

# **COVID-19 Modeling**

## **May 18, 2021**

Presentation available at:  
[dfr.vermont.gov](https://dfr.vermont.gov)

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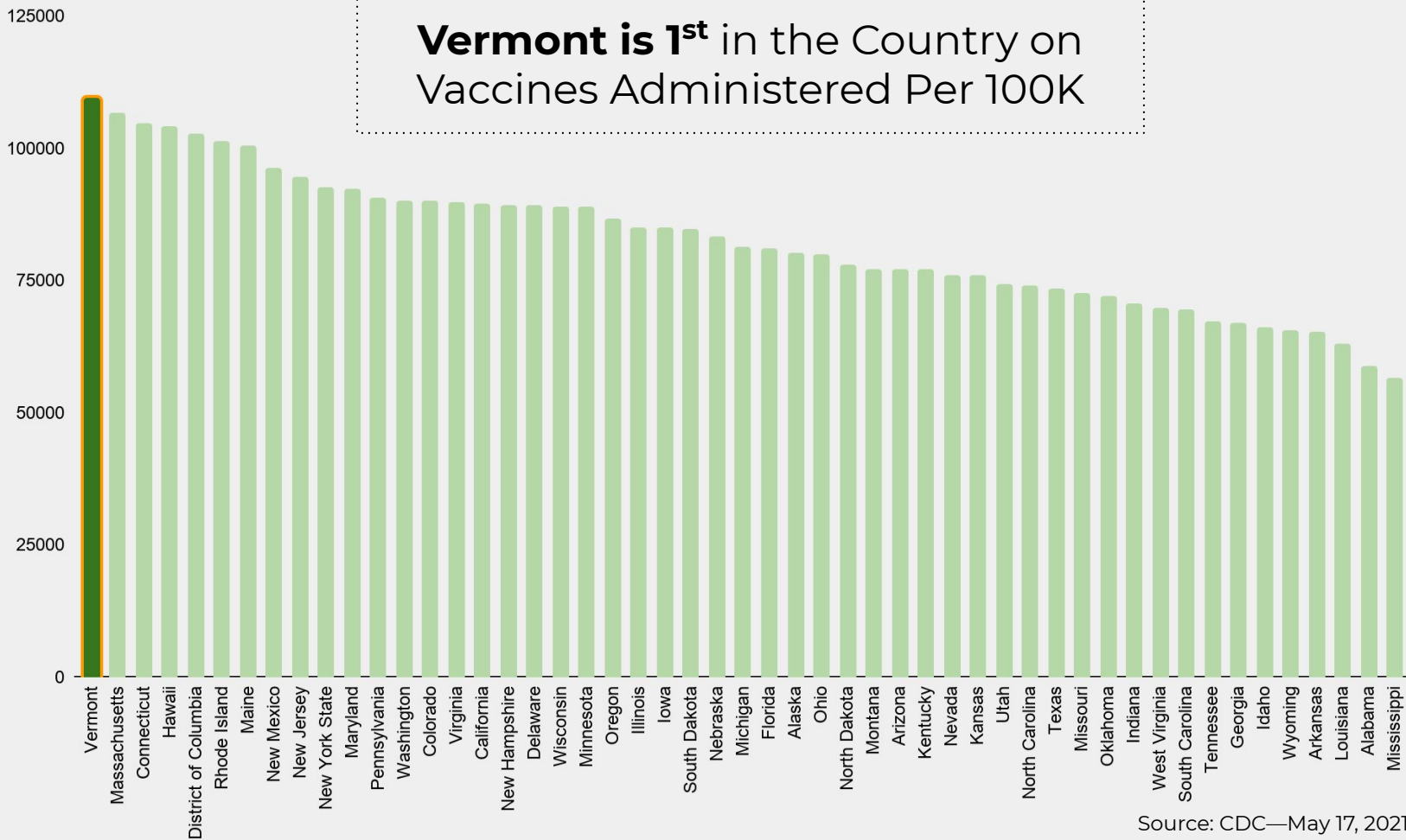
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# Vermont Vaccination Data

# Vermont CDC Vaccine Scorecard

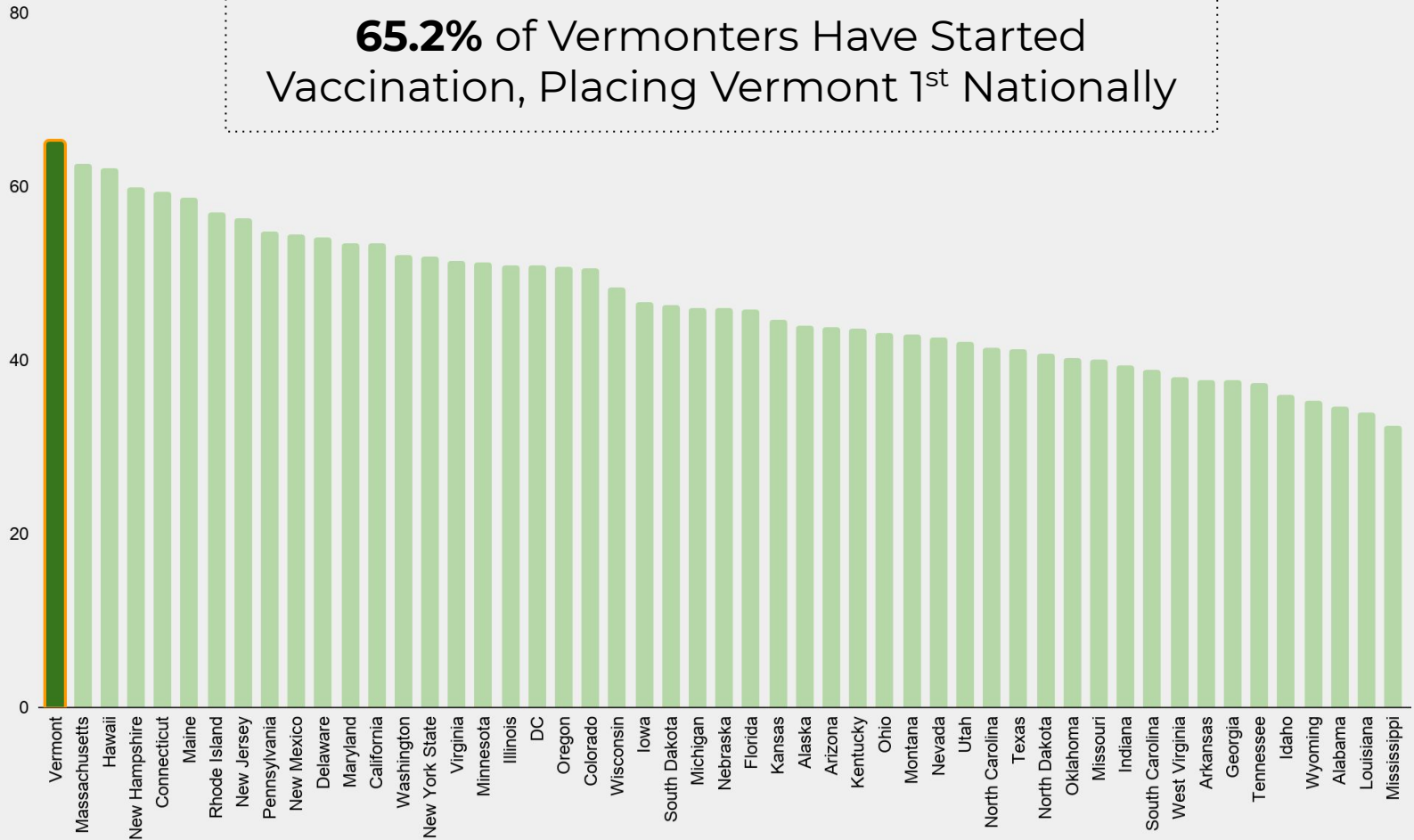
Metric	Figure	State Ranking
<b>Doses Administered per 100K</b>	<b>109,535</b>	<b>1</b>
<b>% At Least 1 Dose</b>	<b>65.2%</b>	<b>1</b>
<b>% Fully Vaccinated</b>	<b>47.5%</b>	<b>3</b>
<b>% 65+ One Dose</b>	<b>97.5%</b>	<b>1</b>
<b>% 65+ Fully Vaccinated</b>	<b>88.0%</b>	<b>1</b>

**Vermont is 1<sup>st</sup>** in the Country on  
Vaccines Administered Per 100K



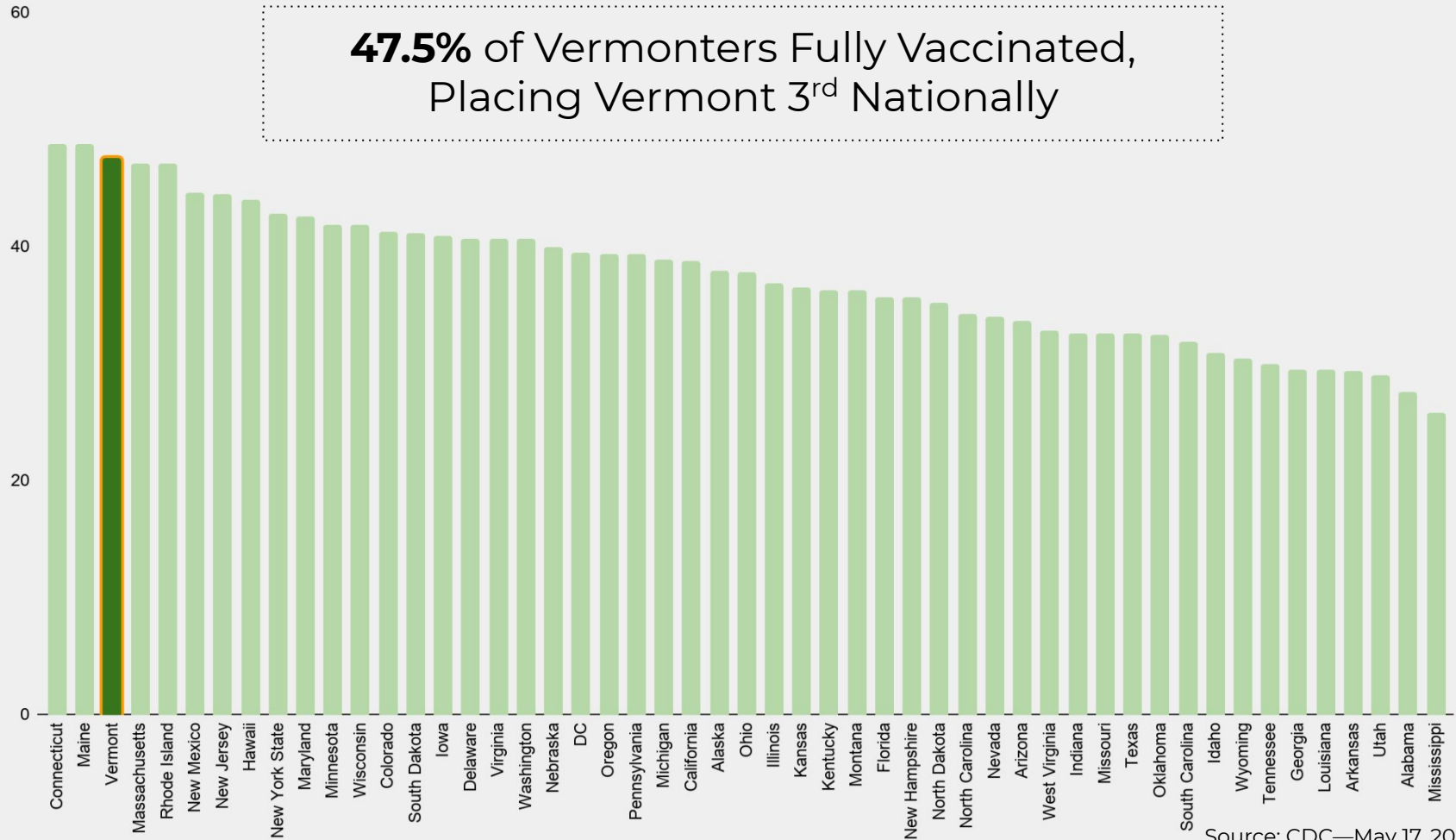
Source: CDC—May 17, 2021

**65.2%** of Vermonters Have Started Vaccination, Placing Vermont 1<sup>st</sup> Nationally



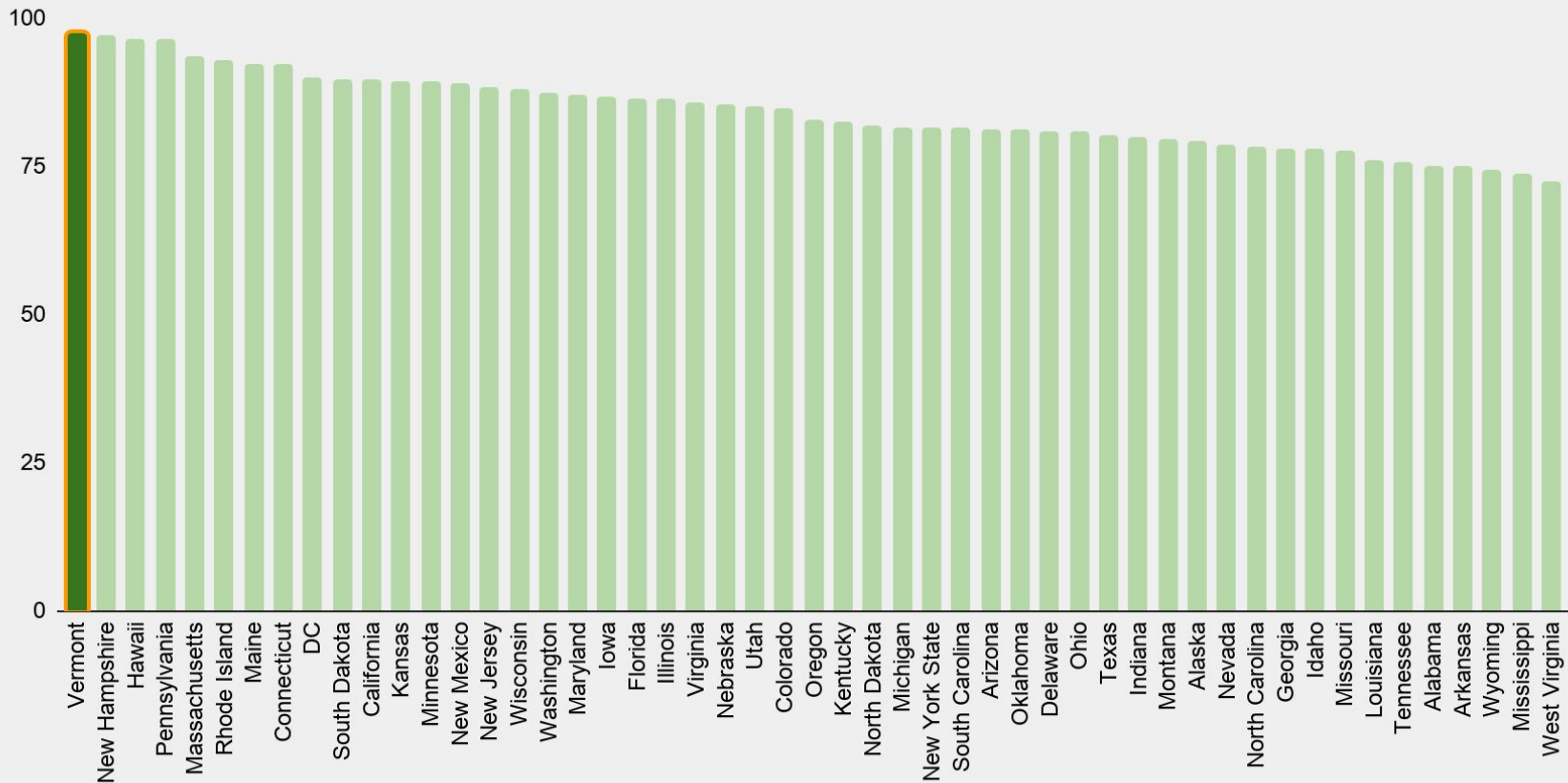
Source: CDC—May 17, 2021

**47.5%** of Vermonters Fully Vaccinated,  
Placing Vermont 3<sup>rd</sup> Nationally



Source: CDC—May 17, 2021

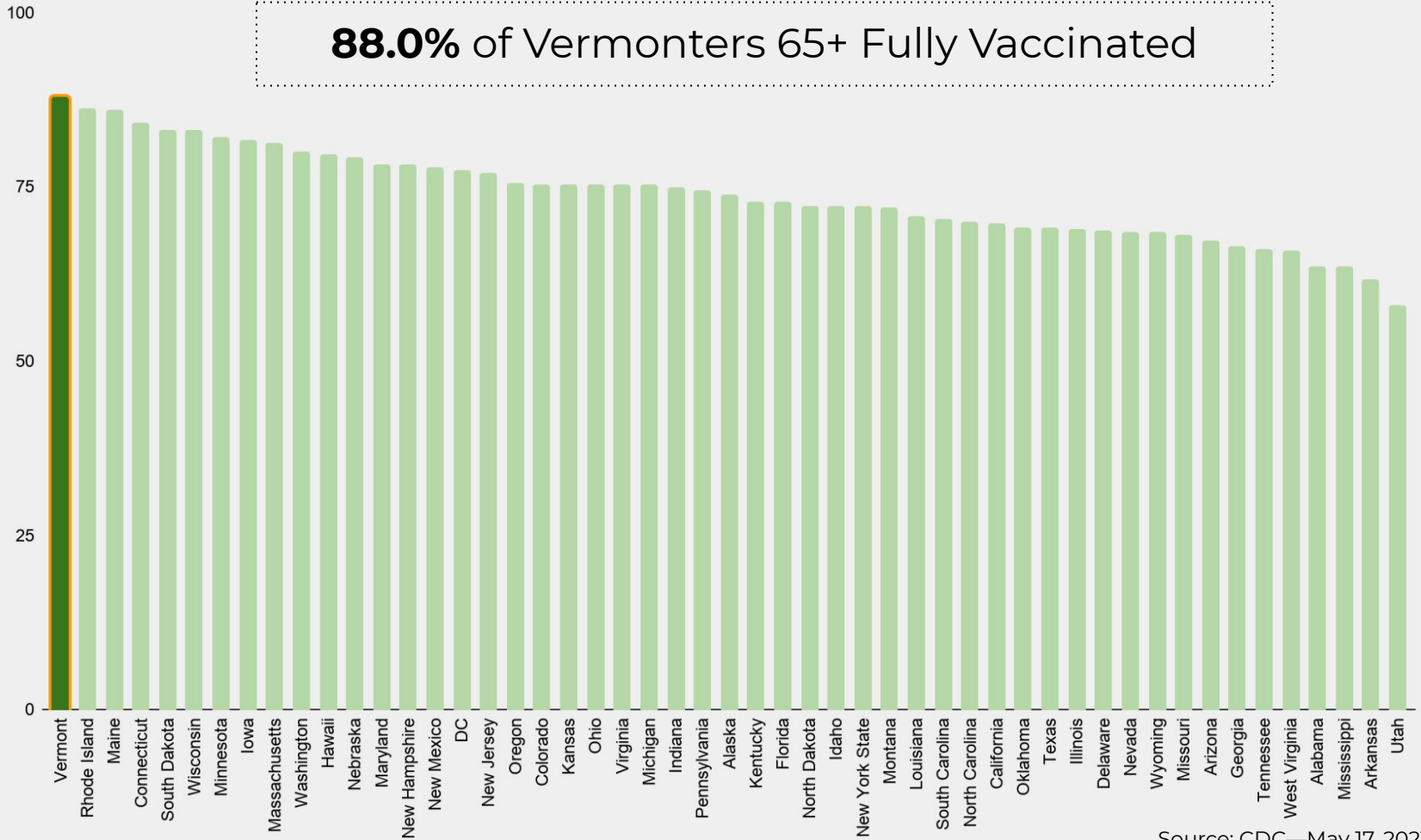
# 97.5% of Vermonters 65+ Partially or Fully Vaccinated



Source: CDC—May 17, 2021

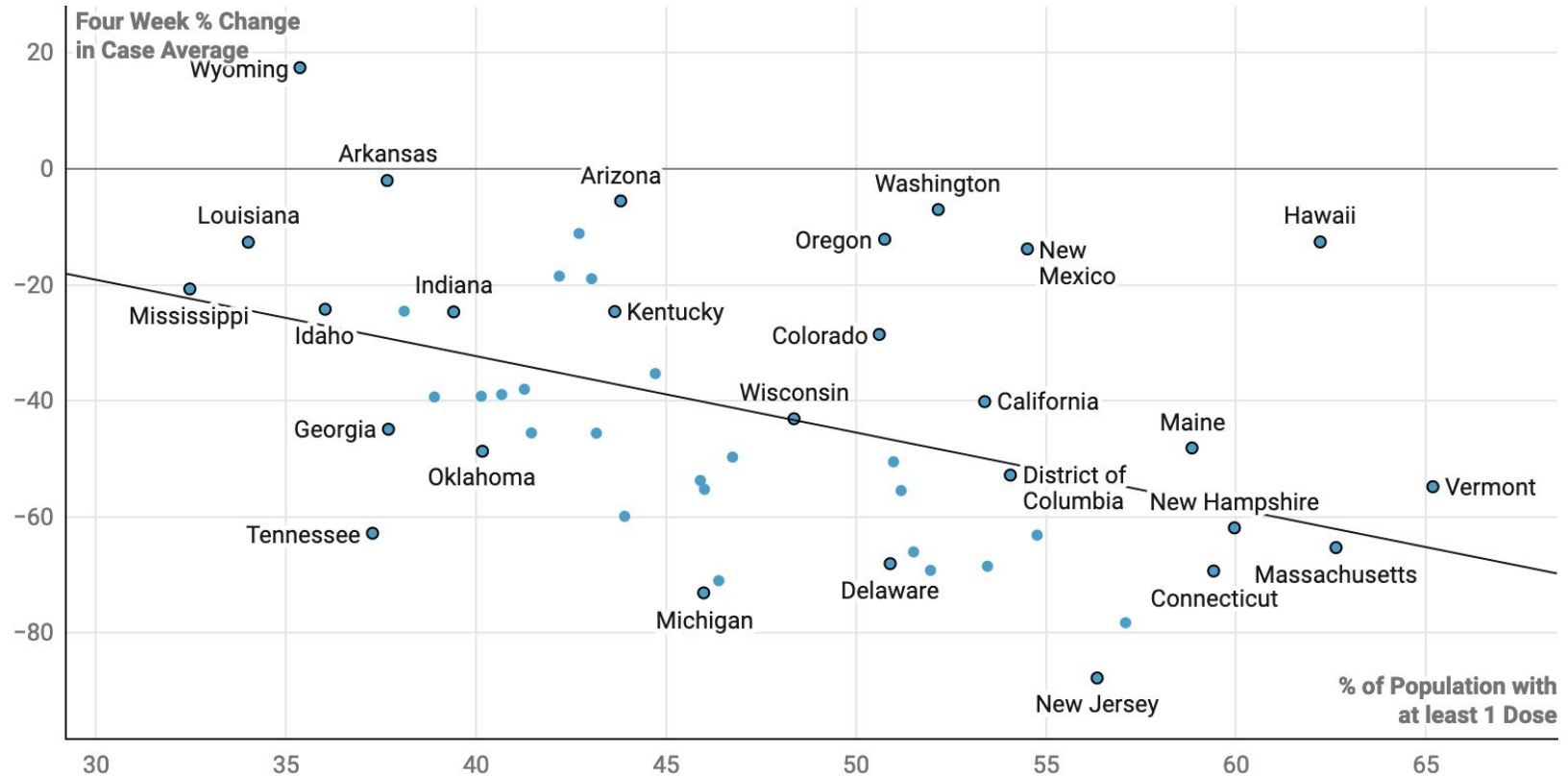


# 88.0% of Vermonters 65+ Fully Vaccinated



Source: CDC—May 17, 2021

# % Initiated Vaccinations and Four Week Change in Case Rate

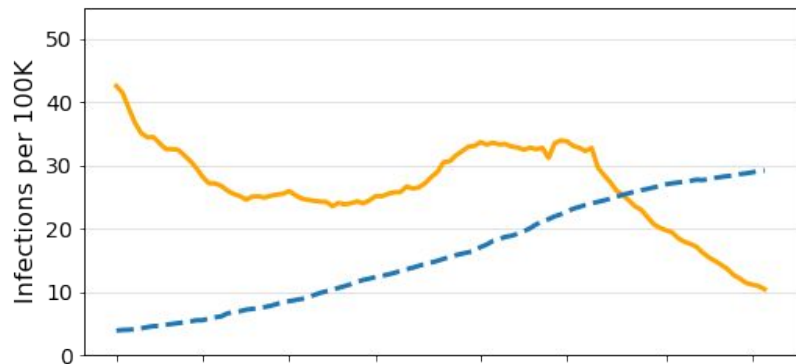


Case rate changes calculated as the difference between 7-day averages. Linear regression shows a correlation of -0.46.

