

# **COVID-19 Modeling**

## **September 8, 2021**

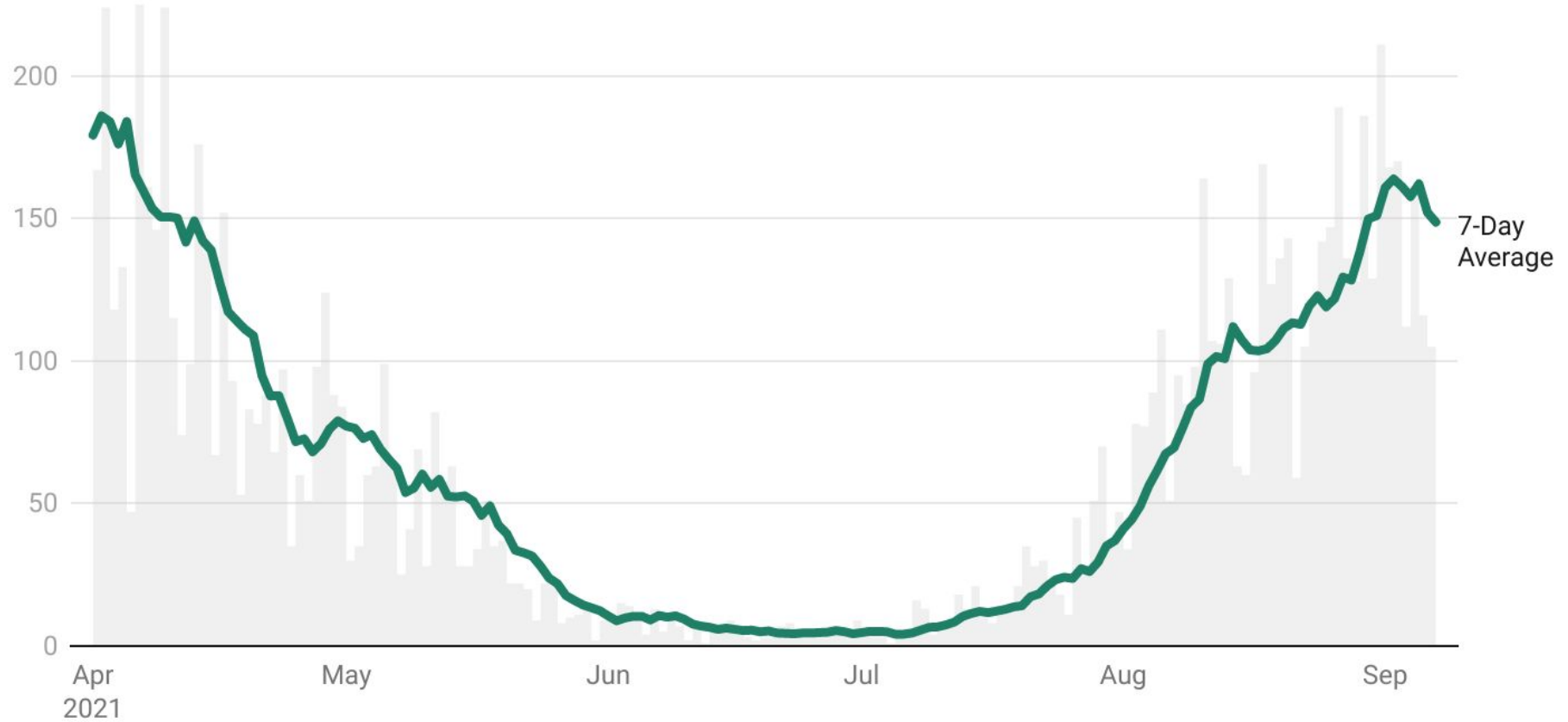
Presentation available at:  
[dfr.vermont.gov](https://dfr.vermont.gov)

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# Vermont Case Data

# Vermont New Case Growth

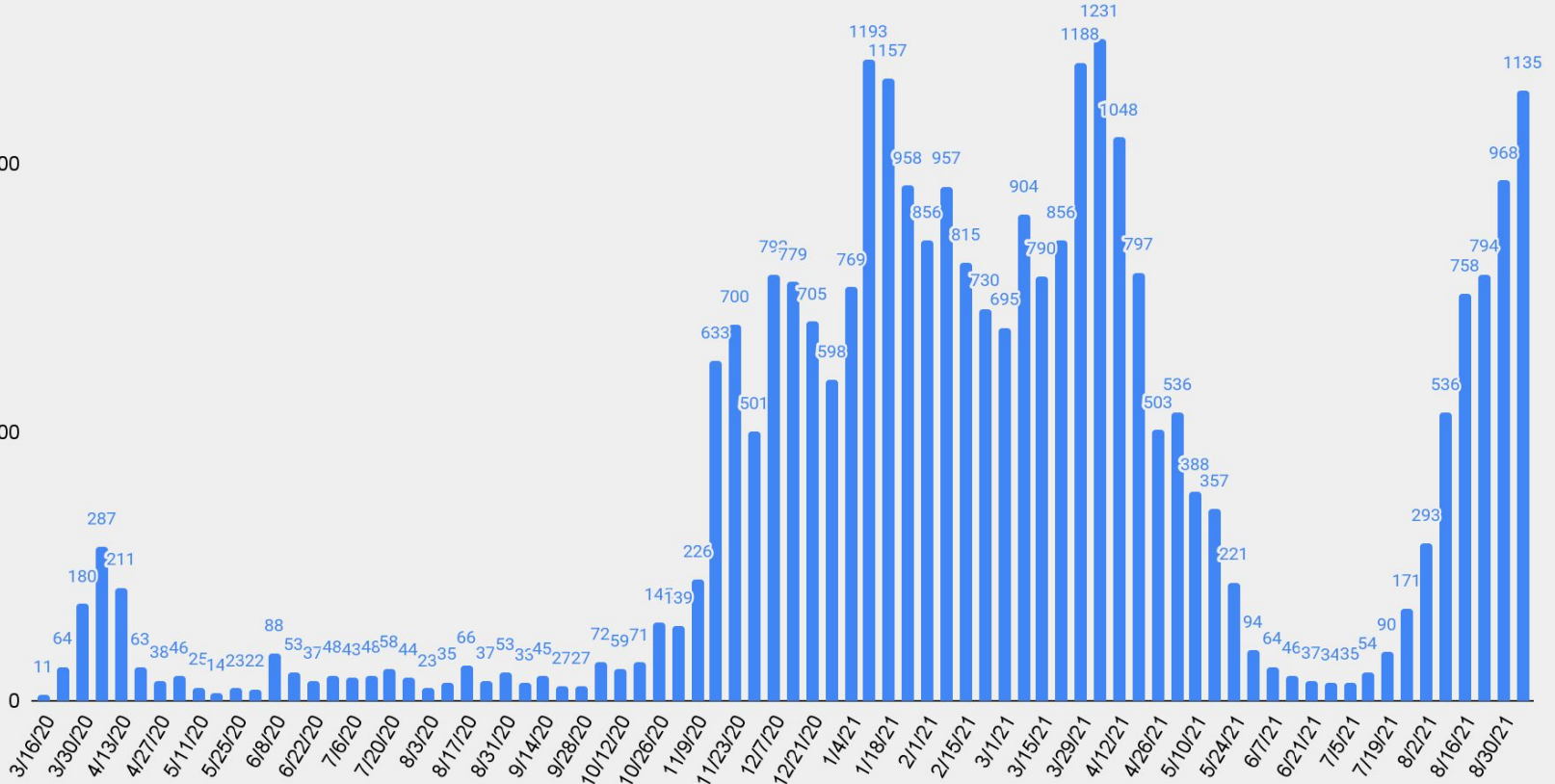


# Vermonters Diagnosed with COVID-19 by Week

1500

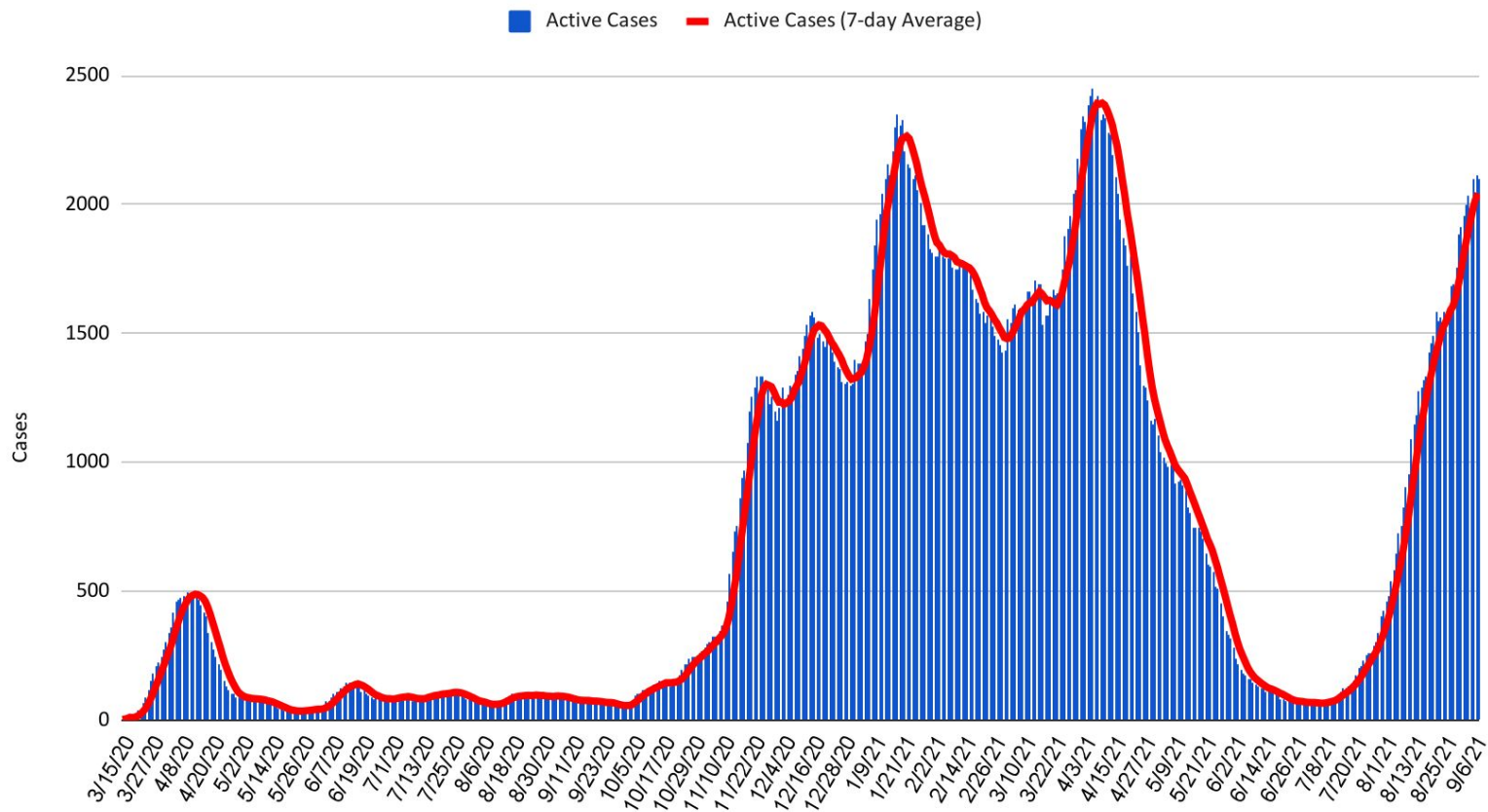
1000

500

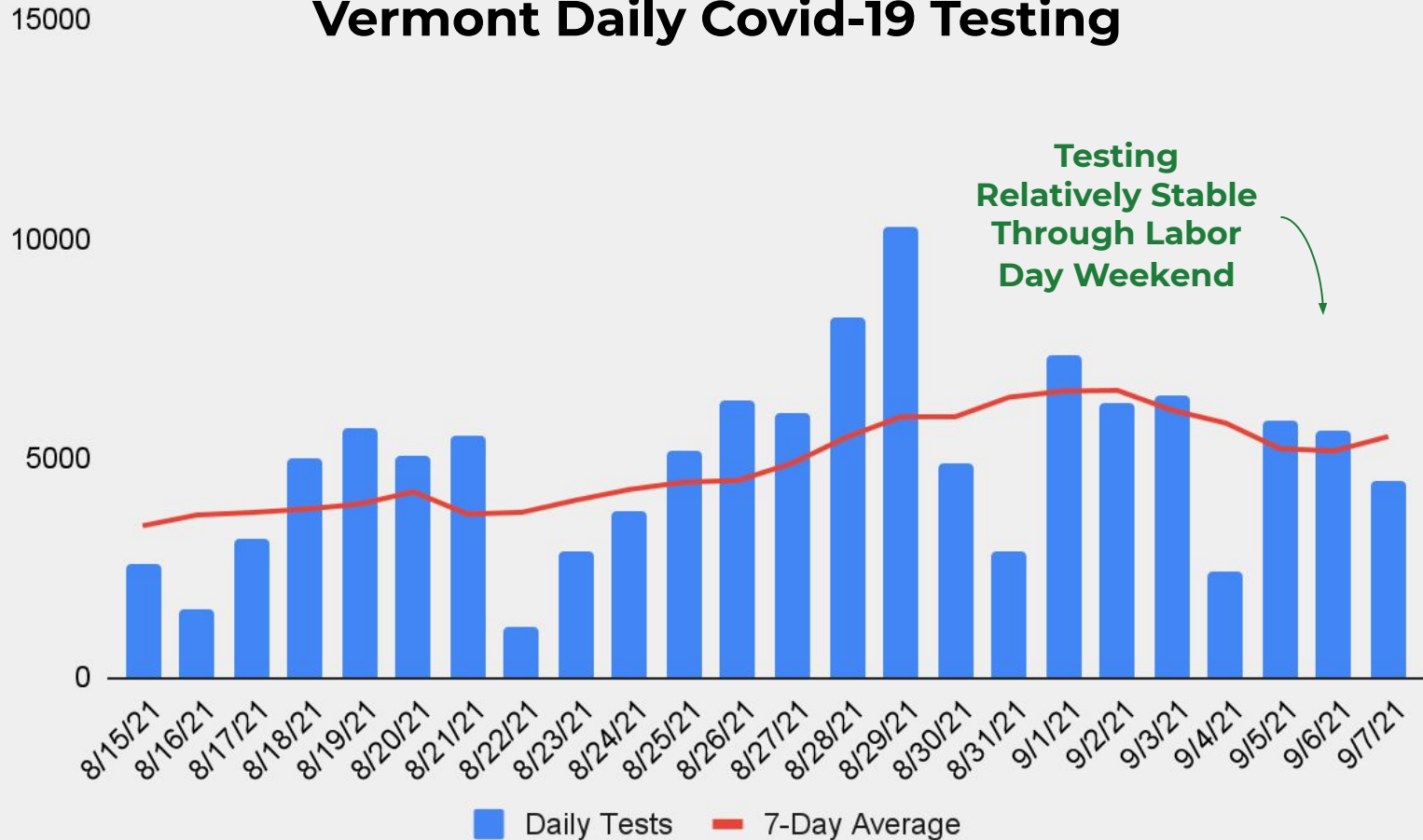


Source: Vermont Department of Health (week calculated as Tuesday to Monday)

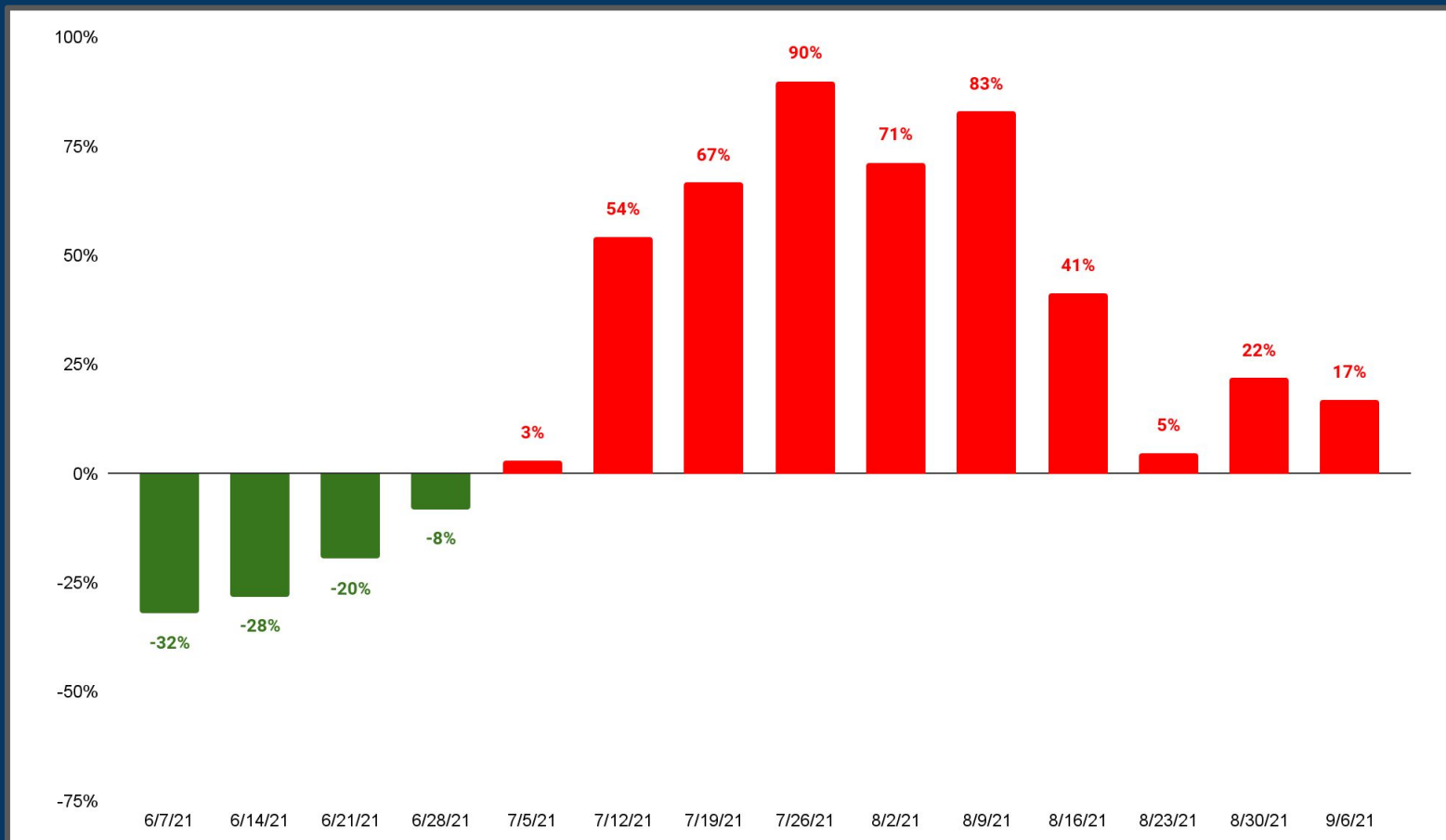
## Estimated Active Cases of COVID-19 in Vermont



