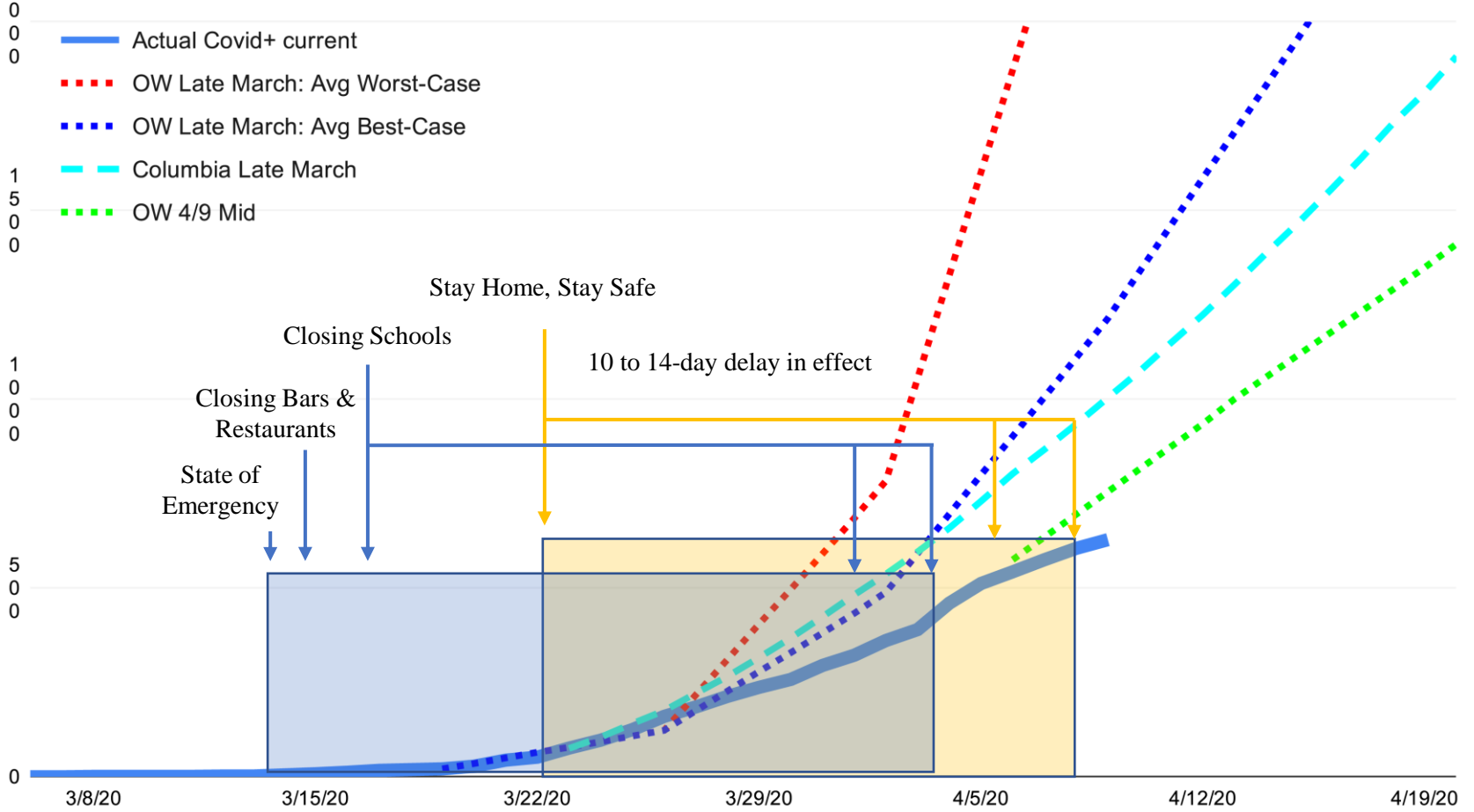
Close Look at Forecasting