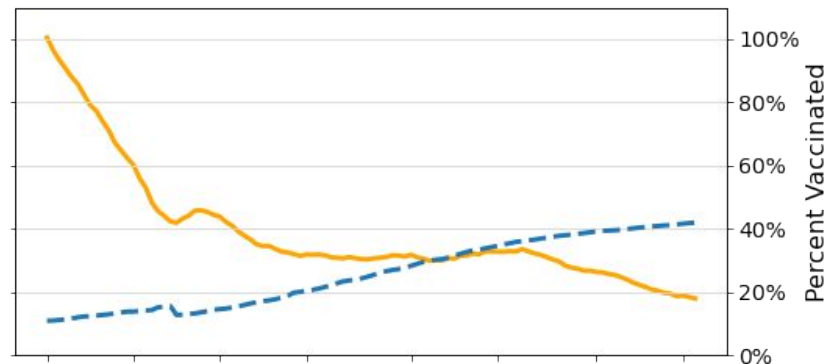
# US Census Region Case Rate & Vaccination by Age Band

- New Infections per 100K (14-Day Average)
- - - Percent Received First Vaccine Dose

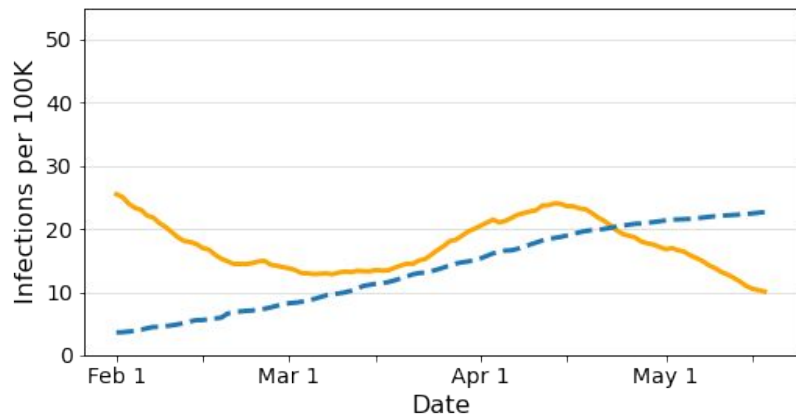
### Northeast



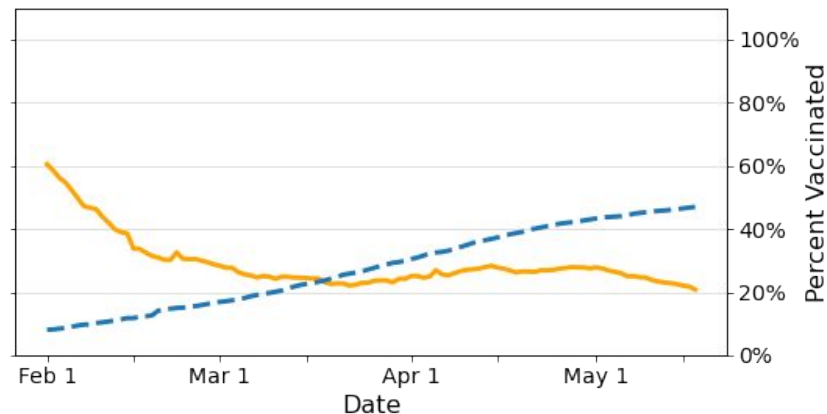
### South



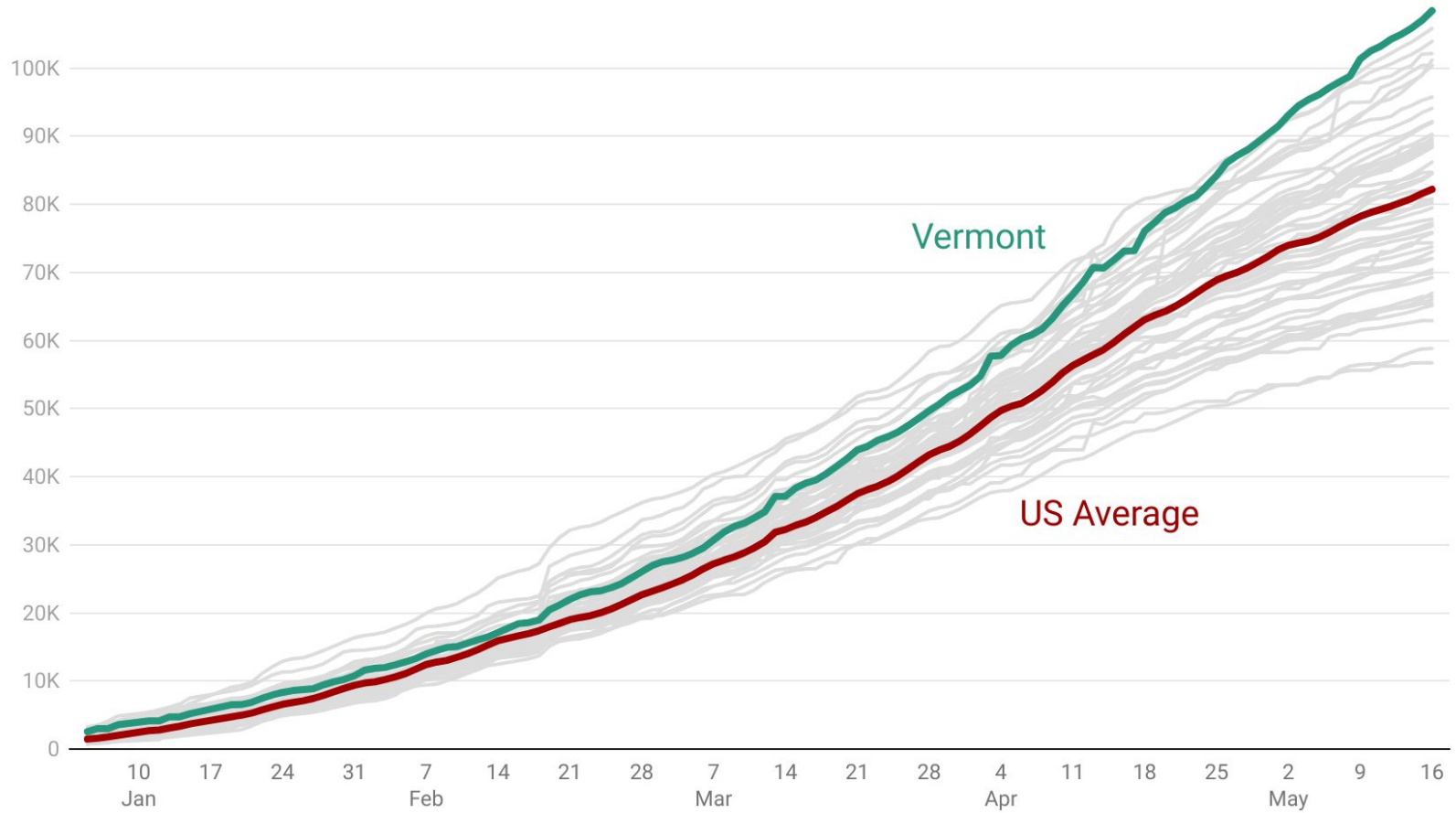
### Midwest



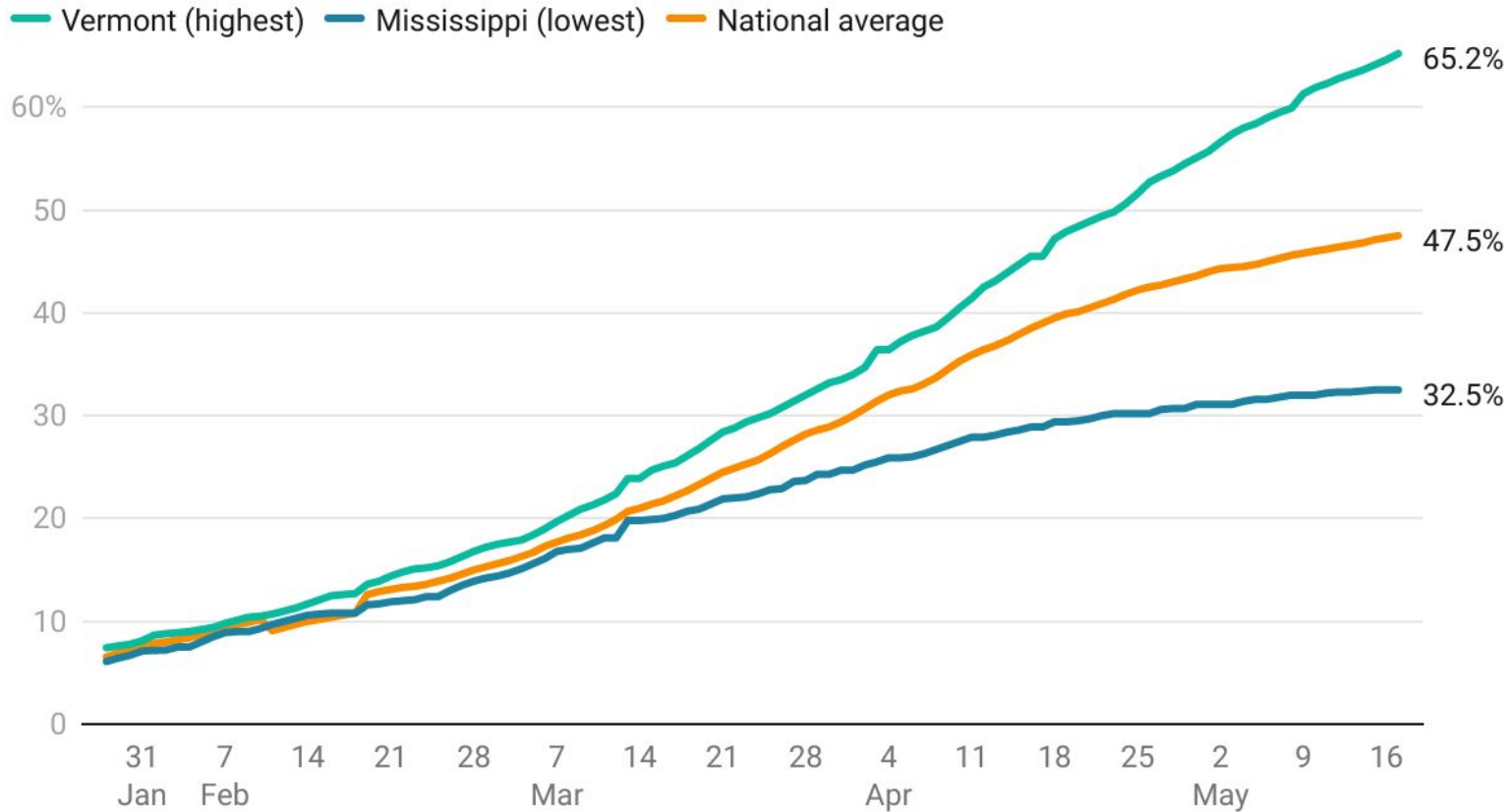
### West



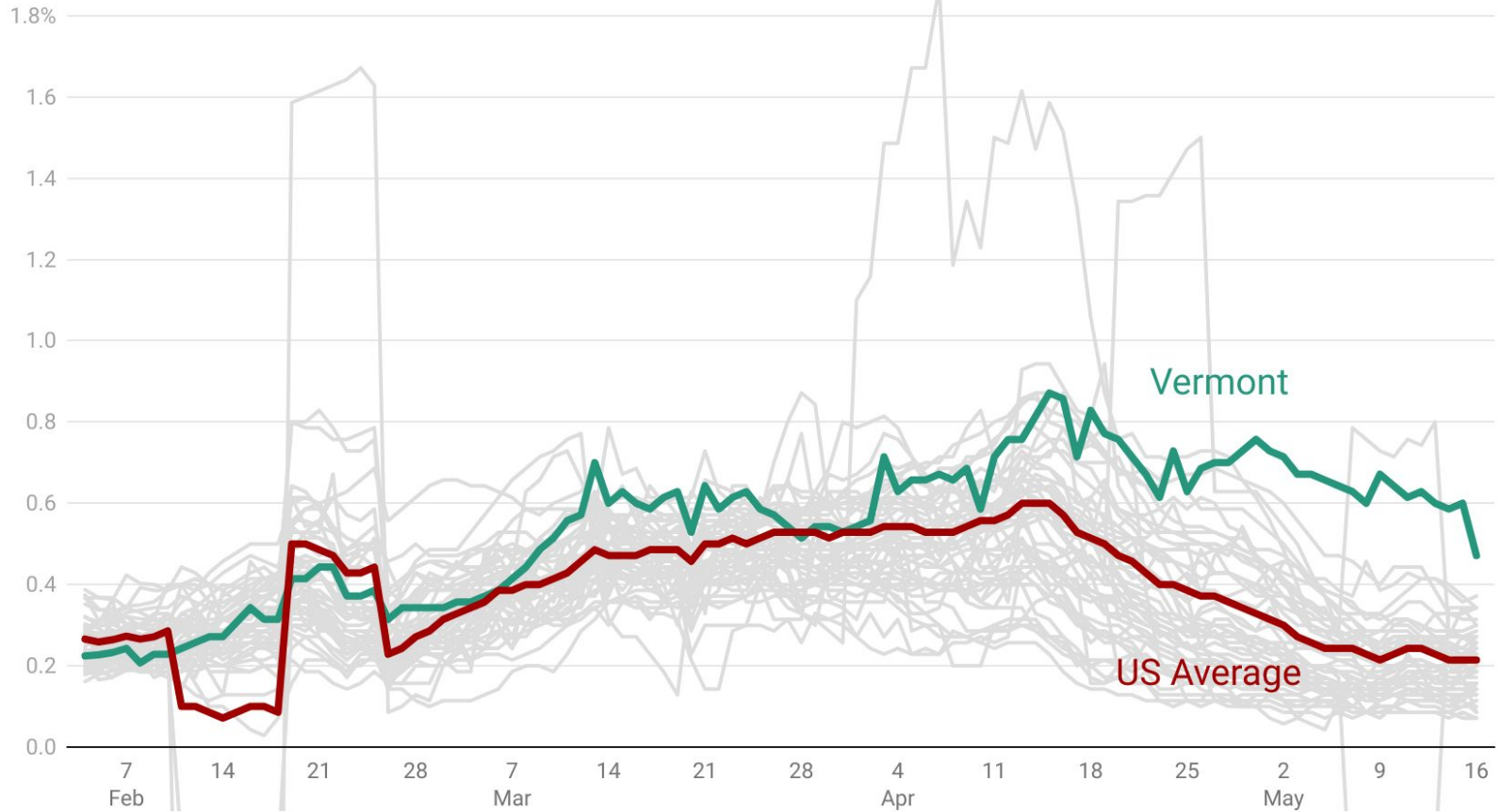
# COVID-19 Vaccine Doses Administered per 100K