# Vermont Daily Covid-19 Testing



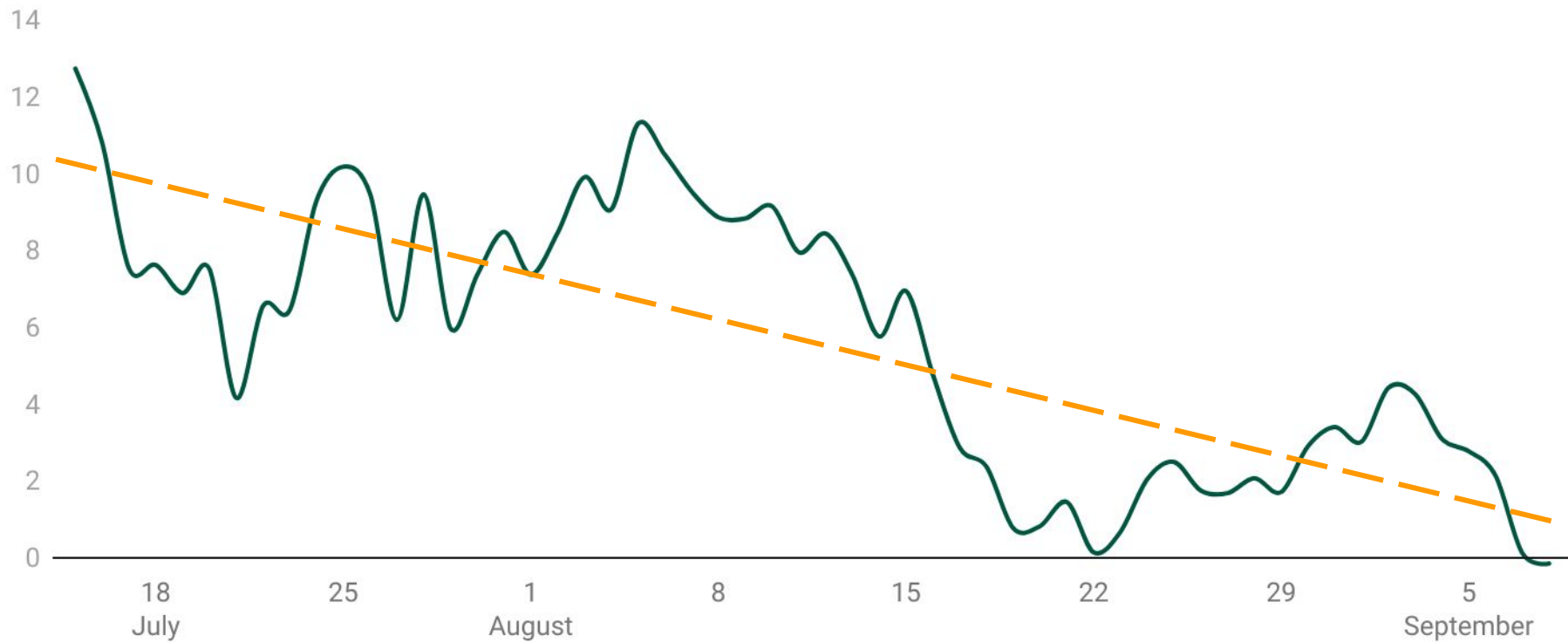
# Change in Vermont Weekly Case Growth



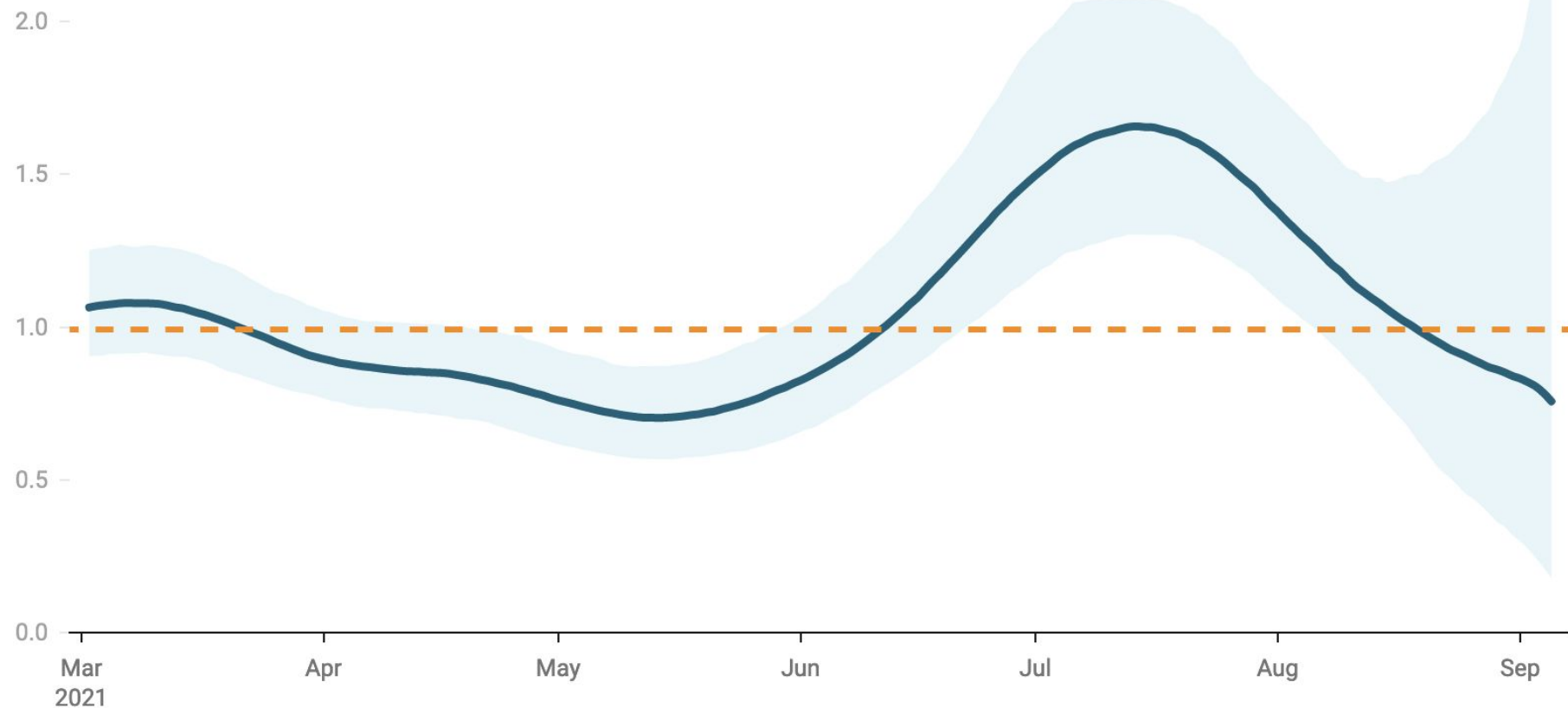


# Vermont Case Growth Trends

Daily growth rate change in Vermont's 14-day case average

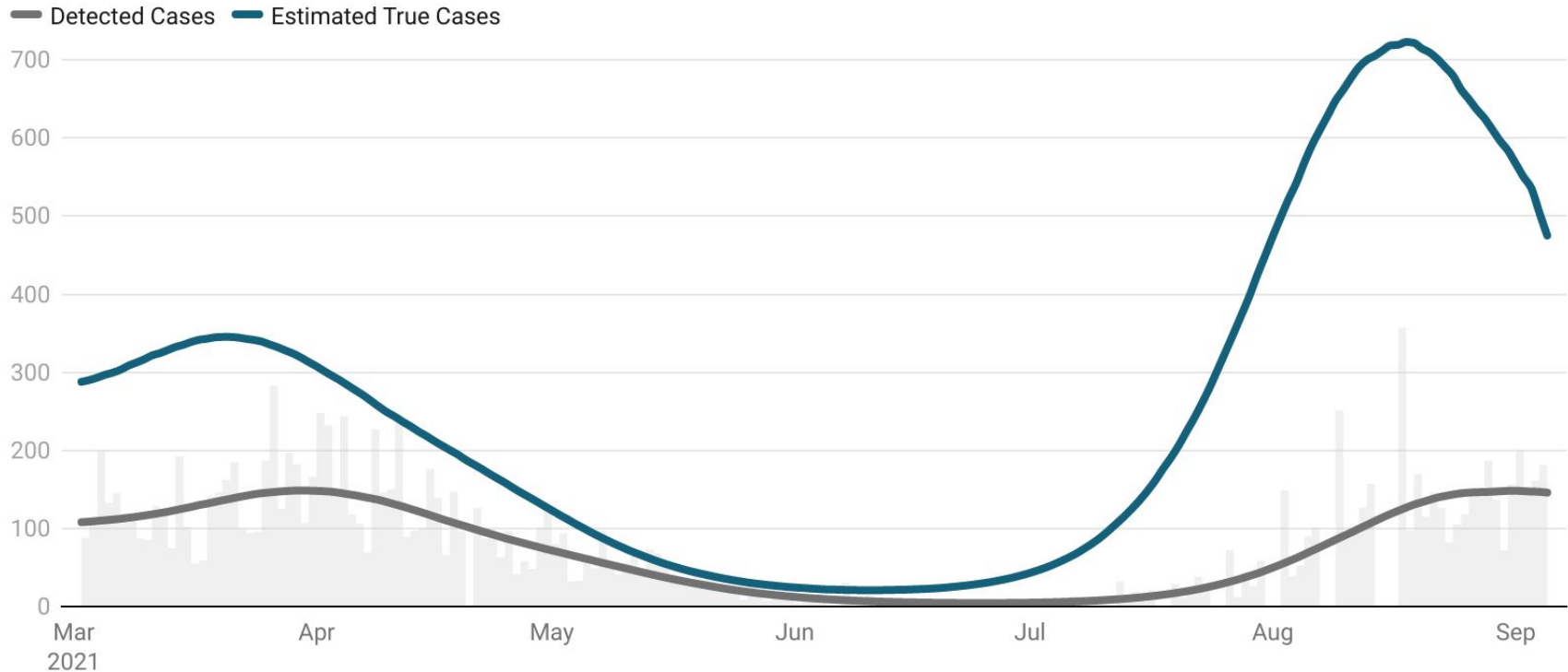


## COVID-19 $R_t$ in Vermont



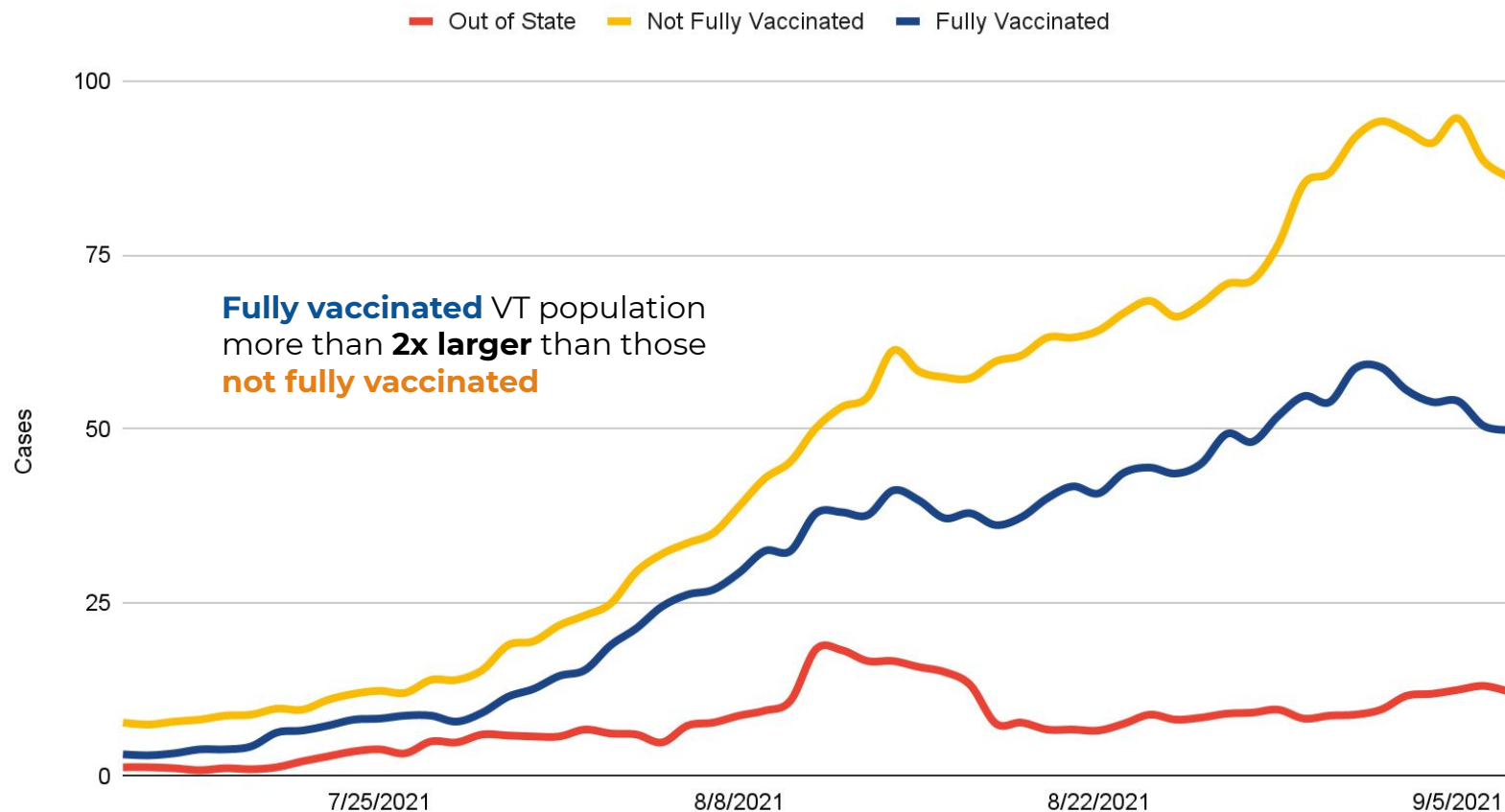
# Estimated vs Detected COVID-19 Cases in Vermont

This figure shows both the number of detected cases (gray) and an estimate of the true number of infections



Created with Datawrapper

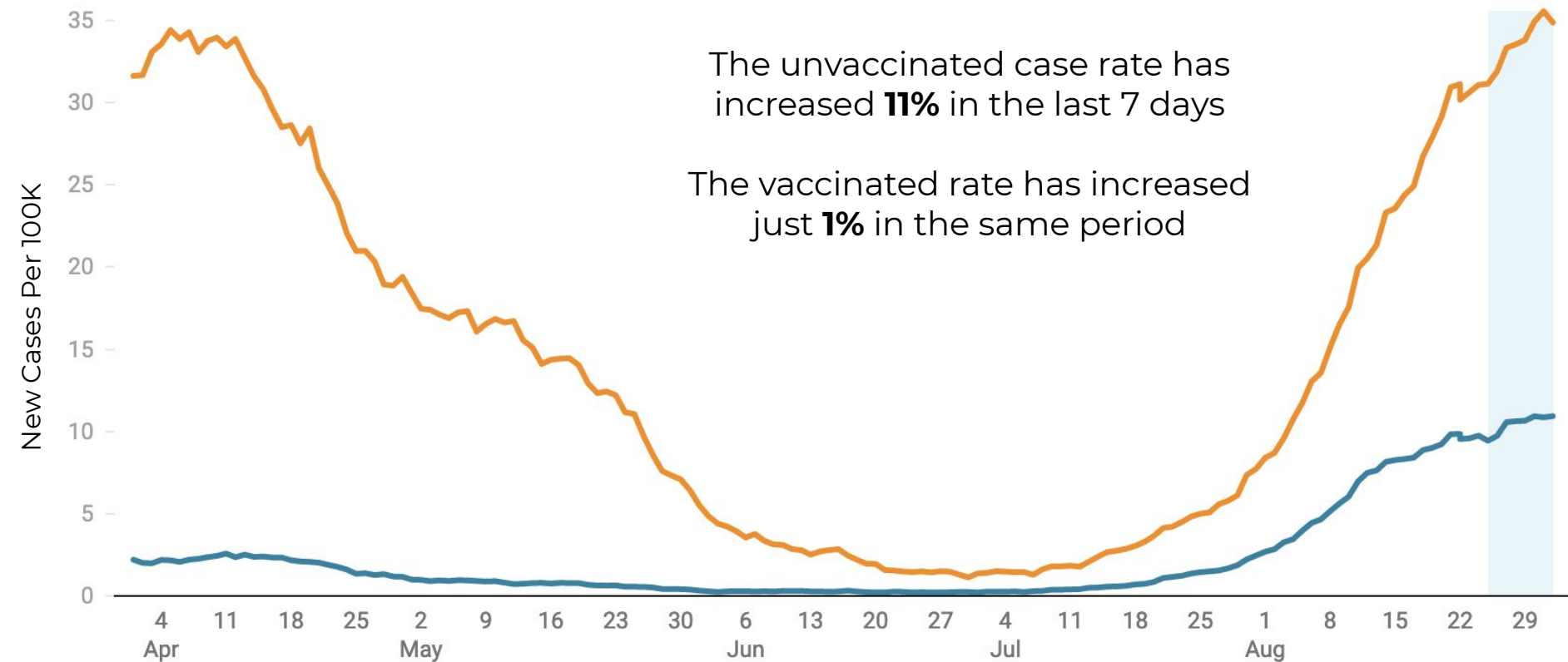
## Vermont Covid-19 Cases (Raw Count 7-Day Average)



Source: Vermont Dept. of Health—September 7, 2021; not fully vaccinated population includes children 0-11 & eligible unvaccinated adults; population estimates using 2019 US census data

## Vermont COVID-19 Cases per 100K (14-Day Average)

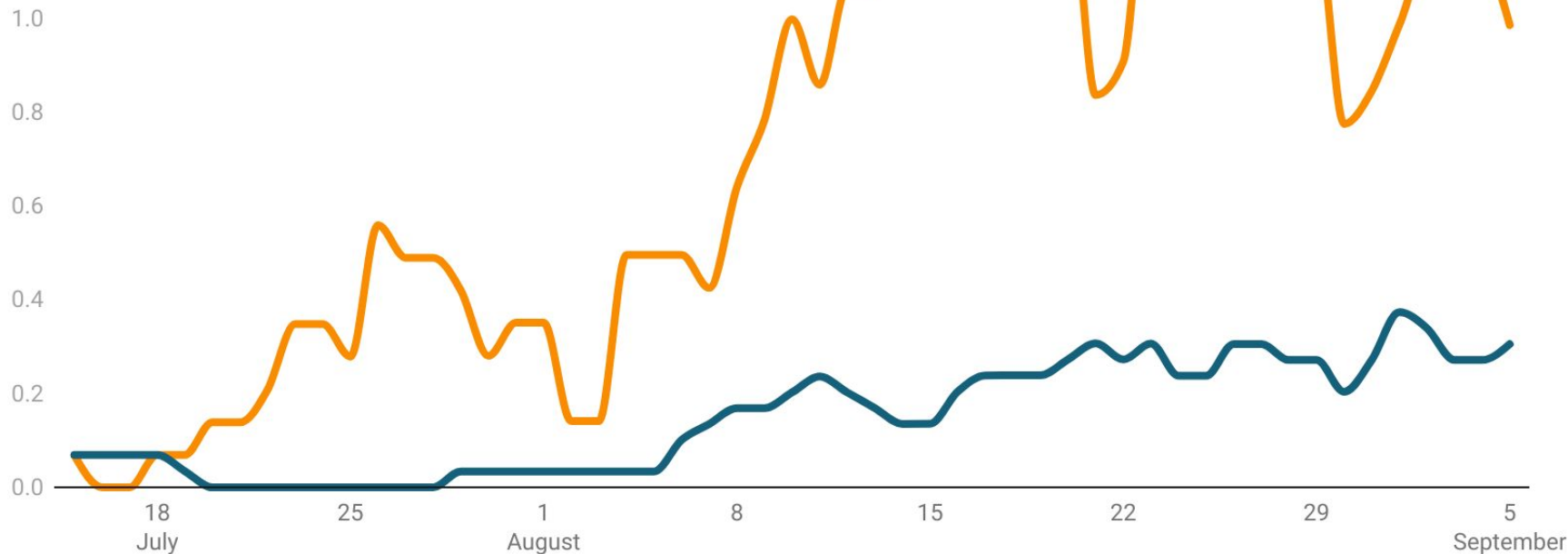
Among Not Fully Vaccinated    Among Fully Vaccinated



# COVID-19 Hospitalizations in Vermont (7-Day Average)

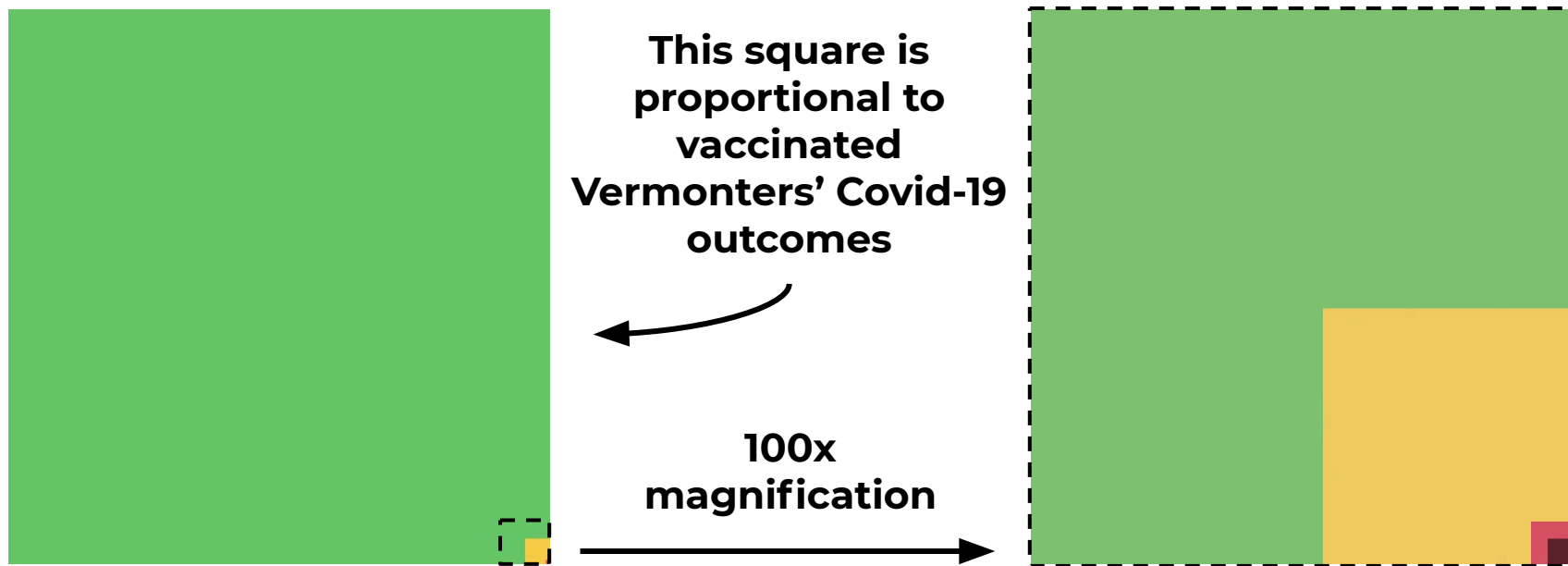
Among Fully Vaccinated Among Not Fully Vaccinated

1.4 Since early July, hospitalizations among those not fully vaccinated have been **6x higher** than among those fully vaccinated



# Covid-19 Among Fully Vaccinated People in Vermont

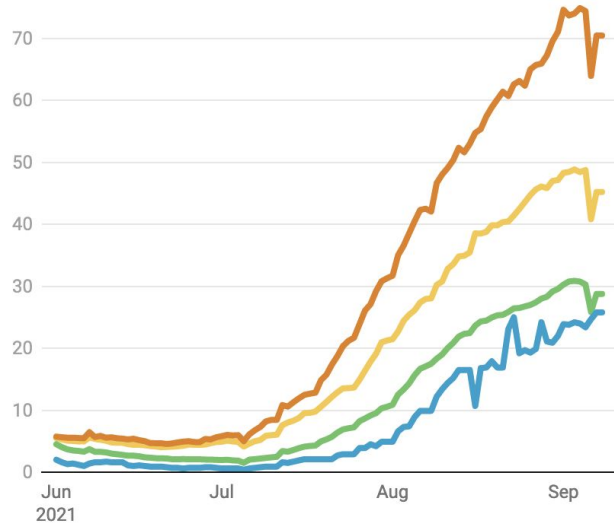
- 426,323 fully vaccinated
- 1,928 tested positive (0.45%)
- 53 hospitalized for Covid-19 (0.012%)
- 18 died due to Covid-19 (0.004%)



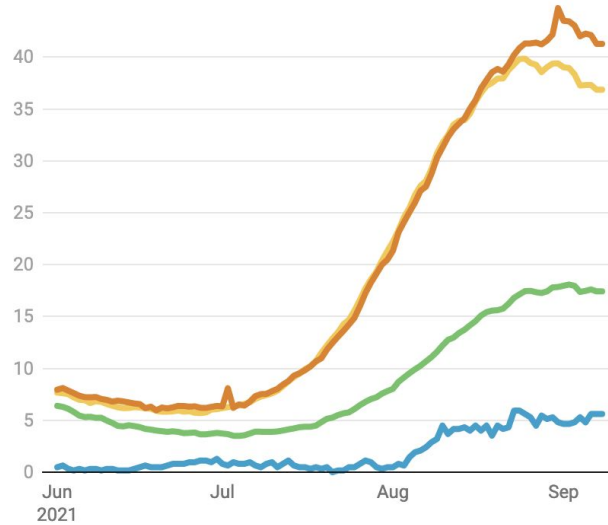
Source: Vermont Department of Health and CDC; percentages calculated using CDC total fully vaccinated; data from January 1, 2021 to September 7, 2021; magnification 100x areal/10x linear

# Infections, Hospitalizations, & Deaths by Percentage of State Population Vaccinated

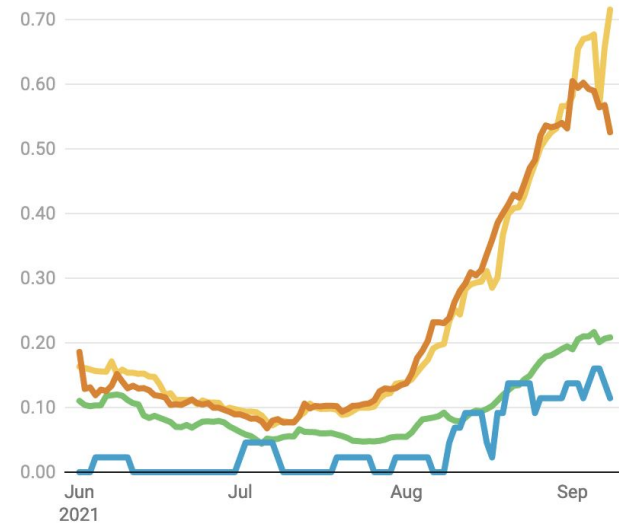
Bottom Third Vaccinated States   Middle Third Vaccinated States   Top Third Vaccinated States   Vermont