vs. Actual Case Count
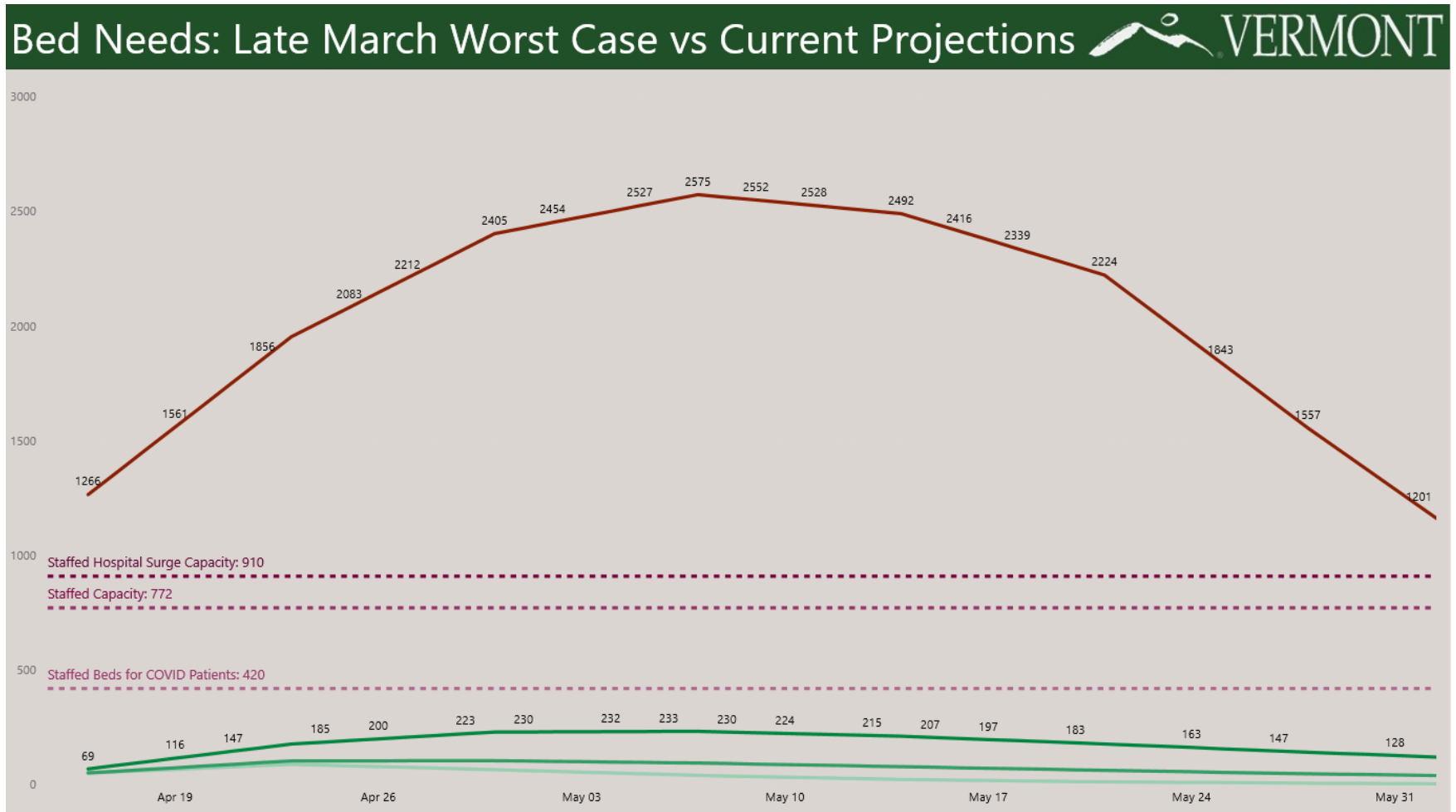

