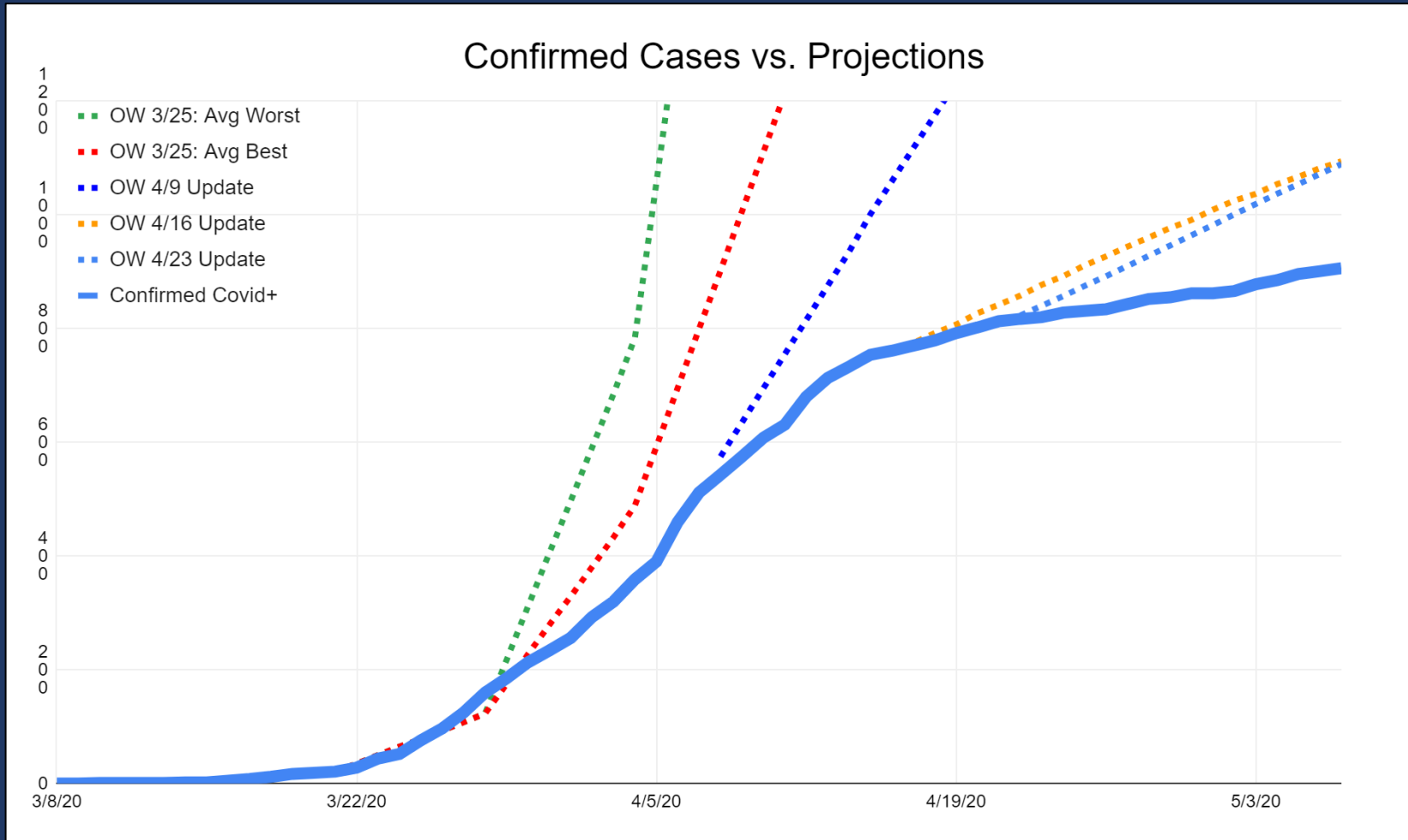# COVID-19 MODELING
May 8, 2020

Overview
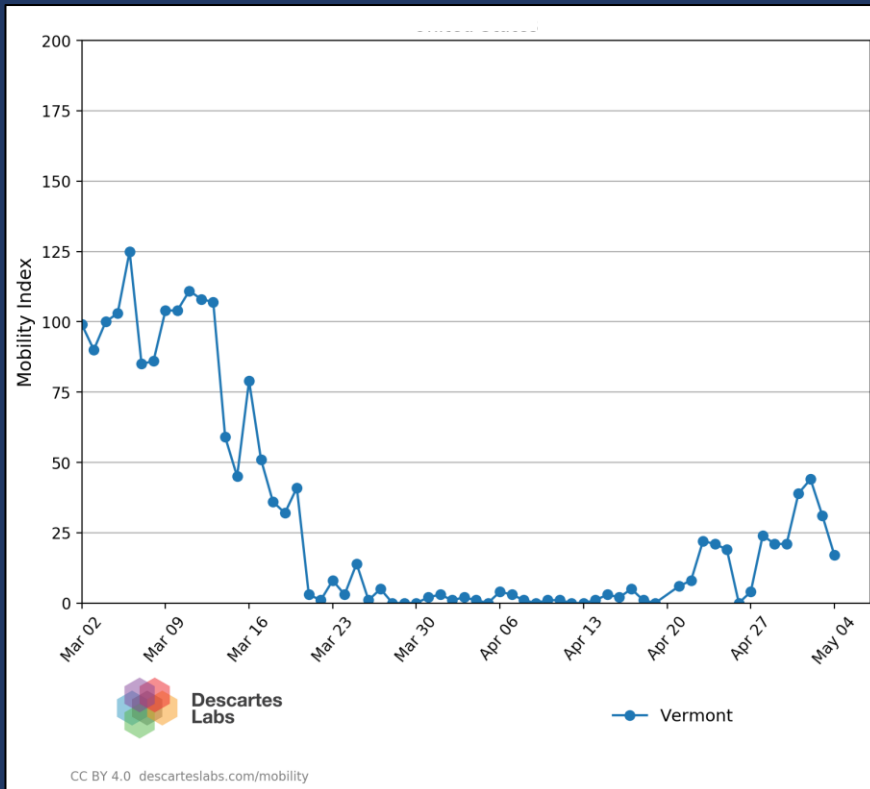## Presentation Updated Through May 8, 2020

- **Goal**: Develop multiple forecasting perspectives
  - Oliver Wyman – Helen Leis
  - Columbia University – Professor Jeffrey Shaman, Ph.D.
  - Northeastern University – Professor Alessandro Vespignani, Ph.D.
  - University of Washington – Institute for Health Metrics and Evaluation (IHME)
  - UVM – Larner College of Medicine – Department of Microbiology & Molecular Genetics – Translational Global Infectious Disease Research (TGIR) Group – John Hanley, PhD

- **Forecasting is imprecise:**