Infections per 100K



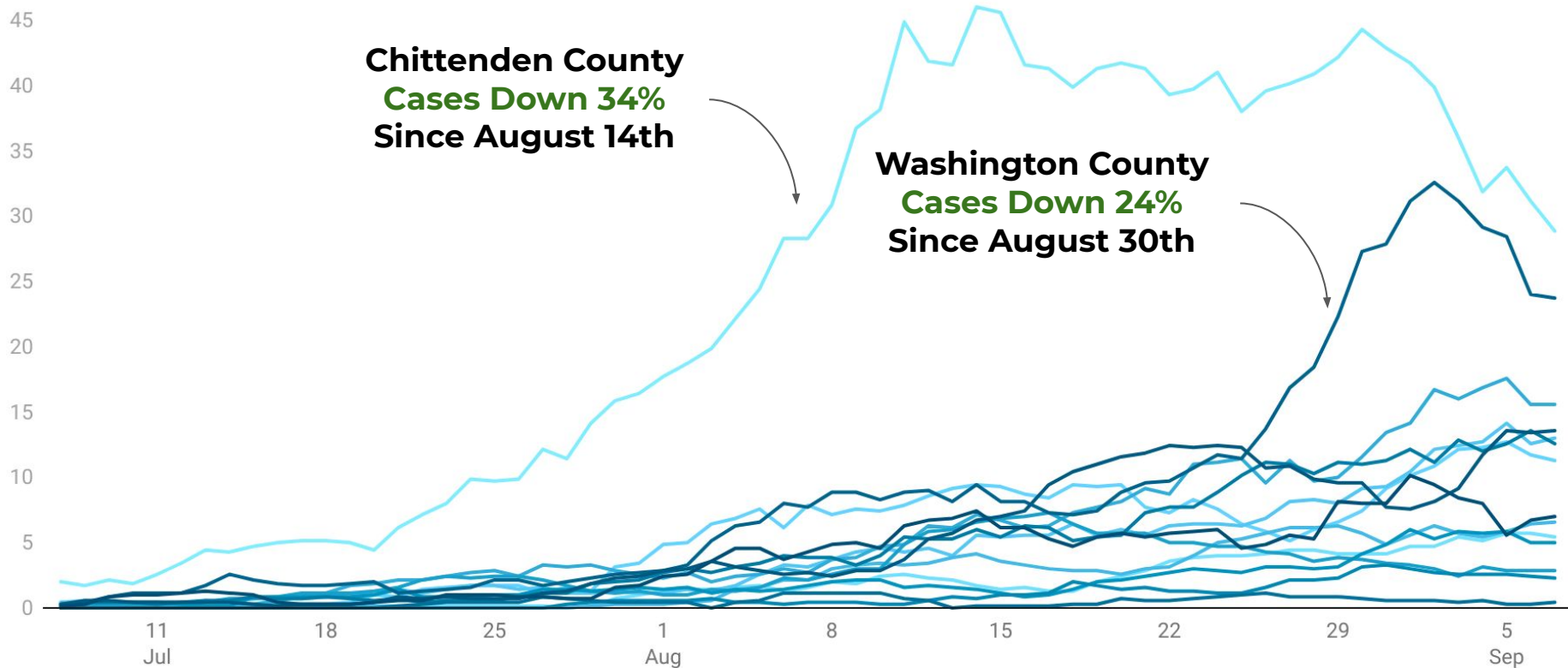
Hospitalizations per 100K



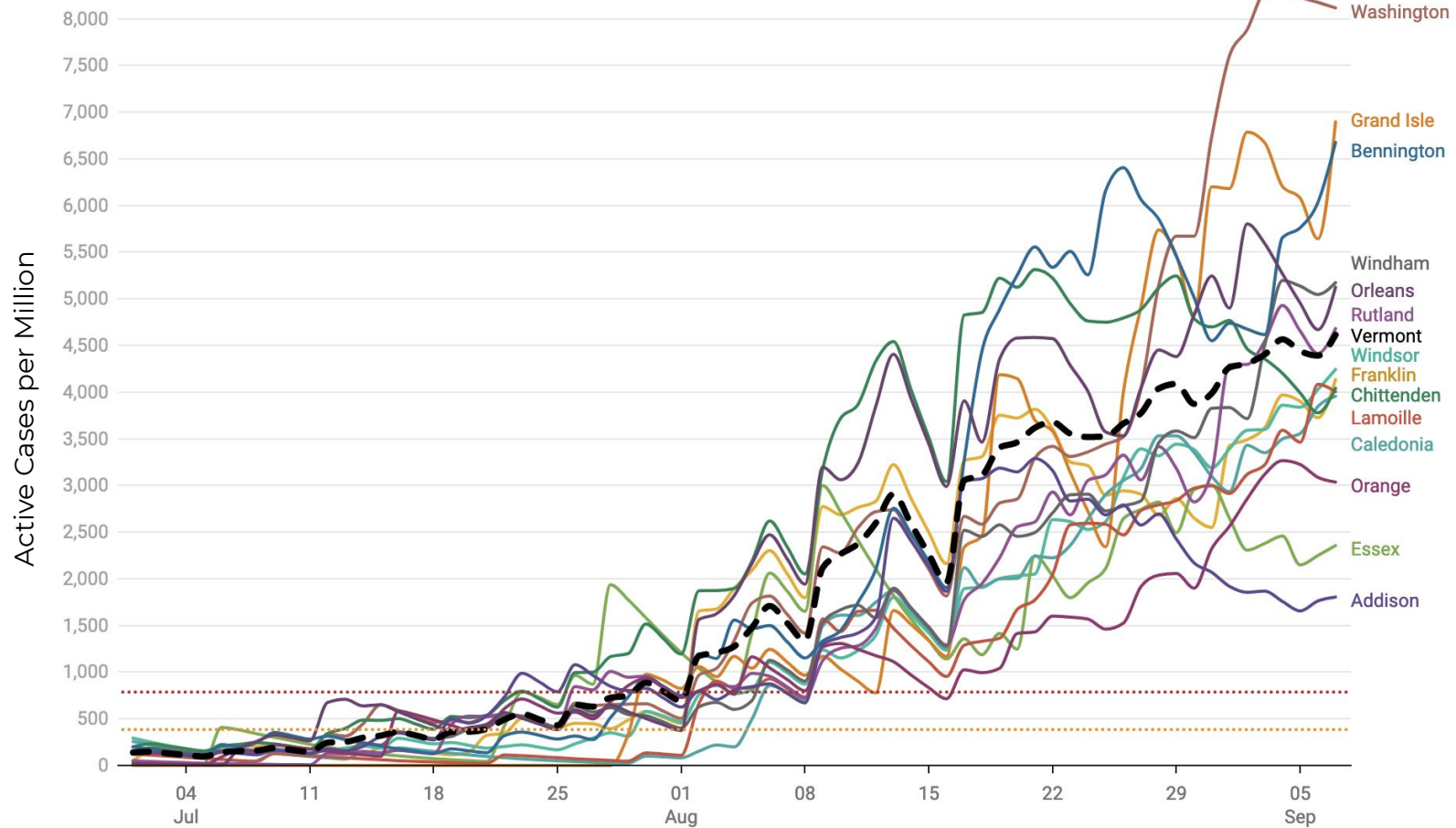
Deaths per 100K



## Raw Daily Case Totals By County (7-Day Average)



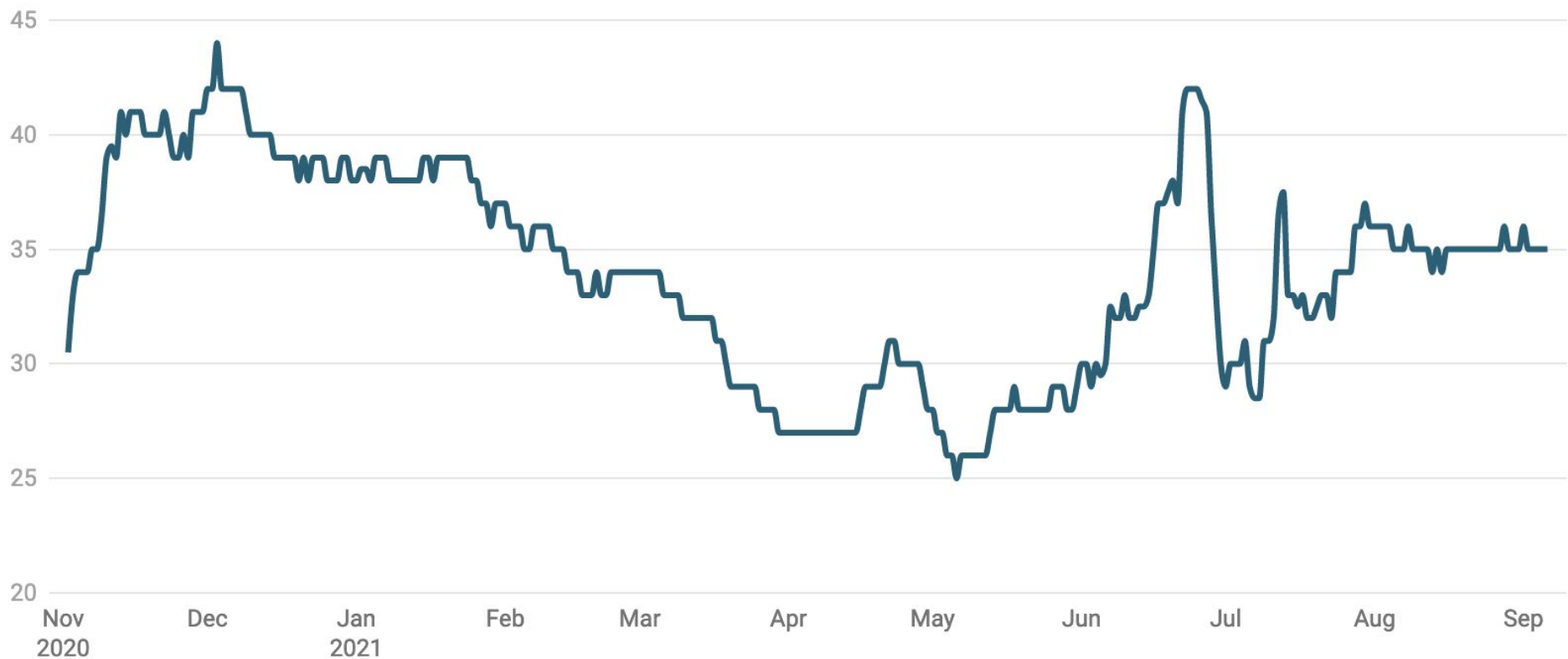
# Active Cases in Vermont Counties



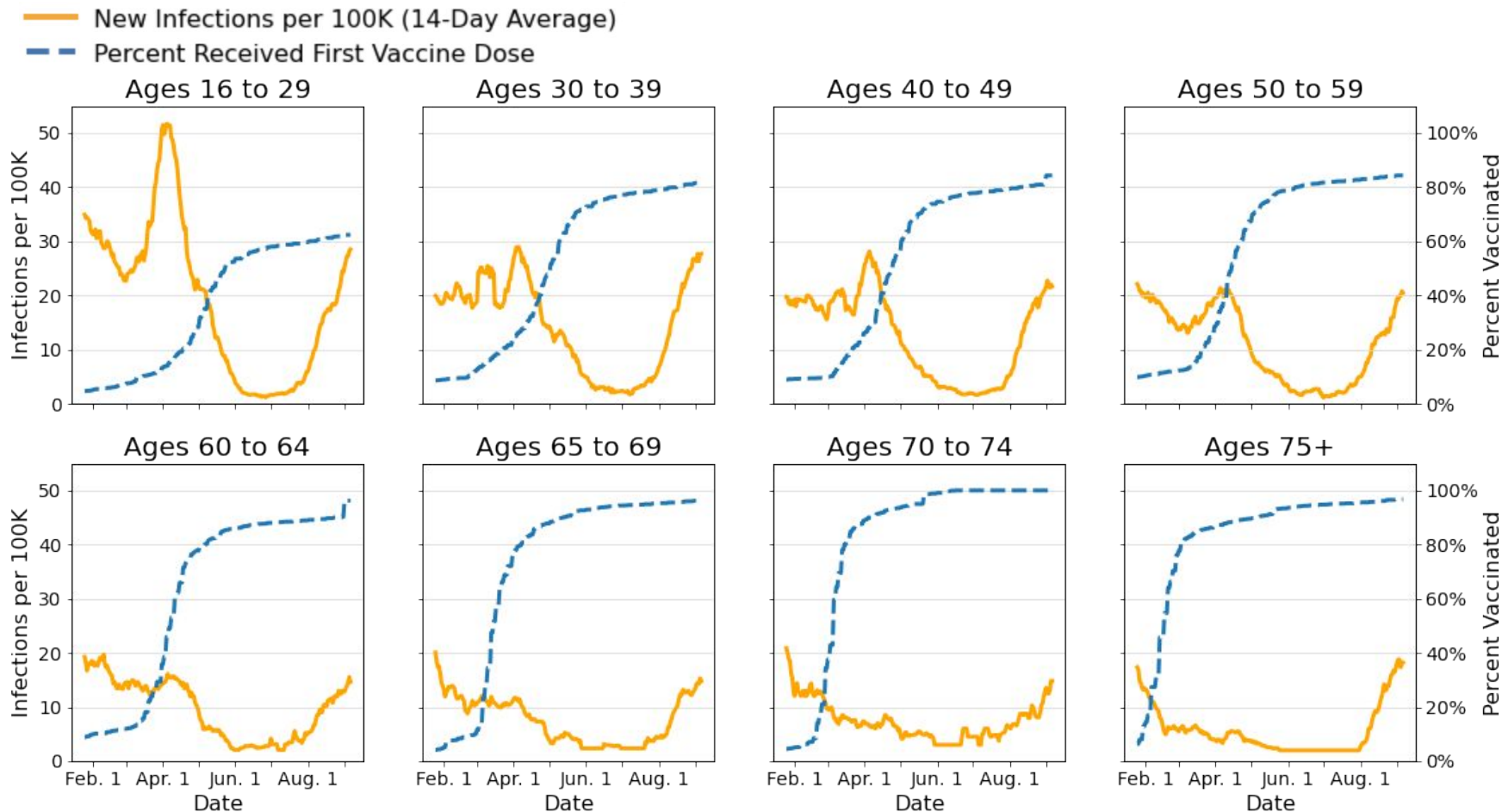
Source: Vermont Dept. of Health—September 6, 2021; DFR Active Case Algorithm (per million)

# Age of Infected Vermonters

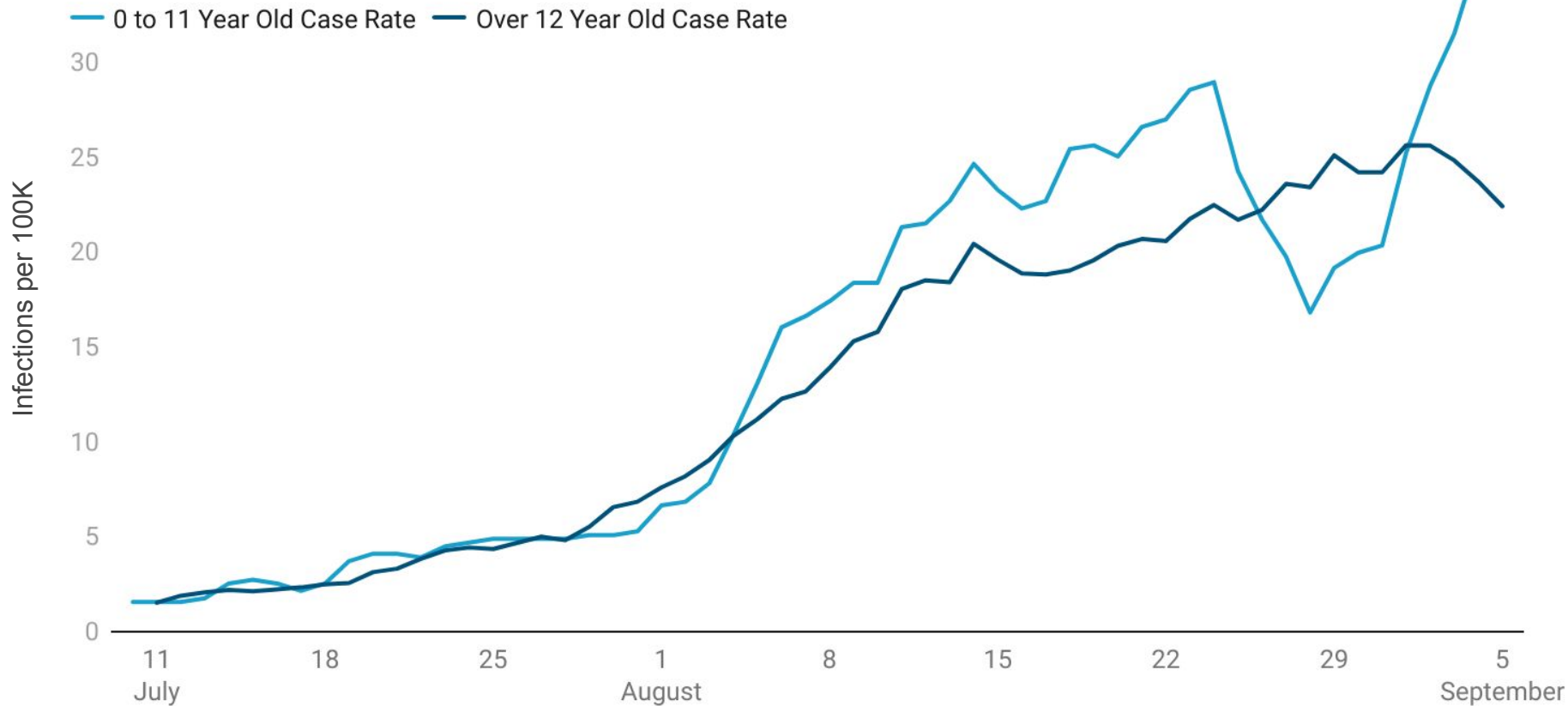
Median age of COVID positive individuals in VT over the last 14 days.



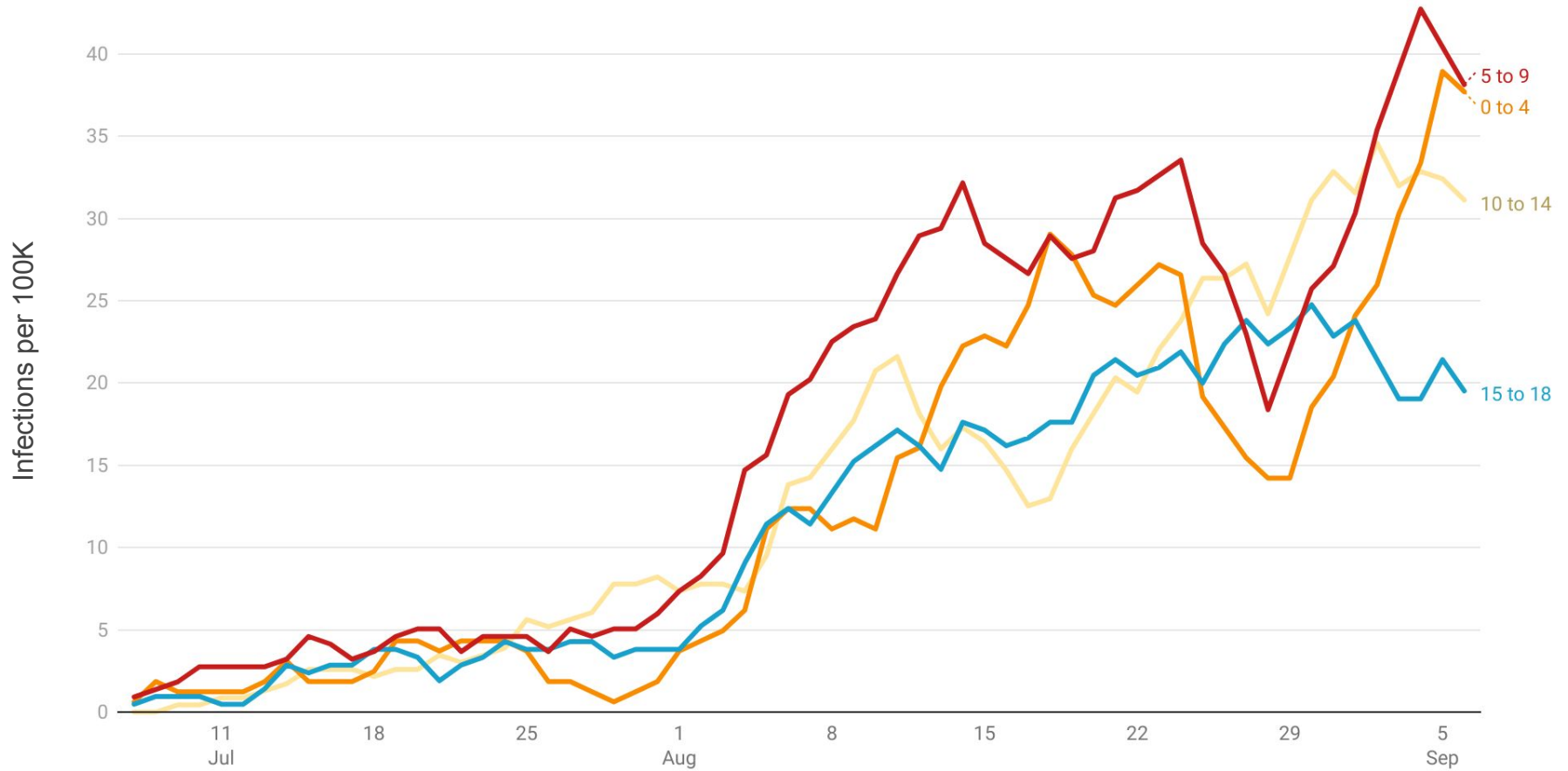
# Vermont Case Rate & Vaccination by Age Band



# Vermont Case Rates By Age (7-Day Average)



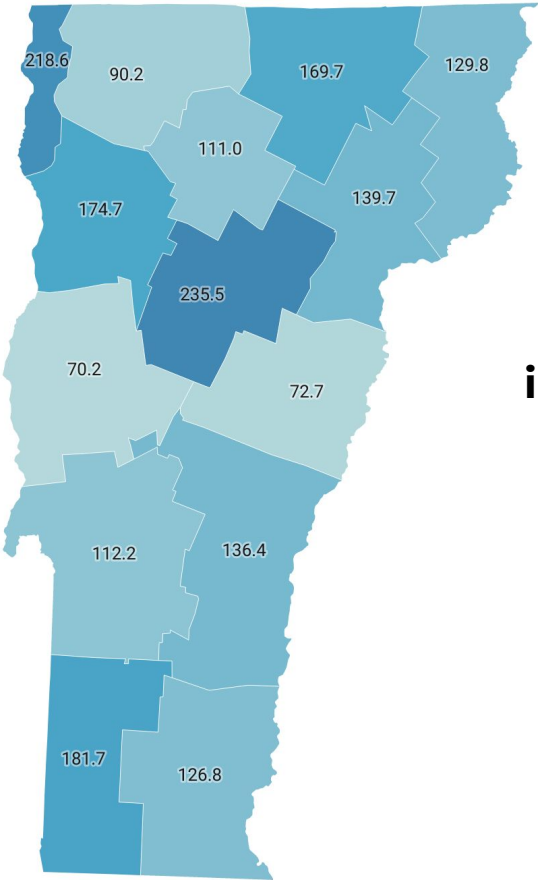
## Vermont Covid-19 Case Rates by Age (7-Day Average)



