COVID-19 Modeling
May 15, 2020

Overview

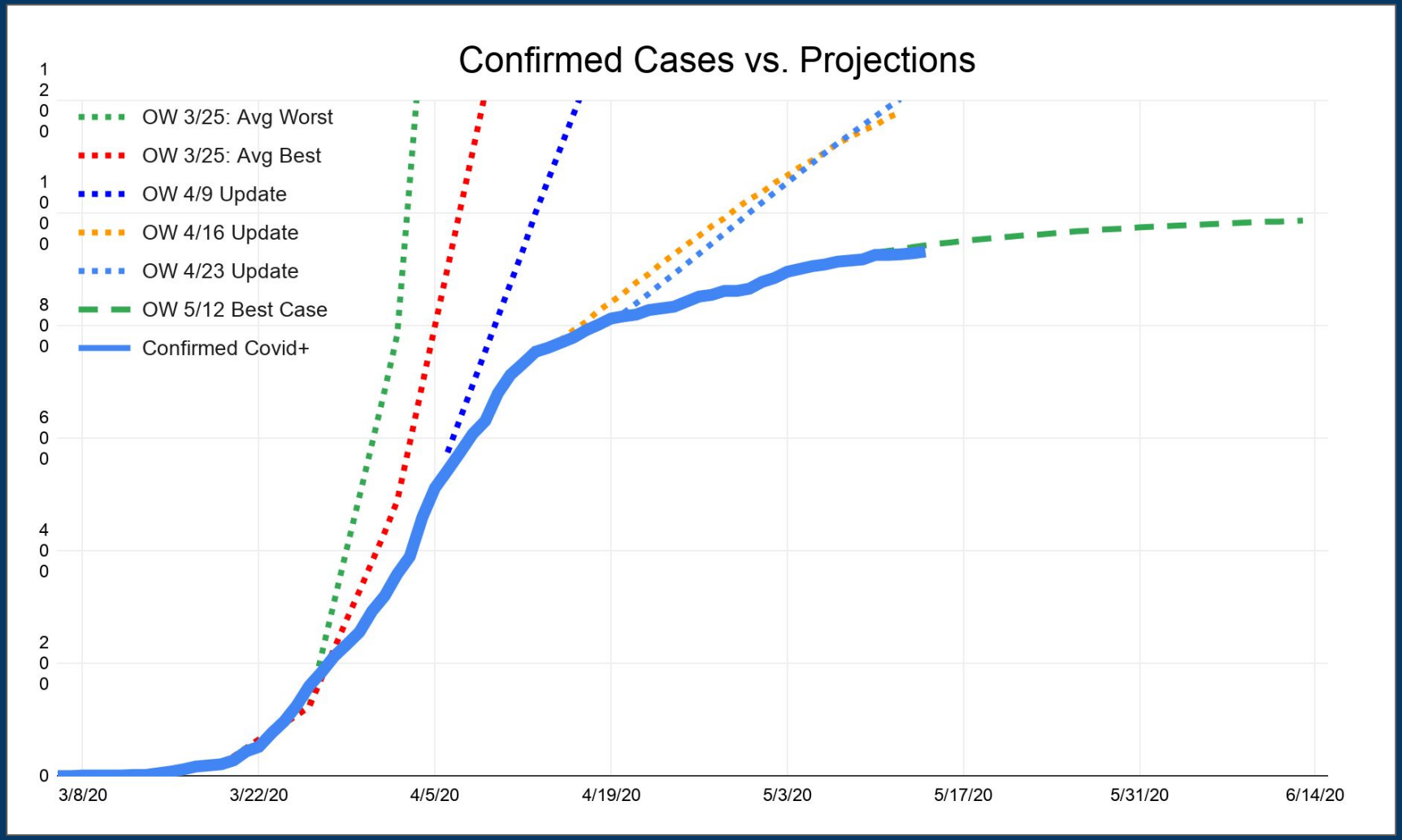
Presentation Updated Through May 15, 2020

- **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:**
  - 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

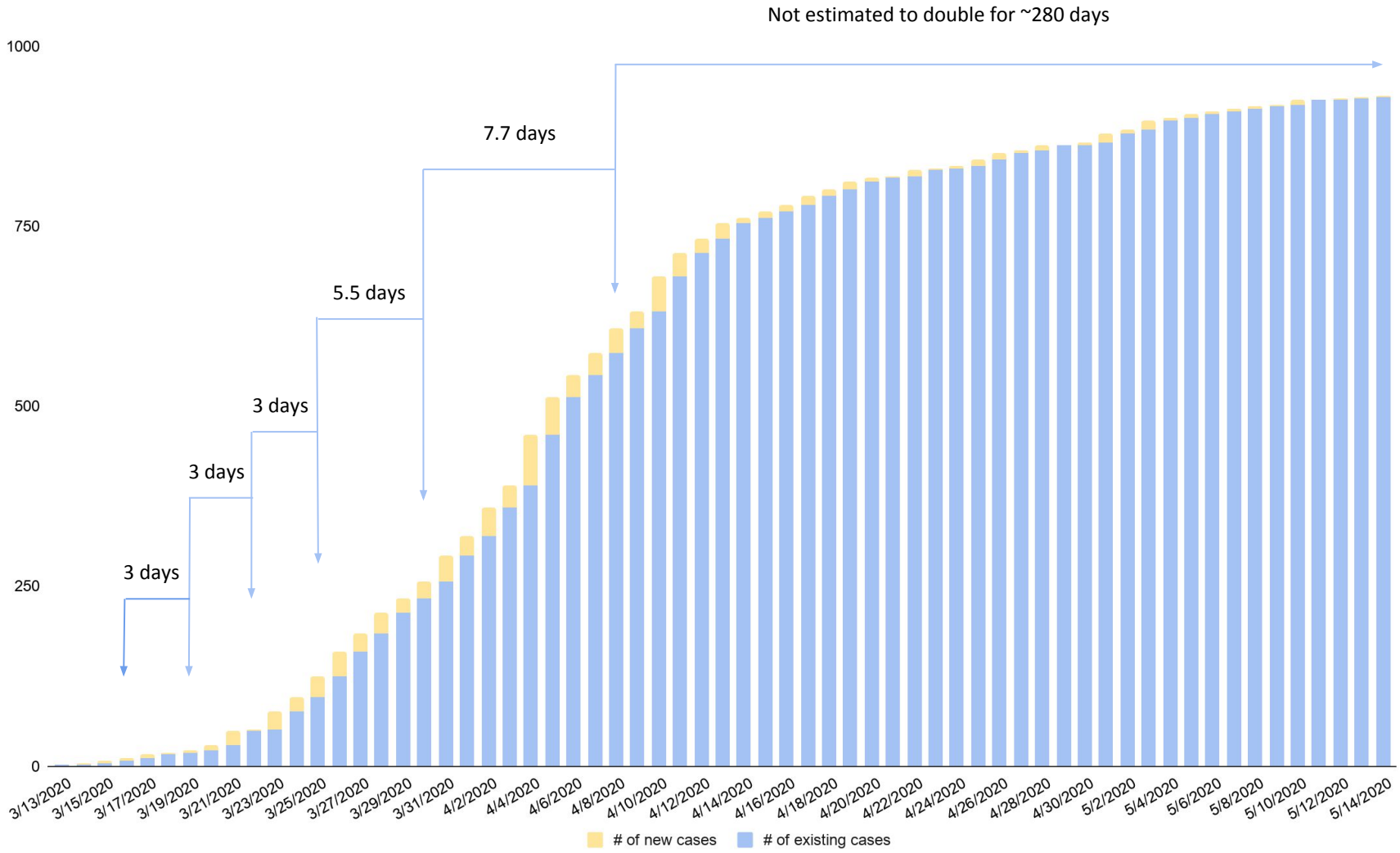
- **Ultimate Purpose of Forecasting:**
  - Phase 1: Medical Surge Planning
  - Phase 2: Support Restart Vermont and Monitor Key Trends