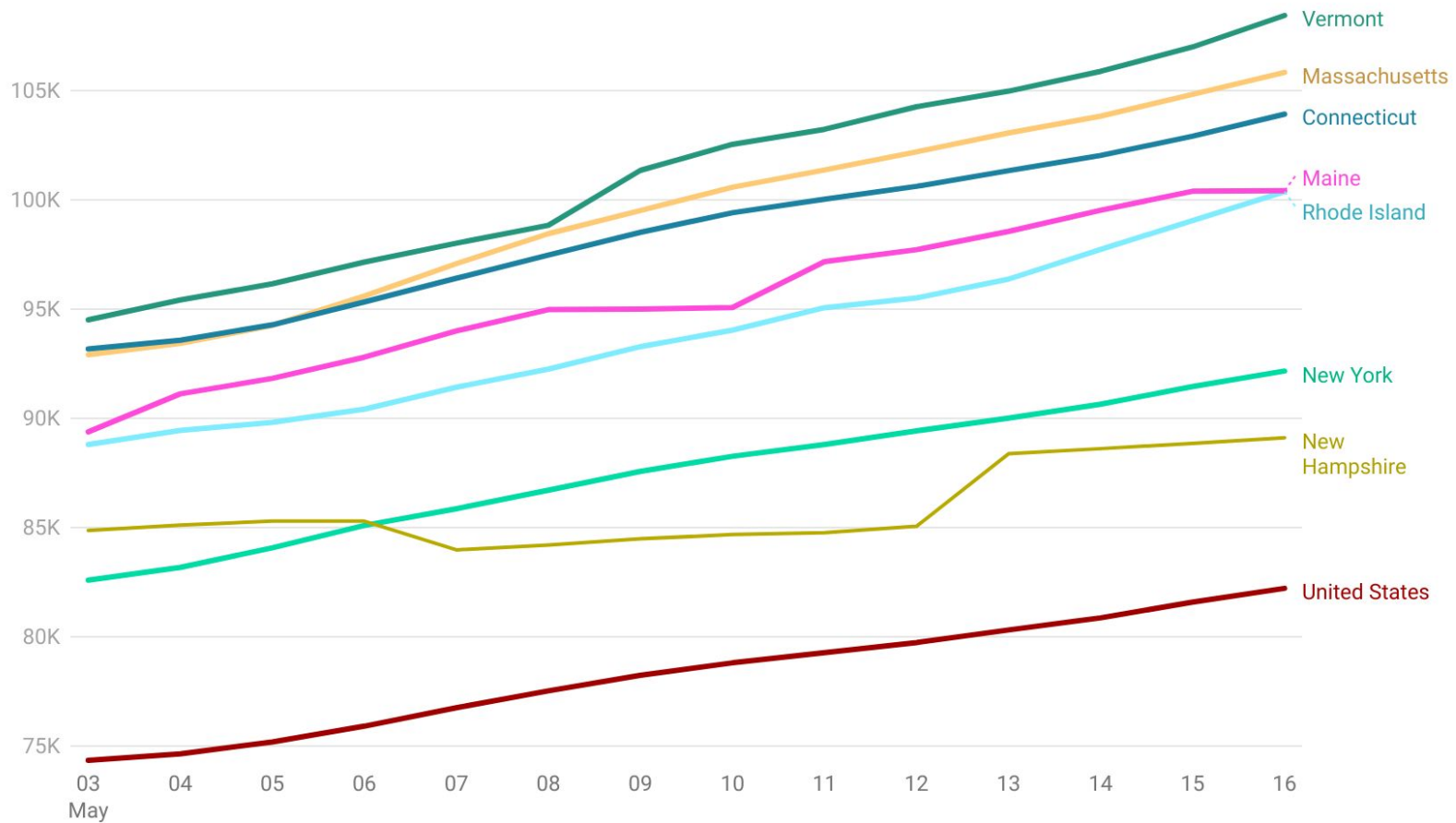
# Percentage with At Least 1 Dose



# Daily Percentage of Population Starting Vaccination

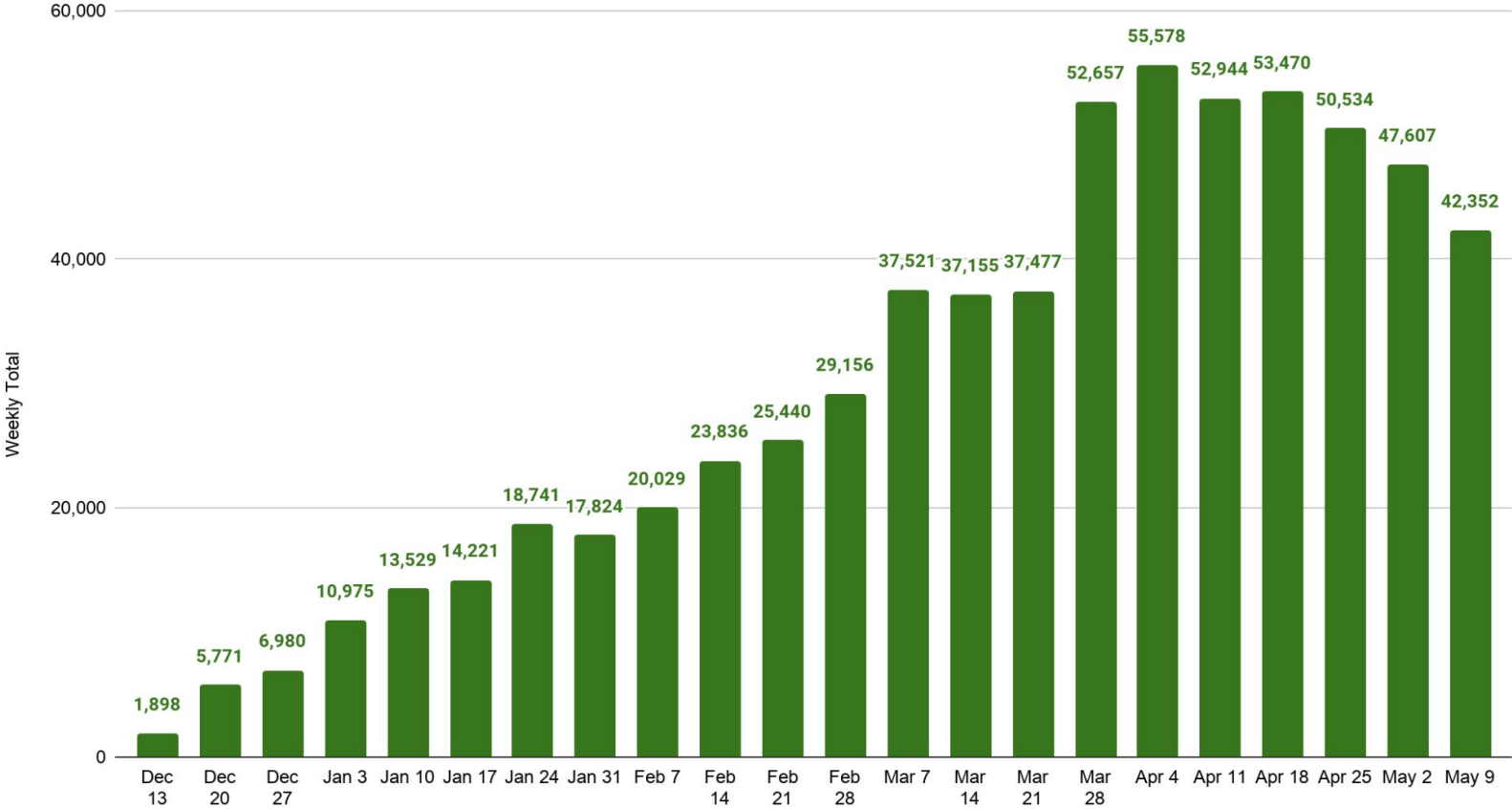


# COVID-19 Vaccine Doses Administered per 100K - Northeast



Source: CDC—May 17, 2021

# Vermont Weekly Vaccine Administrations

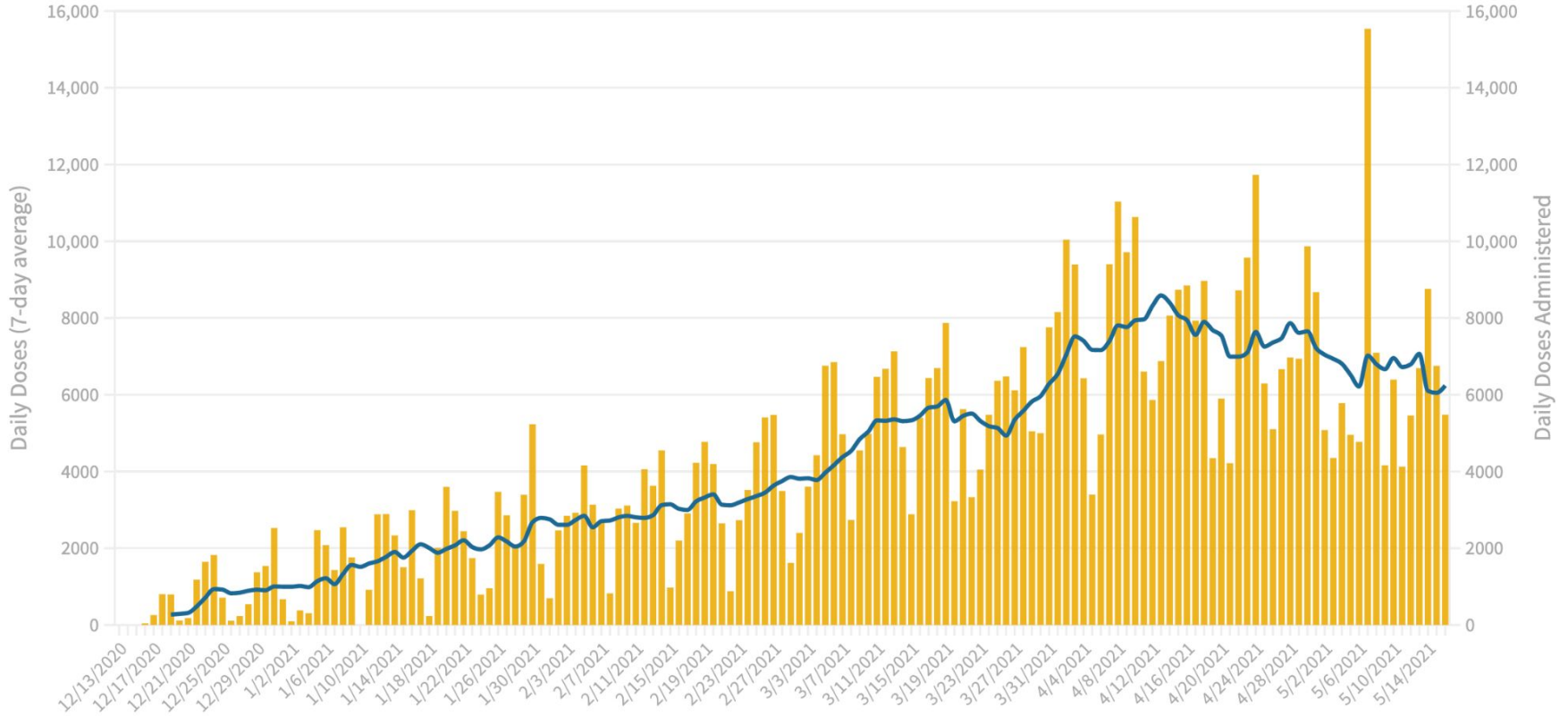


Source: Vermont Department of Health—May 17, 2021; week calculated beginning given Sunday through Saturday



# COVID-19 Vaccinations in Vermont

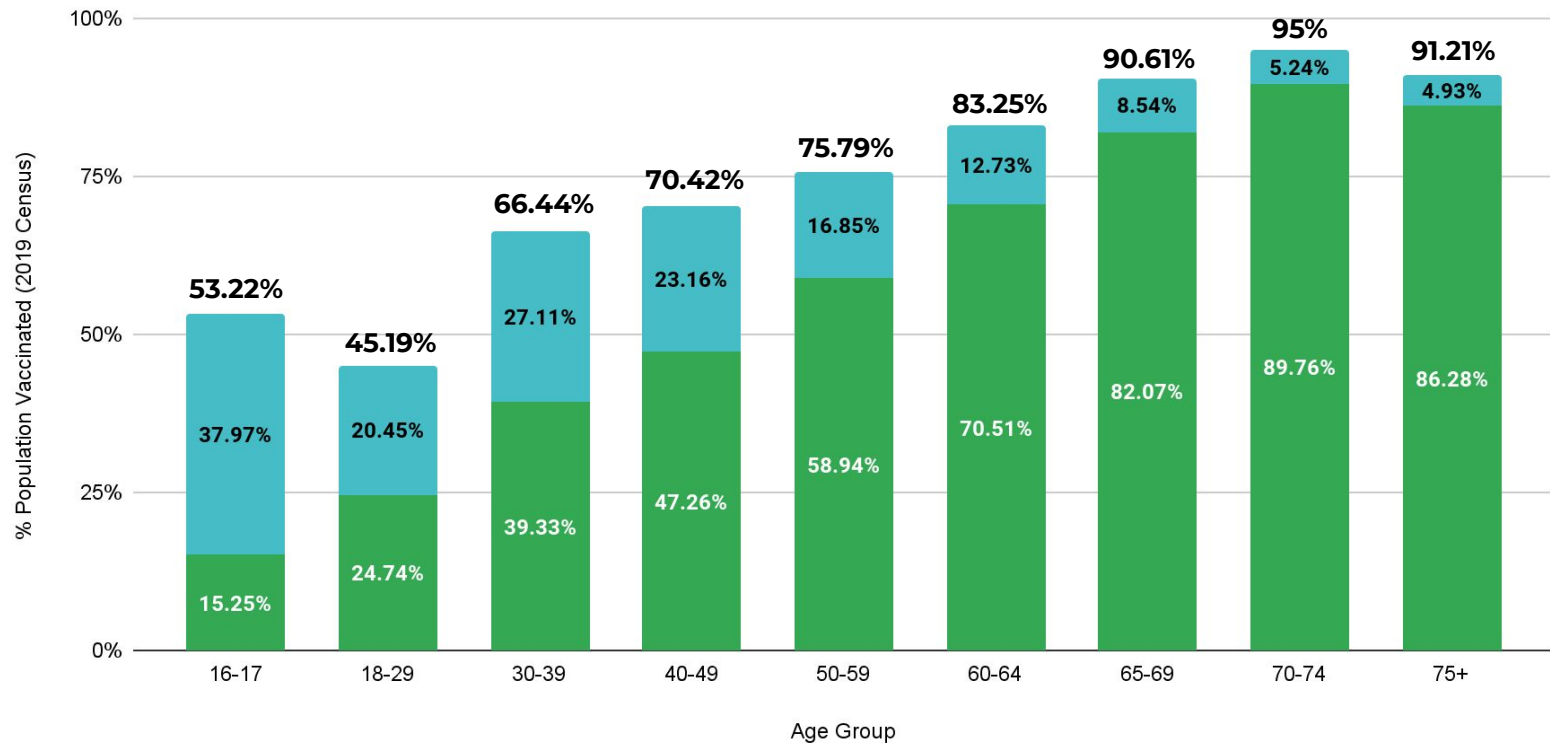
■ Daily Doses (7-day average) ■ Daily Doses Administered



# Vermont Vaccination Progress

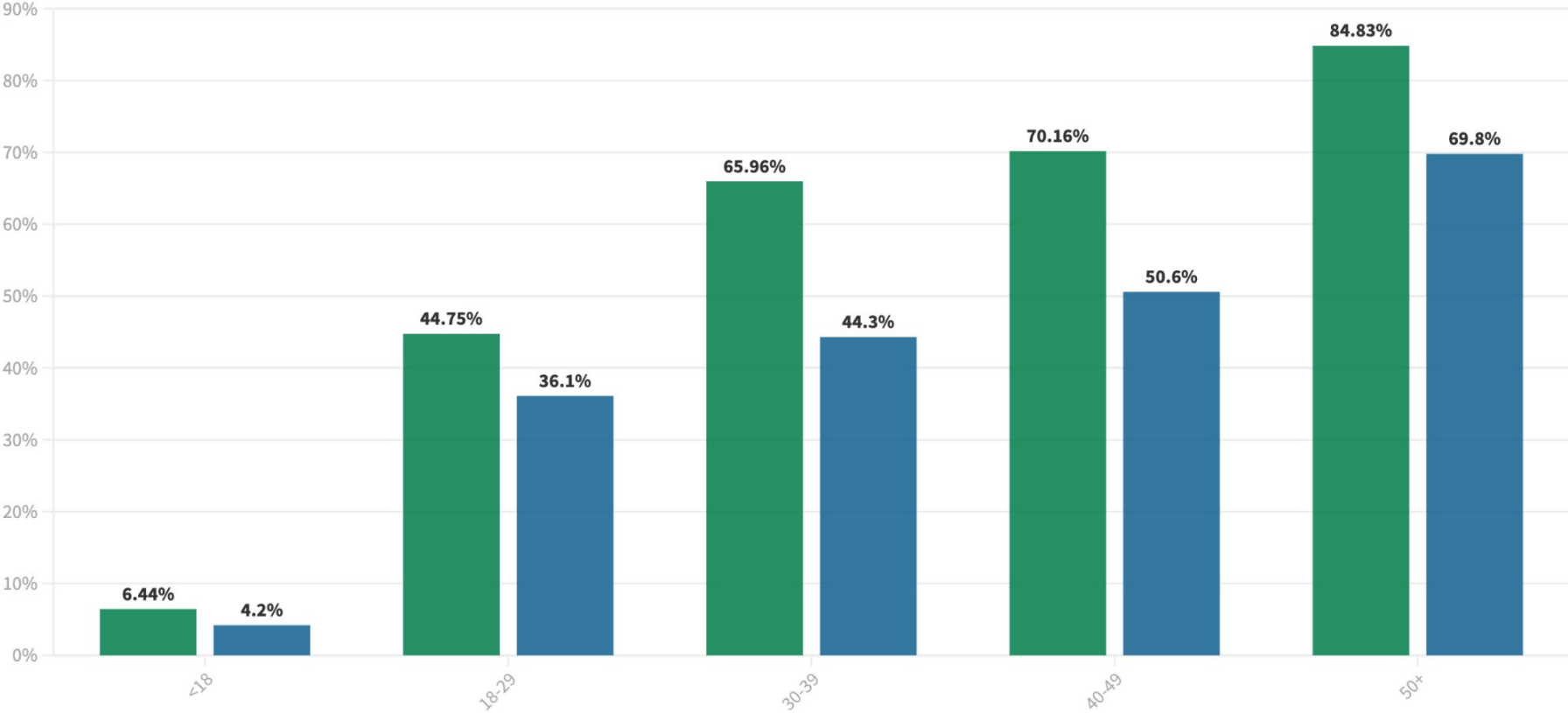
By Age Band

Partially Vaccinated Fully Vaccinated



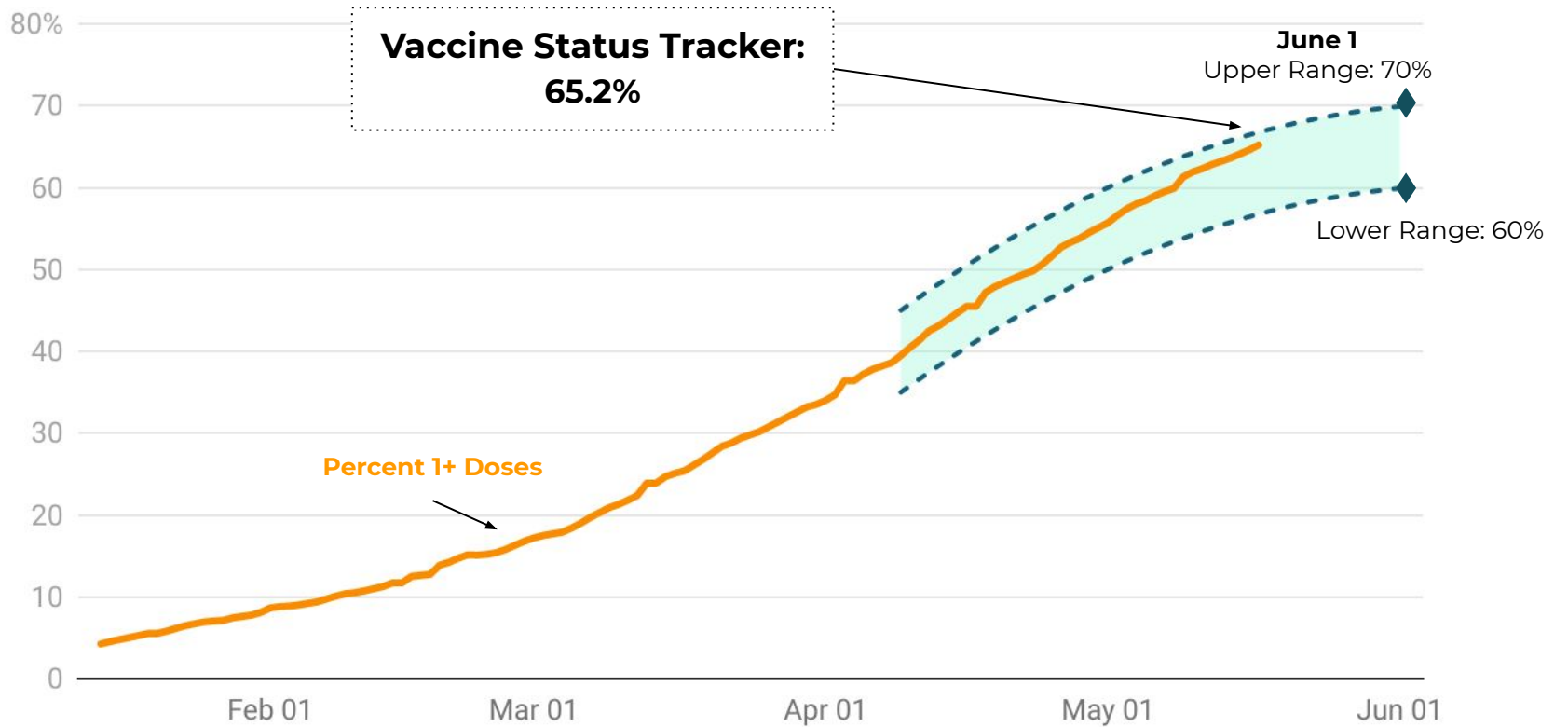
# Vaccinations by Age — Vermont vs. United States

Vermont United States



Source: Vermont Department of Health and CDC—May 17, 2021

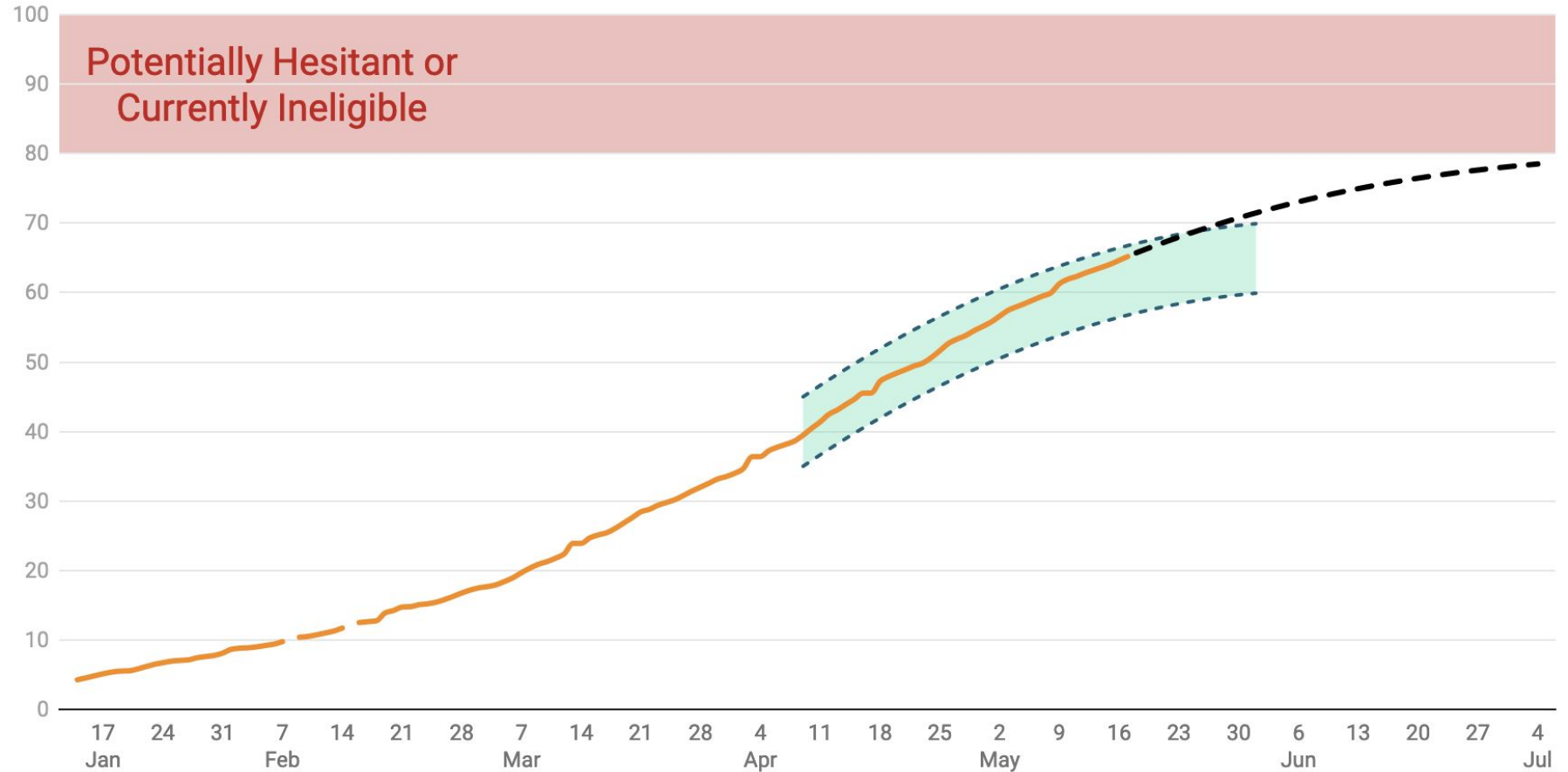
# Vermont Forward Progress to Goal



Source: CDC—May 17, 2021; ranges represent 1+ dose for all Vermonters; VT at 63.2% using 2020 census with population of 643,503