  - <u>Focus on the near term:</u> Forecasting is much less predictable the further out you model
  - <u>Focus on ranges rather than specifics:</u> Forecasts are represented as a range of possible outcomes (i.e., likely, best & worst)
  - <u>Consistent refinement:</u> Continually updating with new data and new assumptions
  - <u>Appropriate Perspective:</u> Ultimately forecasts are developed for planning purposes and are not representative of definitive outcomes

- **Ultimate Purpose of Forecasting:**
  - Phase 1: Medical Surge Planning
  - Phase 2: Support Restart Vermont and Monitor Key Trends

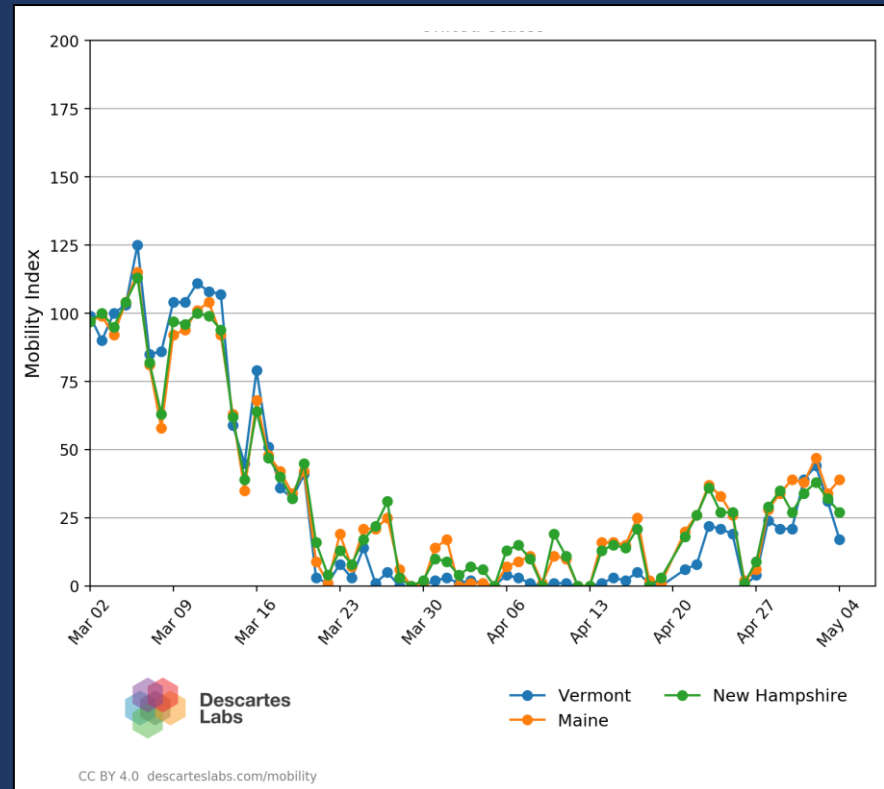# Positive Trend: Actual Results Are Better Than Forecasts