Positive Trend: Actual Results Are Better Than Forecasts



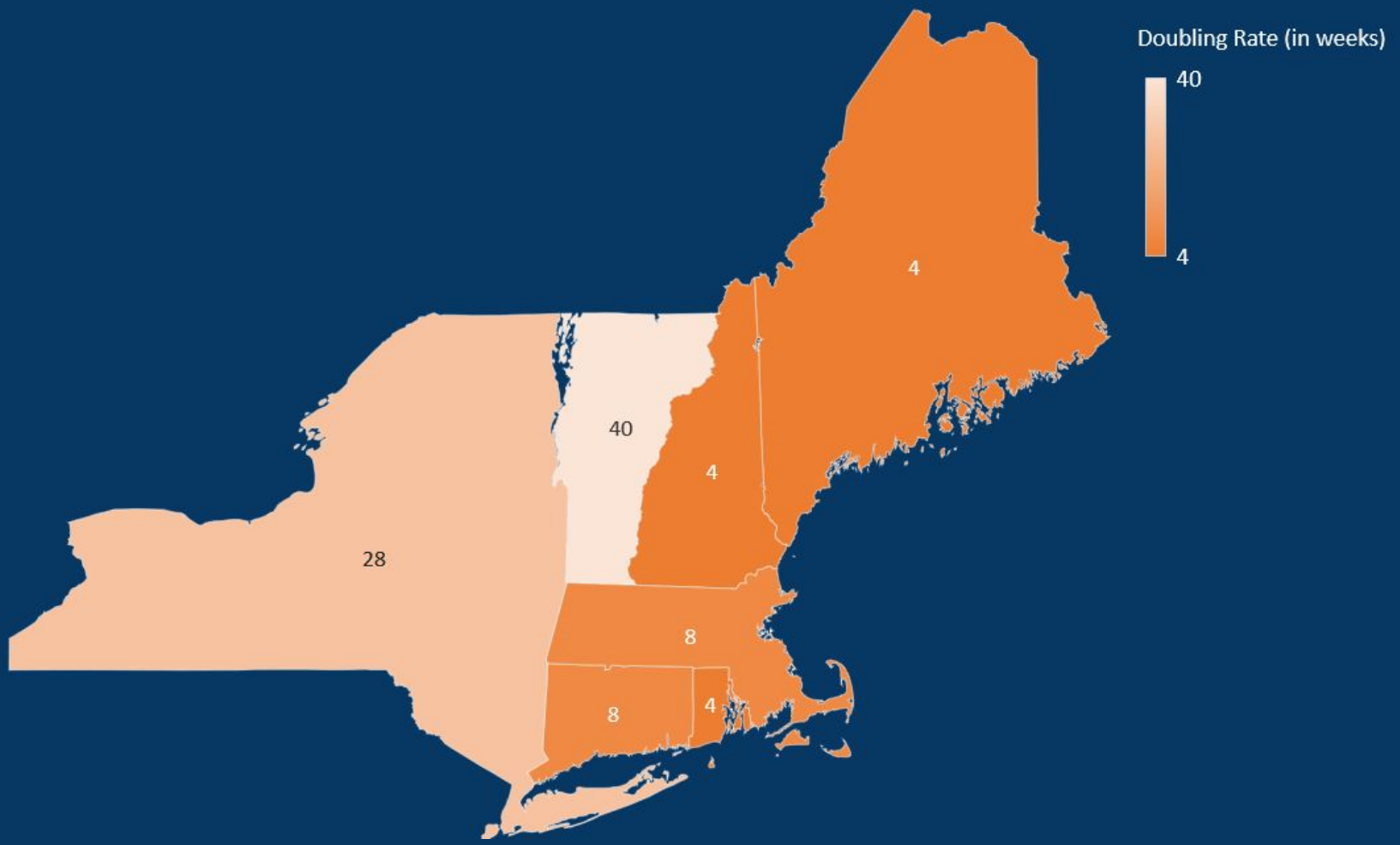
Sources: Oliver Wyman (OW) May 13, 2020 Model & Vermont Department of Health