# Forecasted % Of Vermonters With 1+ COVID Vaccine Doses

— Actual — Forecasted



# Vermont Case Data

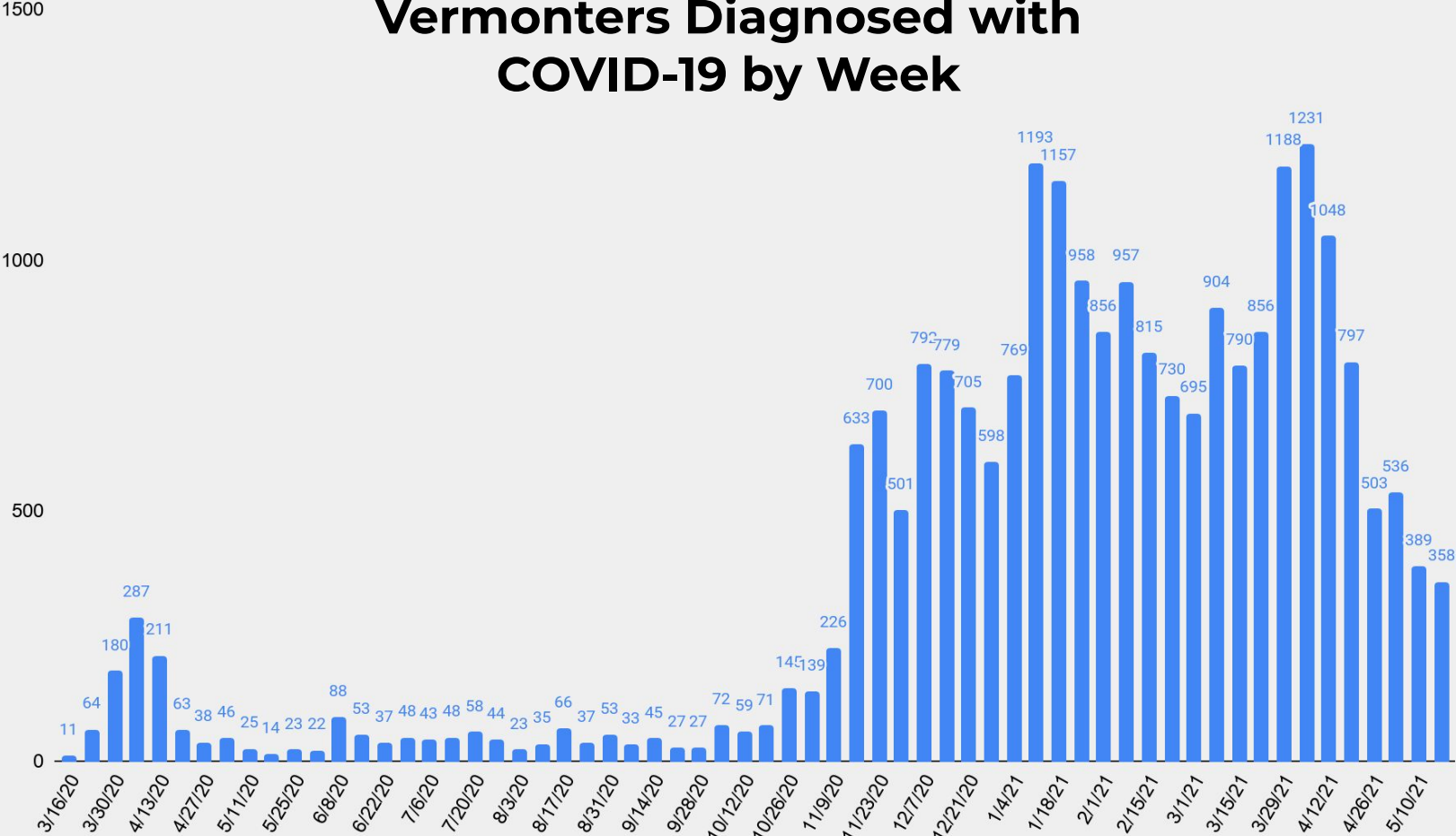
# COVID Infections per 100K in Vermont (7-Day Average)



Cases are down 75% since April 1st and 24% in the last week

Source: Vermont Department of Health—May 18, 2021

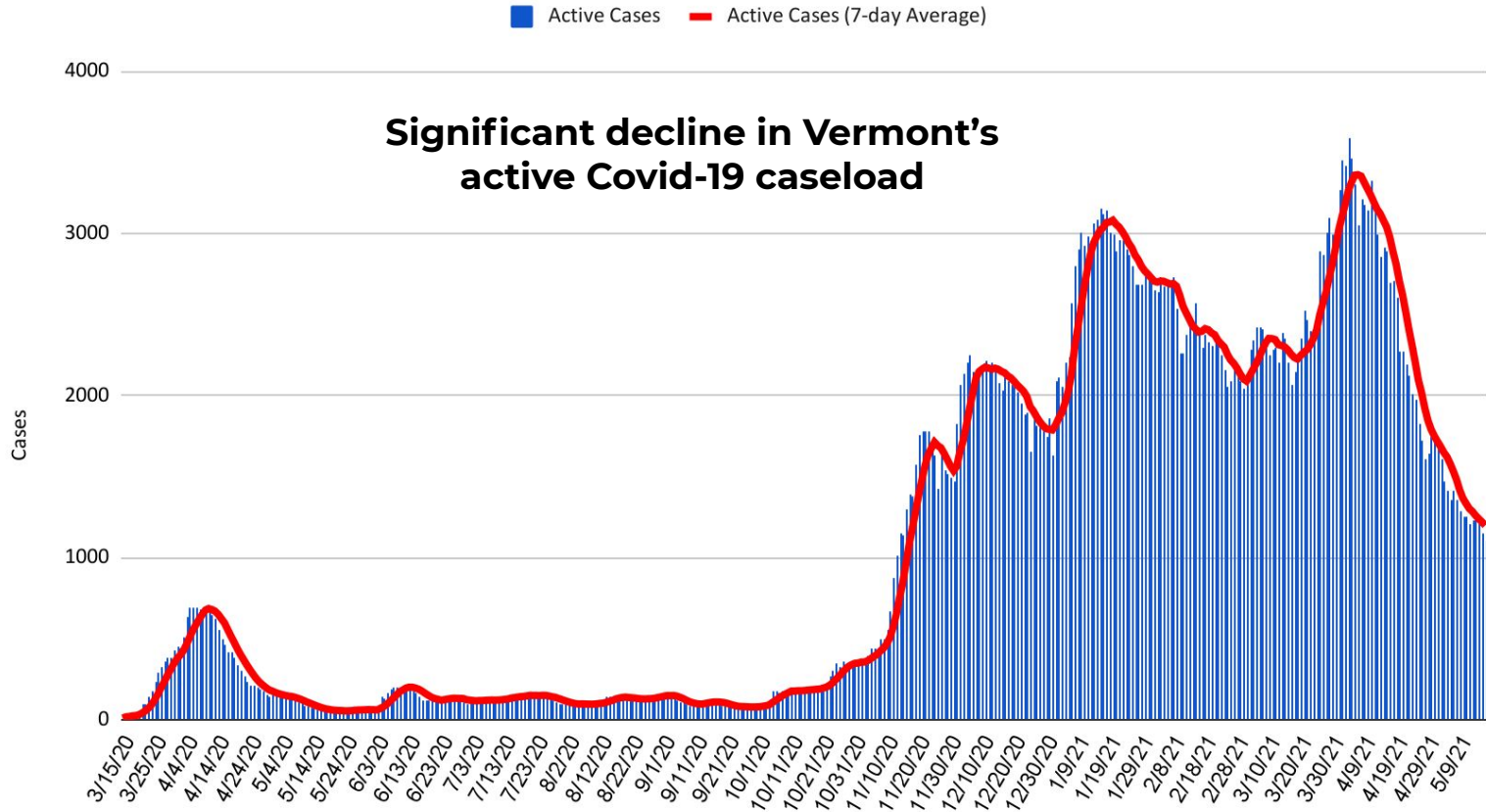
# Vermonters Diagnosed with COVID-19 by Week



Source: Vermont Department of Health (week calculated as Tuesday to Monday)



## Estimated Active Cases of COVID-19 in Vermont



# Age of Infected Vermonters

Median age of COVID positive individuals in VT over the last 14 days.



Source: VDH—May 17, 2021

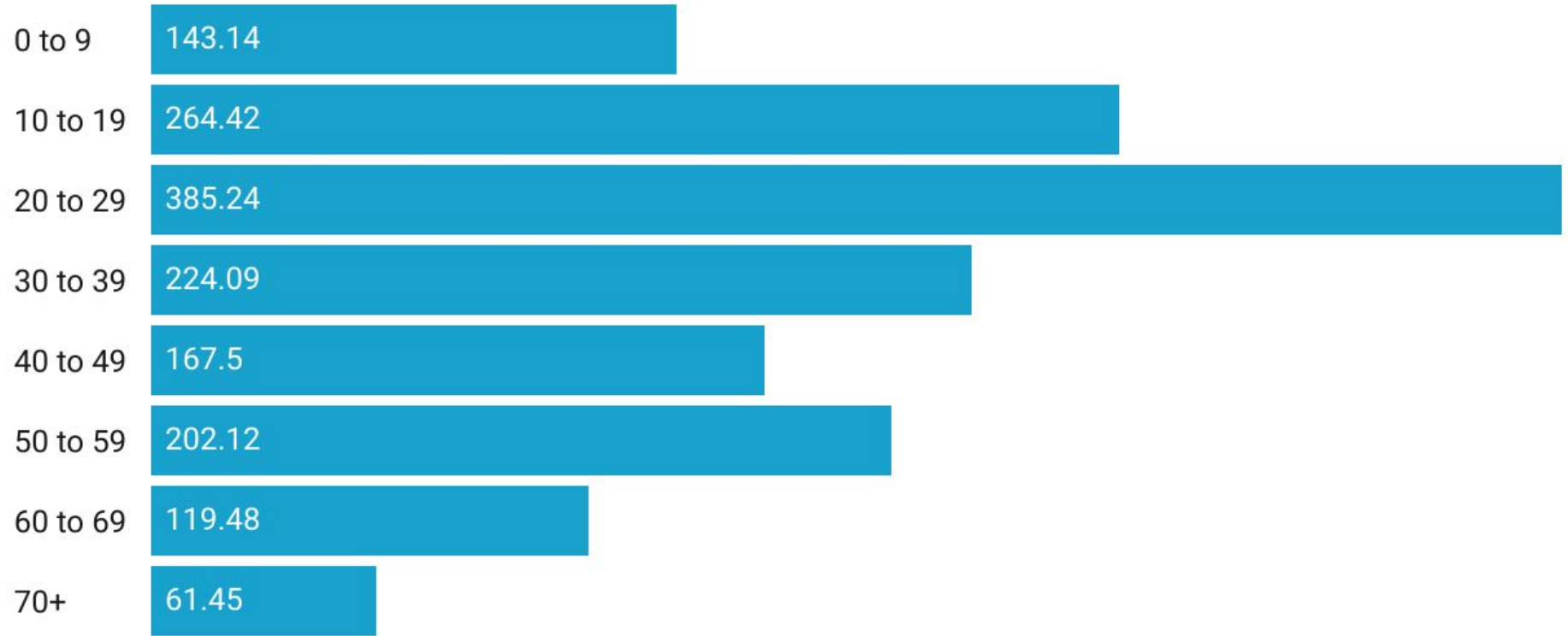
# Vermont Cases by Age Band

14-day averages



Source: VDH—May 16, 2021

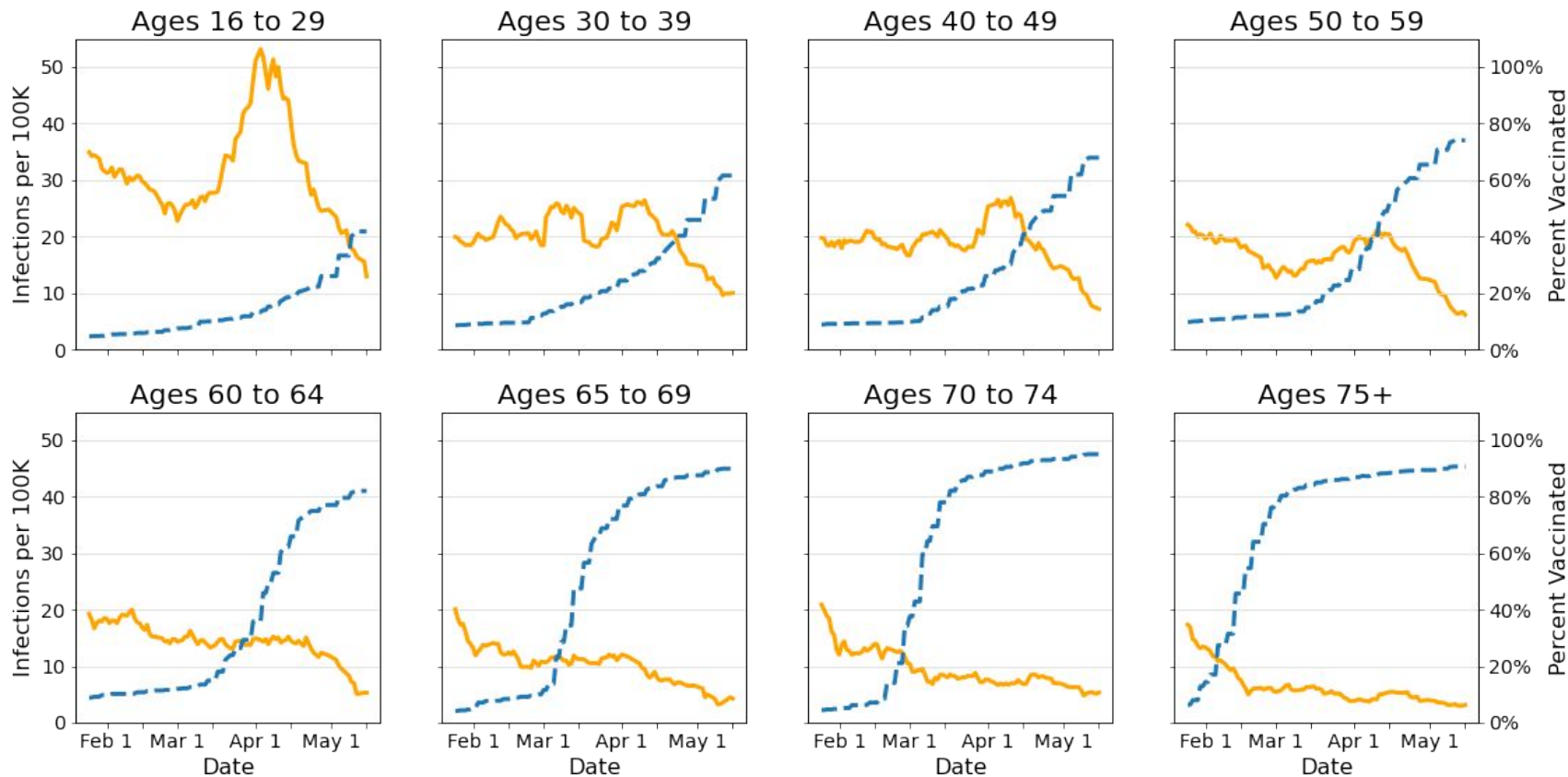
# Cases per 100,000 Residents by Age Band, Last 30 Days



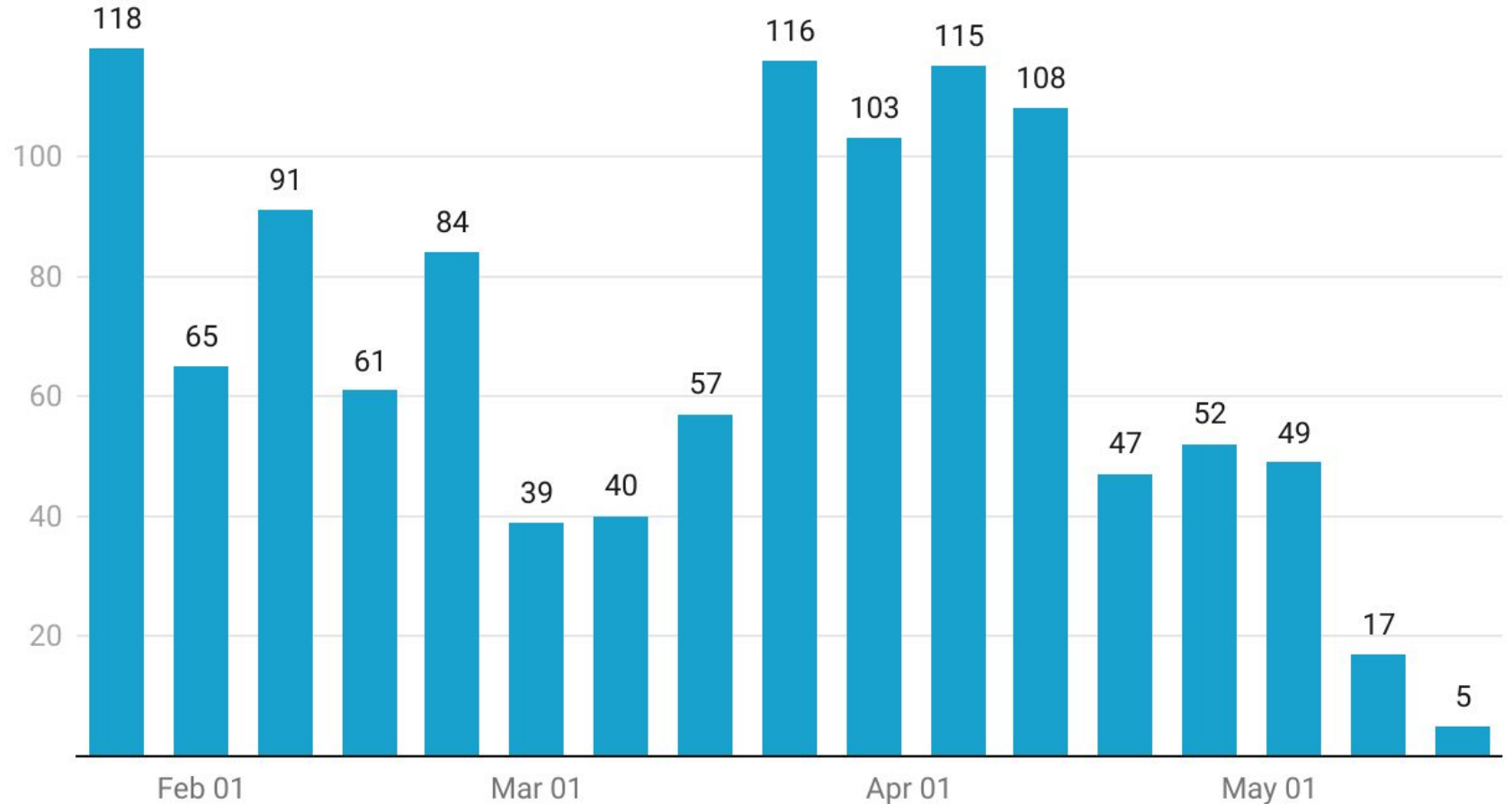
# Vermont Case Rate & Vaccination by Age Band

— New Infections per 100K (14-Day Average)