Source: VDH—September 7, 2021

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

Results Reported August 24 to 30

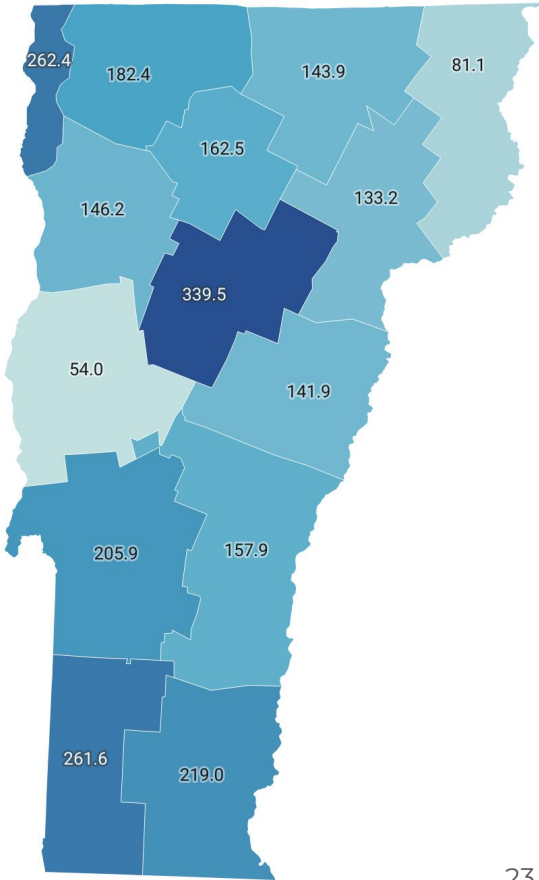


Covid-19 case rates  
**increased** this past week

Washington County seeing  
highest case rates in Vermont

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

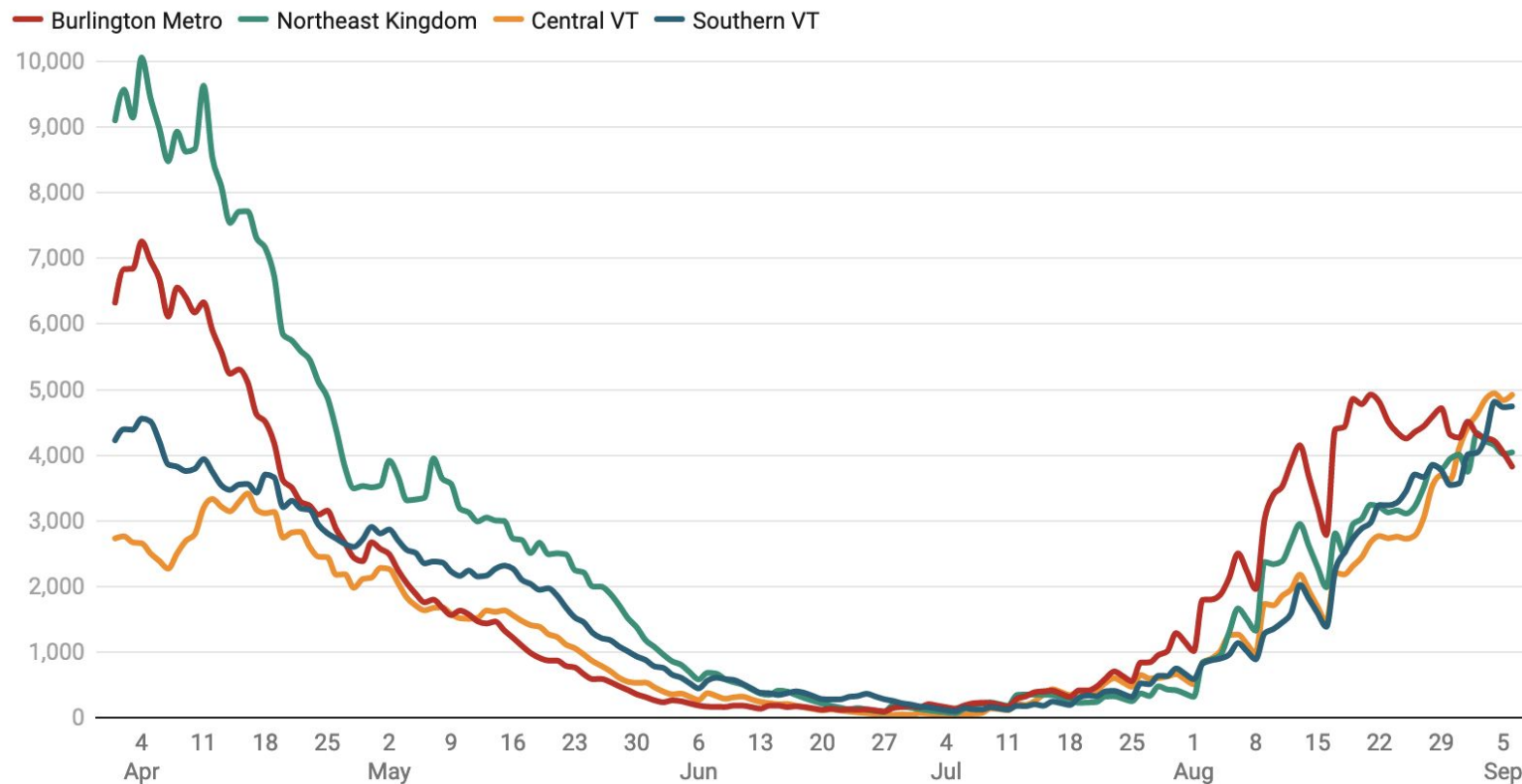
Results Reported August 31 to September 6





# 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).





# Fall 2021 Higher Education Restart

Higher Education Institutions Reporting	Enrollment	Students Fully Vaccinated	Students Not Fully Vaccinated (No Exemption Granted)	Students with Unknown Vaccine Status	Students Granted Vaccine Mandate Exemption
15 (of 16)	26,347	24,706	441	698	502
		93.8%	1.7%	2.6%	1.9%

Week Number 1: **37 positive cases** out of 12,623 tests  
Week Number 2: **36 positive cases** out of 7,434 tests

## Active Outbreaks in Long Term Care Facilities

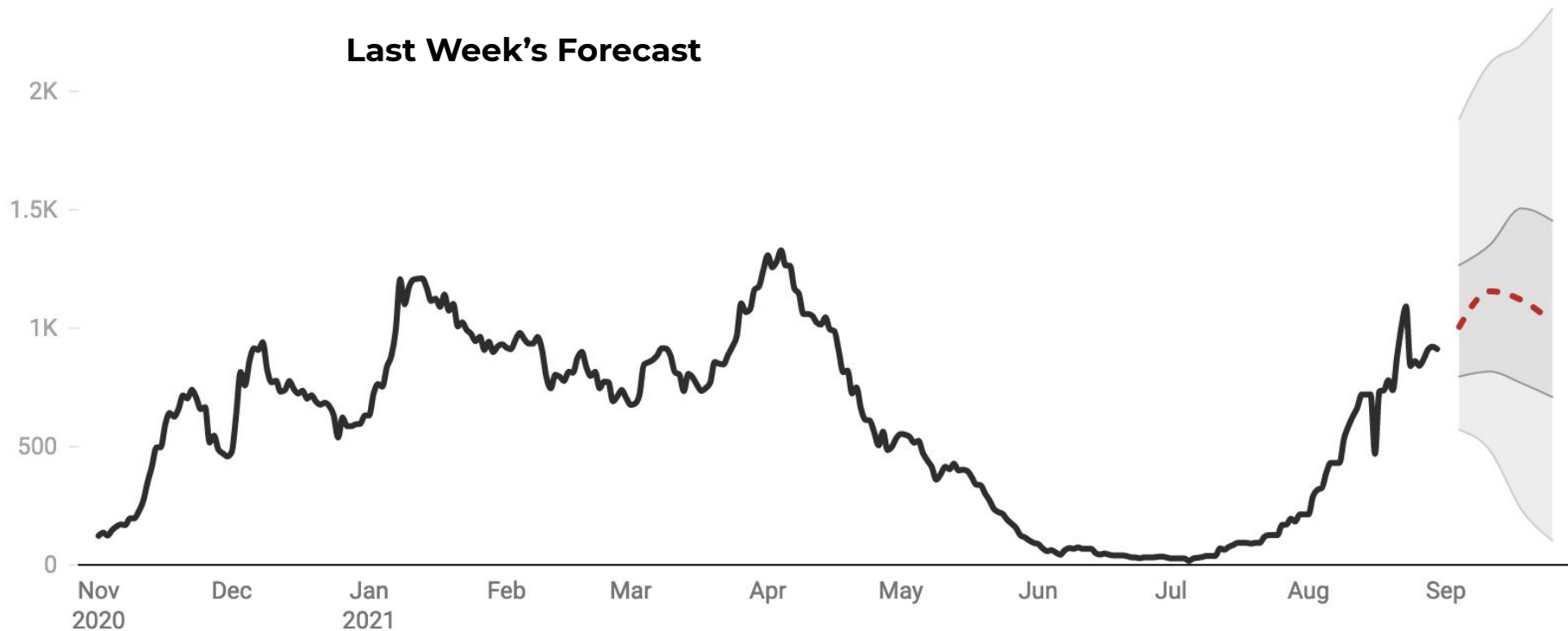
Facility Name	Total COVID-19 Cases
Cedar Hill Skilled Nursing Facility, <i>Windsor</i>	30
Ethan Allen Residence, <i>Burlington</i>	25
Vernon Green Nursing Home, <i>Vernon</i>	22
Vermont Veterans Home, <i>Bennington</i>	14
Mansfield Place, <i>Essex</i>	10
Harbor Village, <i>Burlington</i>	Not Shown*
Vernon Hall Assisted Living, <i>Vernon</i>	Not Shown*
<b>Total (of facilities shown)</b>	101

Source: Vermont Department of Health—September 7, 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

# VT 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.

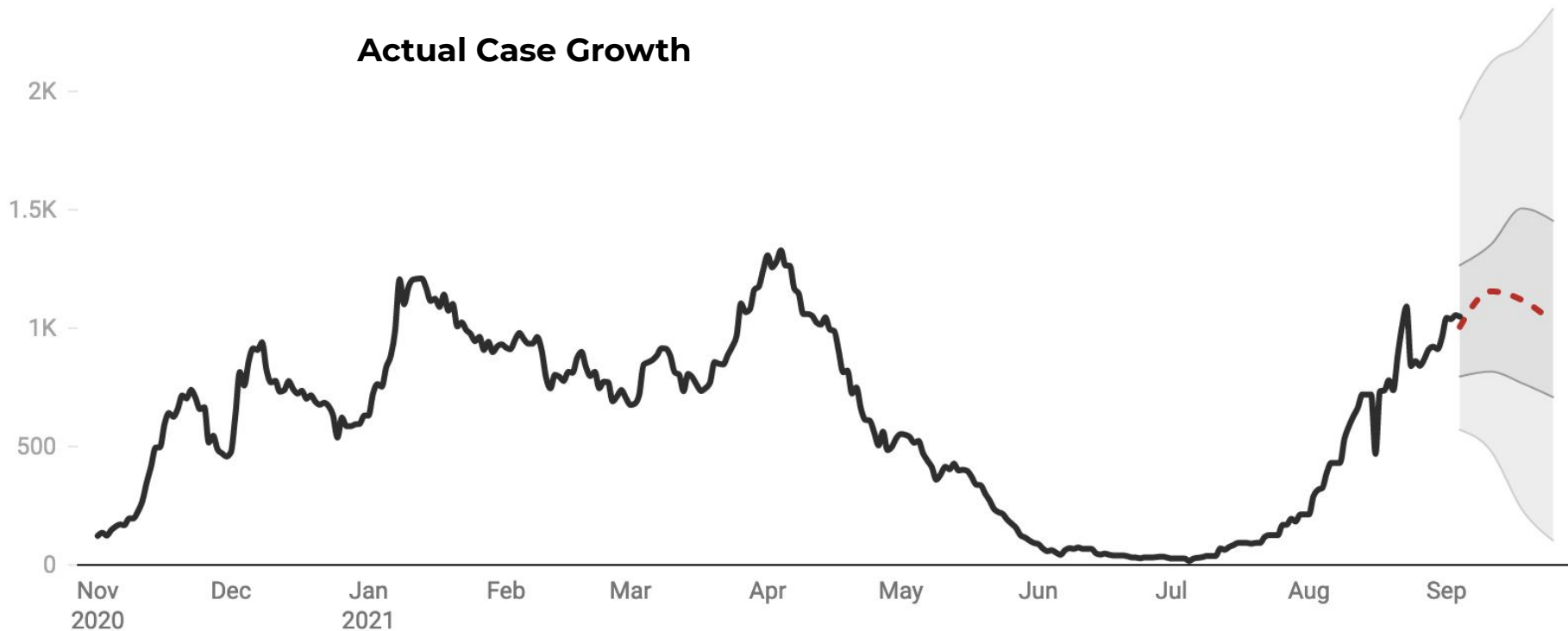
## Last Week's Forecast



# VT 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.

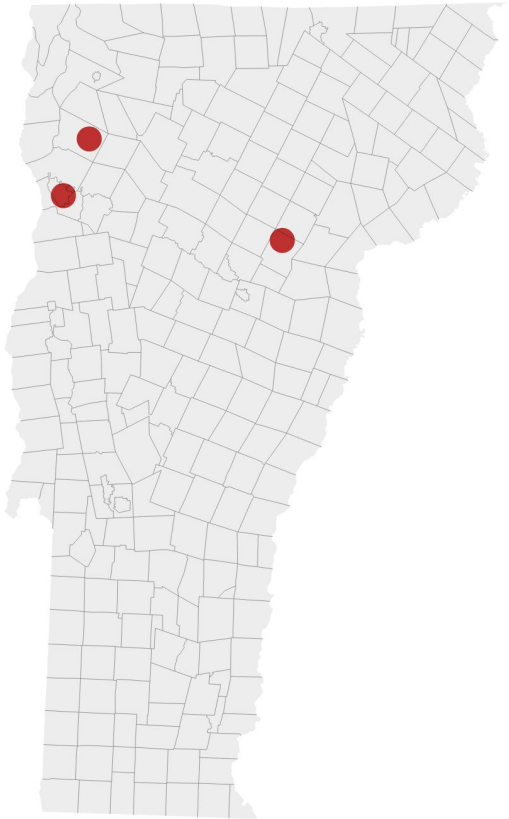
## Actual Case Growth



# Washington County Outbreaks

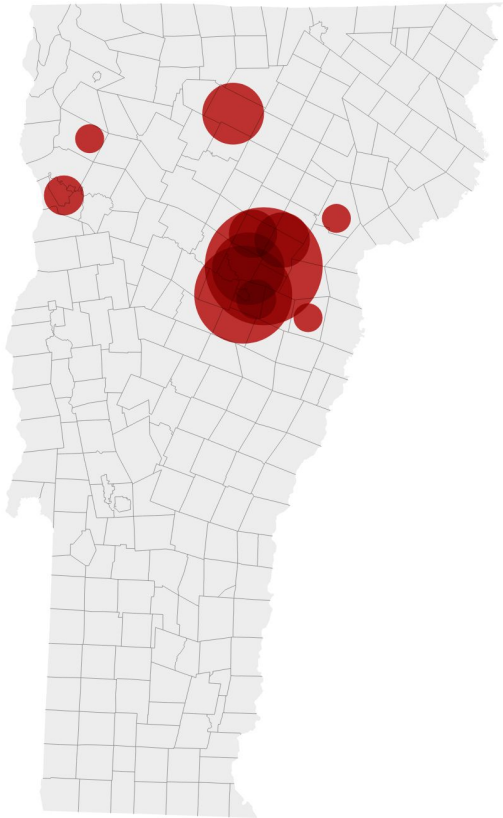
# Initial Wedding Outbreak: August 26

3 Total Cases



# Continued Wedding Spread: September 7

65 Total Cases



# Initial Camp Outbreak: August 2

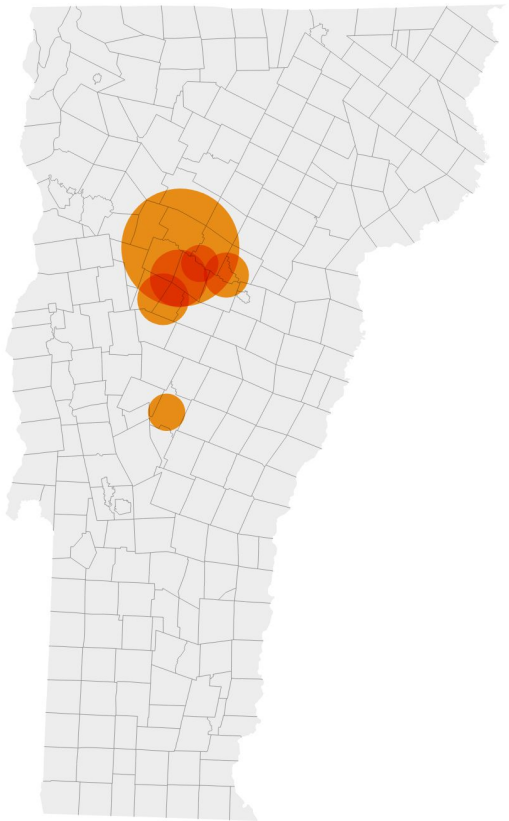
3 Total Cases





# Final Camp Spread: August 20

38 Total Cases



# New Research

# British Vaccination Study

## Overview

Study designed to identify risk factors for breakthrough infection and study breakthrough illnesses.

## Components

- 1.24 million adults—971,504 fully vaccinated—with either Pfizer-BioNTech, Moderna, or AstraZeneca
- Case-controlled study using self-reported data from UK-based users of the COVID Symptom Study mobile app
- 0.2% of fully vaccinated individuals reported testing positive

## Conclusions

The study, [published](#) in the Lancet Infectious Diseases, found vaccinations:

- Reduce chance of infection
- Protect against severe Covid-19 symptoms
- Reduce the risk of hospitalization
- Significantly reduce likelihood of ongoing, debilitating symptoms after infection, including 'long-haul' Covid
- Vaccinated participants were more likely to be completely asymptomatic, especially in those 60+

# Yale-Stanford Bangladesh Masking Study

## Overview

A large, randomized trial led by researchers at Stanford Medicine and Yale University found a face mask is an effective way to reduce Covid-19 in community settings.

## Components

- Researchers enrolled nearly 350,000 people from 600 villages in rural Bangladesh for 8-week study
- First randomized controlled trial exploring whether masking prevents Covid-19 transmission at the community level

## Conclusions

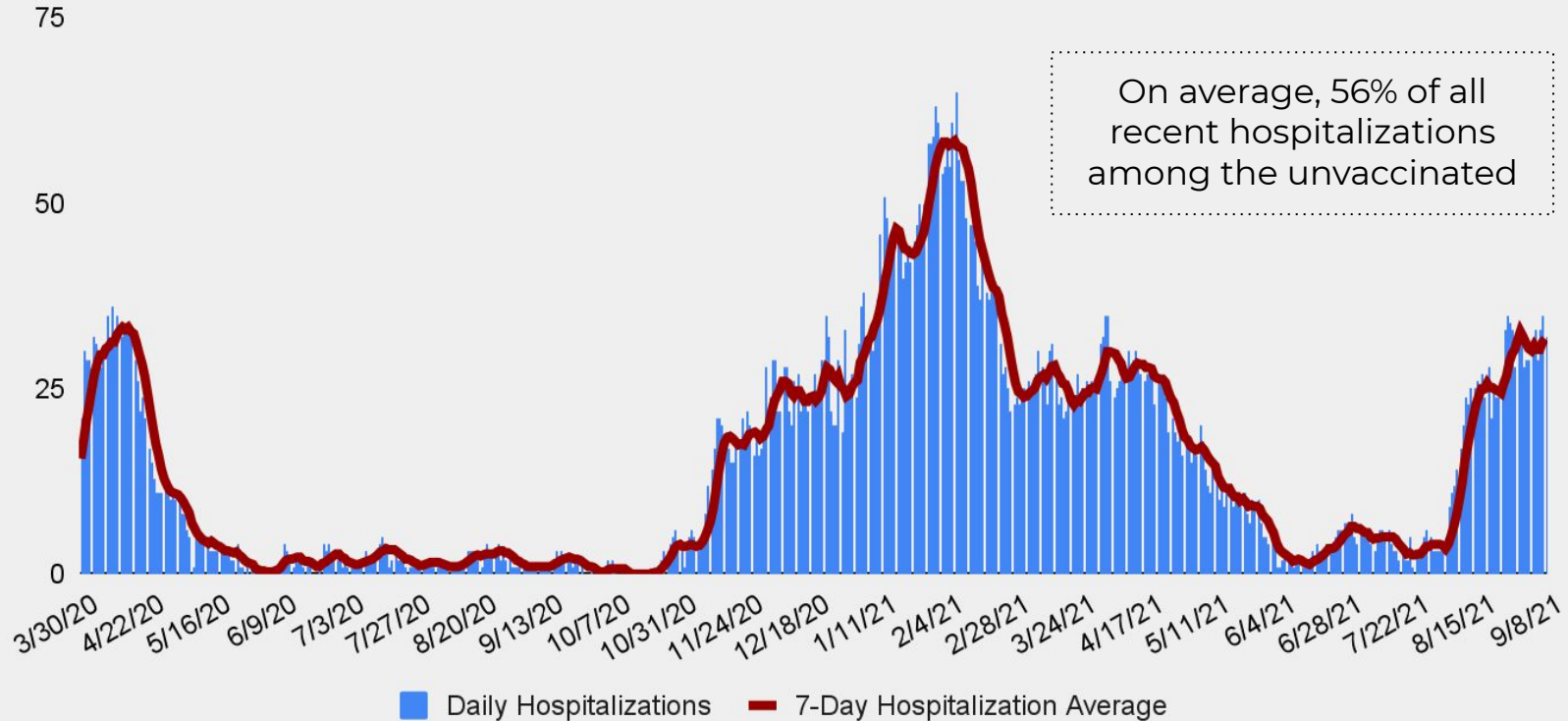
The study, [published](#) in pre-print in Poverty Action, found:

- Those living in villages randomly assigned to interventions promoting use of masks were 11% less likely than those living in control villages to develop Covid-19
  - The protective effect increased to nearly 35% for people over 60 years old
- The model is being scaled to reach tens of millions in Southeast Asia and Latin America over the next few months