Time Until Confirmed Cases Double



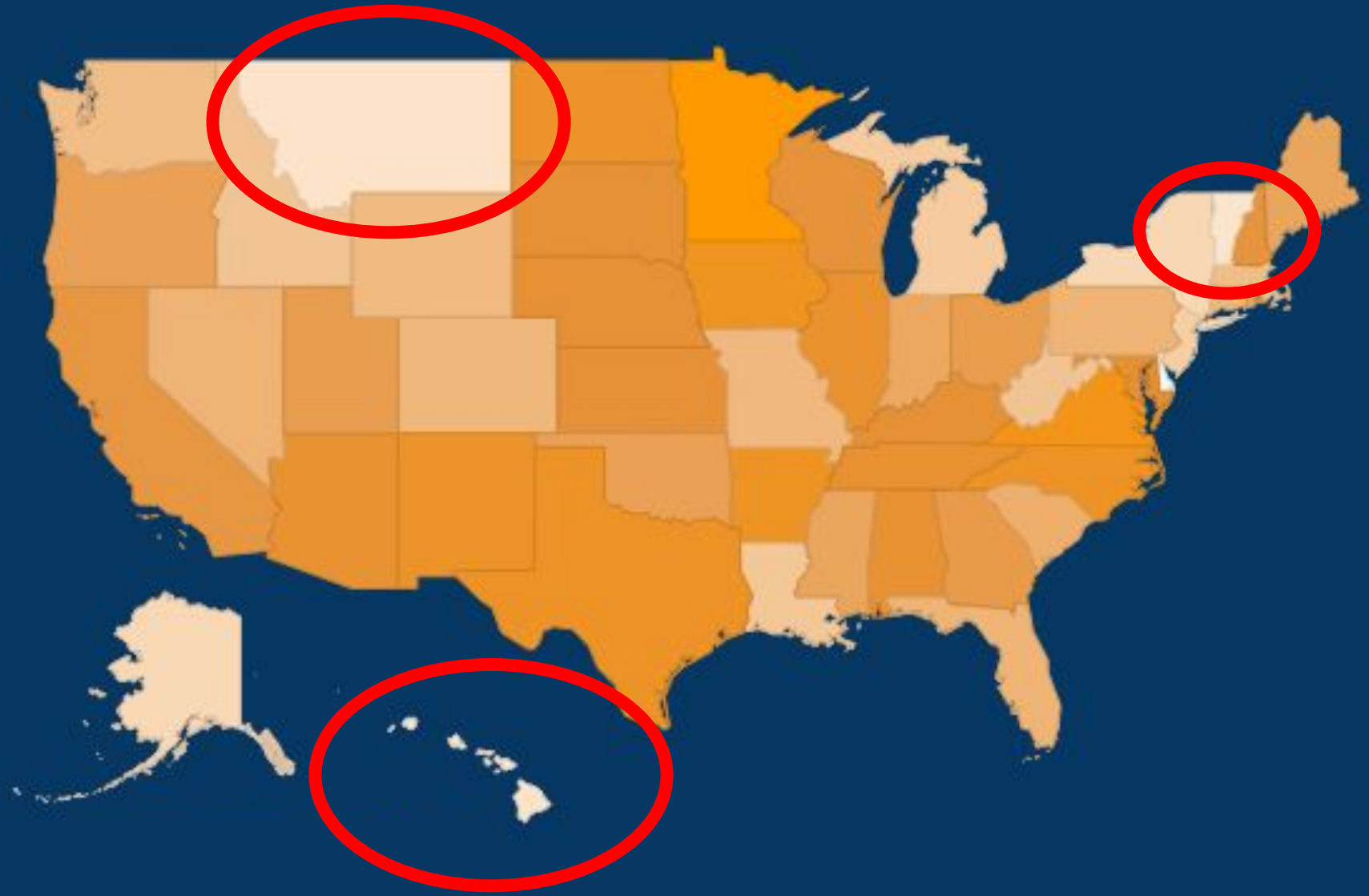
Source: Vermont Department of Health and Department of Financial Regulation Forecast