- - - Percent Received First Vaccine Dose

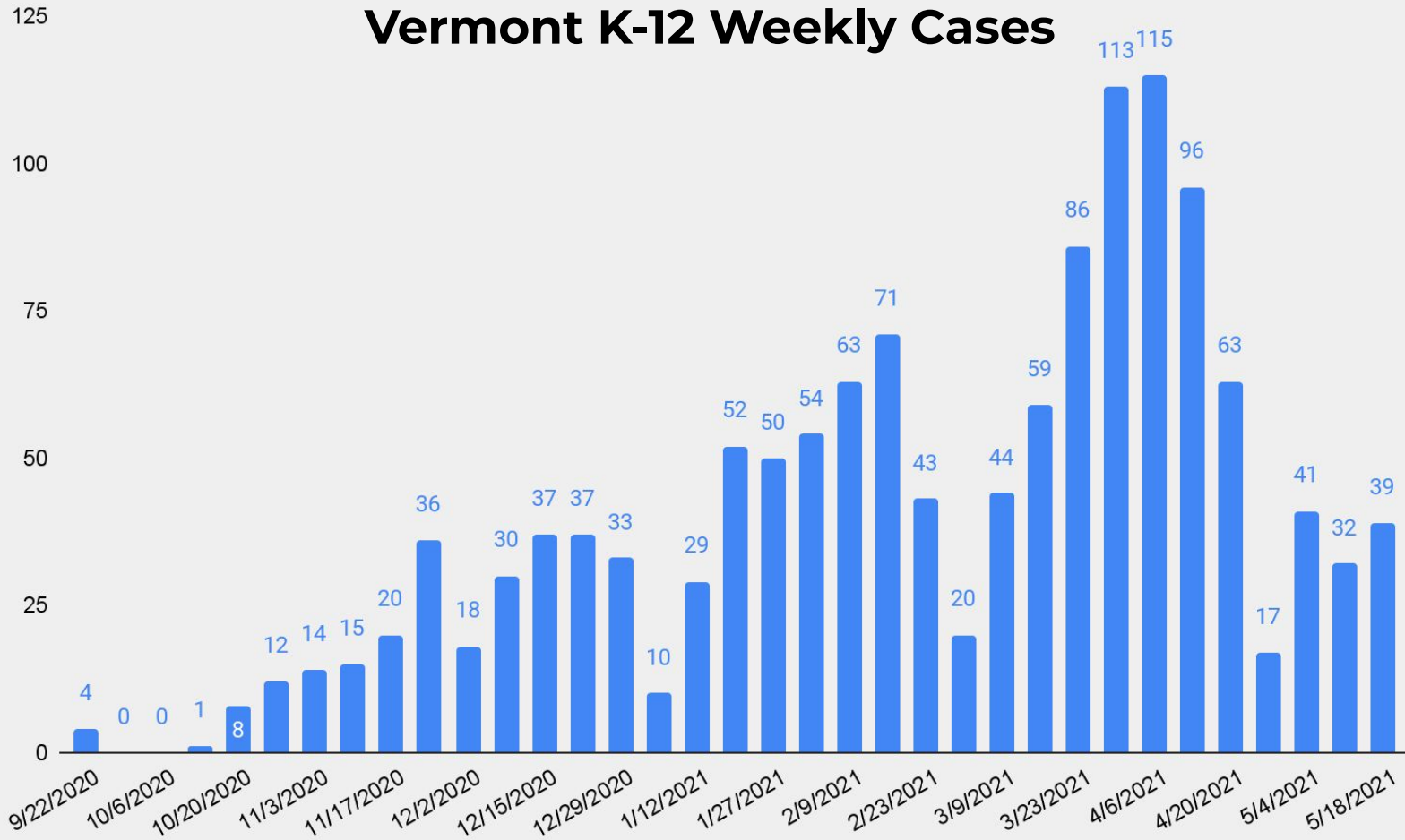


# Weekly Higher Education Cases in Vermont



Source: Vermont Higher Education Institution Reporting—May 17, 2021

# Vermont K-12 Weekly Cases

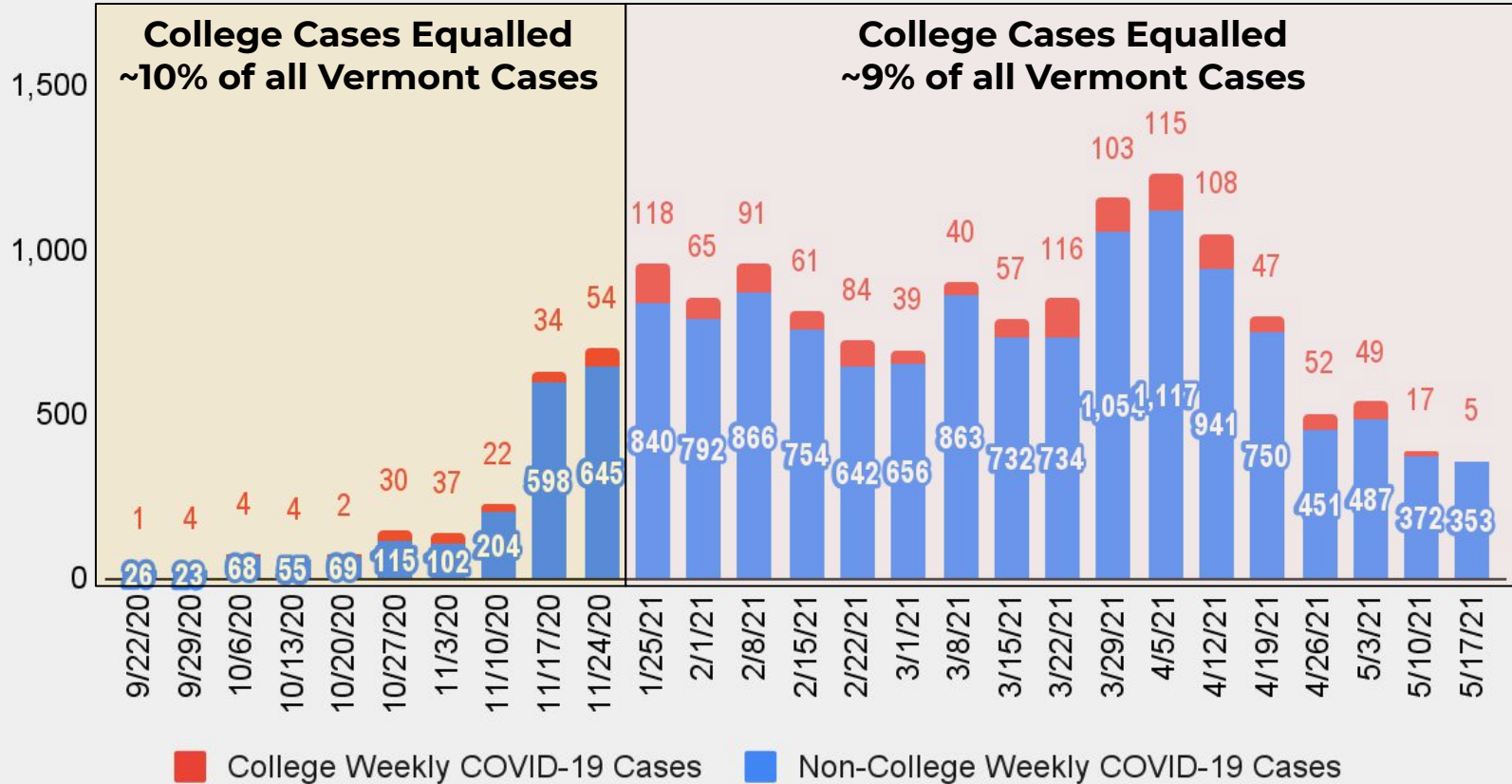


Source: Vermont Department of Health—May 17, 2021

# Higher Education COVID-19 Cases

Fall 2020

Spring 2021



Source: Vermont Higher Education Institution Reporting—May 17, 2021



# Active Outbreaks in Long Term Care Facilities\*

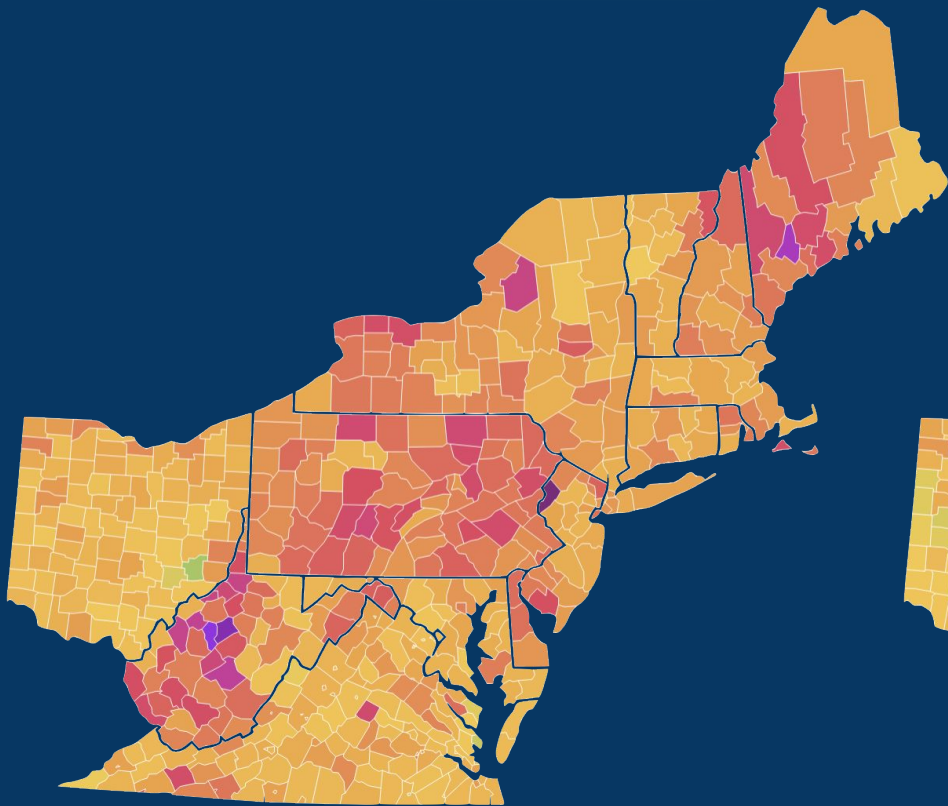
Facility Name	Total COVID-19 Cases
None	None

Source: Vermont Department of Health—\*Last updated May 17, 2021 (reporting Monday through previous Sunday); 'Active' defined as less than 28 days since most recent case's specimen collection date or illness start date (whichever is later); privacy suppressions include facility w/ <25 staff and residents and/or >75% of facility infected or fewer than 5 active cases.

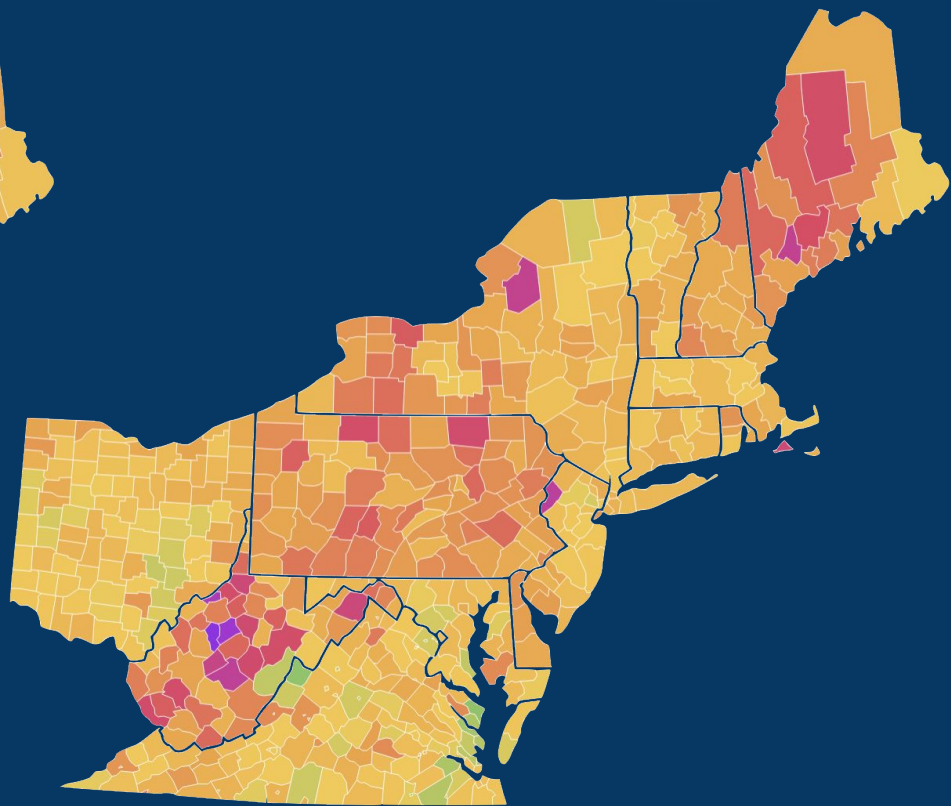
# Active Cases per Million



0                      5,000                      25,000 +



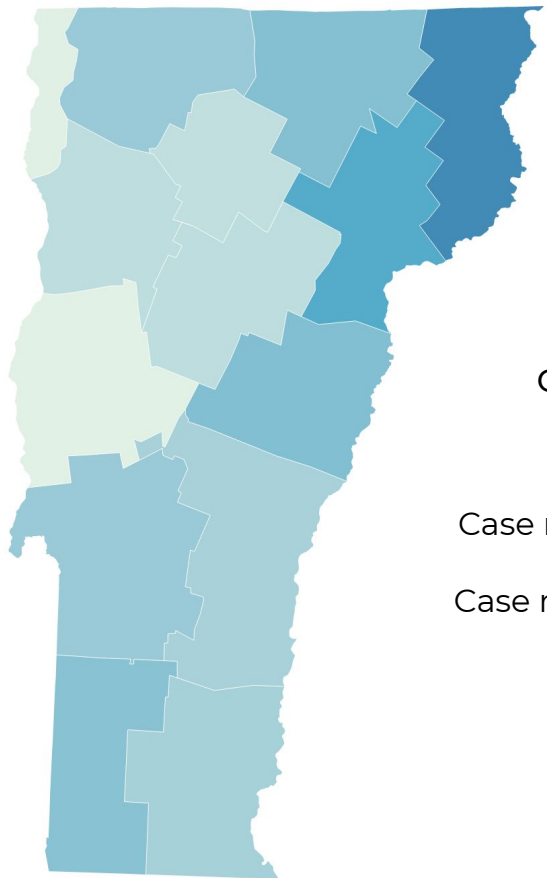
Last Week  
May 11<sup>th</sup>



Today  
May 18<sup>th</sup>

## Vermont Weekly Cases by County (per 100,000)

Results Reported May 4 to May 10

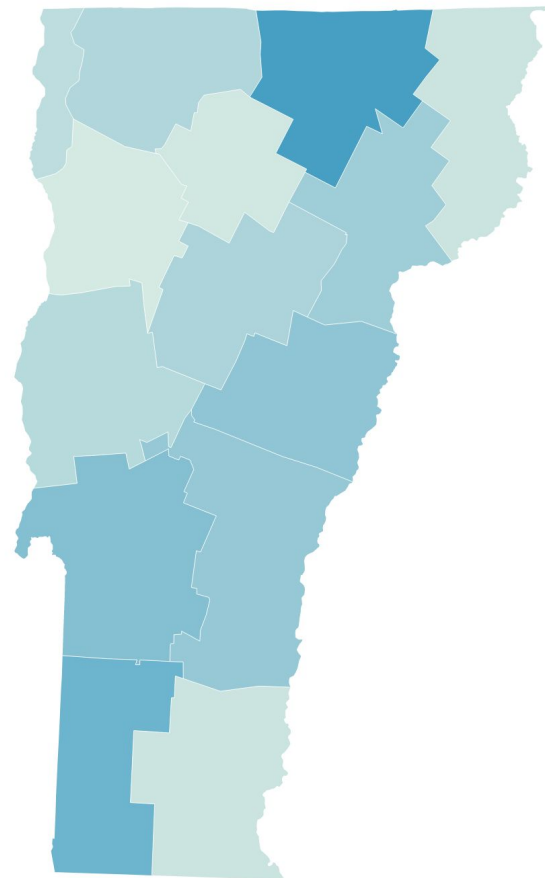


Vermont Covid-19  
case rates last week  
**mostly declined**

Case rates fell sharply in Chittenden,  
Caledonia, and Essex;  
Case rates highest in Orleans County

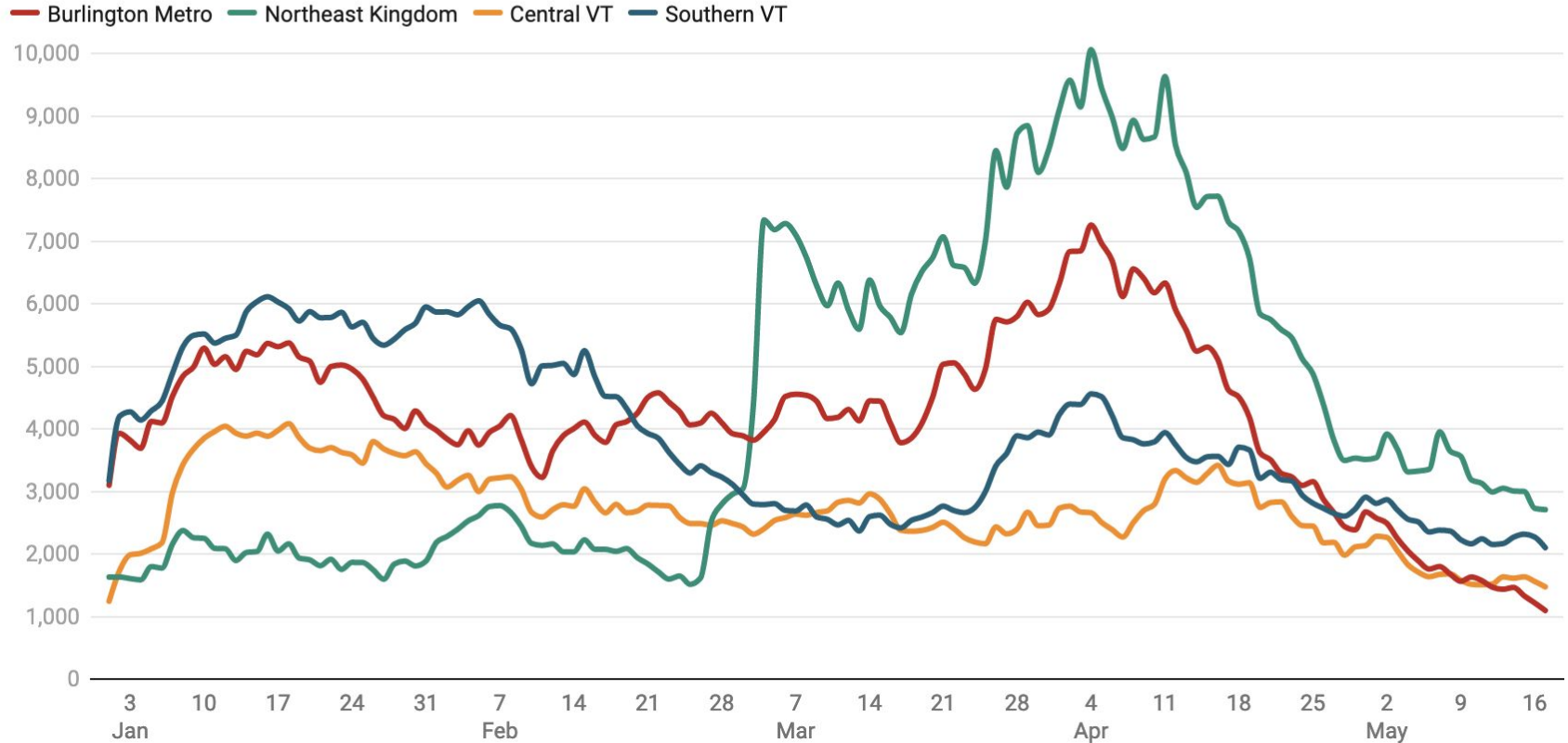
## Vermont Weekly Cases by County (per 100,000)

Results Reported May 11 to May 16

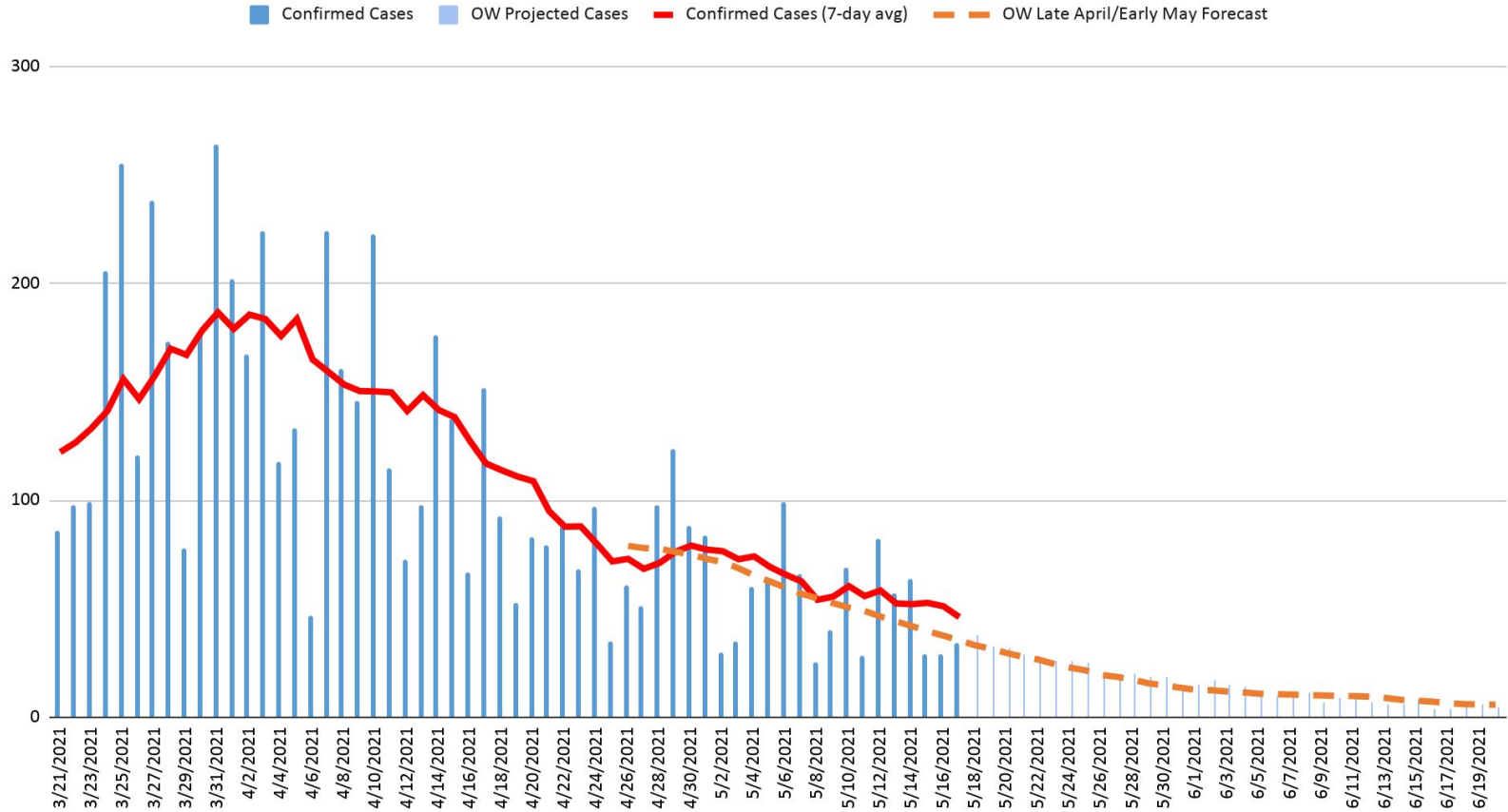


# Active COVID Cases per Million in Vermont Regions

For the purpose of this analysis, Vermont has been split into four regions: **Burlington Metro** (Chittenden, Franklin, Grand Isle), **Northeast Kingdom** (Caledonia, Orleans, Essex), **Central** (Lamoille, Washington, Addison, Orange), and **Southern** (Rutland, Windsor, Bennington, Windham).