Confirmed Cases vs. Projections

Legend:
- OW 3/25: Avg Worst
- OW 3/25: Avg Best
- OW 4/9 Update
- OW 4/16 Update
- OW 4/23 Update
- Confirmed Covid+

X-axis: 3/8/20, 3/22/20, 4/5/20, 4/19/20, 5/3/20
Y-axis: 0, 200, 400, 600, 800, 1000, 1200

Sources: Oliver Wyman (OW) April 24, 2020 Model & Vermont Department of Health

Mobility Data Indicates Strong Social Distancing Adherence

Vermont

Northern New England

Source: Descartes Labs – May 4, 2020

Vermont: Time Until Confirmed Cases Double

Source: Vermont Department of Health and Department of Financial Regulation Forecast

5
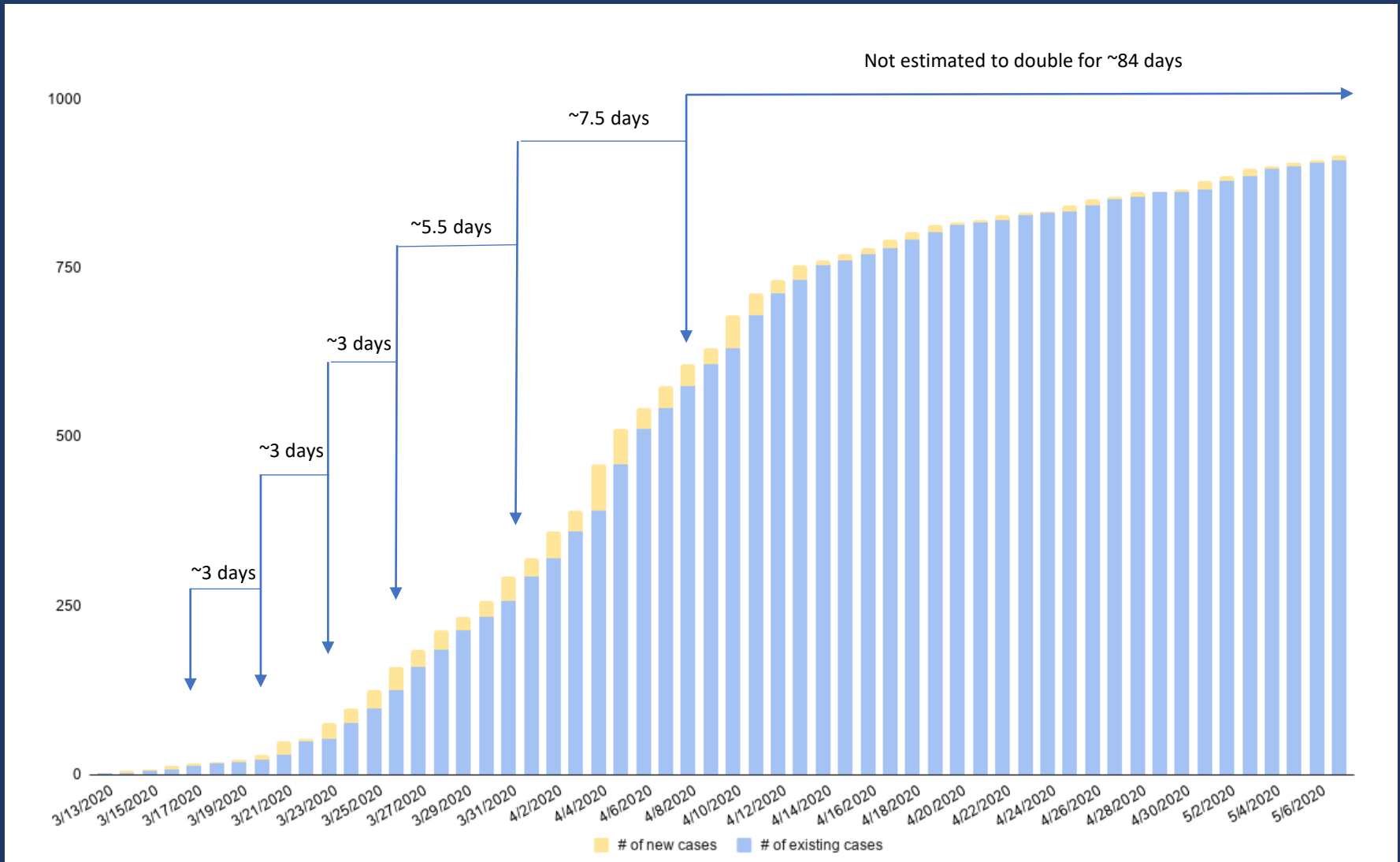
United States: Weeks Until Confirmed Cases Double