# Vermont Hospitalization Data

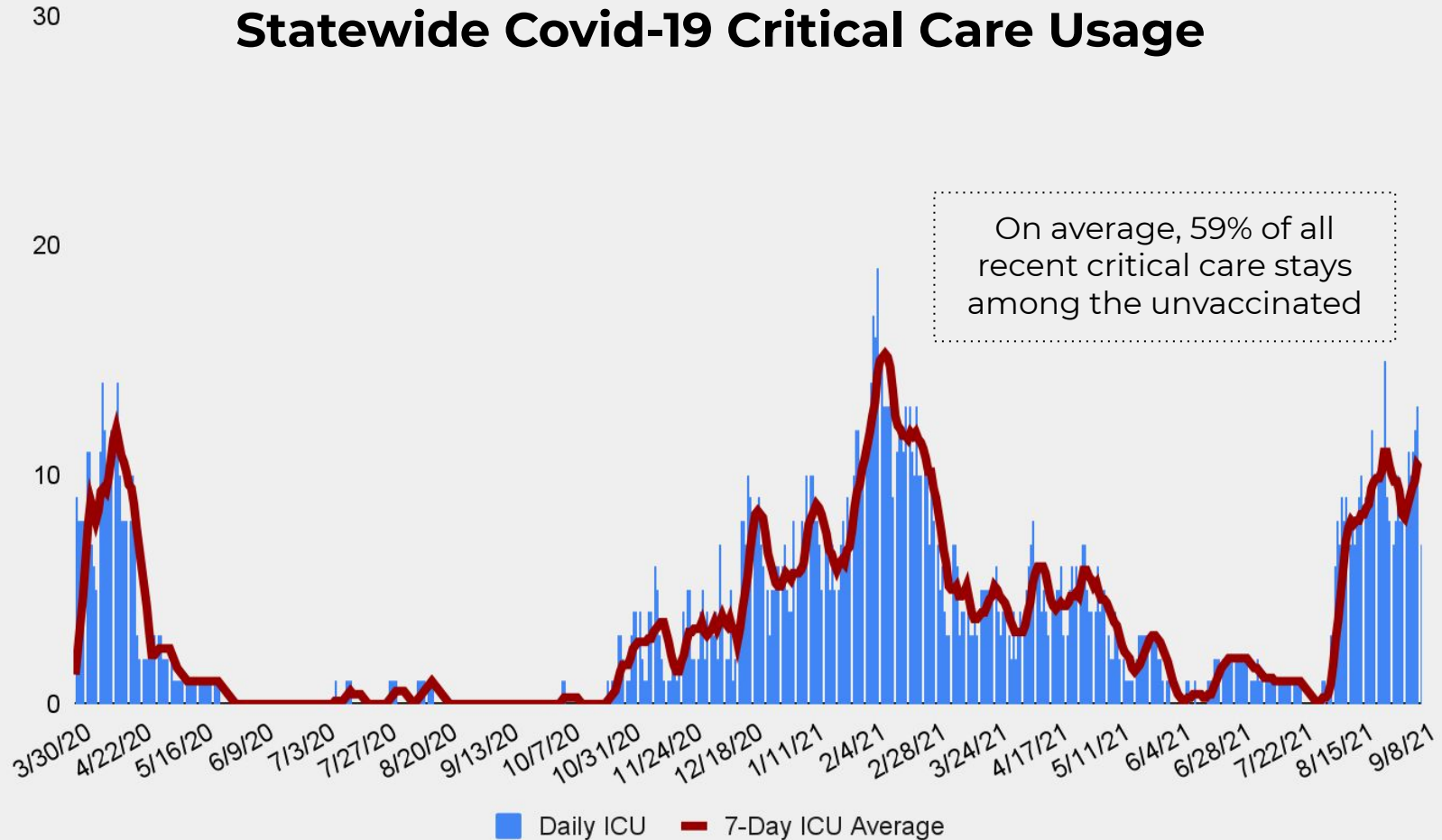
# Statewide Covid-19 Hospitalizations

*Hospitalization rate increasing, but Vermont continues to have fewest hospitalizations per capita nationally*



Source: Vermont Department of Health—September 7, 2021

# Statewide Covid-19 Critical Care Usage



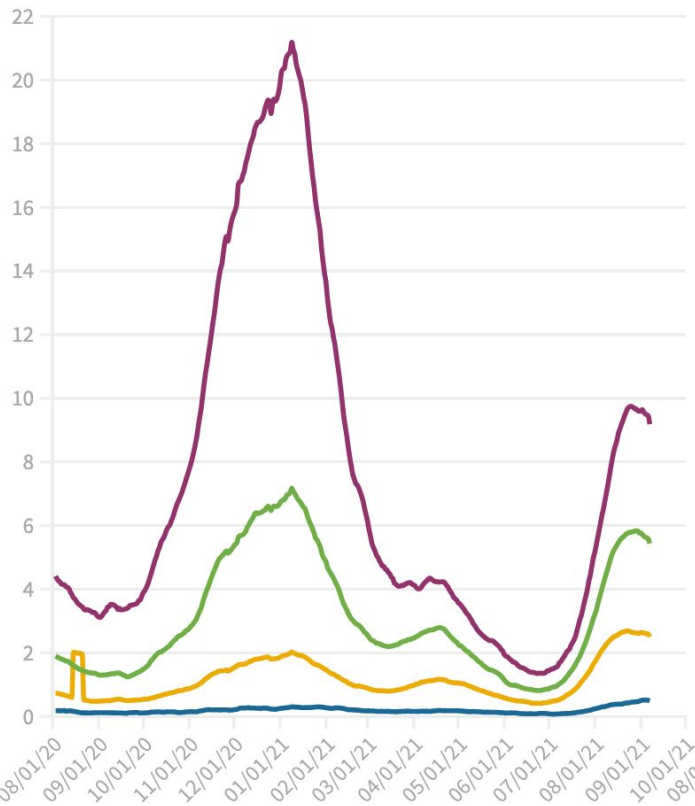
Source: Vermont Department of Health—September 7, 2021

New Hospitalizations per 100K

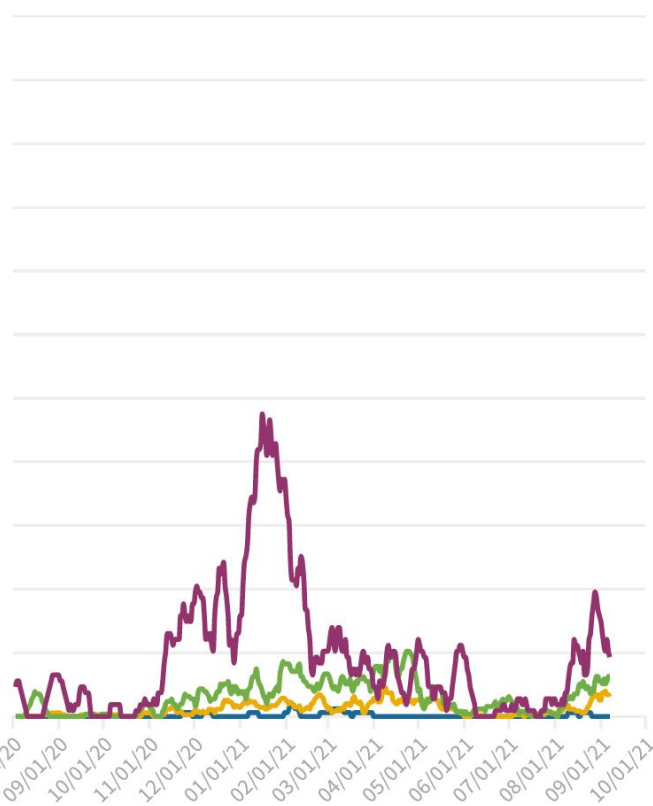
## New Hospitalizations per 100,000 Residents, by Age

0-17 years 18-49 years 50-69 years 70+ years

### United States



### Vermont

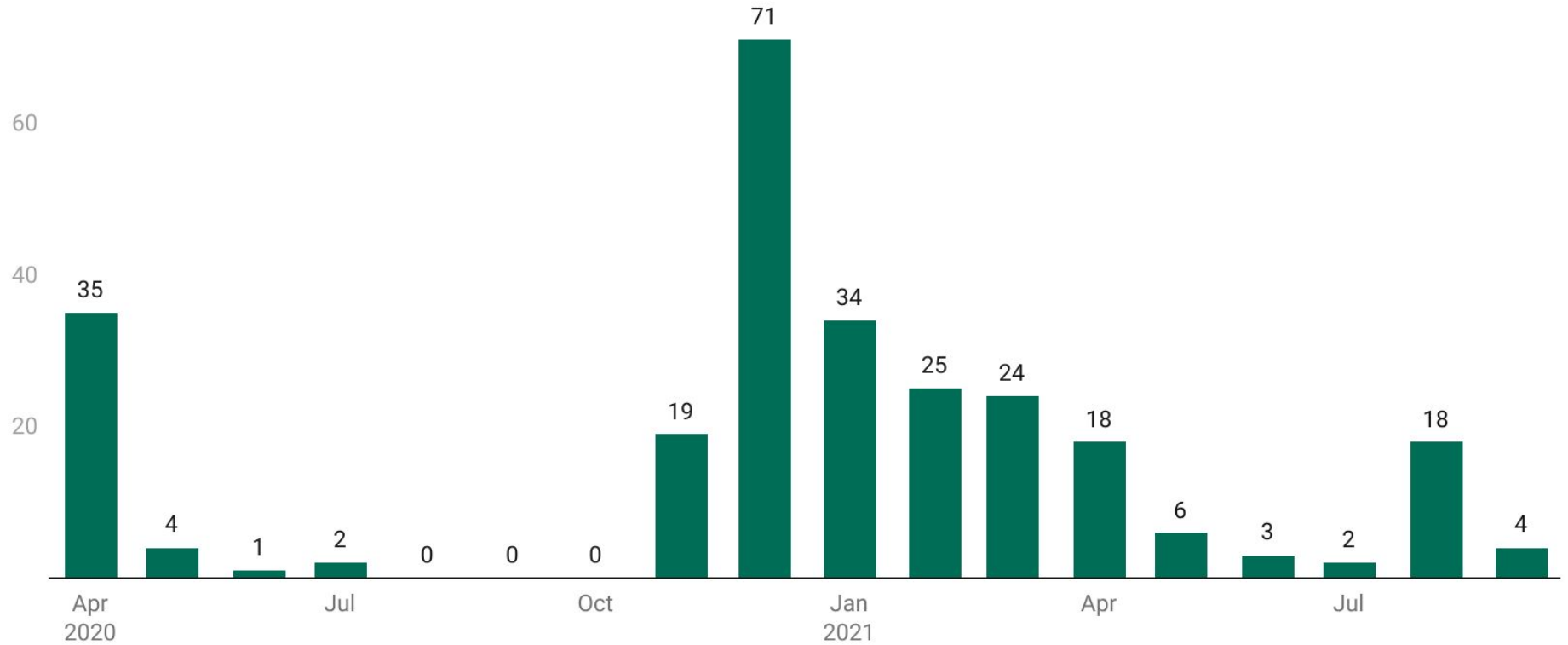




# Vermont Fatality Data

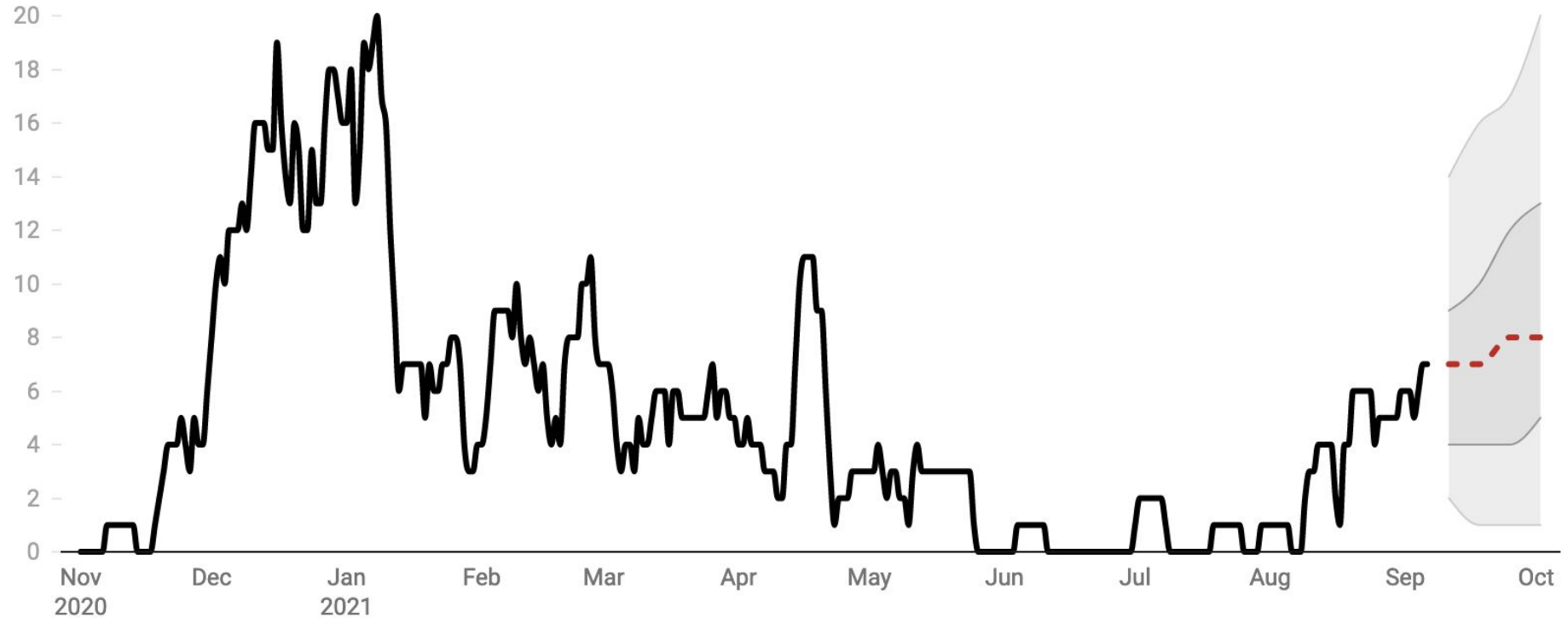
## 20

## Monthly Covid-19 Deaths In Vermont

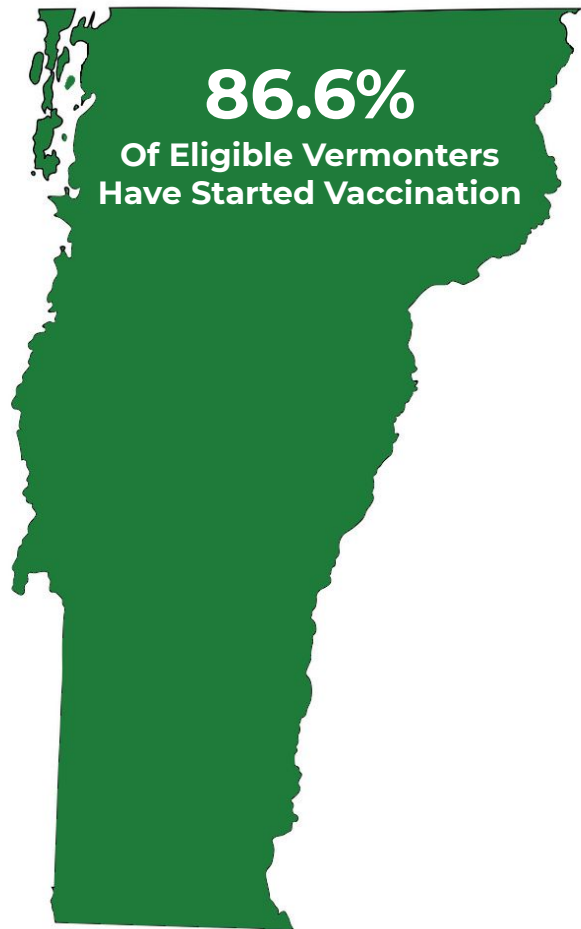


# VT Weekly COVID-19 Deaths Forecast

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.



# Vermont Vaccination Data



# Vermont Vaccination

**+2,526**

Since Last Week

**477,260**

Vermonters with  
at Least 1 Dose

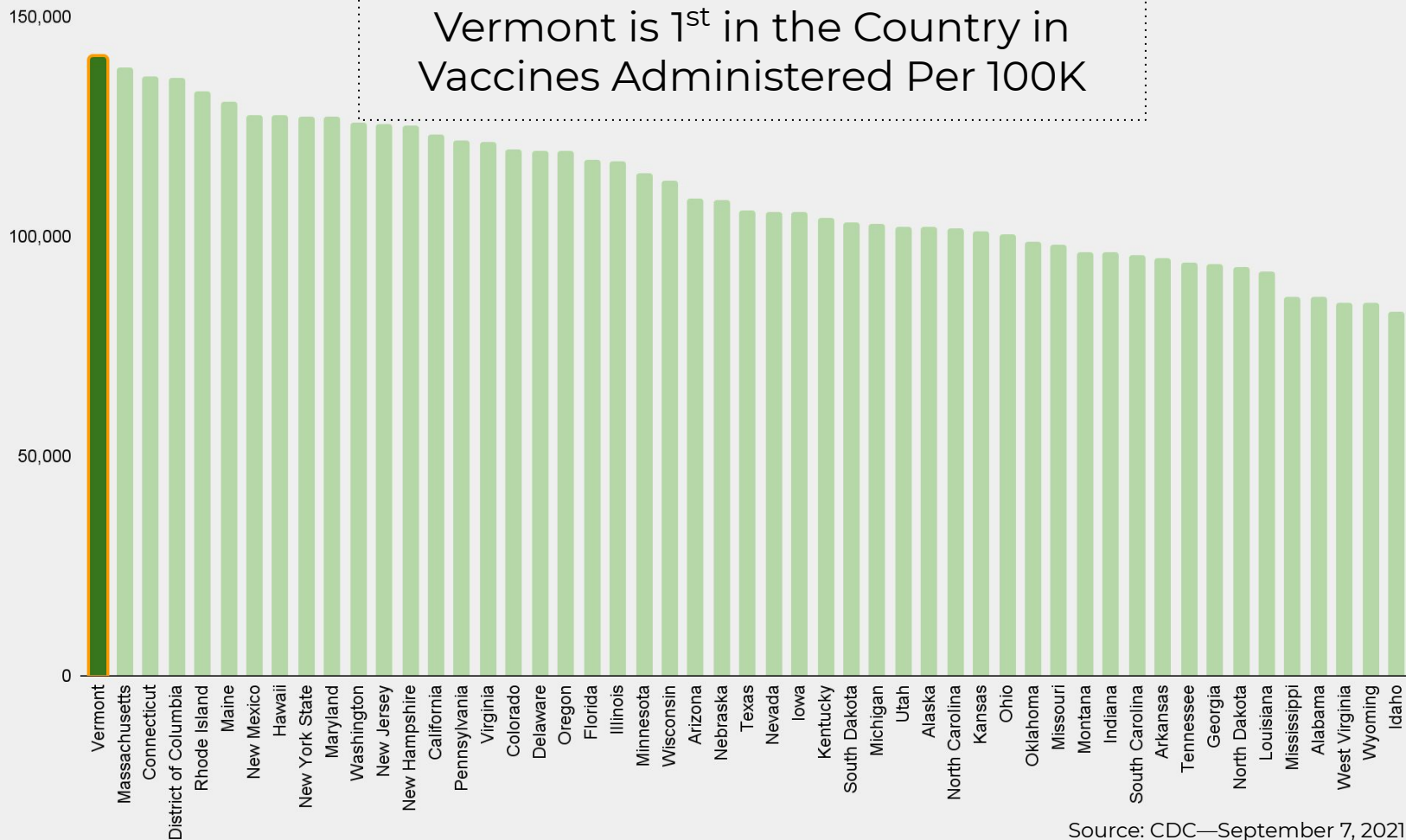
**73,690**

Eligible Vermonters  
still to be vaccinated

# Vermont CDC Vaccine Scorecard

Metric	Figure	State Ranking
<b>Doses Administered per 100K</b>	<b>141,041</b>	<b>1</b>
<b>% At Least 1 Dose (Eligible Population)</b>	<b>86.6%</b>	<b>3</b>
<b>% Fully Vaccinated (Eligible Population)</b>	<b>77.4%</b>	<b>1</b>
<b>% At Least 1 Dose (Full Population)</b>	<b>76.5%</b>	<b>1</b>
<b>% Fully Vaccinated (Full Population)</b>	<b>68.3%</b>	<b>1</b>
<b>% Fully Vaccinated (65 &amp; Over)</b>	<b>94.7%</b>	<b>1</b>

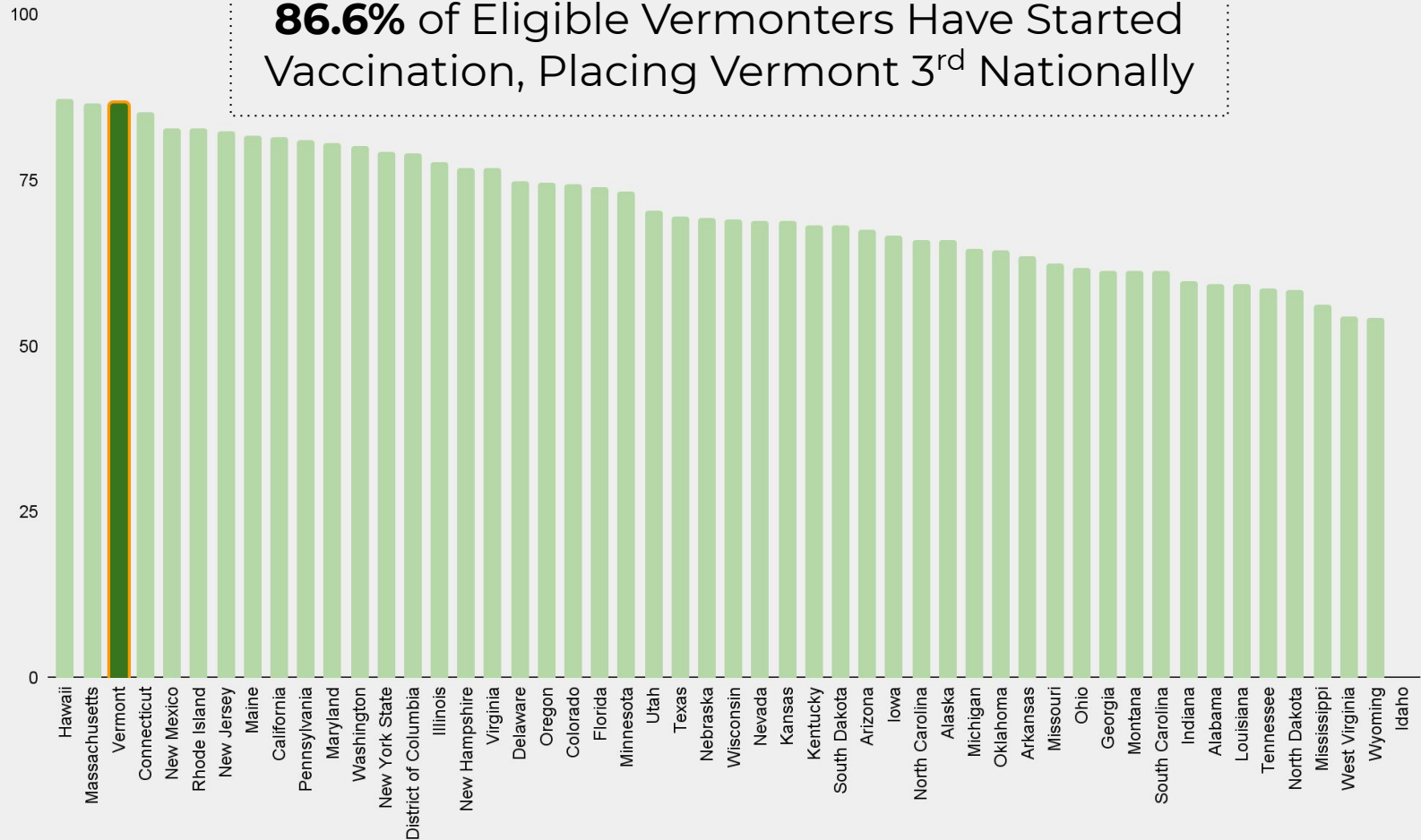
Vermont is 1<sup>st</sup> in the Country in  
Vaccines Administered Per 100K