# Vermont Forecast



Source: Johns Hopkins University Data, CDC Ensemble, & Oliver Wyman Forecast Model—May 17, 2021

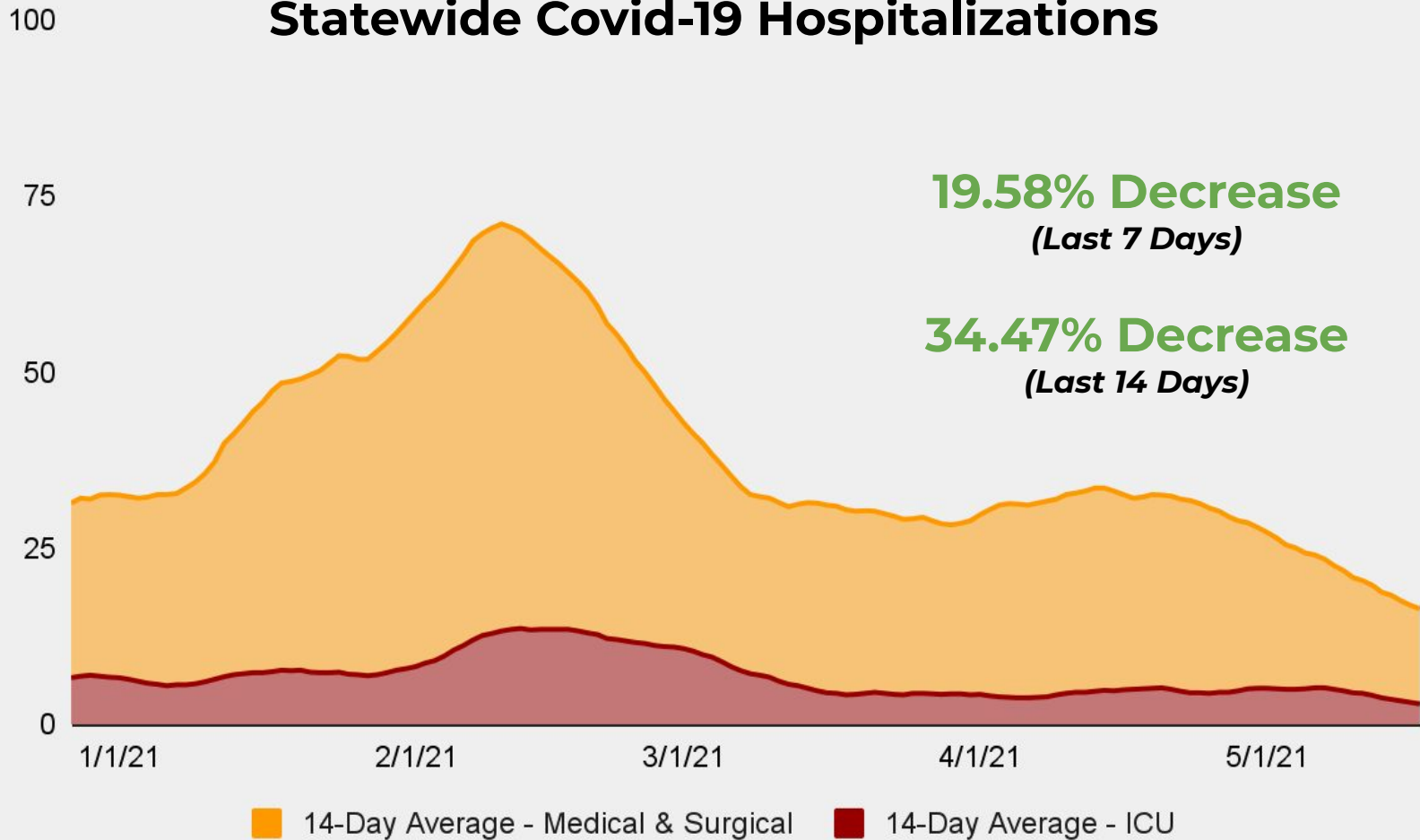
# Vermont Weekly COVID-19 Infections Forecast

Calculated as a 7-day sum. Gray bands represent 50% and 95% confidence intervals. Since projections are only released once a week, the actual number may appear to over or undershoot the forecast.



# Vermont Hospitalization Data

# Statewide Covid-19 Hospitalizations



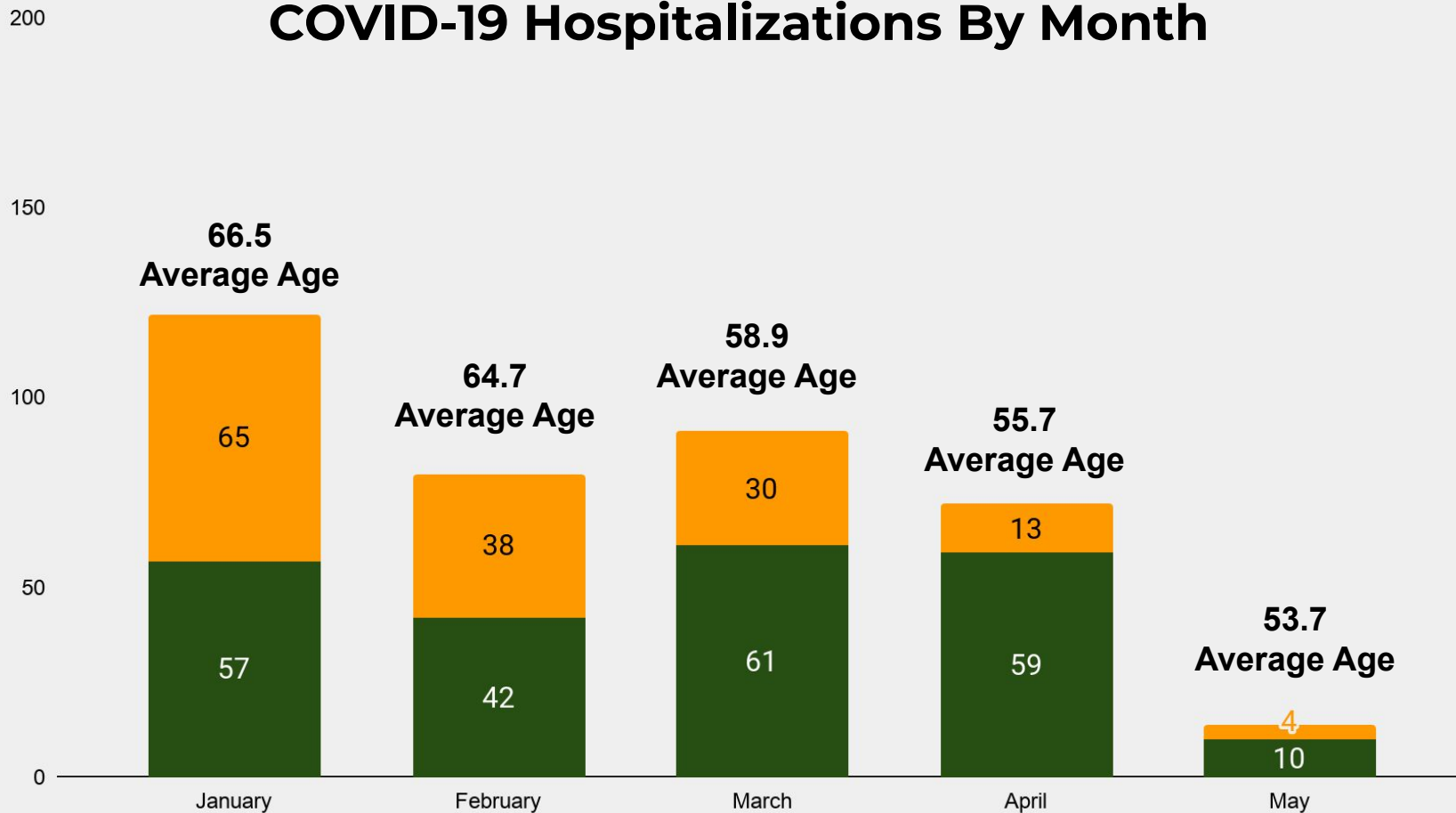
**19.58% Decrease**  
*(Last 7 Days)*

**34.47% Decrease**  
*(Last 14 Days)*

■ 14-Day Average - Medical & Surgical ■ 14-Day Average - ICU



# COVID-19 Hospitalizations By Month



Source: Vermont Department of Health—May 17, 2021

70 & Over Under 70

# Vermont Fatality Data

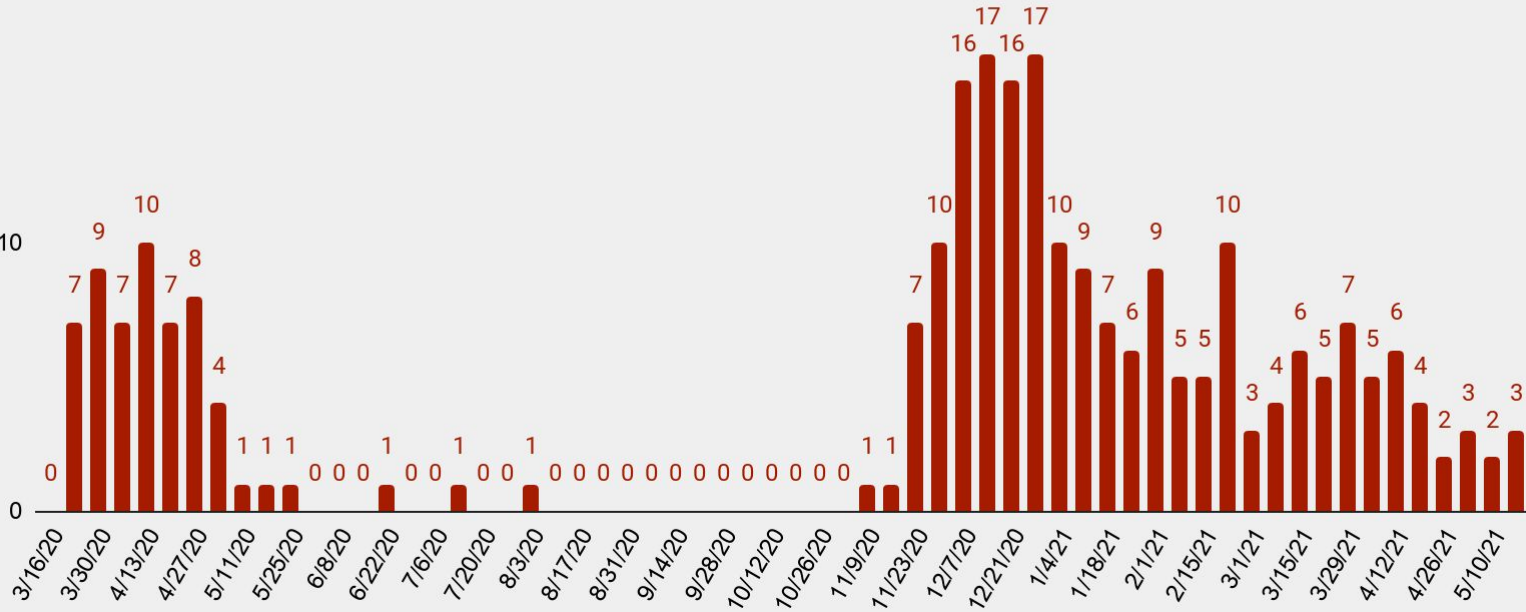
# Vermont Covid-19 Deaths by Week

30

20

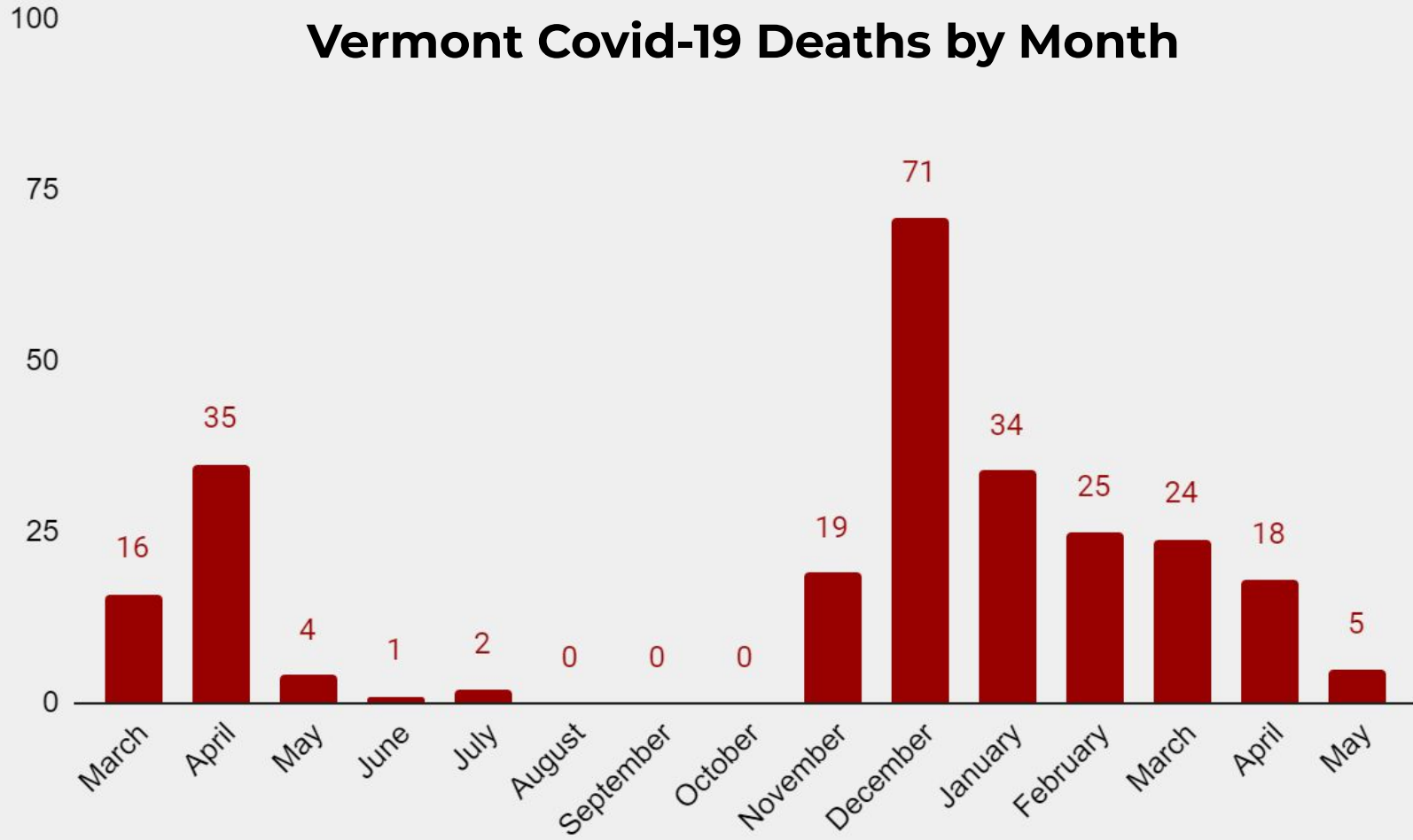
10

0



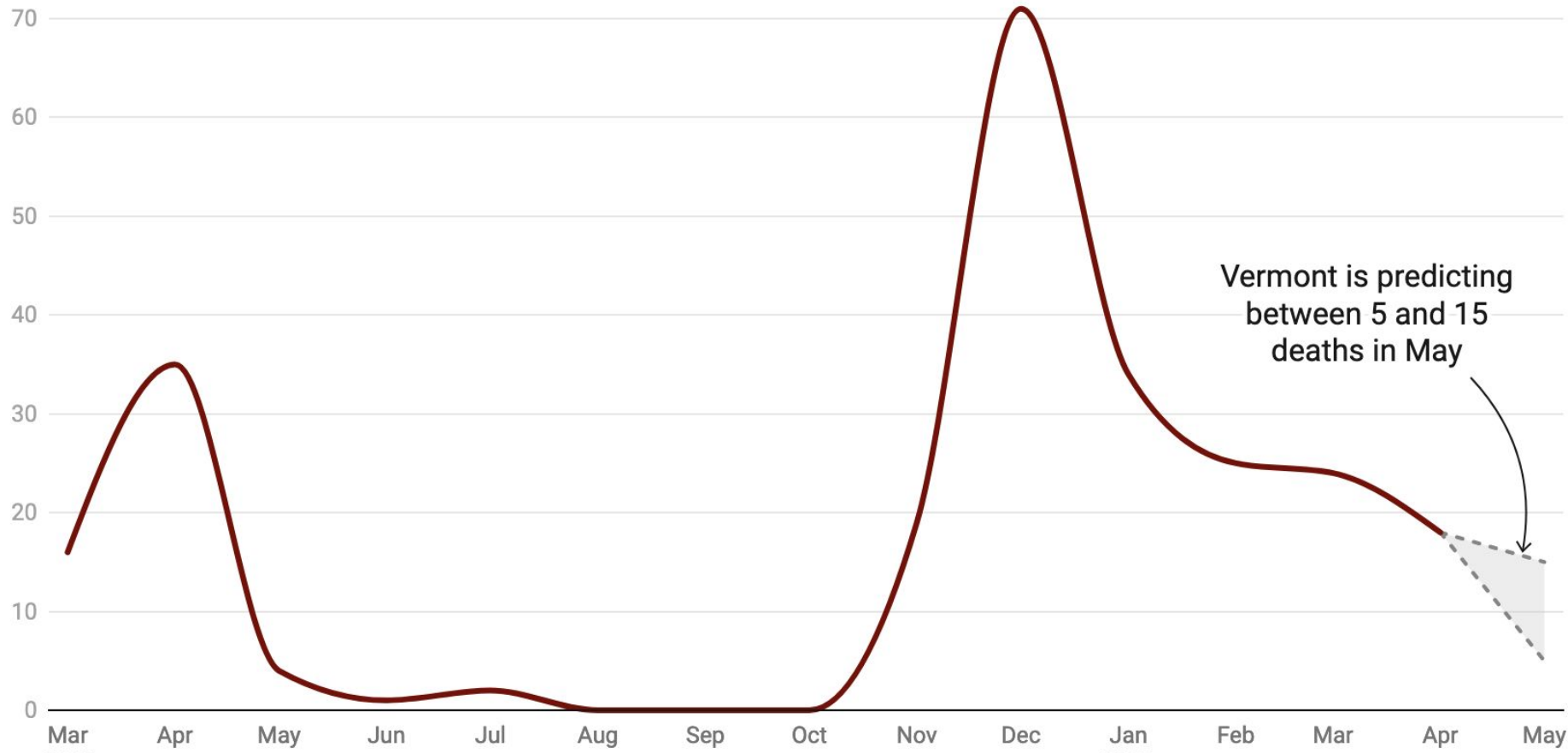
Source: Vermont Department of Health—May 10, 2021

# Vermont Covid-19 Deaths by Month



Source: Vermont Department of Health—May 17, 2021

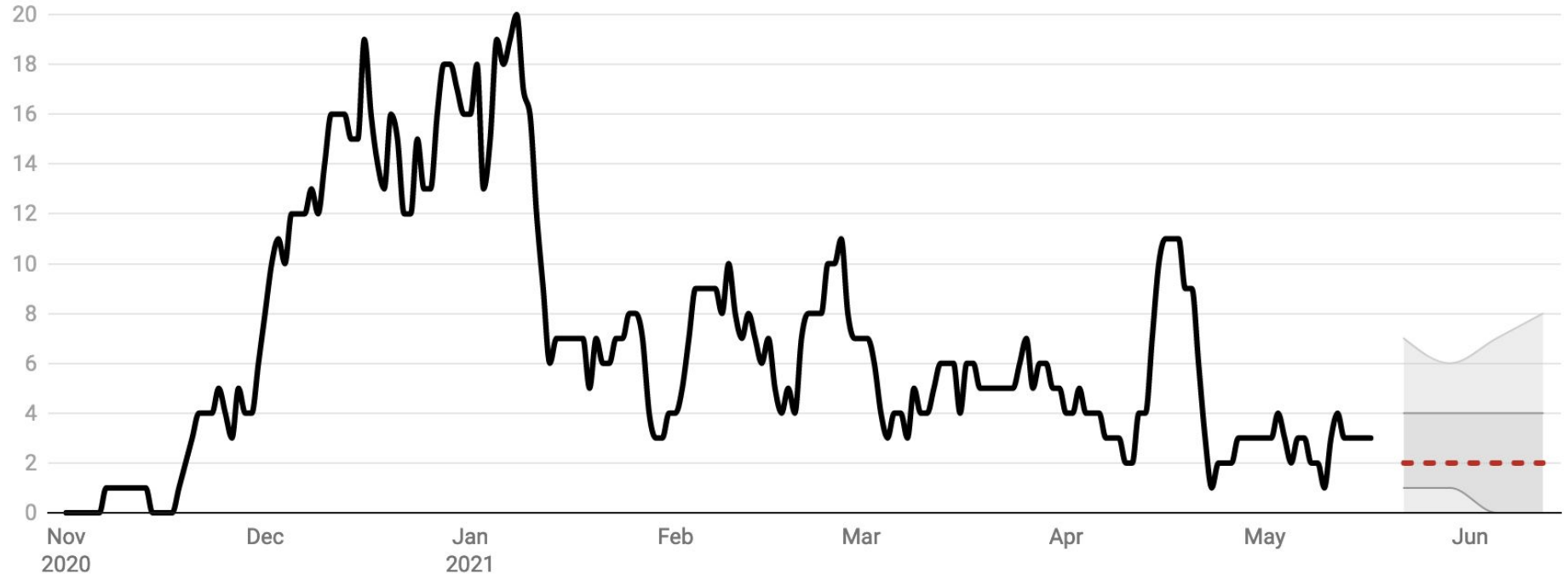
# Vermont COVID-19 Deaths by Month



Source: Vermont Department of Health—May 17, 2021

# Vermont Weekly COVID-19 Deaths Forecast

Calculated as a 7-day sum. Gray bands represent 50% and 95% confidence intervals. Since projections are only released once a week, the actual number may appear to over or undershoot the forecast.