Actual Cases thru 4/9 vs. Projections thru 4/19

Legend:
- Actual Covid+ current
- OW Late March: Avg Worst-Case
- OW Late March: Avg Best-Case
- Columbia Late March
- OW 4/9 Mid

Close Look at Forecasting vs. Actual Case Count

Actual Cases thru 4/9 vs. Projections thru 4/19

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State of Emergency
Closing Bars & Restaurants
Closing Schools
Stay Home, Stay Safe
10 to 14-day delay in effect

Comparison: Hospitalization Late March vs. April 9th Trajectory

Bed Needs: Late March Worst Case vs Current Projections — VERMONT

Red line (Late March Worst Case): 1266, 1561, 1856, 2083, 2212, 2405, 2454, 2527, 2575, 2552, 2528, 2492, 2416, 2339, 2224, 1843, 1557, 1201

Green line (Current Projections): 69, 116, 147, 185, 200, 223, 230, 232, 233, 230, 224, 215, 207, 197, 183, 163, 147, 128

Staffed Hospital Surge Capacity: 910
Staffed Capacity: 772
Staffed Beds for COVID Patients: 420

X-axis: Apr 19, Apr 26, May 03, May 10, May 17, May 24, May 31

Modeling is for planning purposes only
Not representative of definitive outcomes

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Hospitalization Needs – April 9th Trajectory
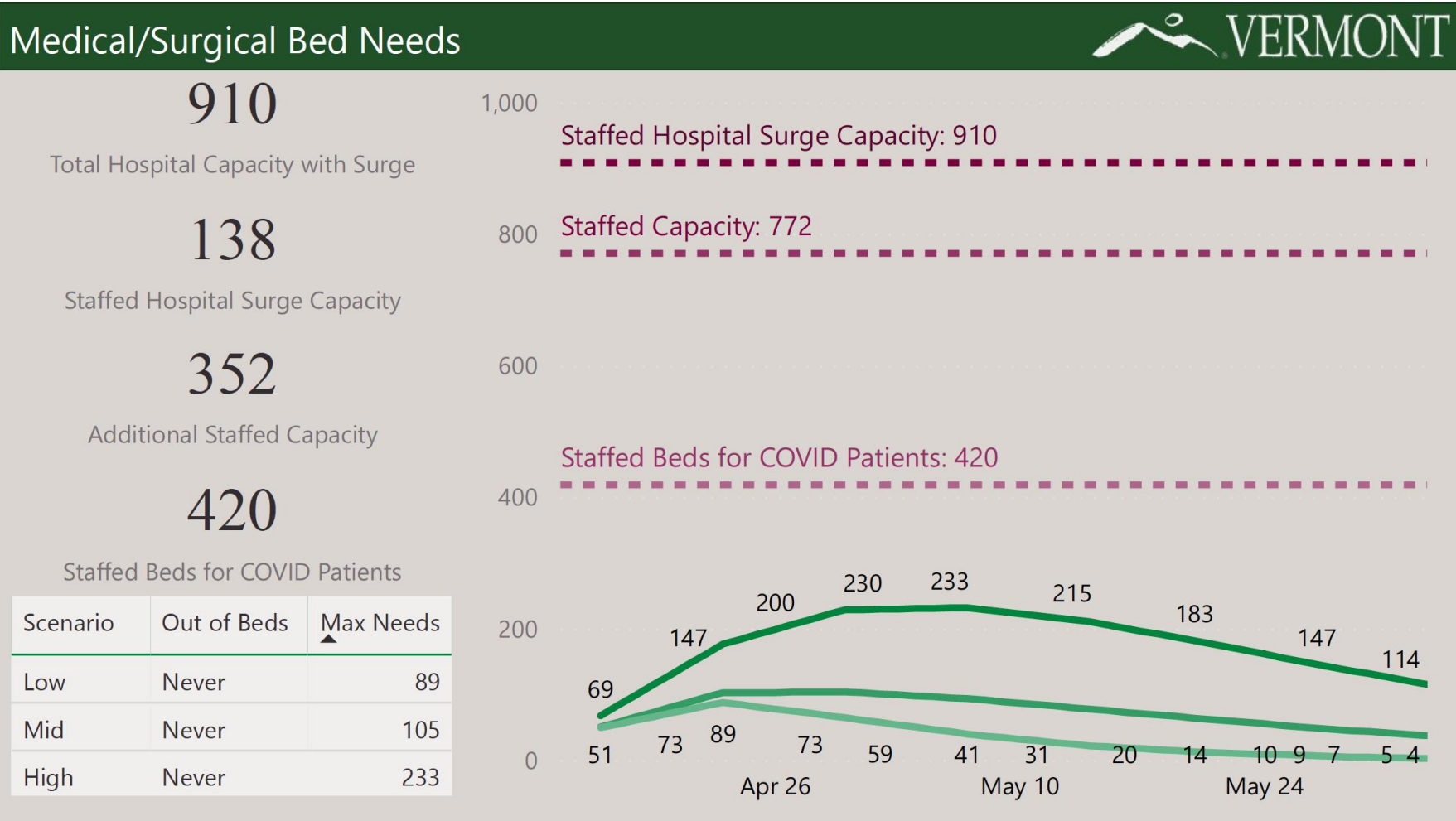
Medical/Surgical Bed Needs — VERMONT