Source: CDC—September 7, 2021

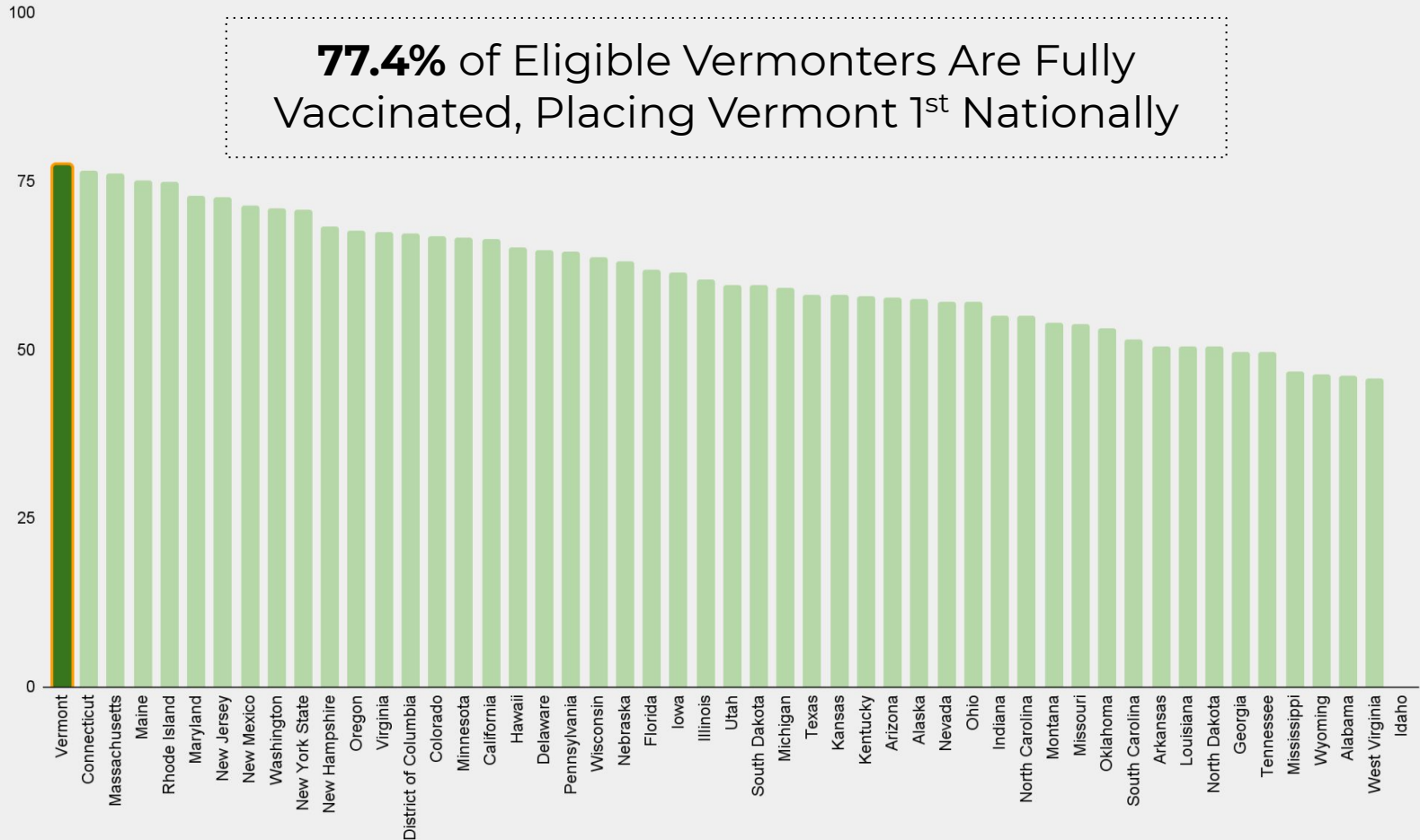


**86.6%** of Eligible Vermonters Have Started Vaccination, Placing Vermont 3<sup>rd</sup> Nationally



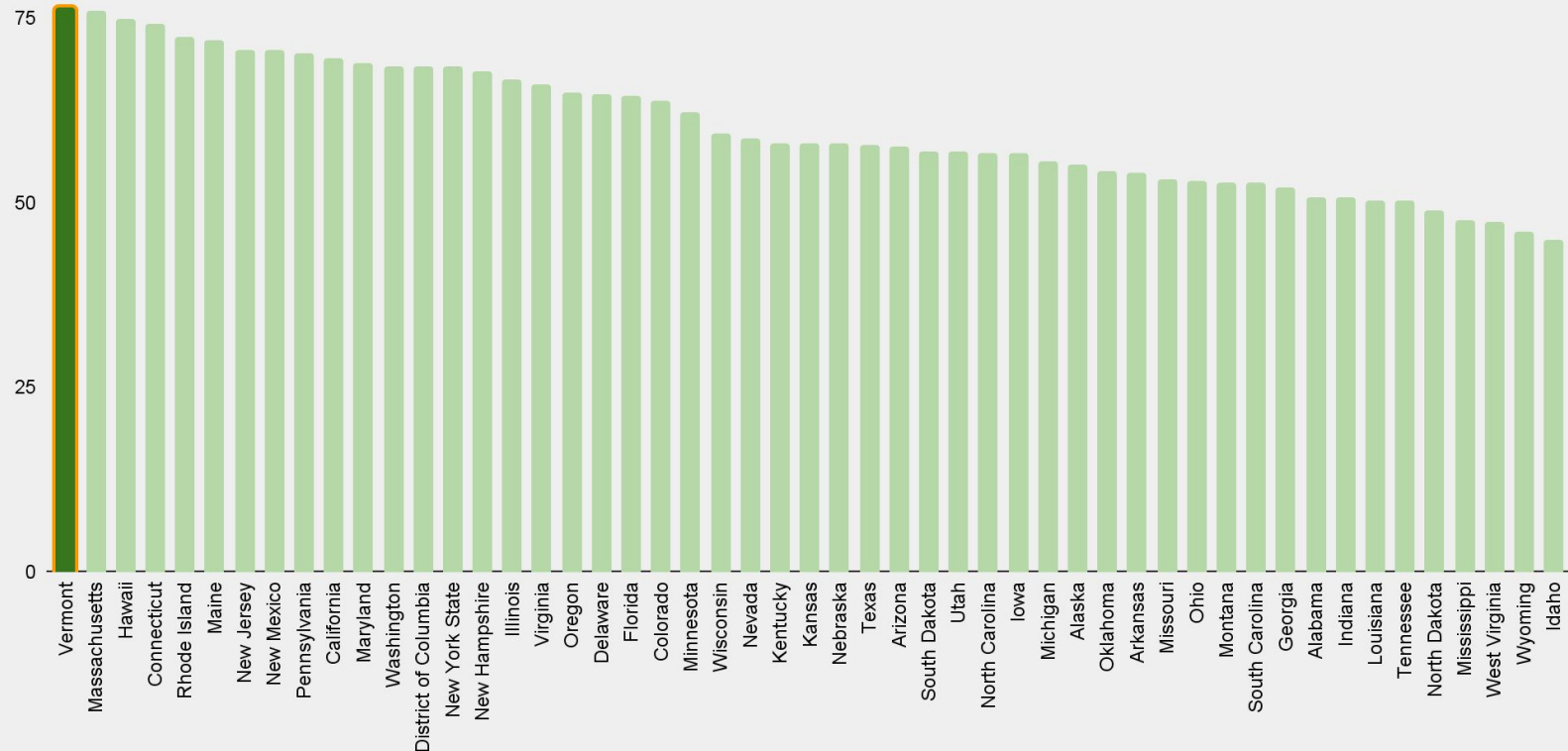
Source: CDC—September 7, 2021

**77.4%** of Eligible Vermonters Are Fully Vaccinated, Placing Vermont 1<sup>st</sup> Nationally



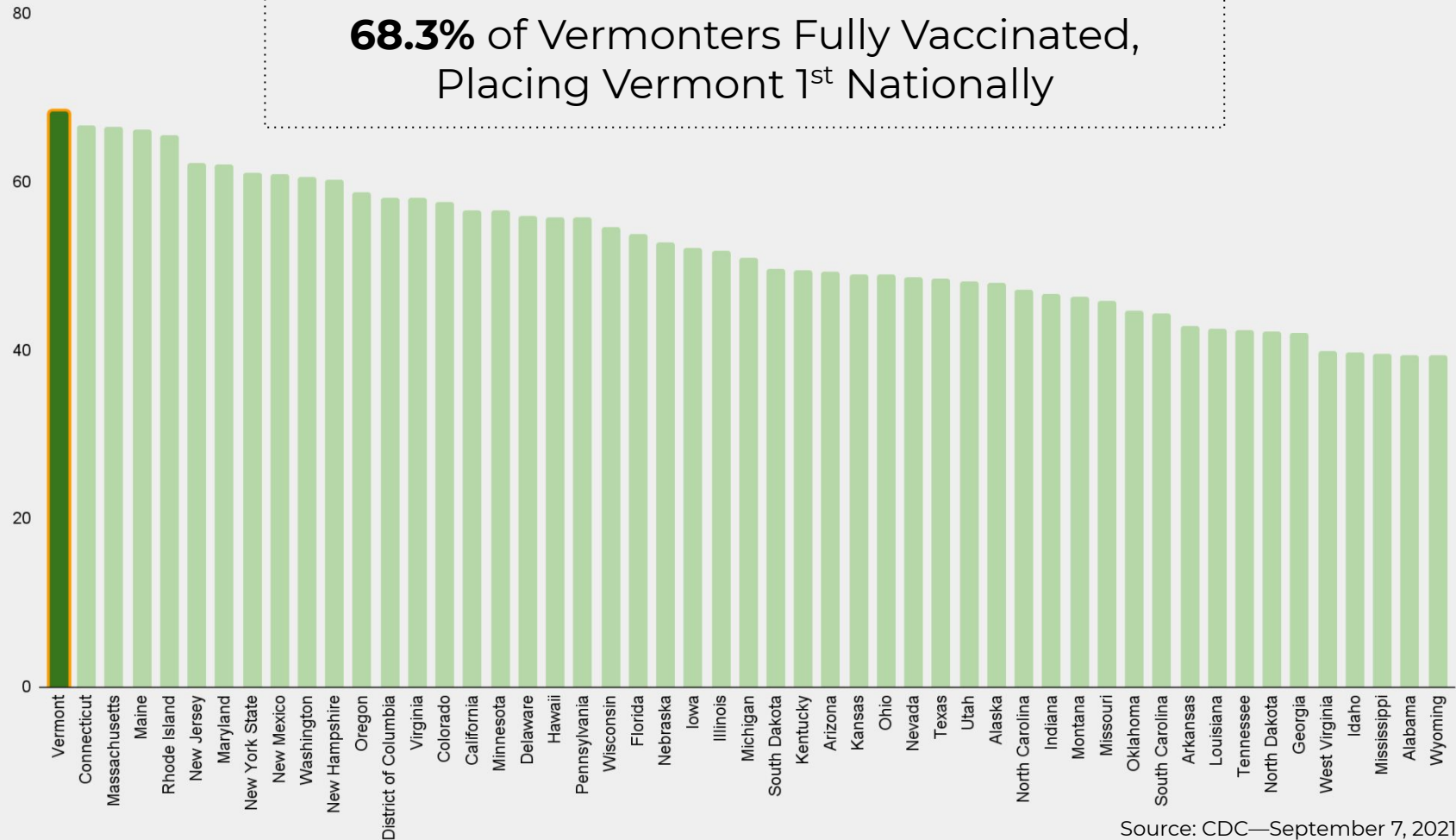
Source: CDC—September 7, 2021

**76.5%** of Vermonters Have Started  
Vaccination, Placing Vermont 1<sup>st</sup> Nationally



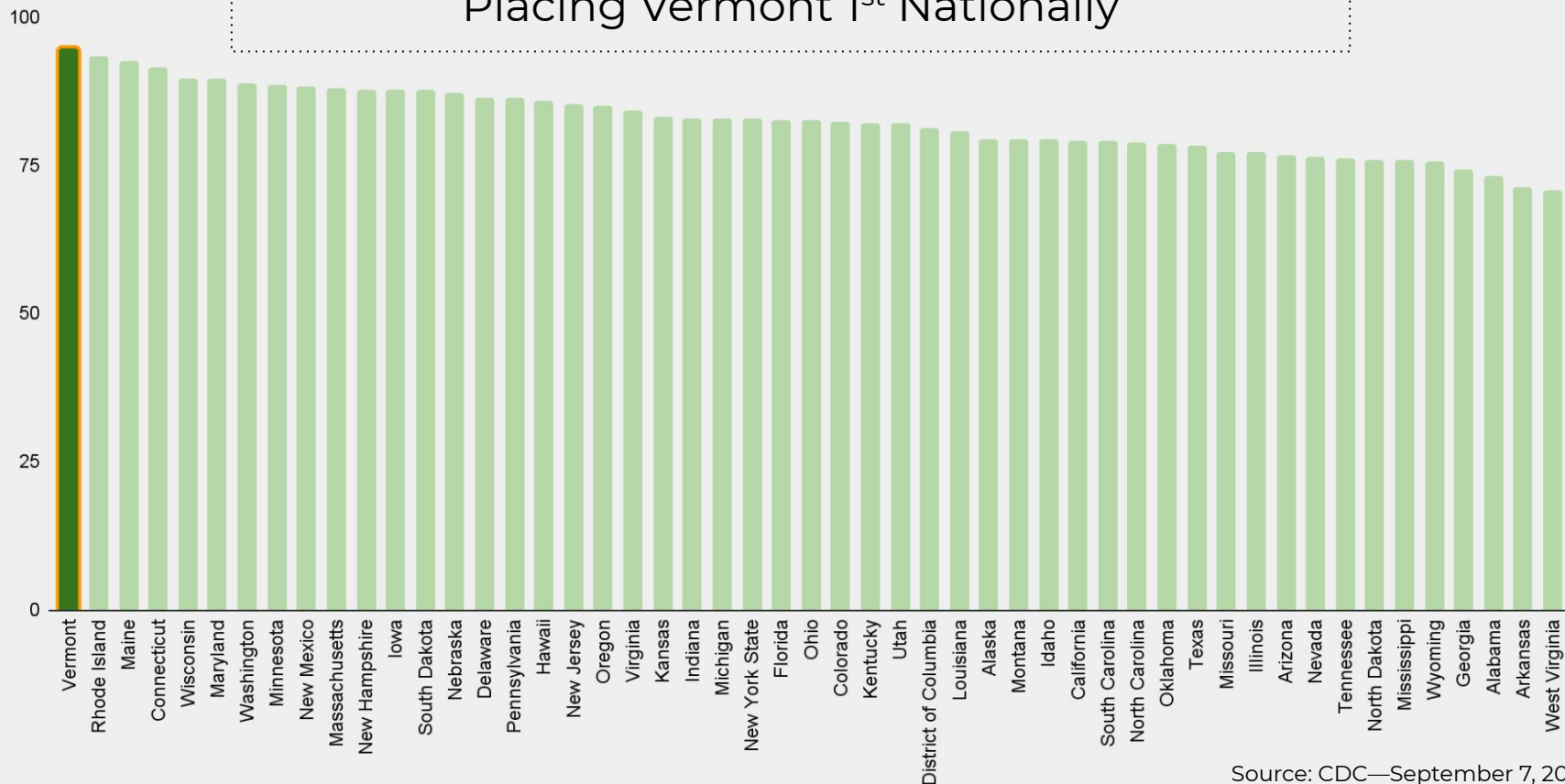
Source: CDC—September 7, 2021

**68.3%** of Vermonters Fully Vaccinated,  
Placing Vermont 1<sup>st</sup> Nationally



Source: CDC—September 7, 2021

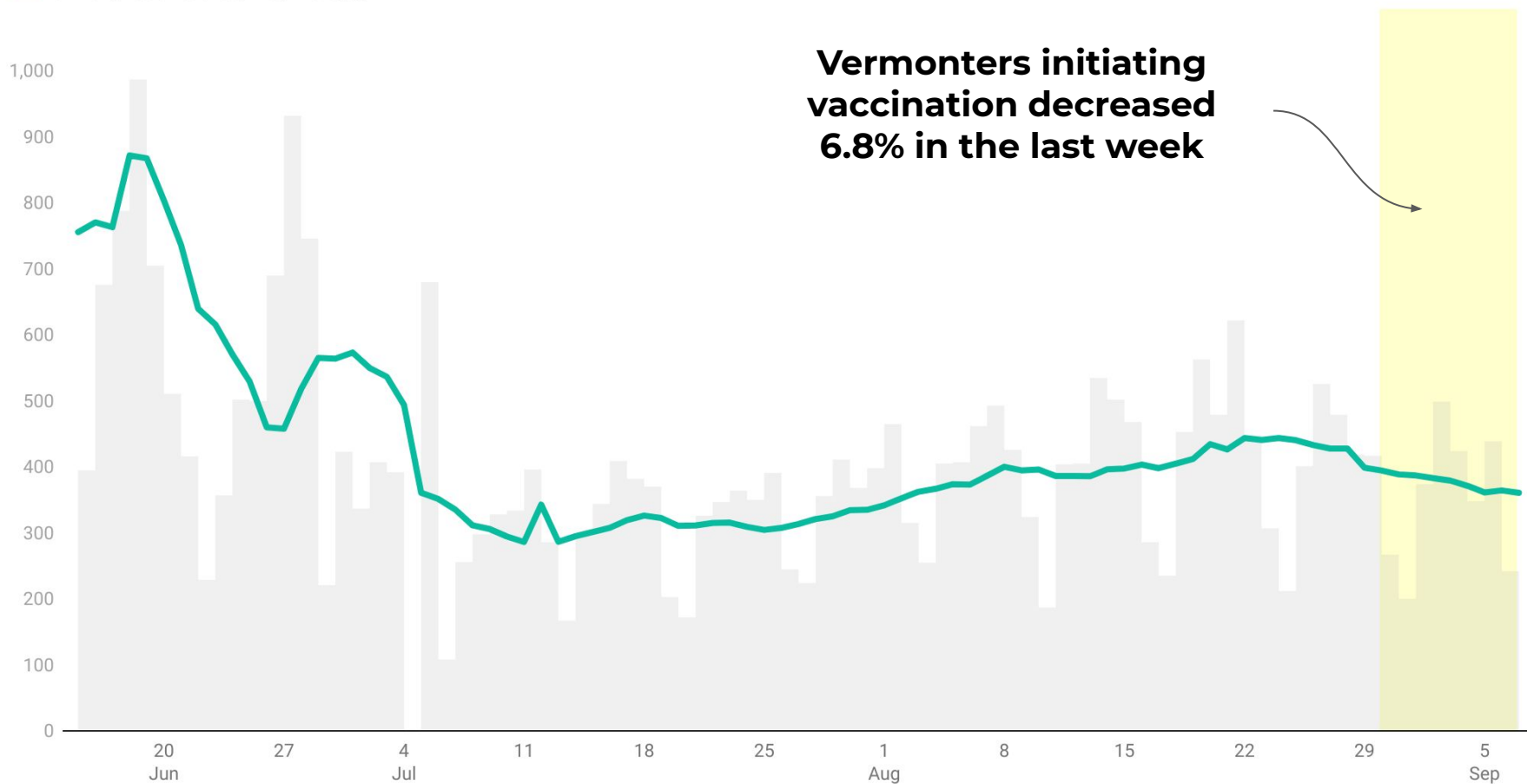
**94.7%** of 65 & Over Vermonters Fully Vaccinated,  
Placing Vermont 1<sup>st</sup> Nationally



Source: CDC—September 7, 2021

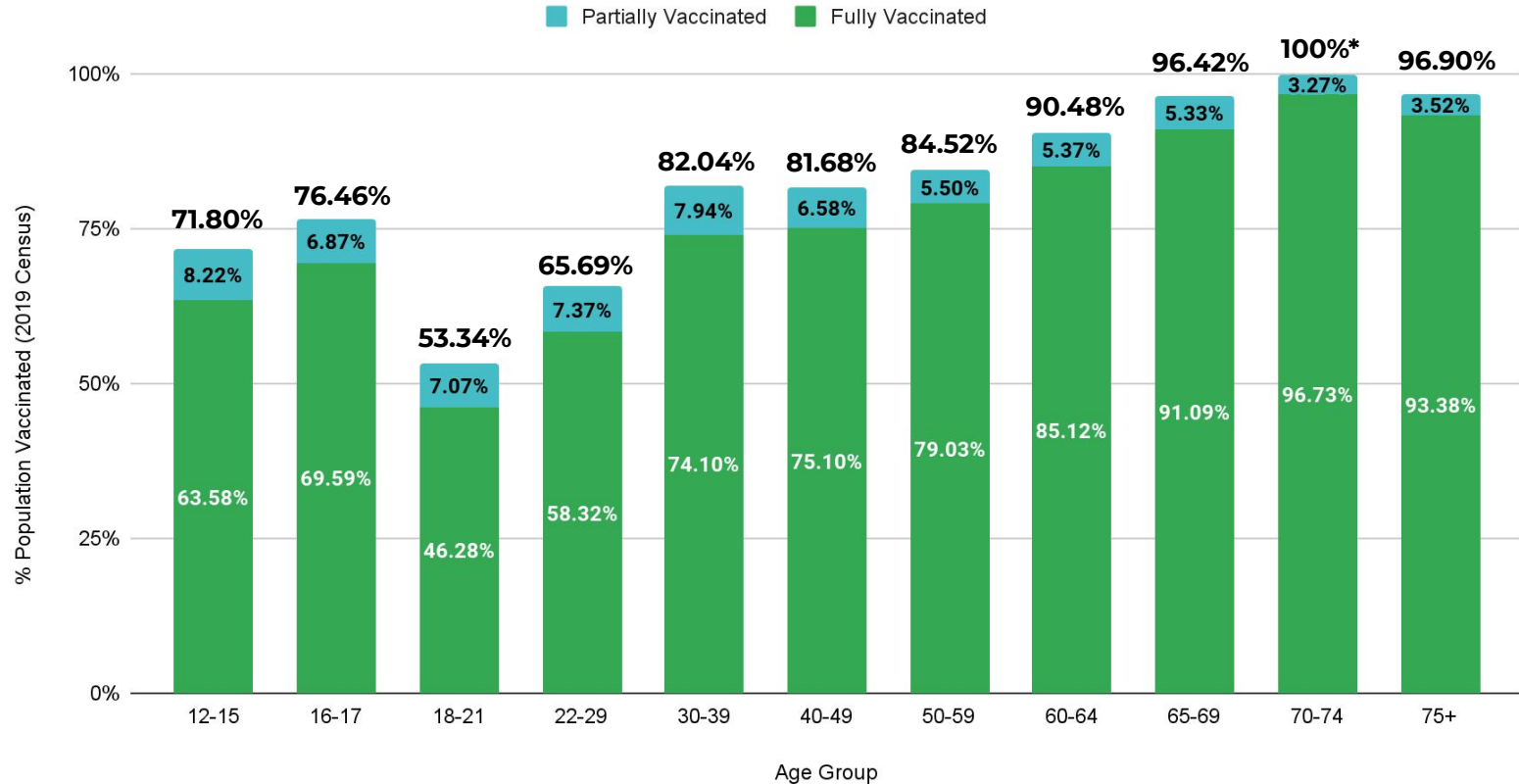
# Vermonters Initiating Vaccination By Day