Vermont doubling at 12-week rate

3rd slowest rate in the country
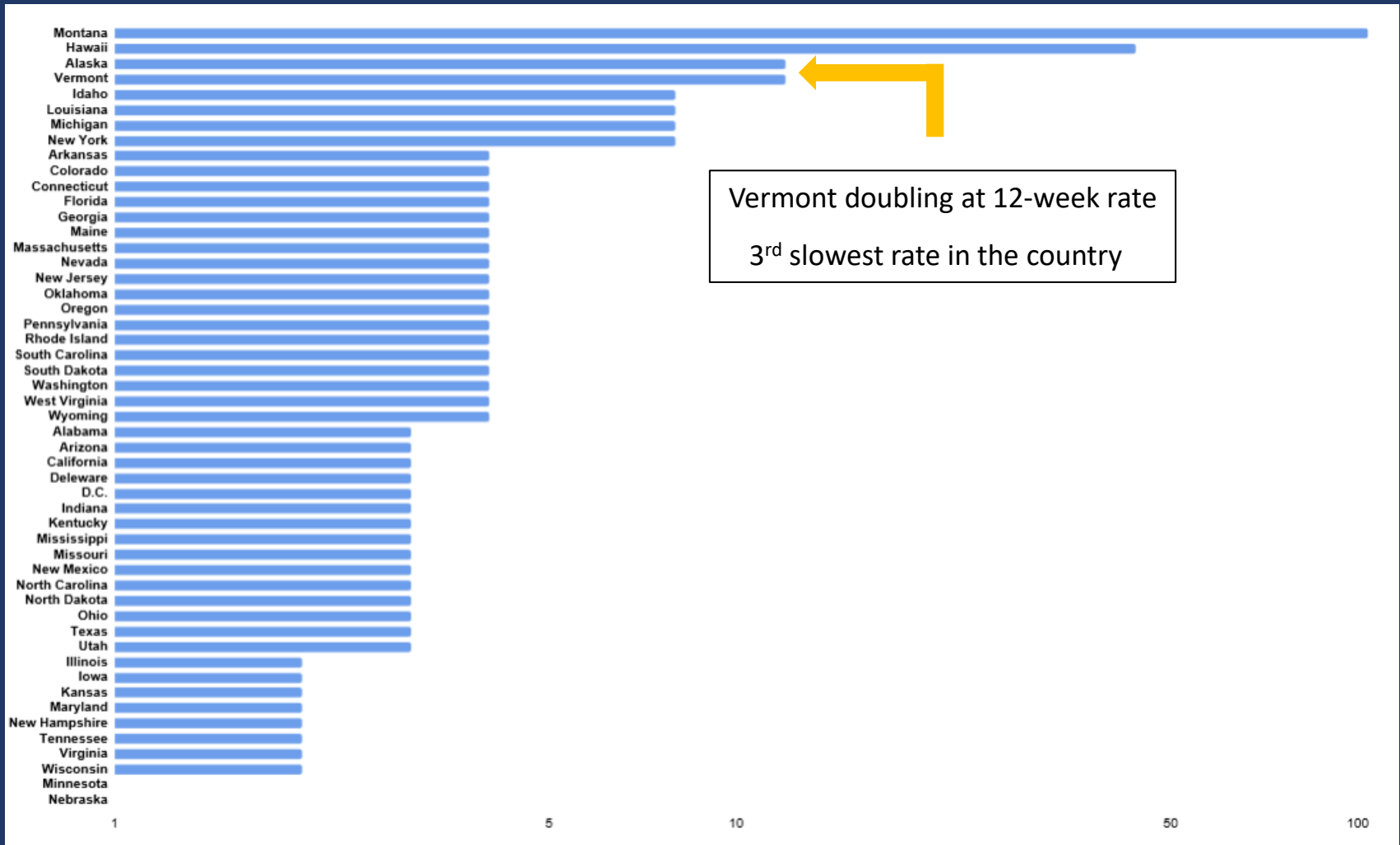
Northeast: Weeks Until Confirmed Cases Double