Current Doubling Rate for Vermont: 40 Weeks



Source: Johns Hopkins University

Nationwide 3-day Growth Rate

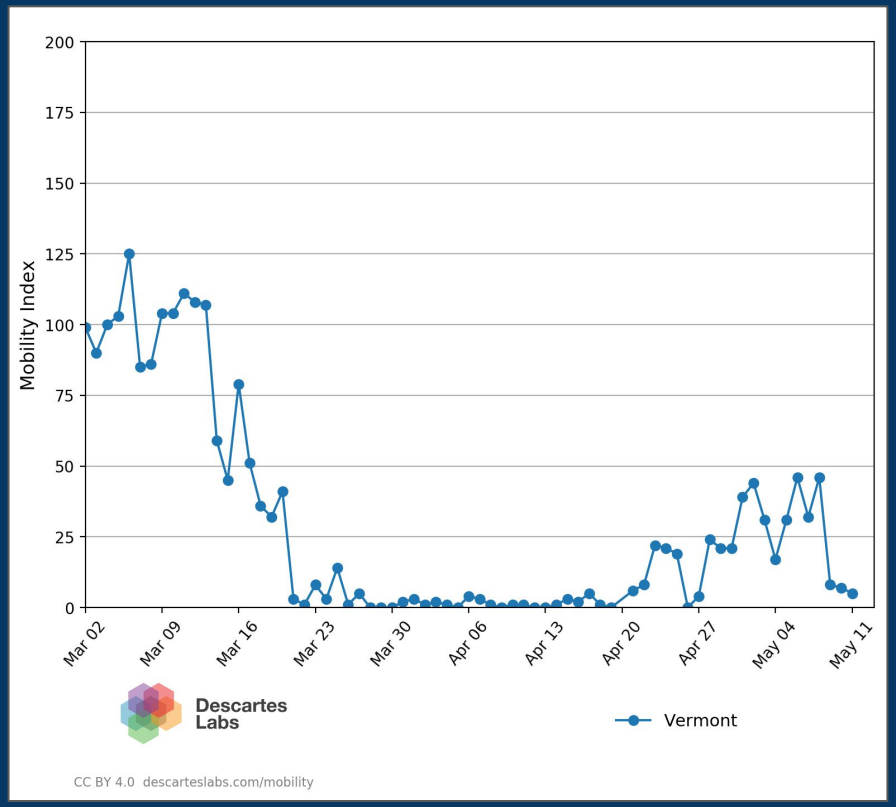


Source: Johns Hopkins University

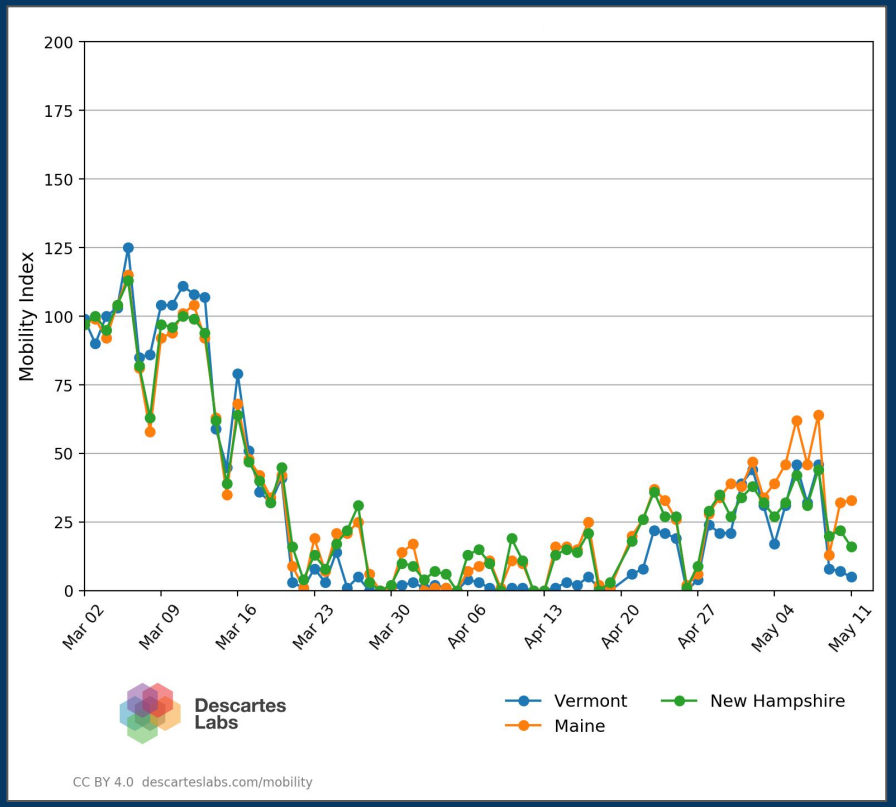
Mobility Data:

- Continued adherence to social distancing
- Increase in mobility with warming weather

Vermont



Northern New England



Source: Descartes Labs – May 11, 2020

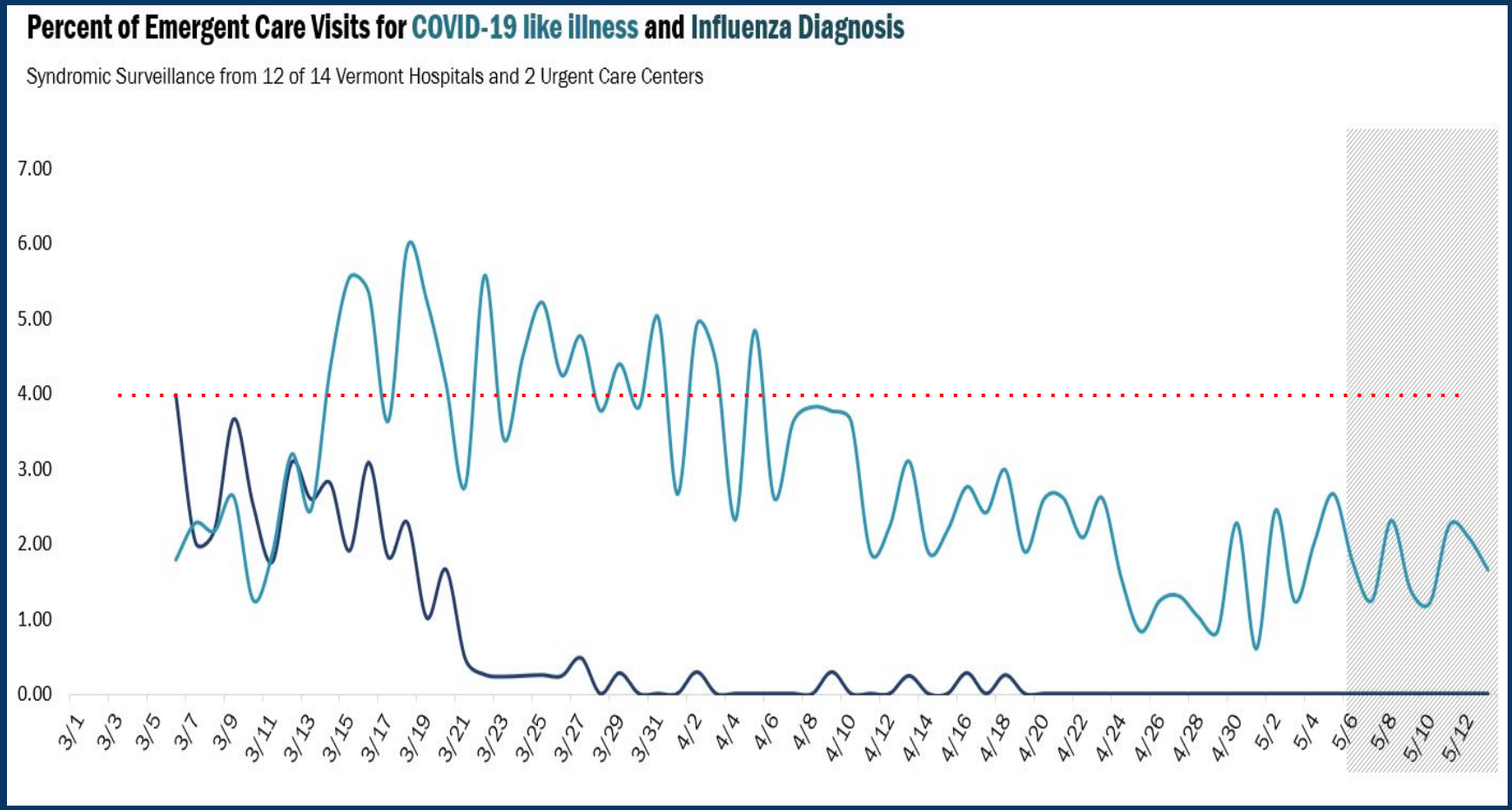
RESTART VERMONT

Metrics to Monitor

1. Syndromic Surveillance
2. Viral Growth & Reproductive Rates
3. Percentage of New Positive Tests
4. Hospital & Critical Care Bed Capacity