— New Daily Vaccinations (7-Day Average)



# Vermont Vaccination Progress

By Age Band



# Regional Data

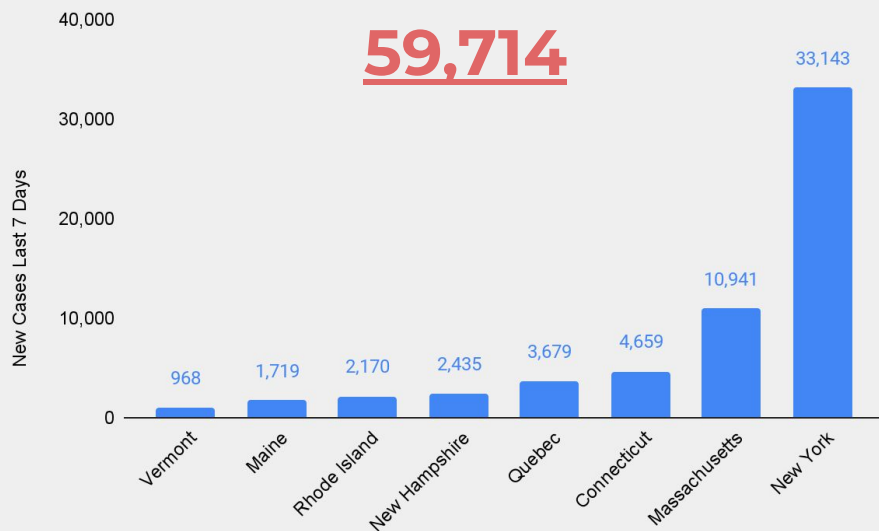


# Regional Cases

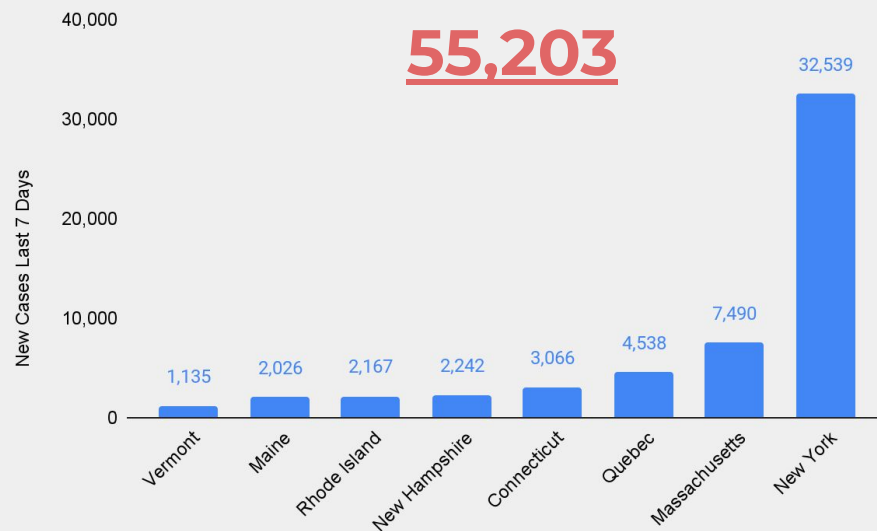
## 7.6% Decrease in New Cases

(Caution: Labor Day-related data anomalies)

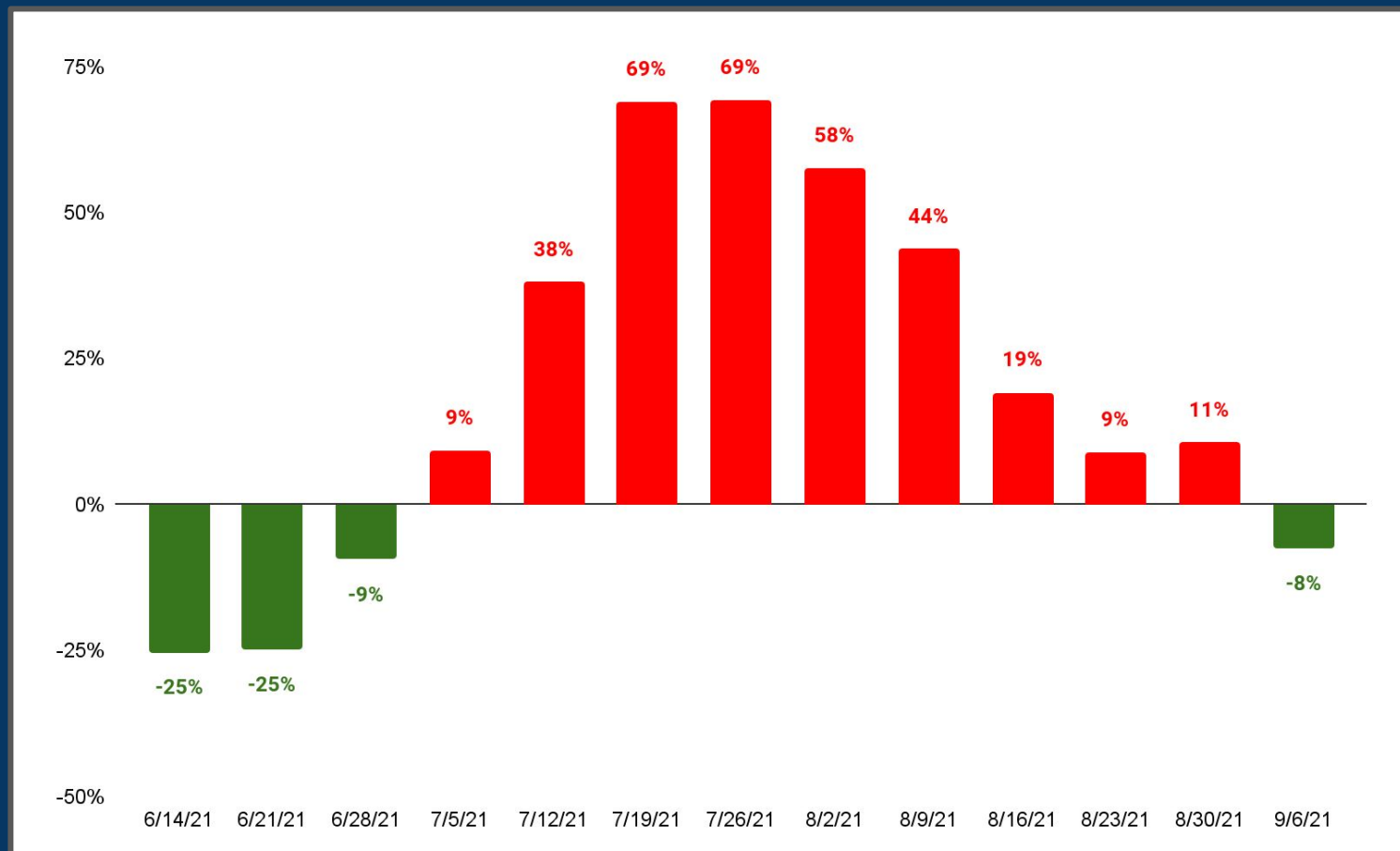
New Cases August 23rd to August 30th



New Cases August 31st to September 6th



# Change in Northeast Regional Weekly Case Growth



# Weekly Regional Cases

250000

200000

150000

100000

50000

0

3/16/20

4/13/20

5/11/20

6/8/20

7/6/20

8/3/20

8/31/20

9/28/20

10/26/20

11/23/20

12/21/20

1/18/21

2/15/21

3/15/21

4/12/21

5/10/21

6/7/21

7/5/21

8/2/21

8/30/21

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

# National Data

300000

# National COVID-19 Cases

(Caution: Labor Day Related Data Anomalies)

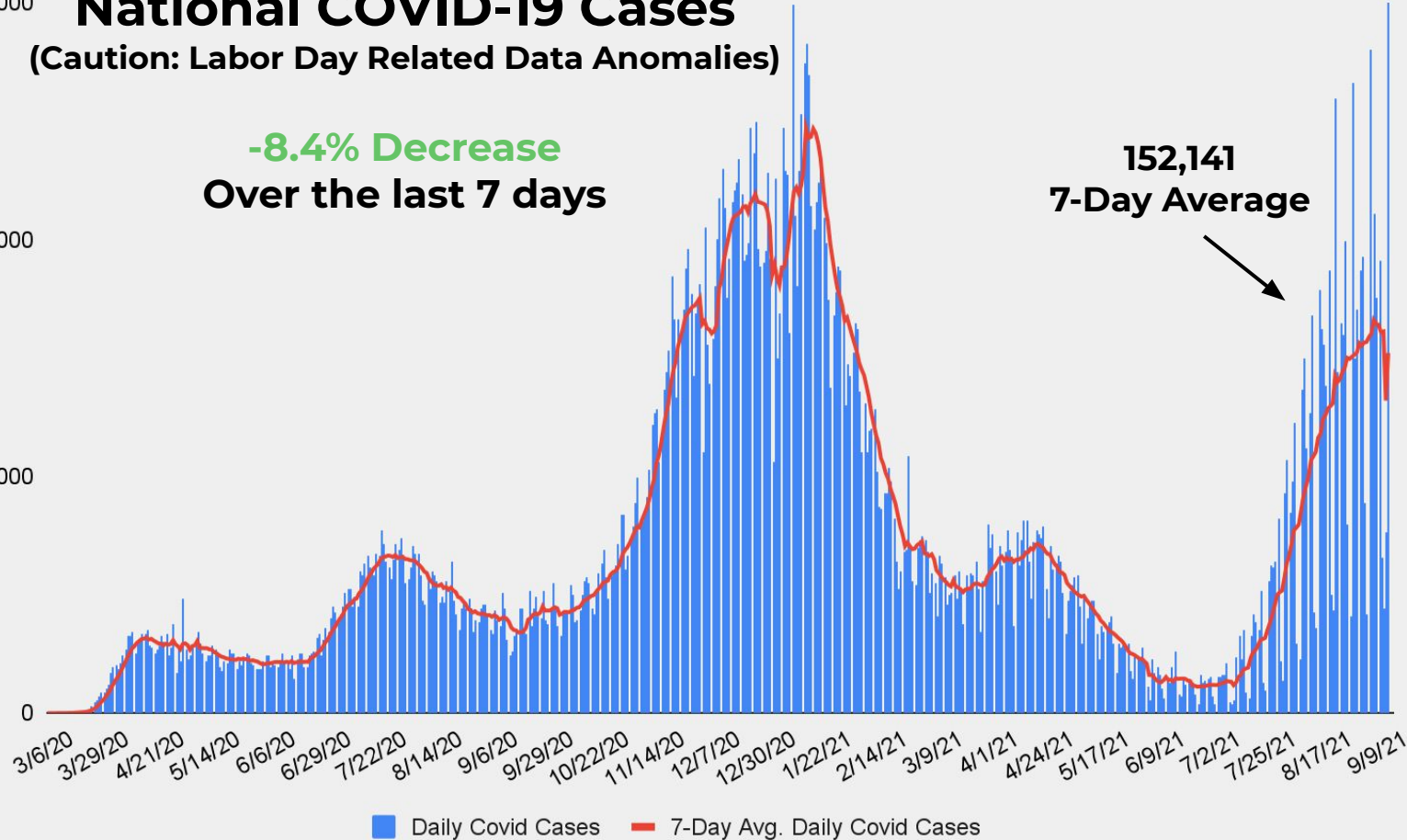
**-8.4% Decrease**  
**Over the last 7 days**

**152,141**  
**7-Day Average**

200000

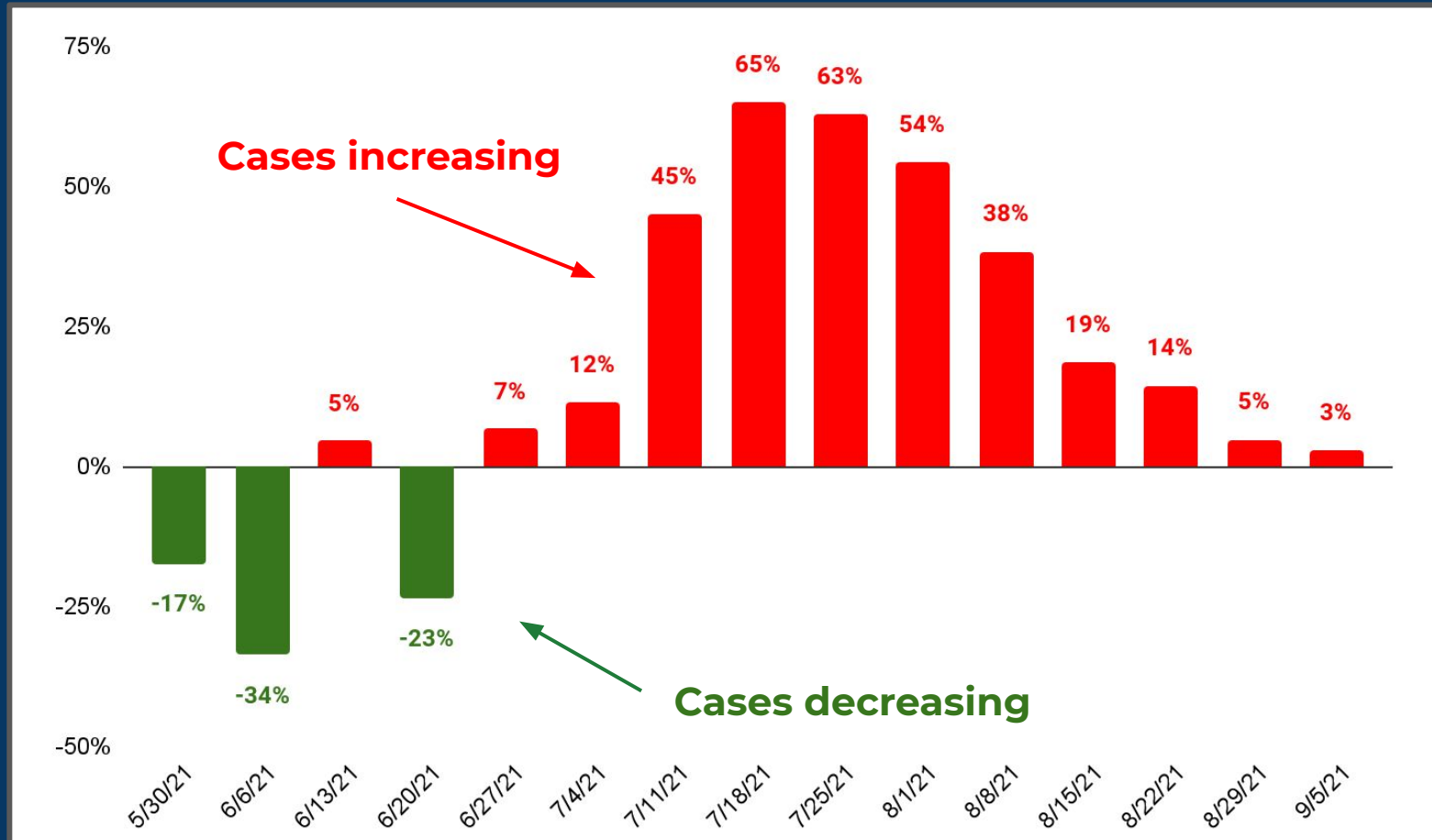
100000

0



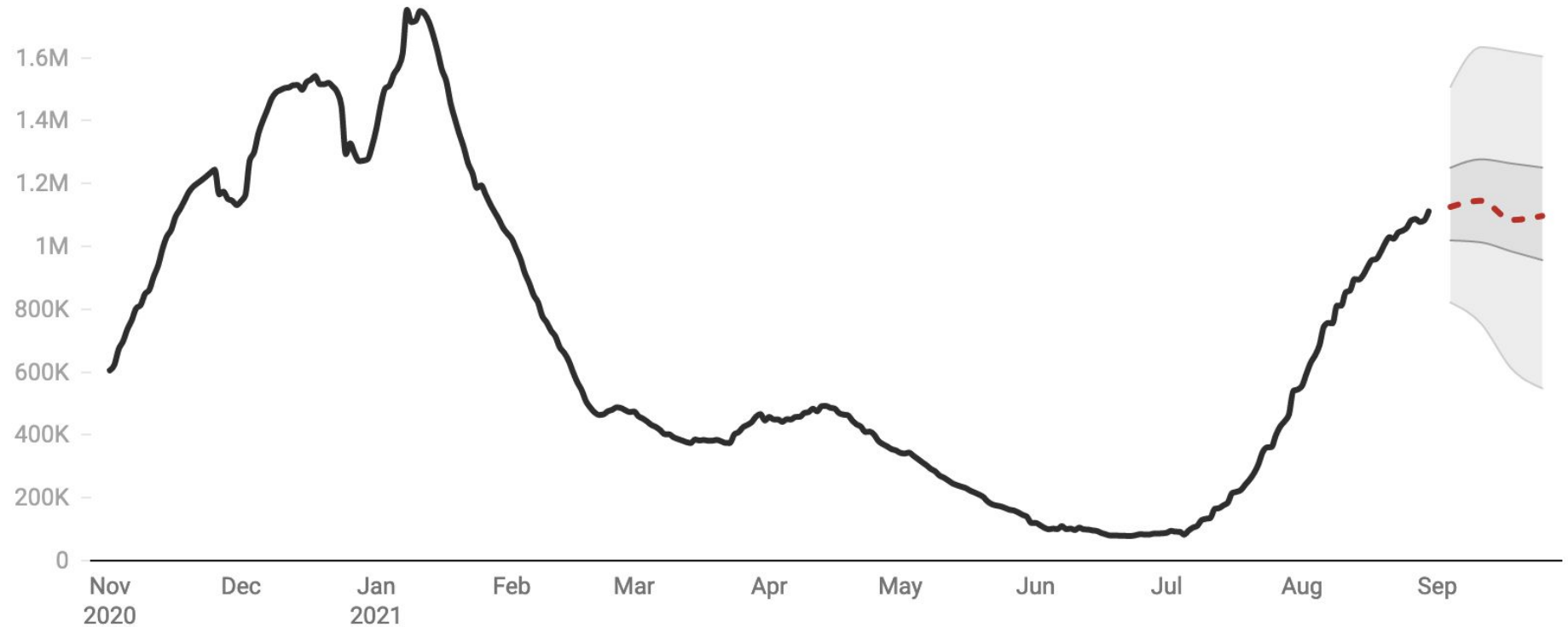
Source: Covid Tracking Project; NYT & CDC—September 7, 2021

# Change in National Weekly Case Growth



# US Weekly COVID-19 Infections Forecast

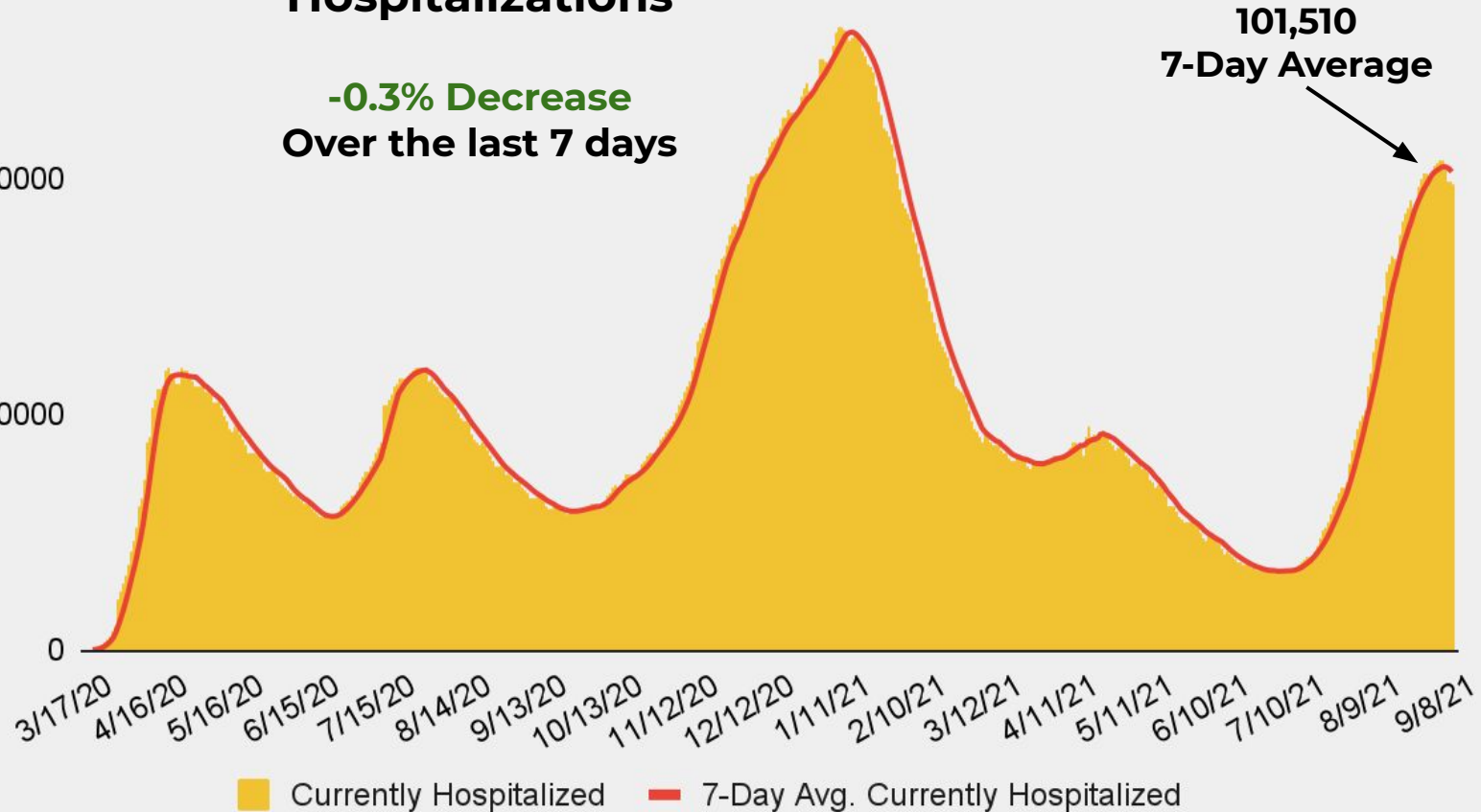
Calculated as a 7-day sum. Gray bands represent 50% and 95% confidence intervals. Since projections are only released once a week, the actual number may appear to over or undershoot the forecast.