910
Total Hospital Capacity with Surge

138
Staffed Hospital Surge Capacity

352
Additional Staffed Capacity

420
Staffed Beds for COVID Patients

Scenario	Out of Beds	Max Needs ▲
Low	Never	89
Mid	Never	105
High	Never	233
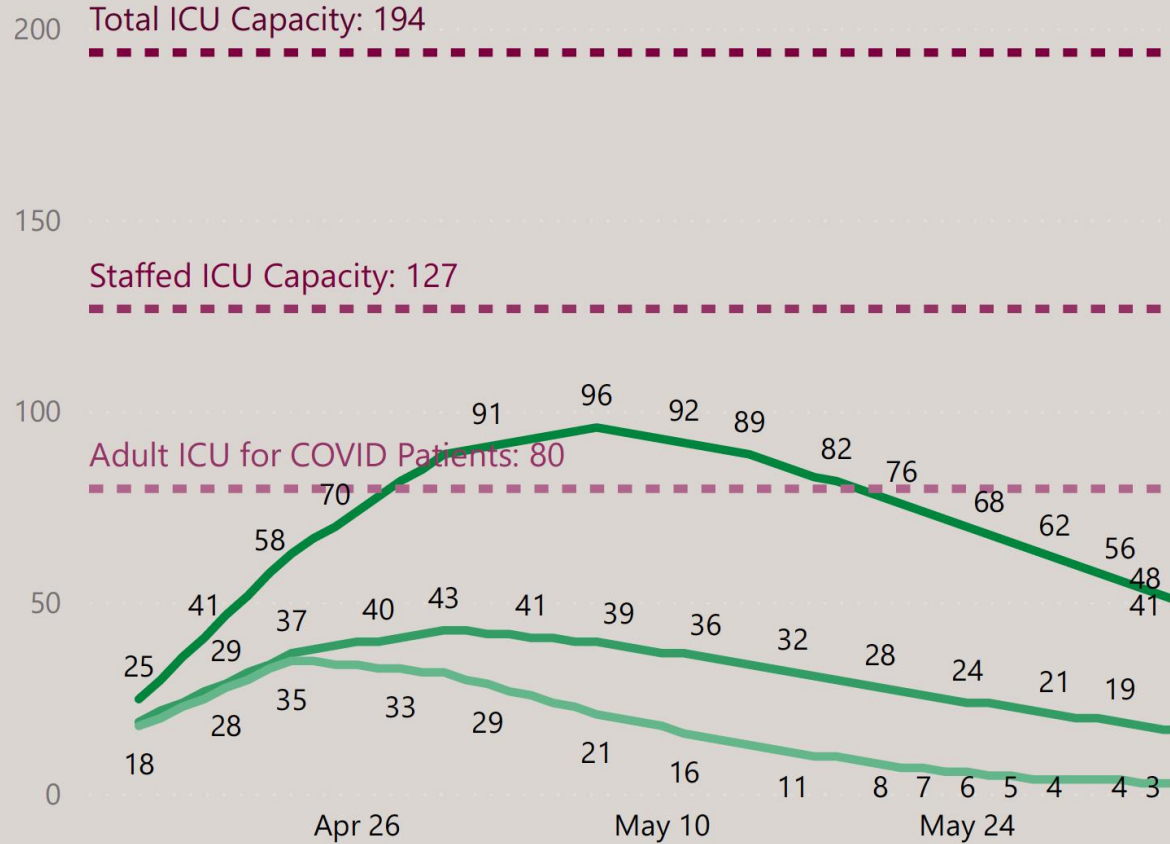
Staffed Hospital Surge Capacity: 910

Staffed Capacity: 772

Staffed Beds for COVID Patients: 420

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ICU Needs – April 9th Trajectory