Data Point 1: Syndromic Surveillance

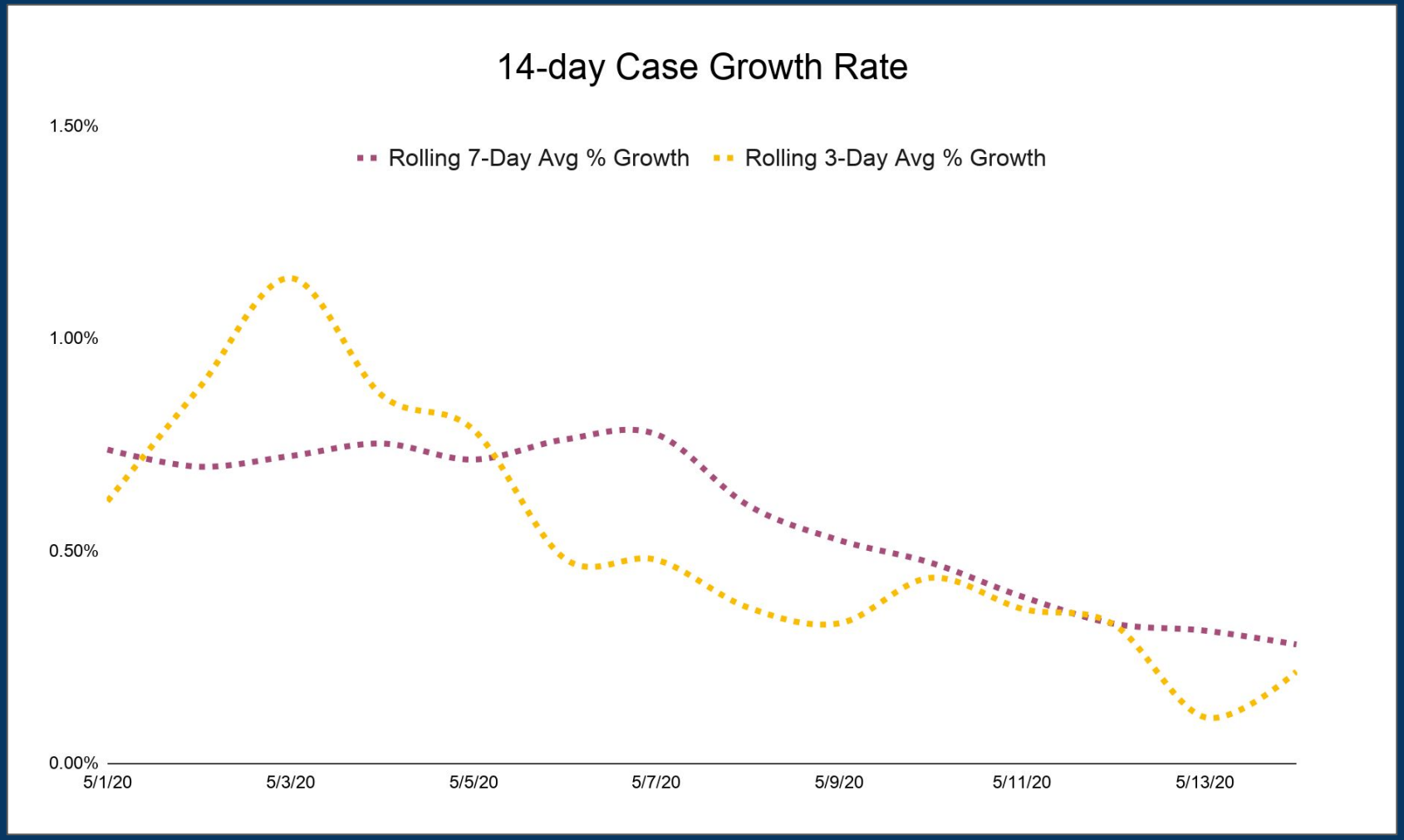
- **Summary:** Percentage of visits with COVID-19 like illness and Influenza diagnosis
- **Warning Flag:** Percentage of visits exceeding 4% for multiple consecutive days