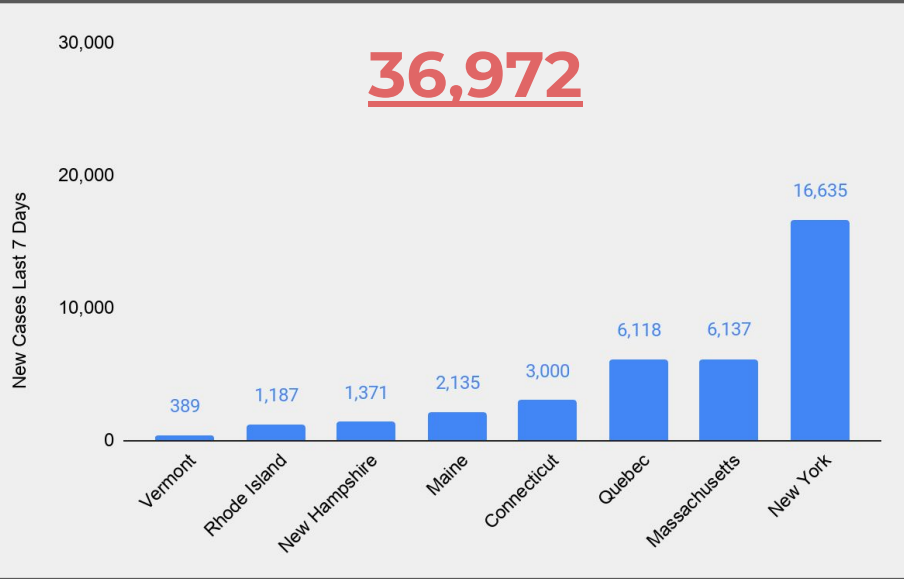


# Regional Data

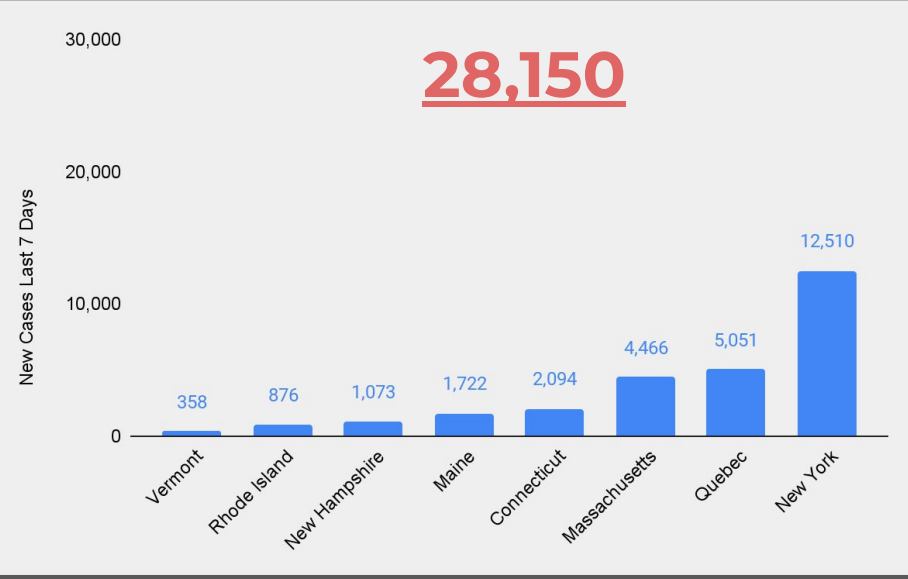
# Regional Cases

23.86% Decrease in New Cases

New Cases May 4th to May 10th



New Cases May 11th to May 17th





# Weekly Regional Cases

250000

200000

150000

100000

50000

0

3/16/20

4/6/20

4/27/20

5/18/20

6/8/20

6/29/20

7/20/20

8/10/20

8/31/20

9/21/20

10/12/20

11/2/20

11/23/20

12/14/20

1/4/21

1/25/21

2/15/21

3/8/21

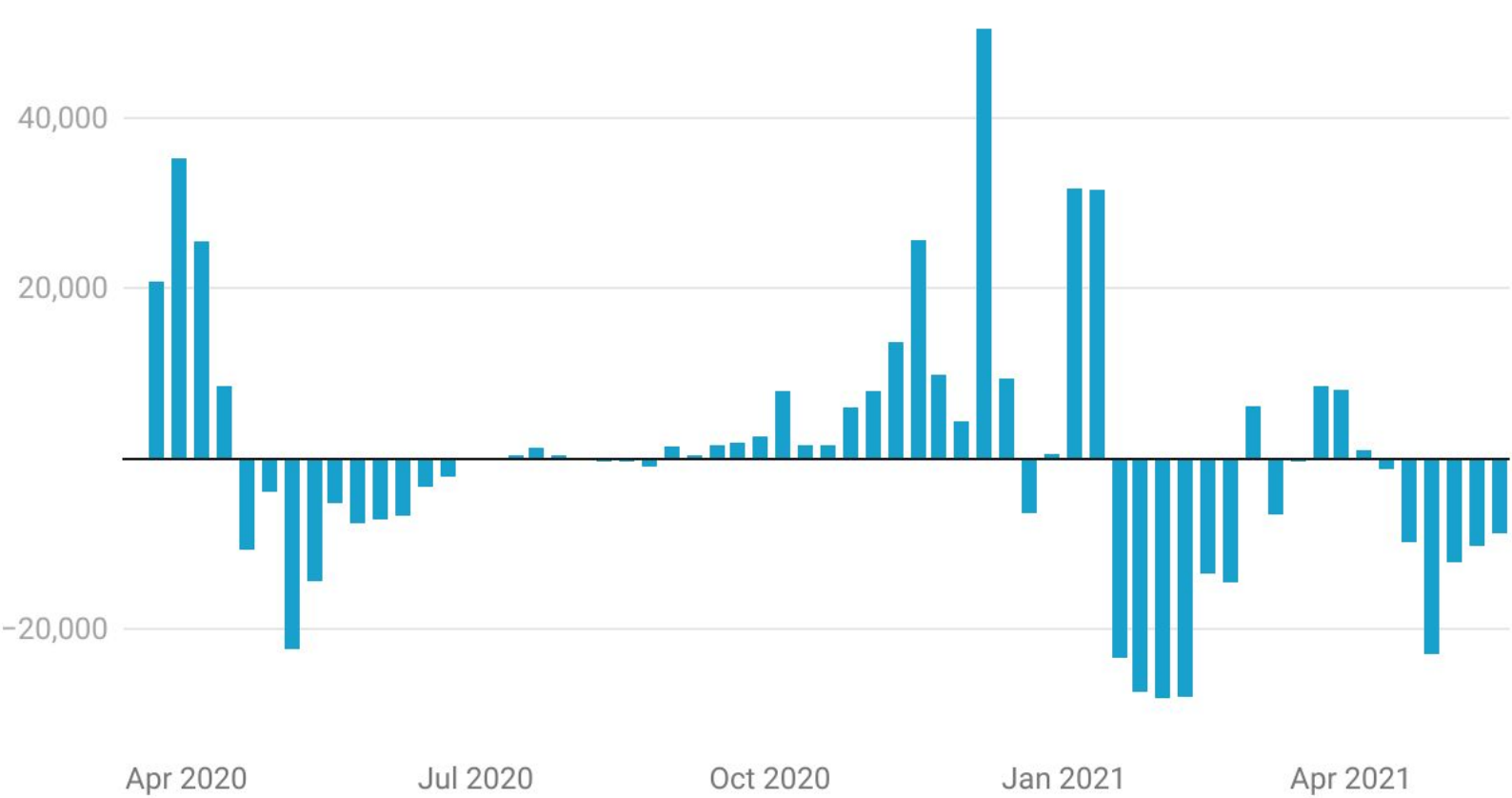
3/29/21

4/19/21

5/10/21

Sources: State Health Departments & CTV National News (Quebec) (includes: CT, ME, MA, NH, NY, QC, RI & VT)

# Change in Regional Weekly Cases



Sources: State Health Departments & CTV National News (Quebec) (includes: CT, ME, MA, NH, NY, QC, RI & VT)

# Covid-19 Cases in K-12 Schools & Colleges Across Northern New England

## New Hampshire

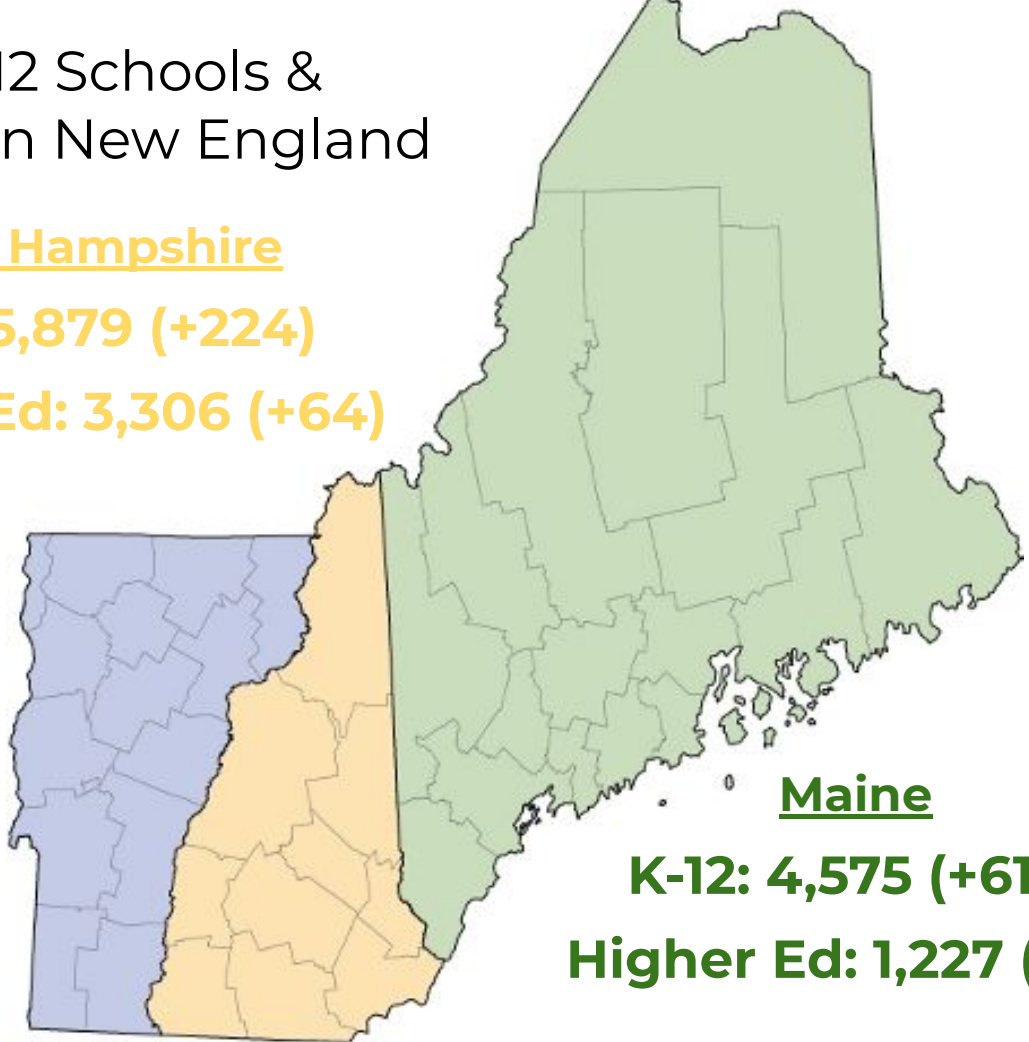
**K-12: 5,879 (+224)**

**Higher Ed: 3,306 (+64)**

## Vermont

**K-12: 1,362 (+39)**

**Higher Ed: 1,167 (+5)**

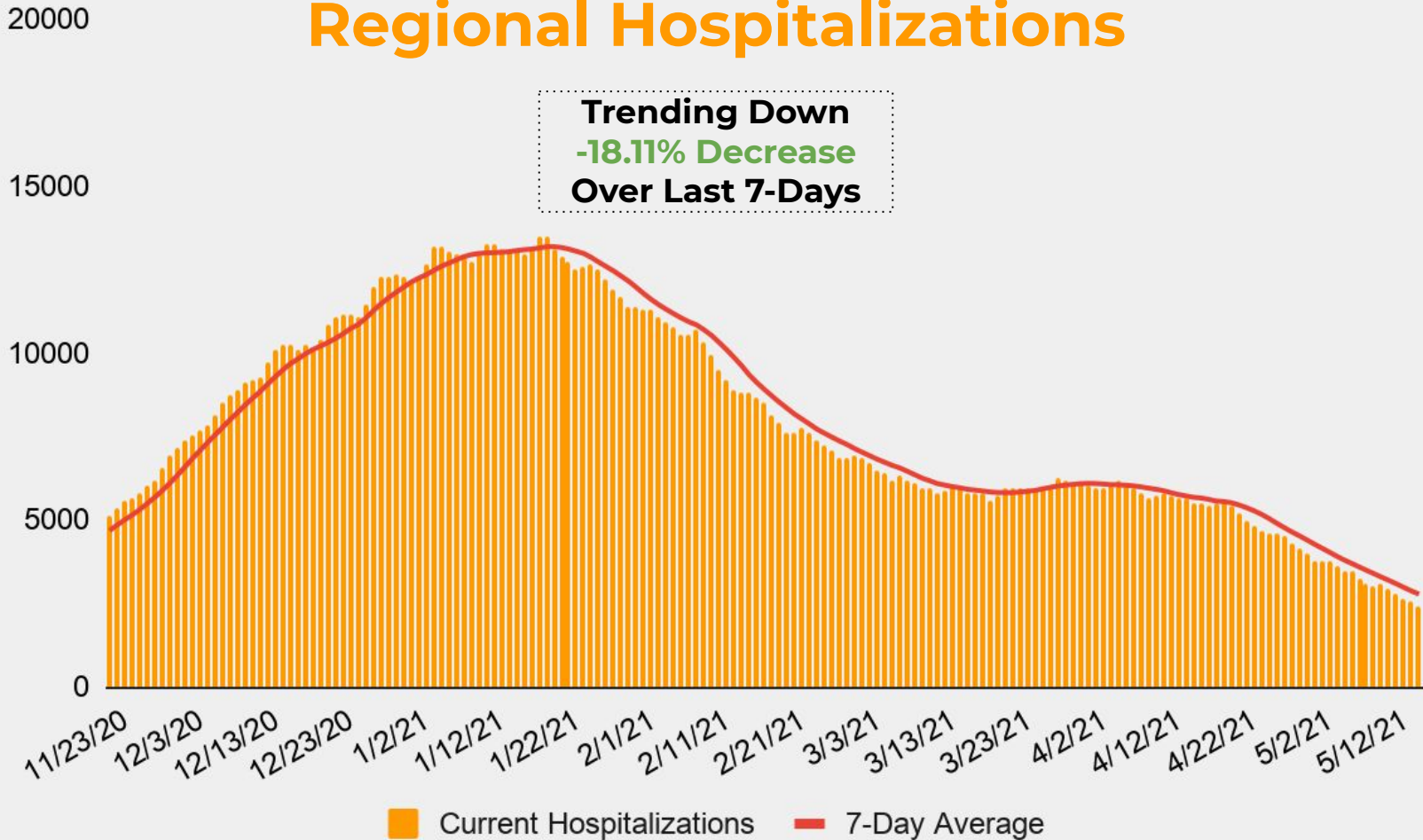


## Maine

**K-12: 4,575 (+612)**

**Higher Ed: 1,227 (+10)**

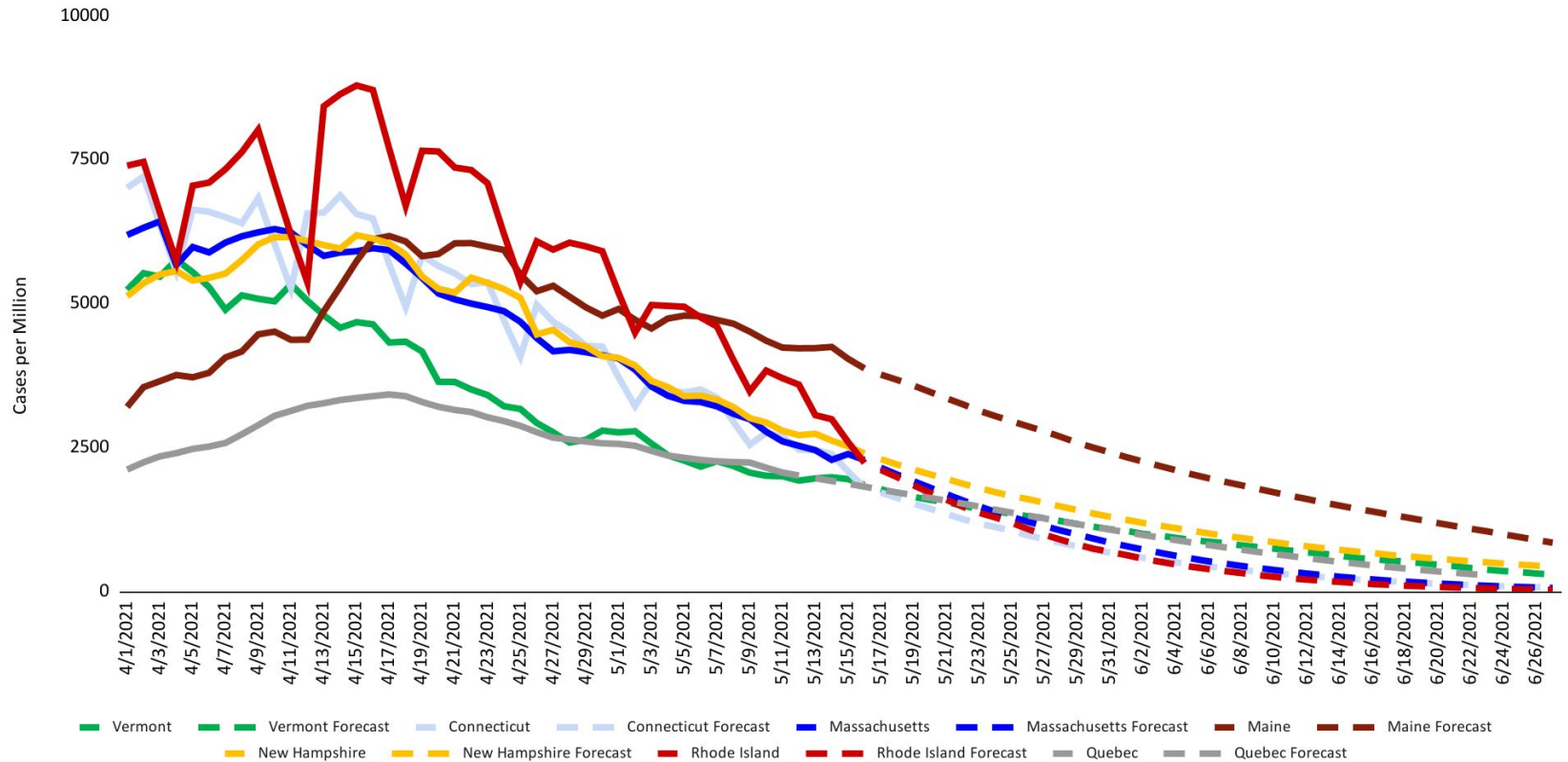
# Regional Hospitalizations



Source: Covid Tracking Project (7-Day Average in CT, ME, MA, NH, NY, RI & VT)—May 17, 2021

# Regional Active Per Capita Case Forecast

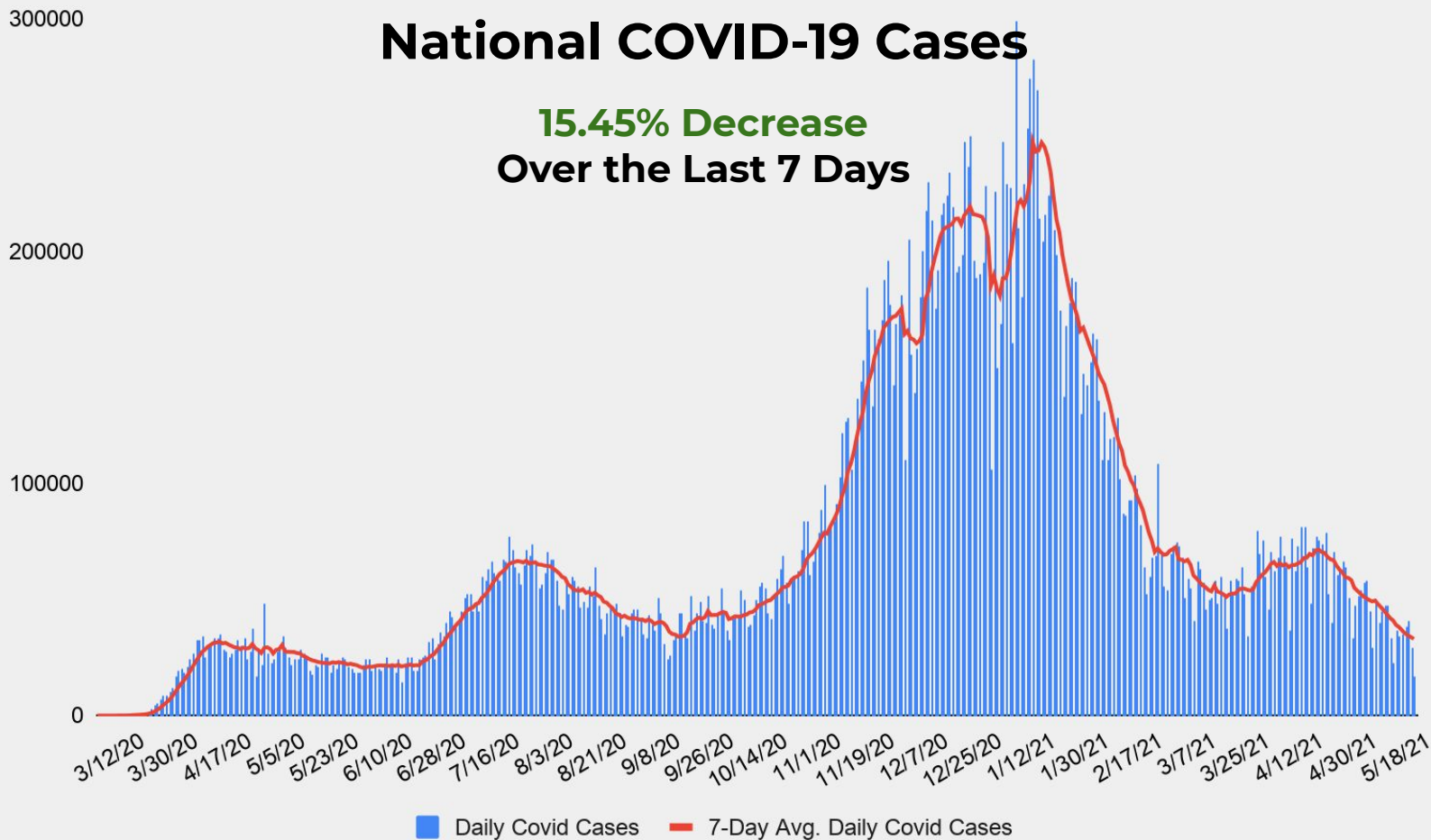
Active Cases per Million (DFR Algorithm)