Doubling Rate (in weeks)

12

2

4

12

2

8

4

4

4

Powered by Bing
© GeoNames
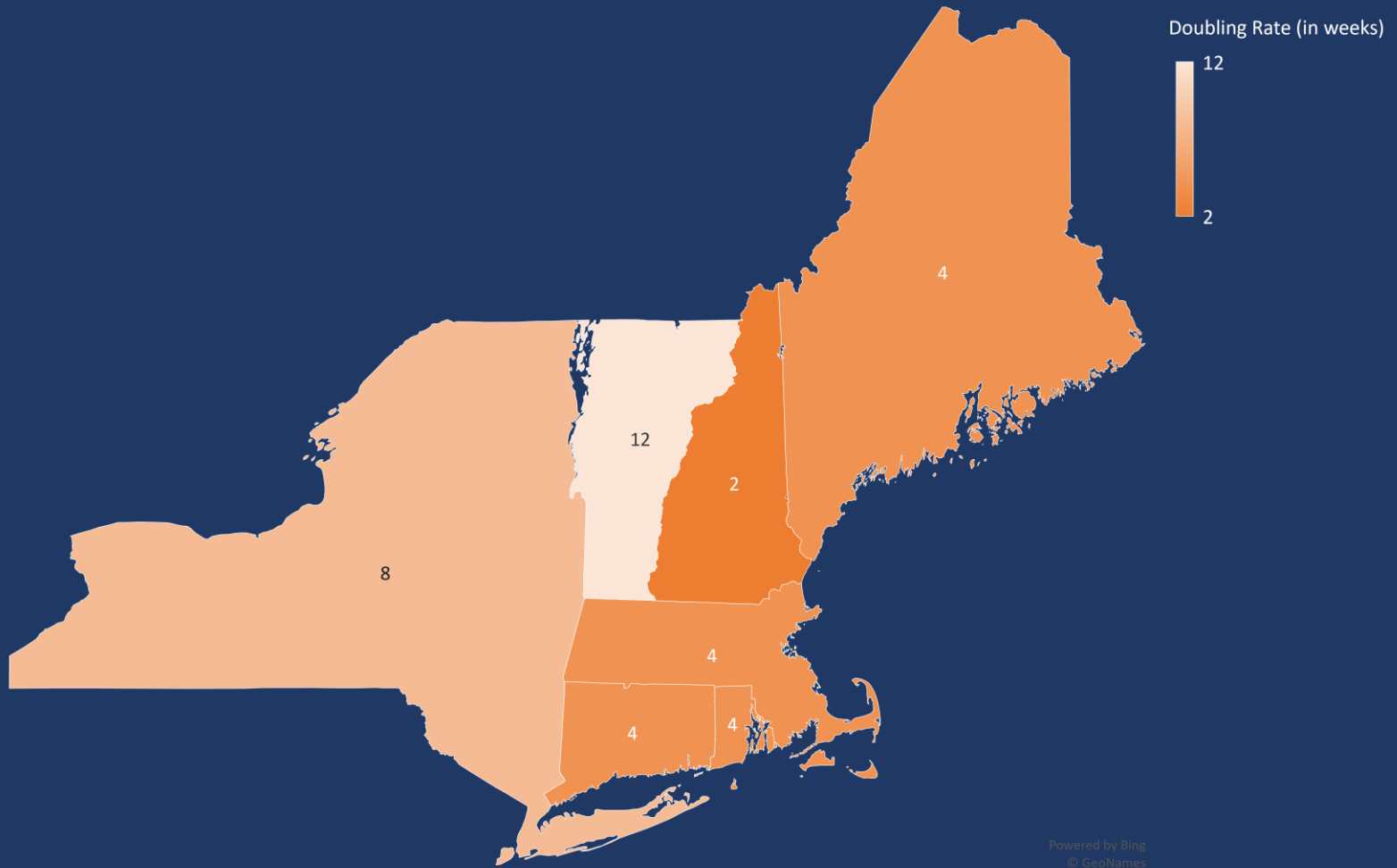
Source: Johns Hopkins University