# National COVID-19 Hospitalizations

**-0.3% Decrease**  
**Over the last 7 days**

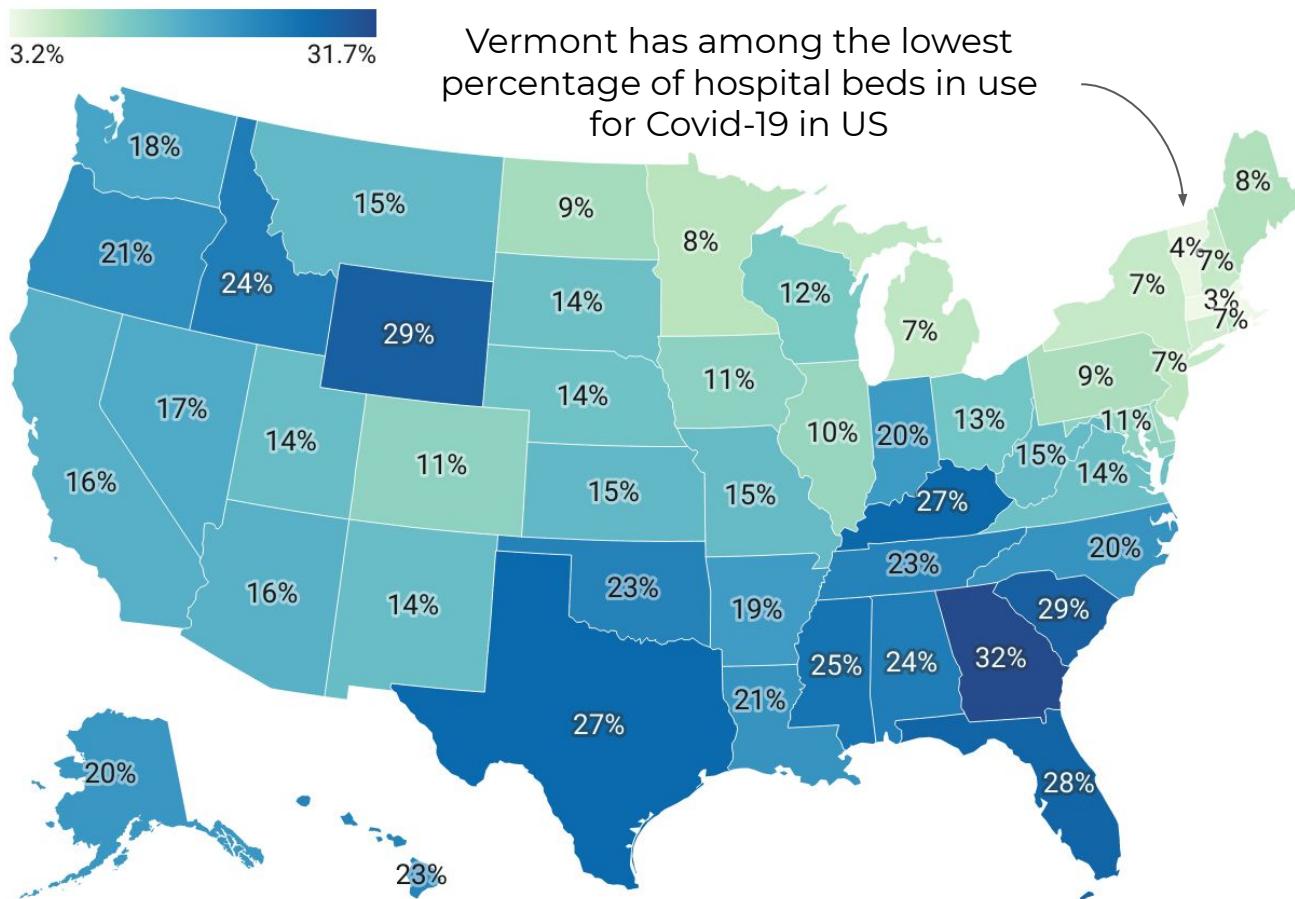
**101,510**  
**7-Day Average**



Source: Covid Tracking Project; NYT & CDC—September 7, 2021



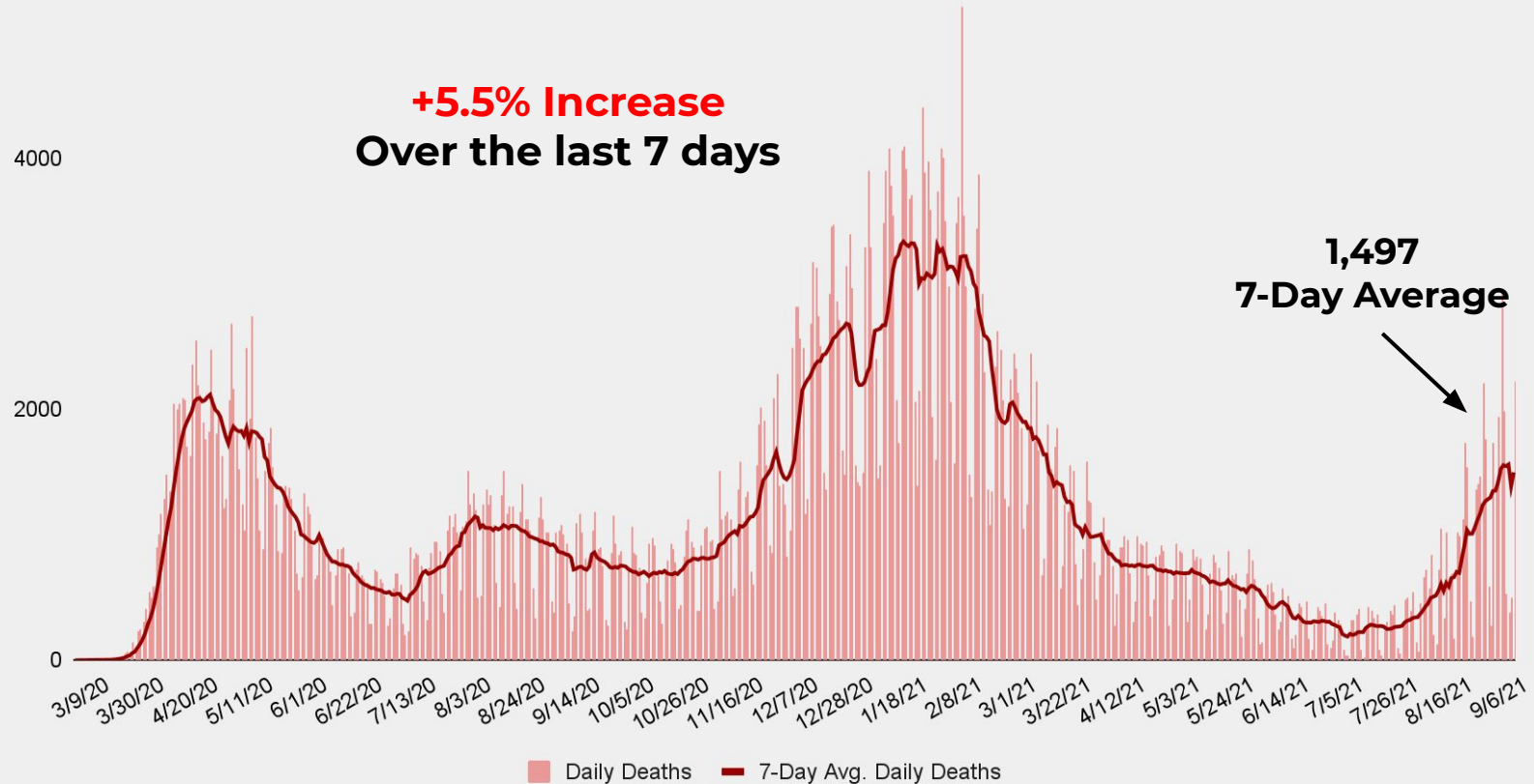
# Percent of All Hospital Beds Used for COVID-19



# National COVID-19 Deaths

(Caution: Labor Day Related Data Anomalies)

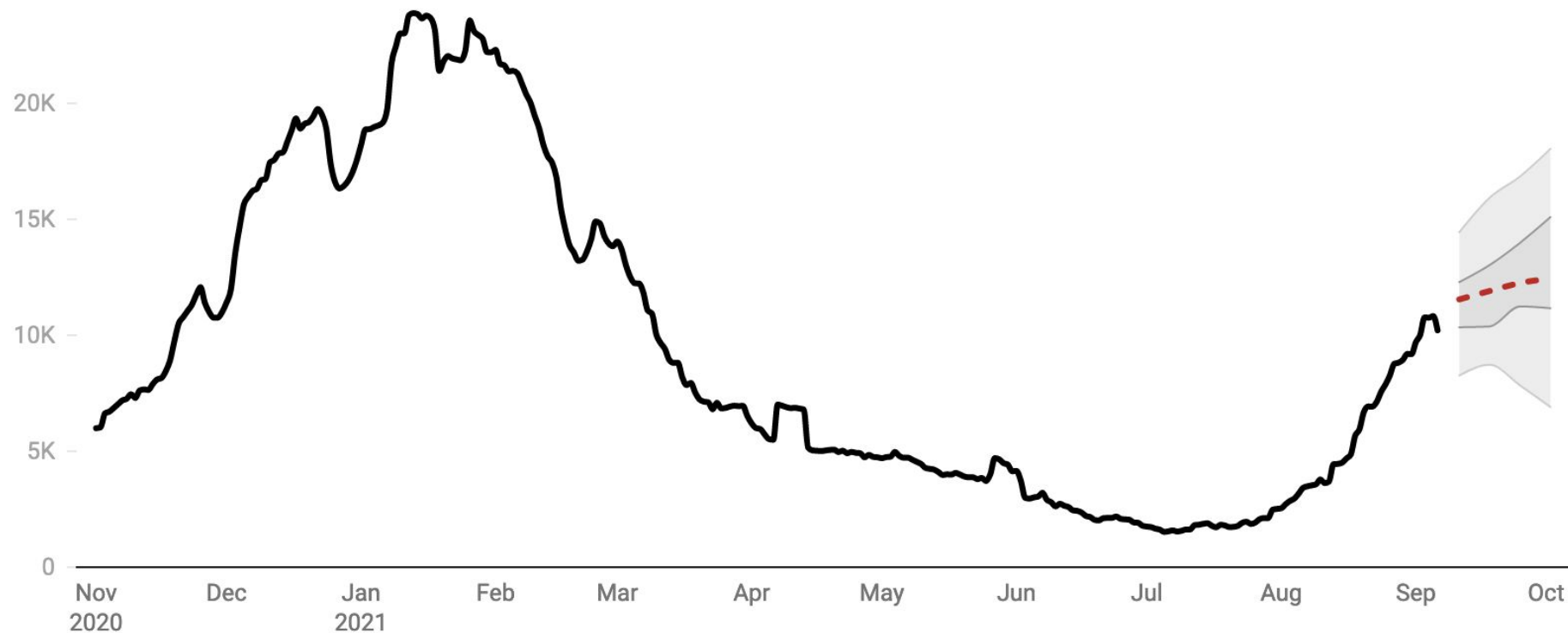
**+5.5% Increase**  
**Over the last 7 days**



Source: Covid Tracking Project; NYT & CDC—September 7, 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

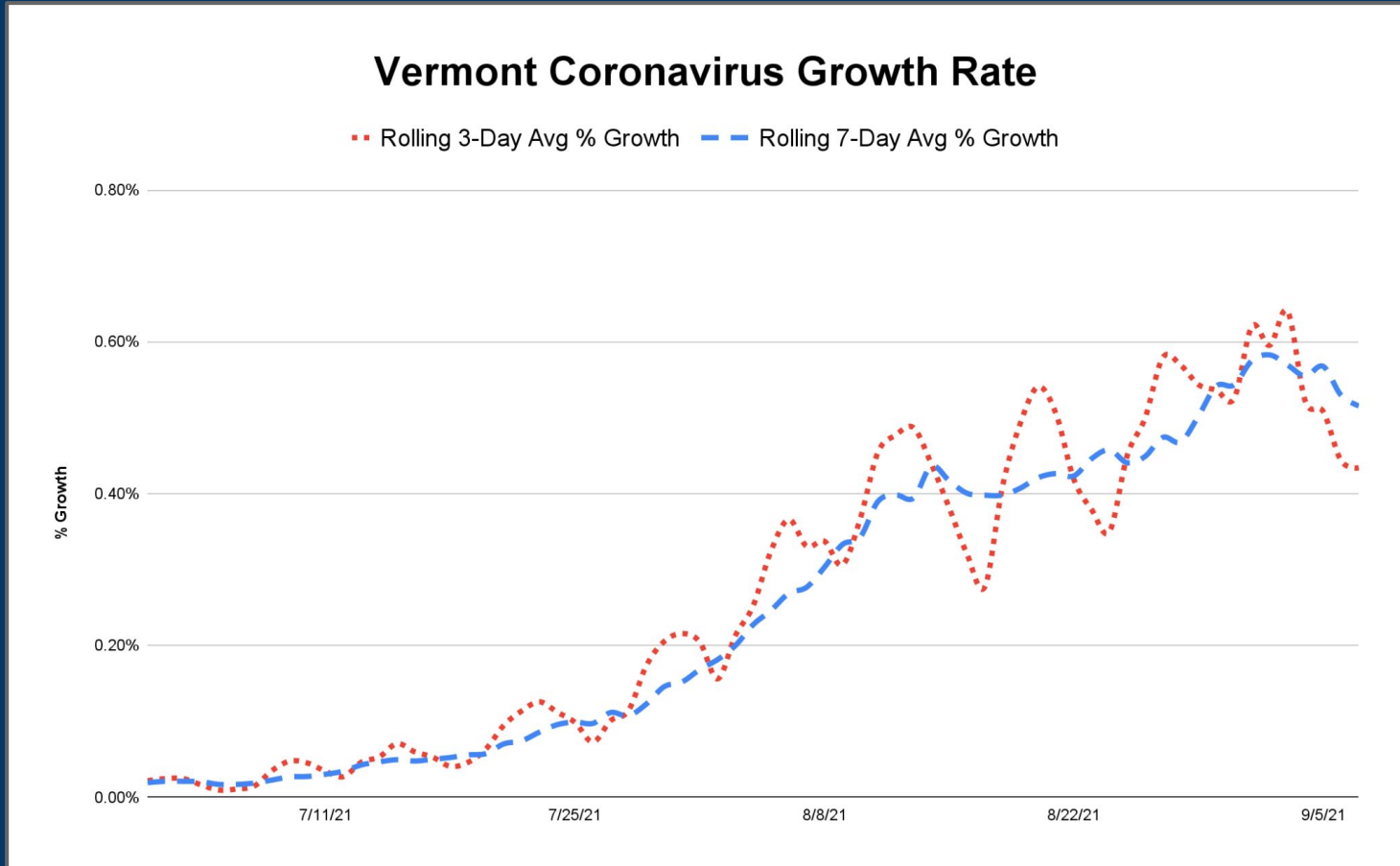
1. Syndromic Surveillance (*retired*)
2. Viral Growth & Reproductive Rates
3. Percentage of New Positive Tests
4. Hospital & Critical Care Bed Capacity

## 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

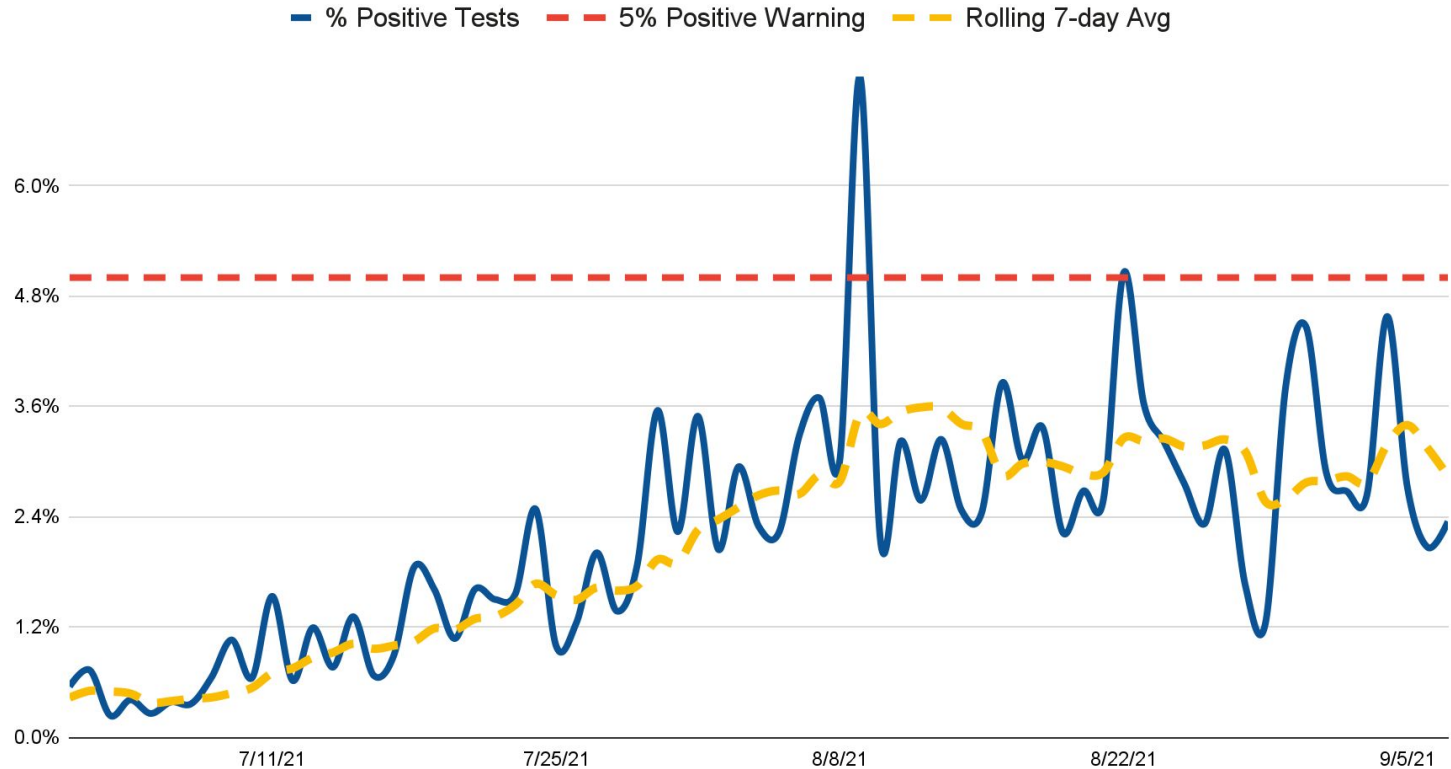
*Vermont Department of Health no longer  
updating syndromic surveillance on a weekly basis.*

# Viral Growth & Reproductive Rates

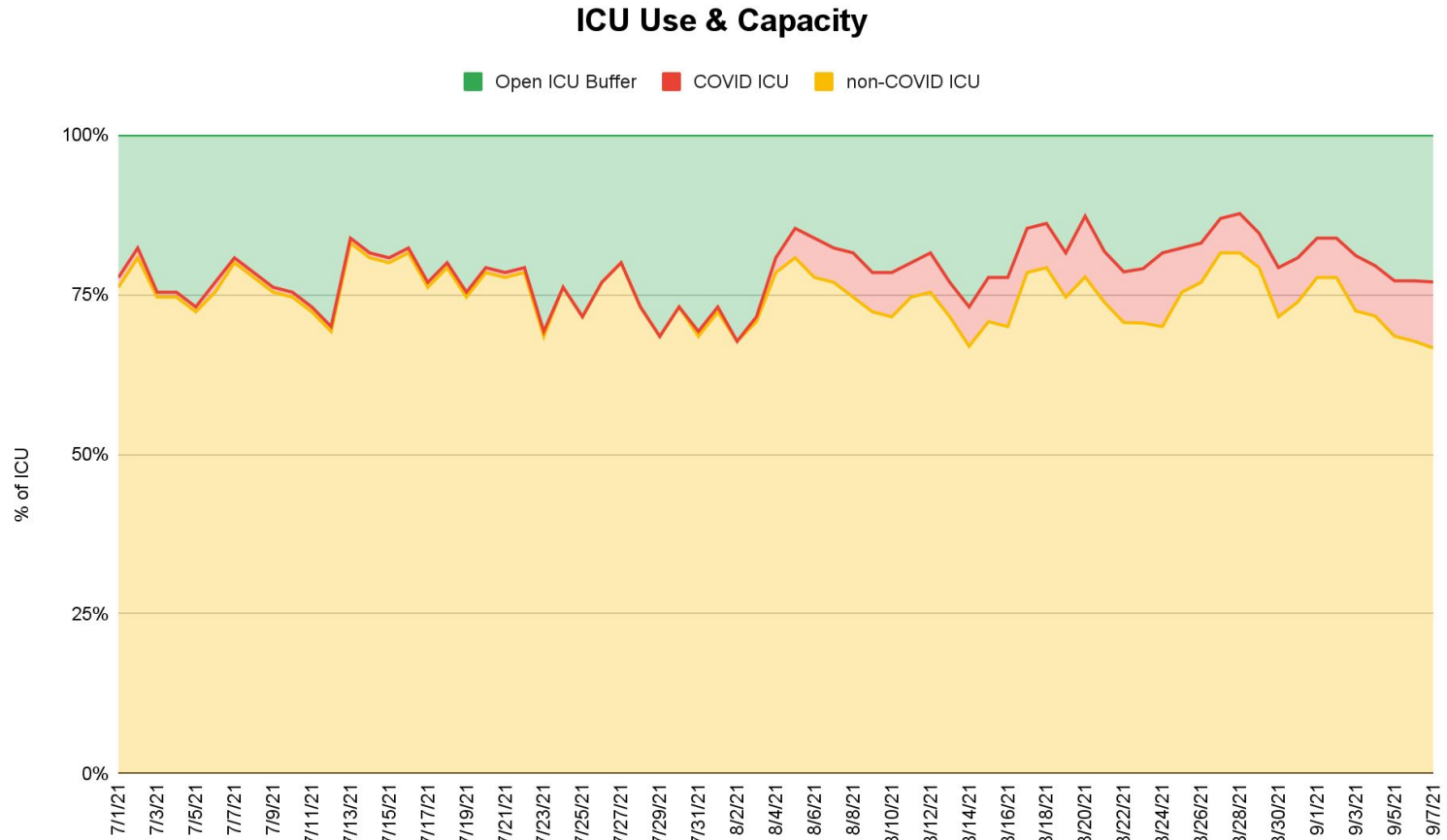


# Percentage of New Positive Tests

## Percent Tests Yielding New Positive COVID-19 Cases



# Hospital & Critical Care Beds





# Vermont Testing