# National Data

# National COVID-19 Cases

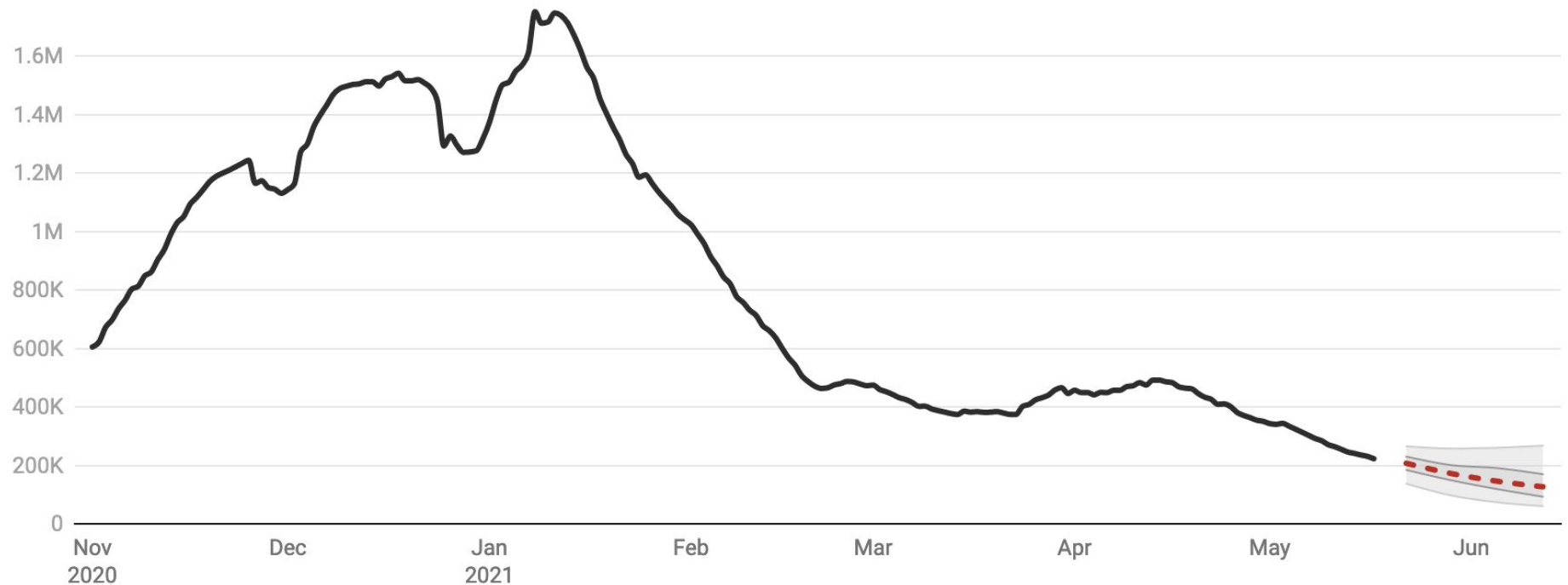
**15.45% Decrease  
Over the Last 7 Days**



Source: Covid Tracking Project; NYT & CDC—May 17, 2021

# US Weekly COVID-19 Infections Forecast

Calculated as a 7-day sum. Gray bands represent 50% and 95% confidence intervals. Since projections are only released once a week, the actual number may appear to over or undershoot the forecast.





# National COVID-19 Hospitalizations

150000

**10.88% Decrease  
Over the Last 7-Days**

100000

**58,499**

**59,427**

50000

**28,341**

**29,443**

**34,714**

0

4/5/20 4/29/20 5/23/20 6/16/20 7/10/20 8/3/20 8/27/20 9/20/20 10/14/20 11/7/20 12/1/20 12/25/20 1/18/21 2/11/21 3/7/21 3/31/21 4/24/21 5/18/21



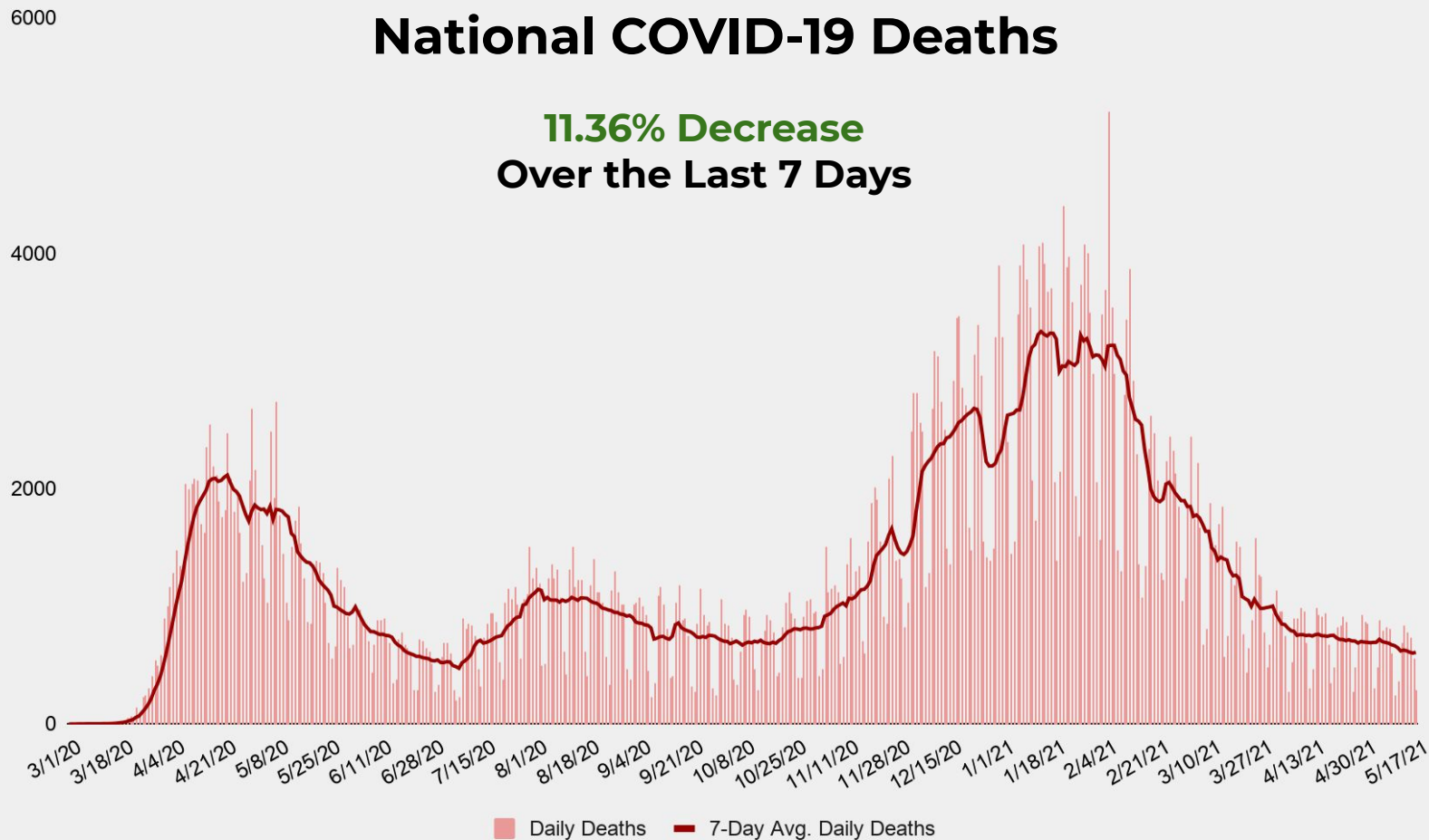
Currently Hospitalized



7-Day Avg. Currently Hospitalized

# National COVID-19 Deaths

**11.36% Decrease  
Over the Last 7 Days**



Source: Covid Tracking Project; NYT & CDC—May 17, 2021

# US Weekly COVID-19 Deaths Forecast

Calculated as a 7-day sum. Gray bands represent 50% and 95% confidence intervals. Since projections are only released once a week, the actual number may appear to over or undershoot the forecast.



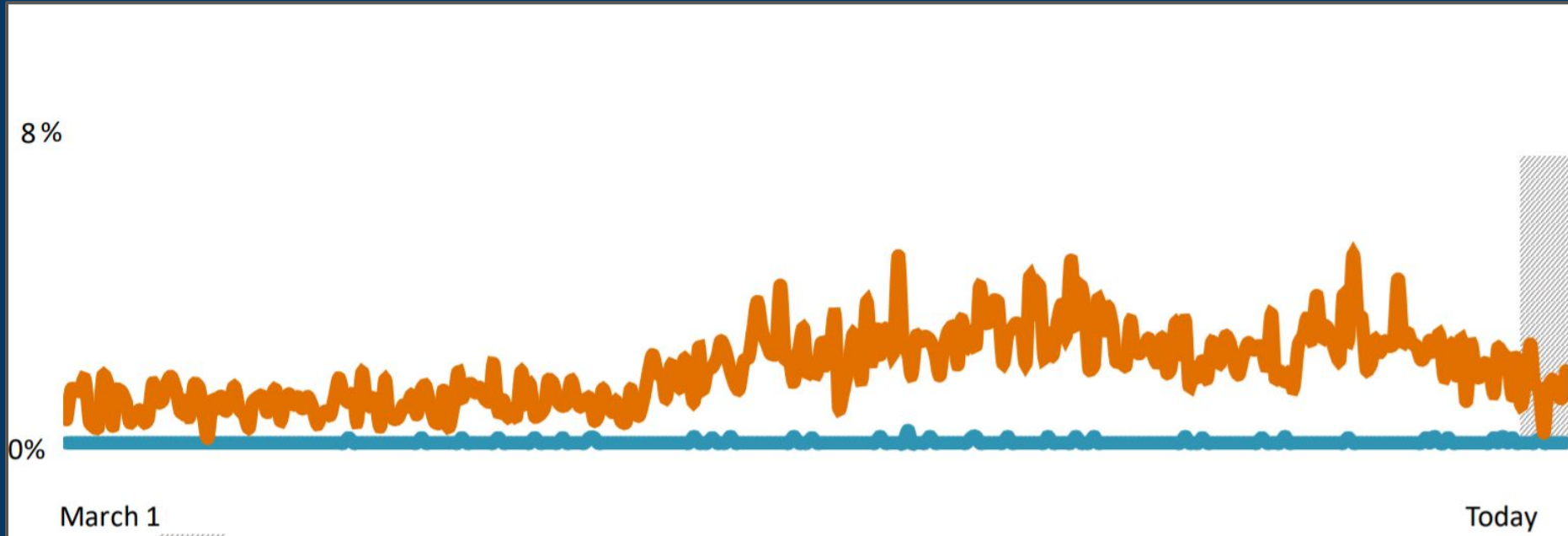
# RESTART VERMONT

## Reopening Metrics

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

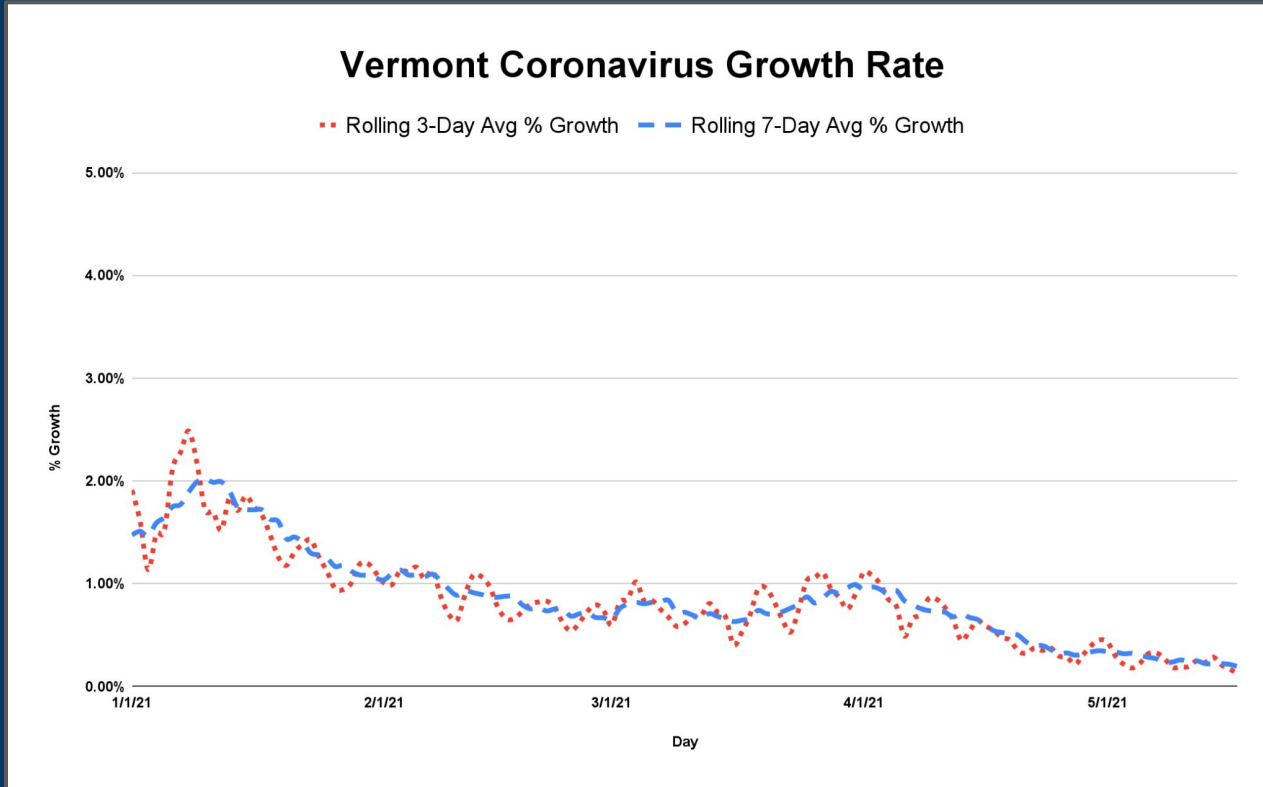
# Data Point 1: Syndromic Surveillance

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



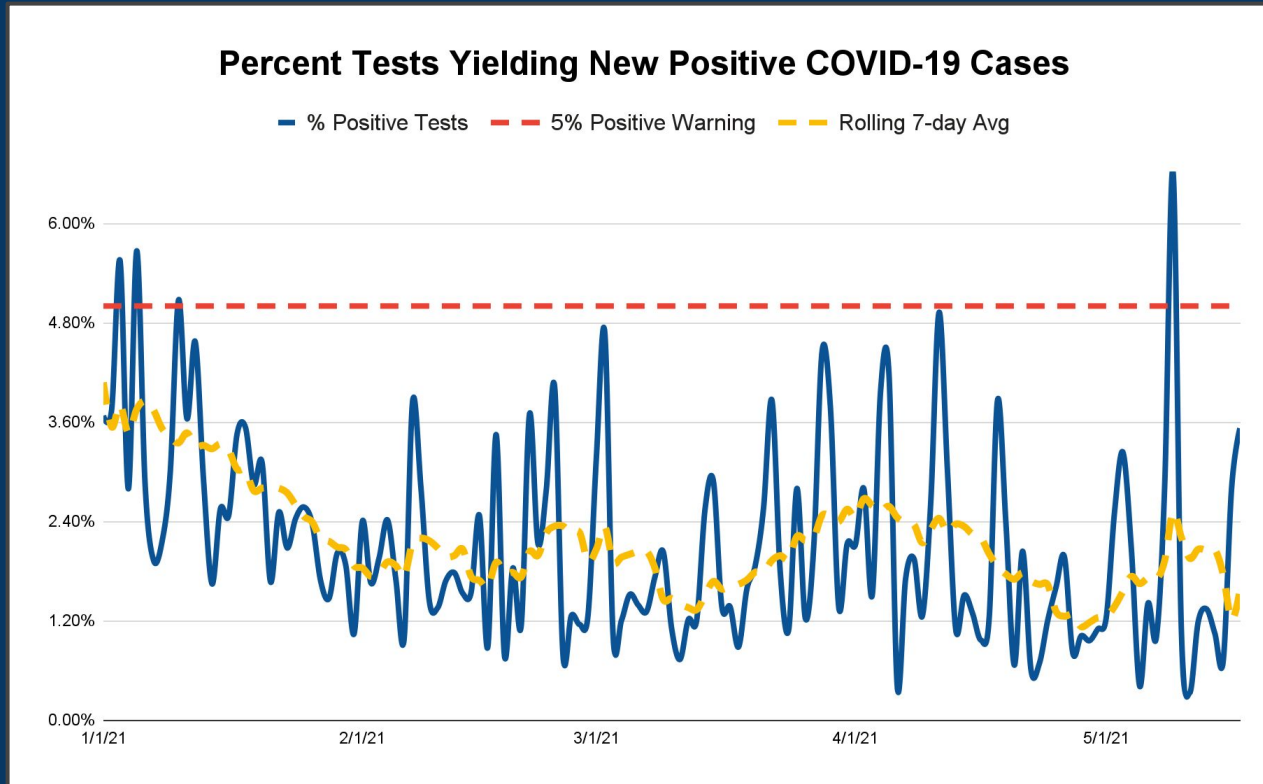
## Data Point 2: Viral Growth and Reproductive Rates

- **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% open ICU beds



# Data Point 3: Percentage of New Positive Tests

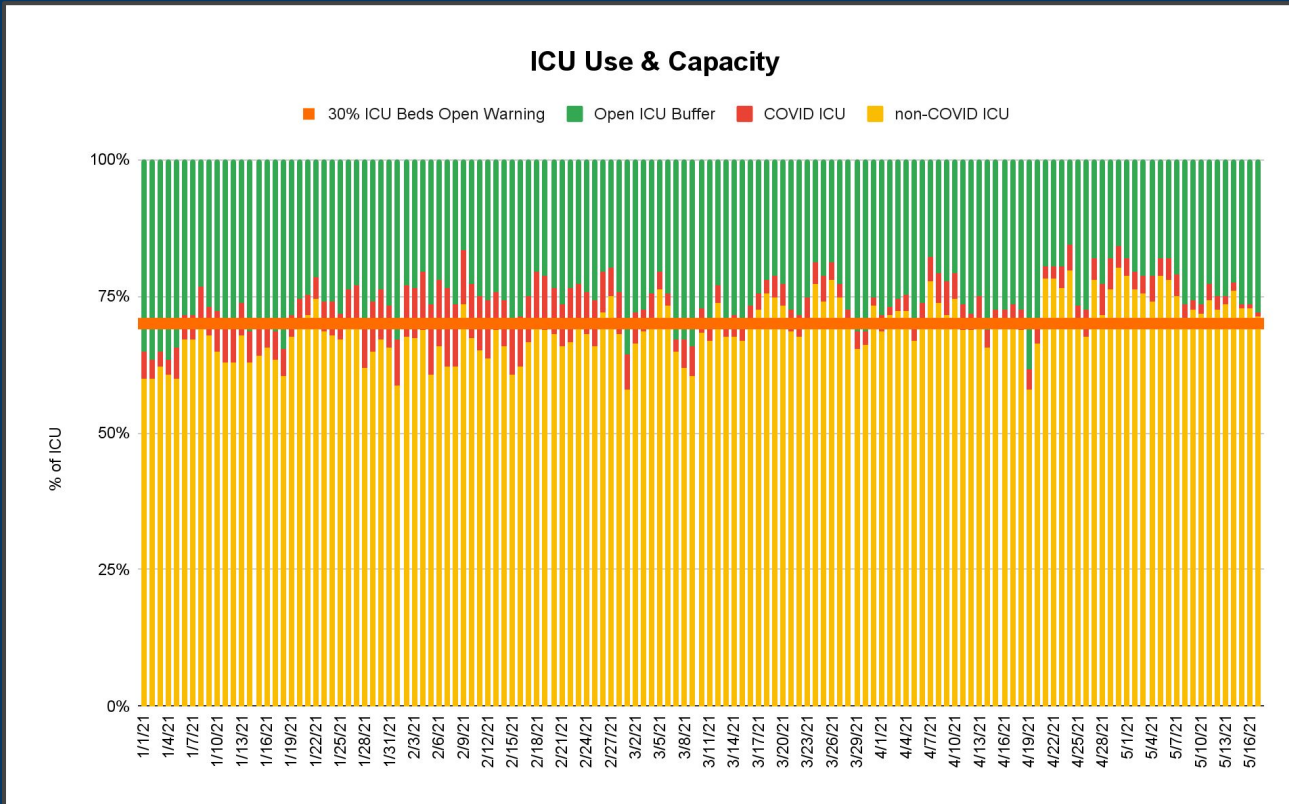
- **Summary:** Percent of tests resulting in a new positive case
- **Warning Flags:** New positives represent >5% of daily results



**Note: low testing volume causing volatility in daily positivity**

# 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%





# Vermont Testing