7

Restart Vermont Modeling

Scenario One (orange line): Back to normal except school closure.

Scenario Two (pink line): Resume non-essential work for about 50% of the work force.

Scenario Three (green line): Resume non-essential work for about 50% of the work force & additional transmissibility reduction (masks, behavioral changes, contact tracing & testing).

Scenario Four (blue line): "stay at home" continued.
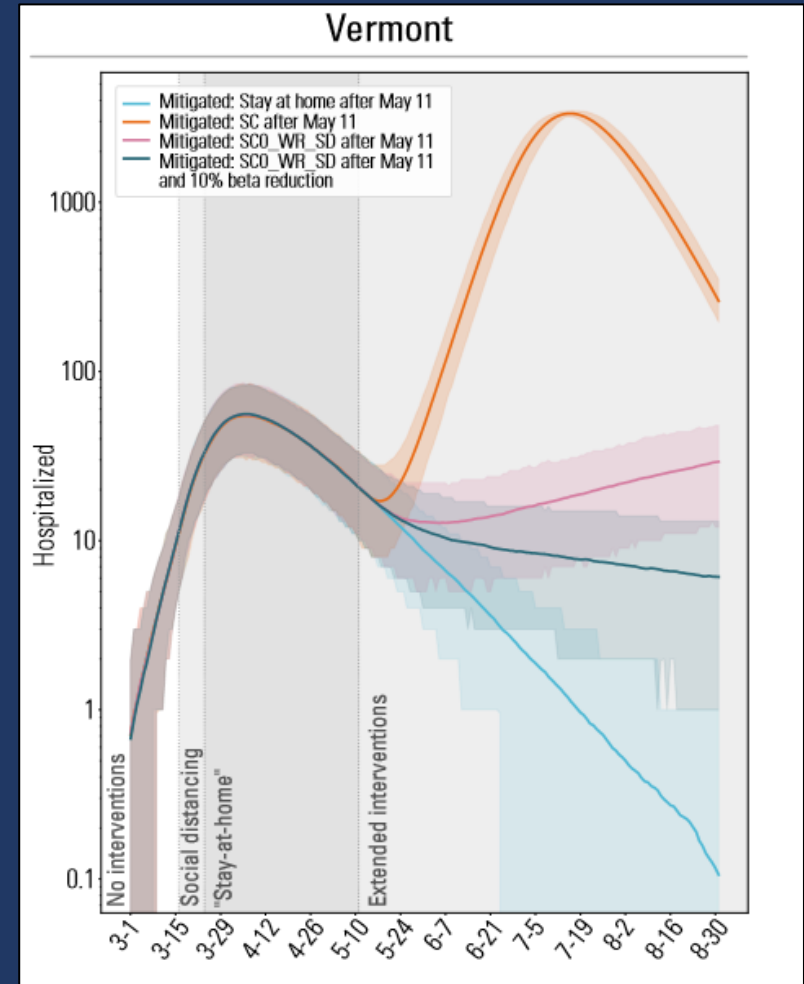
Metrics to Monitor