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Ventilator Needs – April 9ᵗʰ Trajectory
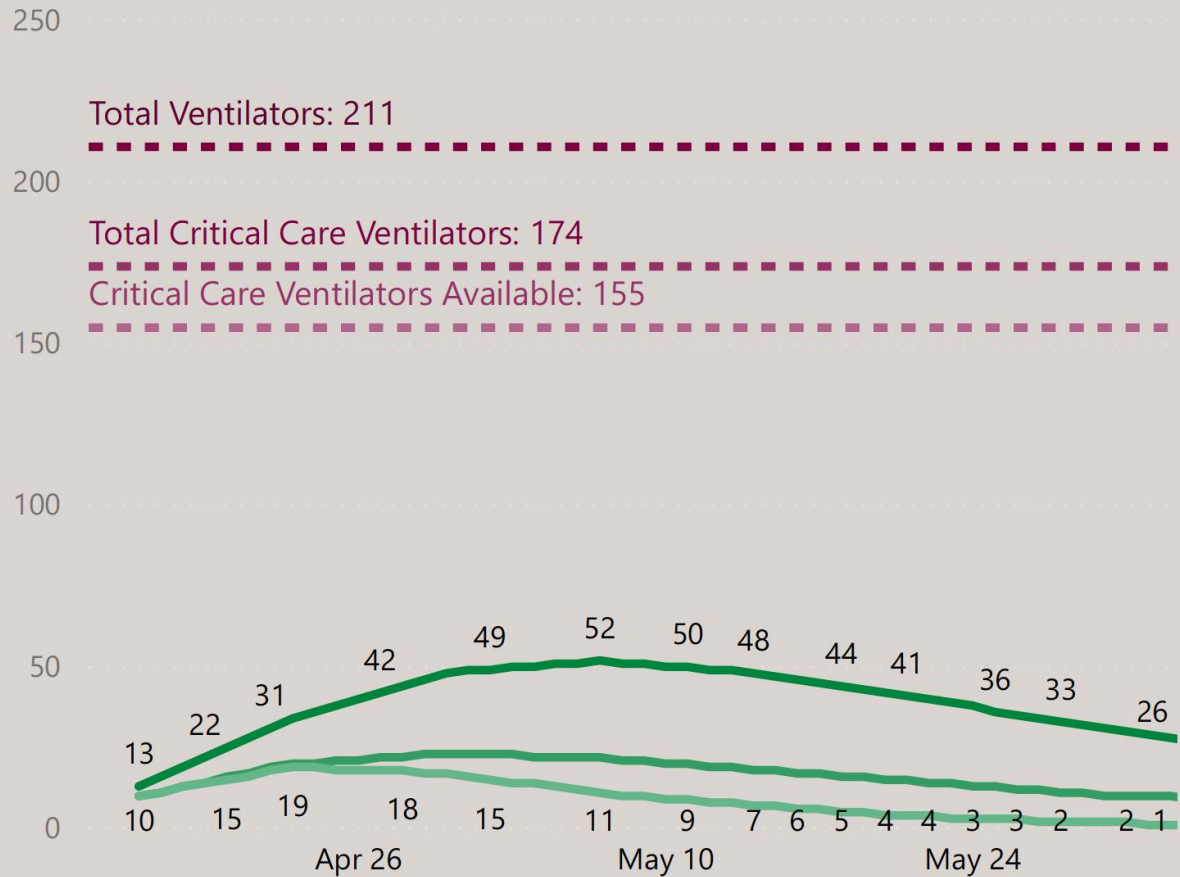
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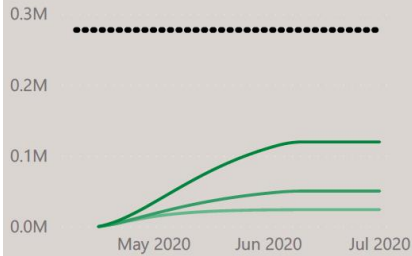
Personal Protection Equipment Analysis

Personal Protective Equipment Dashboard — VERMONT
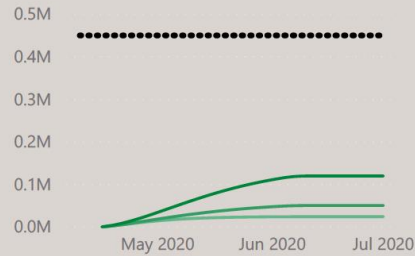
N95 FFP Respirators

277.95K
QOH

Scenario	Out Of Stock Date	Total Future Consumption
Low	Never	24,674
Mid	Never	50,934
High	Never	120,250

Surgical Masks

450.35K
QOH

Scenario	Out Of Stock Date	Total Future Consumption
Low	Never	24,674
Mid	Never	50,934
High	Never	120,250

Body Protection

230.15K
QOH
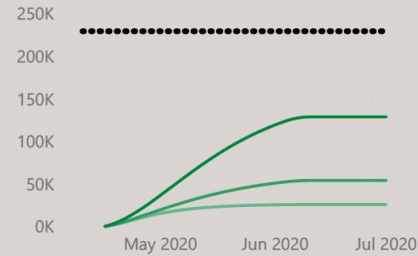
Scenario	Out Of Stock Date	Total Future Consumption
Low	Never	26,572
Mid	Never	54,852
High	Never	129,500

Face Protection

57.46K
QOH
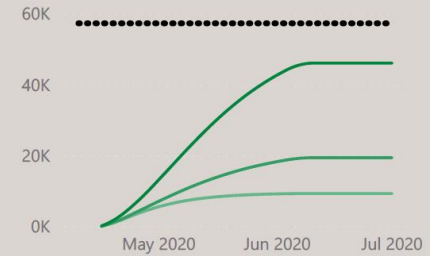
Scenario	Out Of Stock Date	Total Future Consumption
Low	Never	9,490
Mid	Never	19,590
High	Never	46,250

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