Source: Vermont Department of Health

Data Point 2: Viral Growth and Reproductive Rates

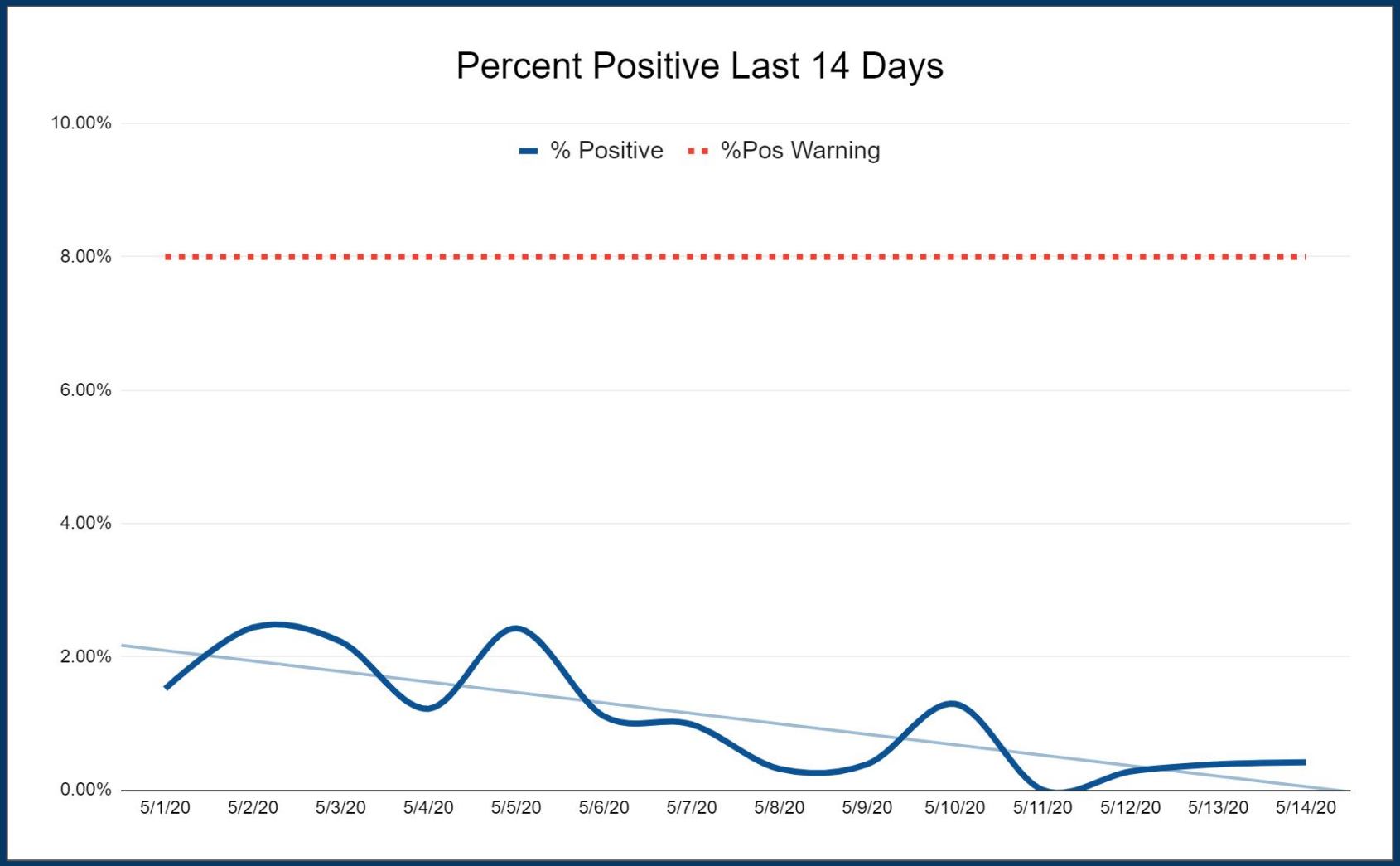
- **Summary:** Case growth measured by daily, 3-day, 7-day, and effective reproductive rate (R_t)
- **Warning Flags:** Sustained viral growth that would lead to <30% of open ICU beds



Source: Vermont Department of Health

Data Point 3: Percentage of New Positive Tests

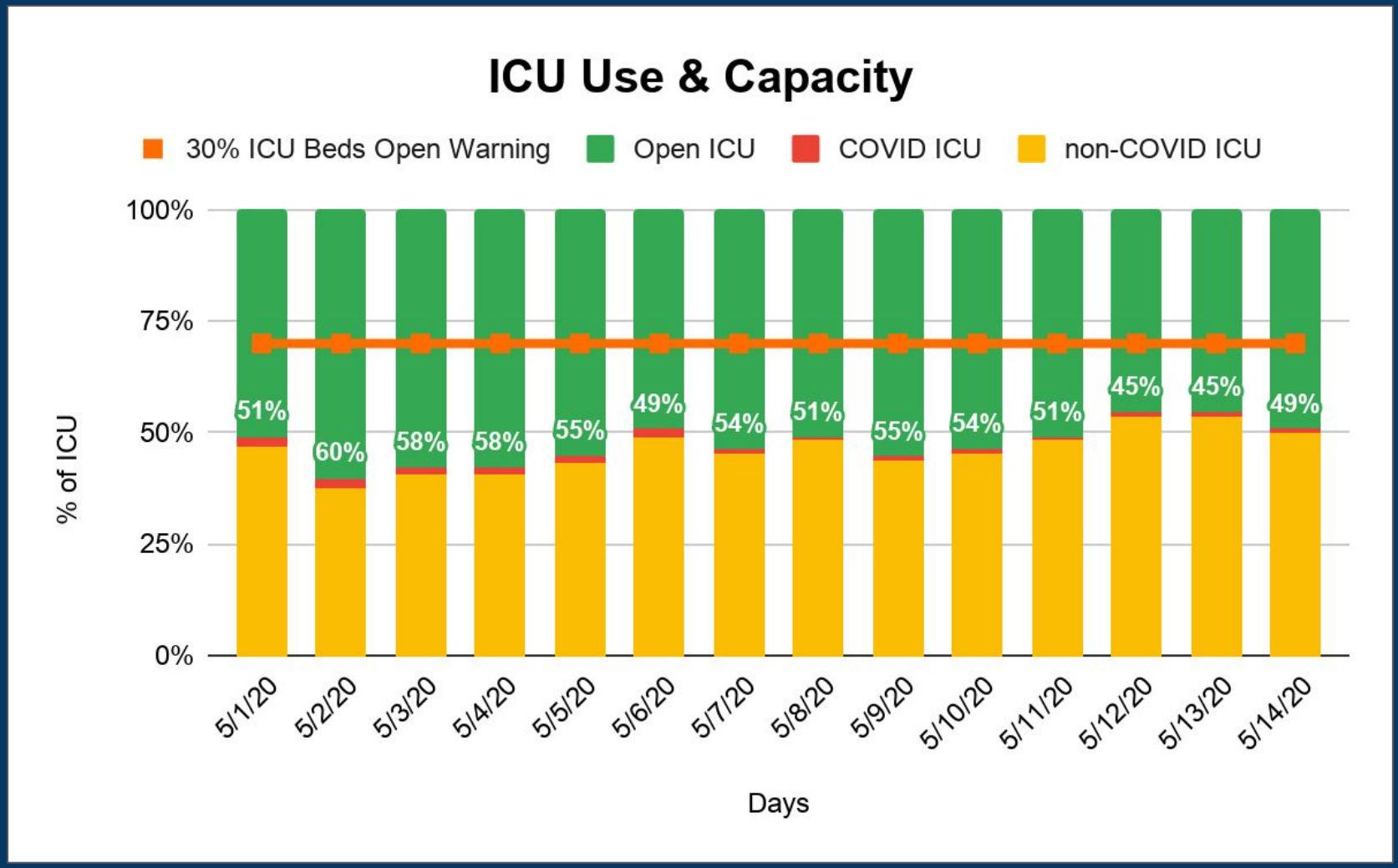
- **Summary:** Percent of tests resulting in a new positive case
- **Warning Flags:** New positives represent >8% of daily results