Data Point 1: Syndromic Surveillance
- % of emergency visits with either COVID-19 like illness or flu diagnosis
- Important for tracking possible outbreaks and/or significant rise in case growth in near real time
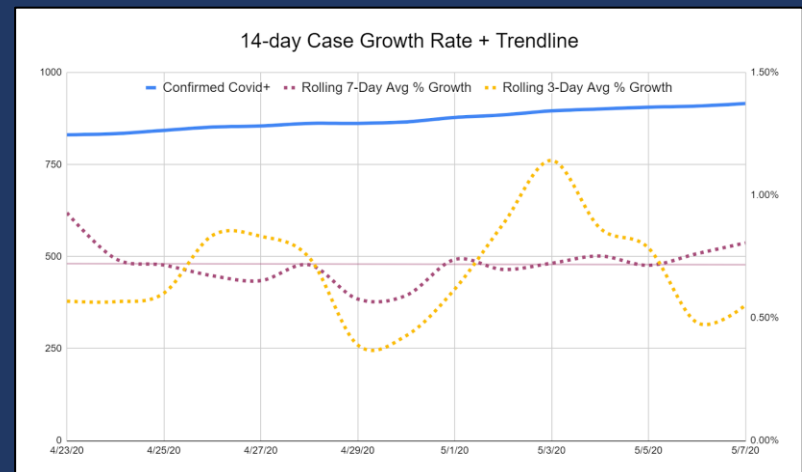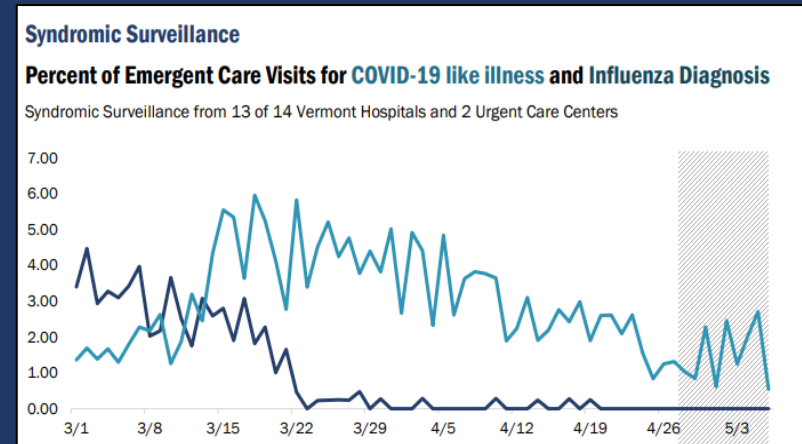
Warning Flag:
- Sustained trend up over several days and/or percentage of visits exceeding 4% for multiple consecutive days

Data Point 2: Viral Growth & Reproductive Rates
- Case growth measured by daily, 3-day, 7-day, and effective reproductive rate (R_t)
- Indicates whether virus is growing or declining

Warning Flags:
- R_t of >1.1
- Sustained growth rate indicating Vt. to exceed 70% of ICU beds over 14-days

Syndromic Surveillance
Percent of Emergent Care Visits for COVID-19 like illness and Influenza Diagnosis
Syndromic Surveillance from 13 of 14 Vermont Hospitals and 2 Urgent Care Centers

14-day Case Growth Rate + Trendline

Metrics to Monitor

Data Point 3: **Percentage of New Positive Tests**
- % of tests resulting in a new positive case
- Gives context that Vt. is testing a wide sample of individuals

Warning Flags:
- Percent positives tests in excess of 8%
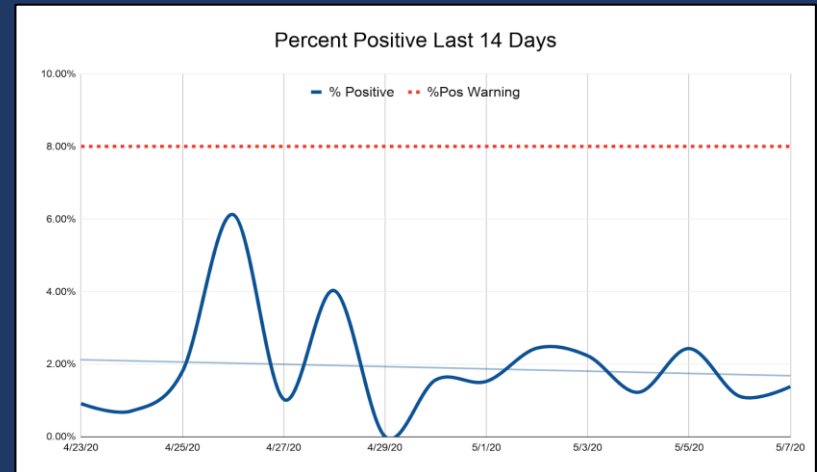
Data Point 4: **Hospital & Critical Care Beds**
- Number of occupied and unoccupied medical surgical and ICU beds
- Indicates hospital resource capacity for critically ill COVID patients

Warning Flags:
- Exceeding 70% of hospital capacity