Source: Vermont Department of Health

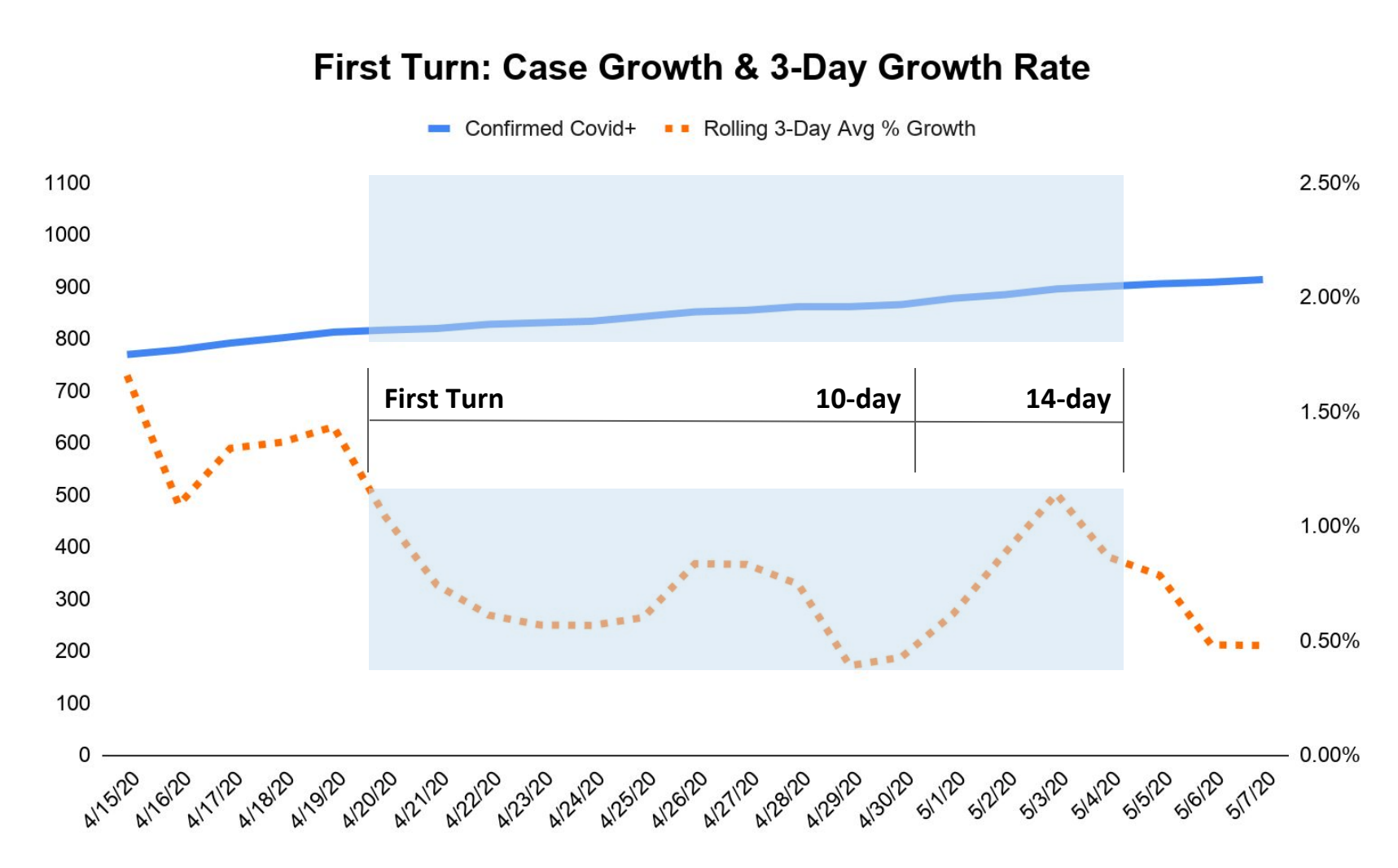
Data Point 4: Hospital & Critical Care Beds

- **Summary:** Number of occupied and unoccupied medical surgical and ICU beds
- **Warning Flags:** Reduction in ICU open beds to less than 30%



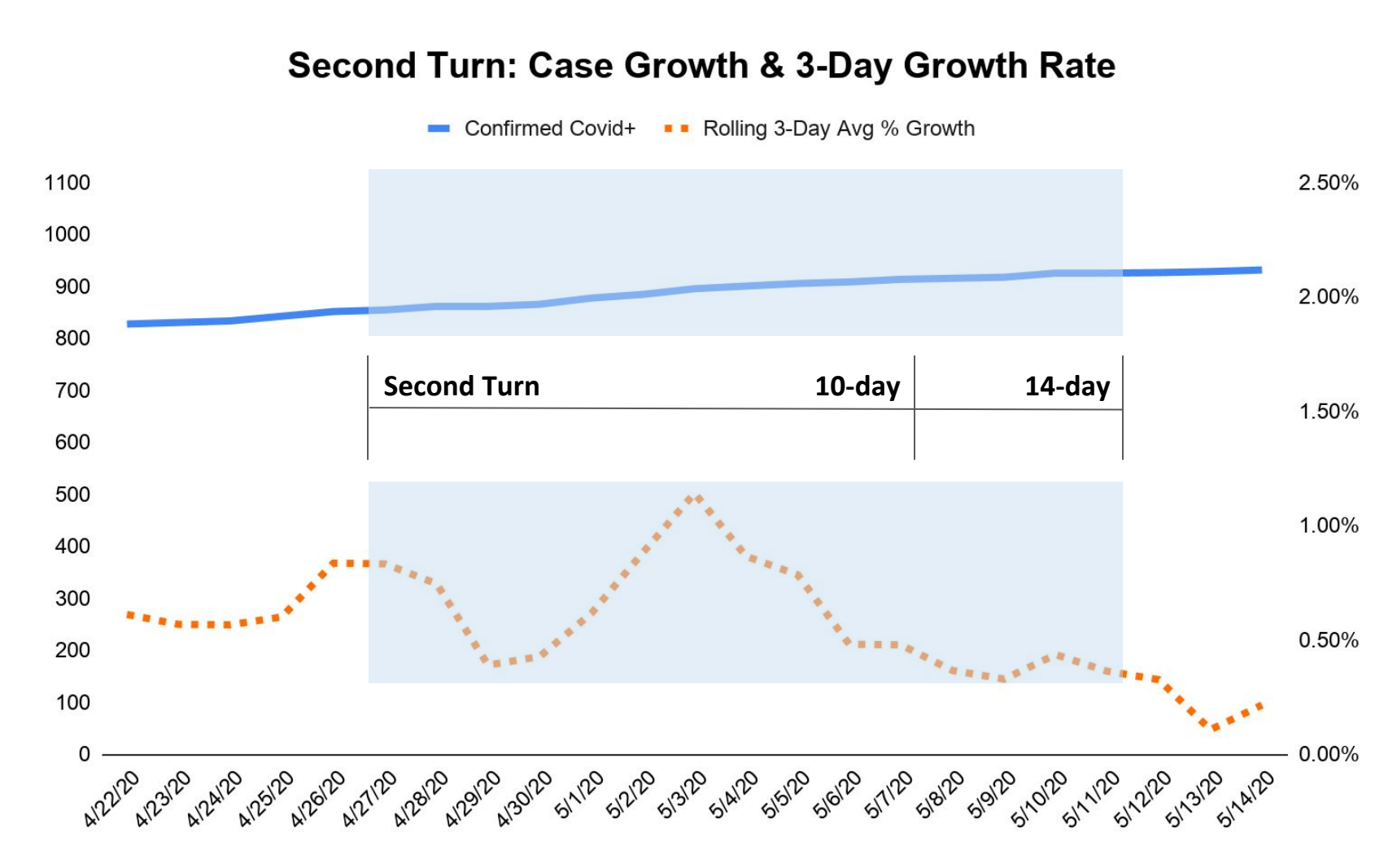
Source: Vermont Department of Health

Restart: Turn 1 Disease Dynamics



Source: Vermont Department of Health

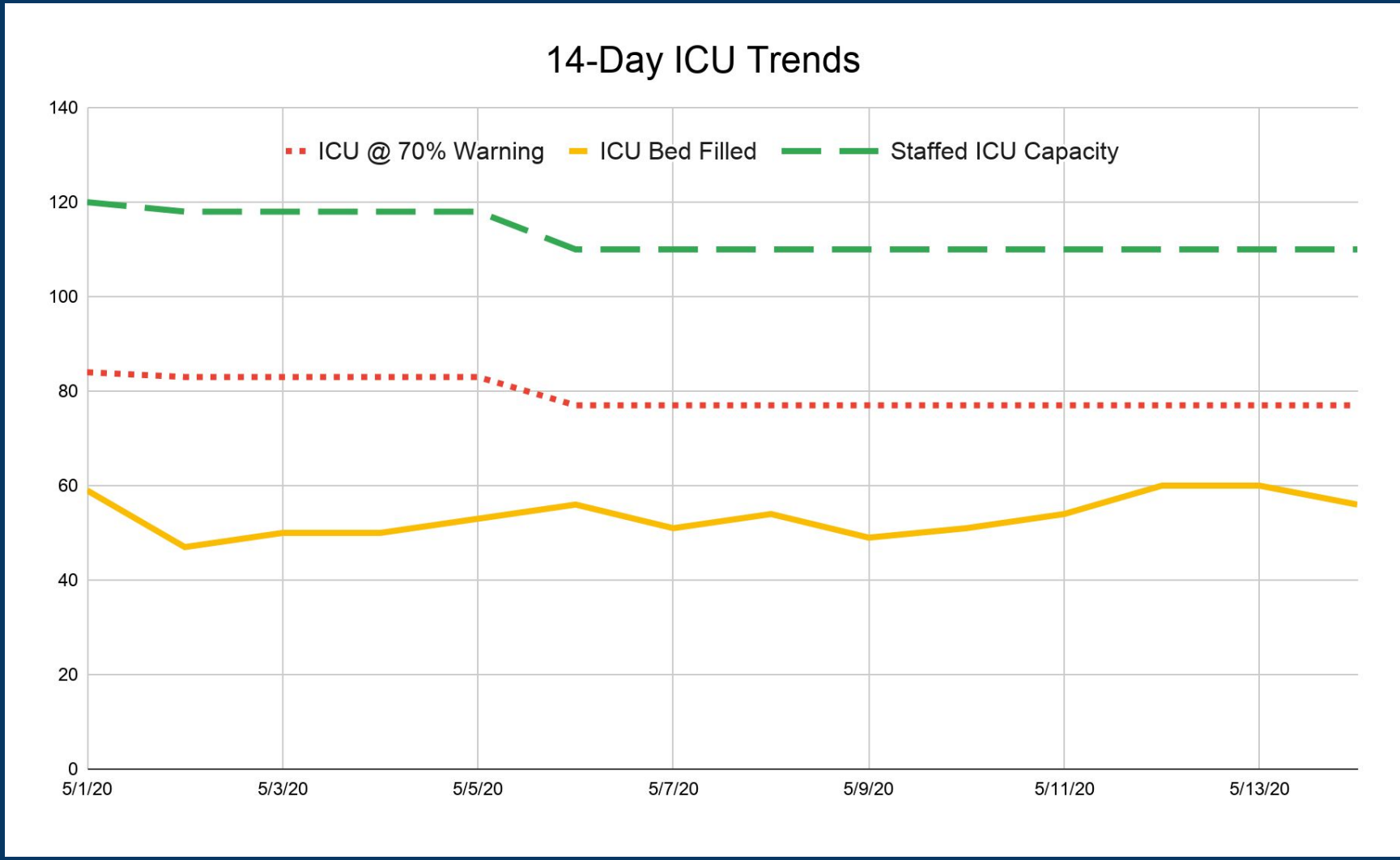
Restart: Turn 2 Disease Dynamics



Source: Vermont Department of Health

Appendix

14-Day ICU Data



Source: Vermont Department of Health