COVID-19 Modeling
September 8, 2021

Presentation available at: dfr.vermont.gov
Vermont Case Data
Vermonters Diagnosed with COVID-19 by Week

Source: Vermont Department of Health (week calculated as Tuesday to Monday)
Vermont Daily Covid-19 Testing

Testing Relatively Stable Through Labor Day Weekend
Change in Vermont Weekly Case Growth

Source: Vermont Dept. of Health (Tuesday to Monday)
Vermont Case Growth Trends

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

Source: Vermont Dept. of Health—September 7, 2021
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.

Source: Covidestim—Covid-19 Nowcasting—September 7, 2021
Fully vaccinated VT population more than 2x larger than those not fully vaccinated.

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.
The unvaccinated case rate has increased **11%** in the last 7 days.

The vaccinated rate has increased just **1%** in the same period.
Since early July, hospitalizations among those not fully vaccinated have been **6x higher** than among those fully vaccinated.

Source: Vermont Dept. of Health and CDC—September 7, 2021
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%)

This square is proportional to vaccinated Vermonters’ Covid-19 outcomes

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**

Source: Covid Act Now—September 7, 2021; Measures last 14 days
Raw Daily Case Totals By County (7-Day Average)

Chittenden County
Cases Down 34%
Since August 14th

Washington County
Cases Down 24%
Since August 30th

Source: Vermont Dept. of Health—September 7, 2021
Active Cases in Vermont Counties

Active Cases per Million

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.

Source: VDH—September 7, 2021
Vermont Case Rate & Vaccination by Age Band

Source: VDH—September 7, 2021
Vermont Case Rates By Age (7-Day Average)

0 to 11 Year Old Case Rate

Over 12 Year Old Case Rate

Source: VDH—September 5, 2021
Covid-19 case rates increased this past week. Washington County seeing highest case rates in Vermont.
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

<table>
<thead>
<tr>
<th>Higher Education Institutions Reporting</th>
<th>Enrollment</th>
<th>Students Fully Vaccinated</th>
<th>Students Not Fully Vaccinated (No Exemption Granted)</th>
<th>Students with Unknown Vaccine Status</th>
<th>Students Granted Vaccine Mandate Exemption</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 (of 16)</td>
<td>26,347</td>
<td>24,706</td>
<td>441</td>
<td>698</td>
<td>502</td>
</tr>
<tr>
<td></td>
<td></td>
<td>93.8%</td>
<td>1.7%</td>
<td>2.6%</td>
<td>1.9%</td>
</tr>
</tbody>
</table>

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

Source: Vermont Higher Education Institutions—Note all institutions reporting case and testing data—September 7, 2021
## Active Outbreaks in Long Term Care Facilities

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

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.

Source: CDC Ensemble Model—August 30, 2021
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

Source: CDC Ensemble Model—September 7, 2021
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

On average, 56% of all recent hospitalizations among the unvaccinated

Source: Vermont Department of Health—September 7, 2021
On average, 59% of all recent critical care stays among the unvaccinated.
New Hospitalizations per 100,000 Residents, by Age

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

**United States**

**Vermont**

Source: US Dept. of Health & Human Services; 7-day average
Vermont Fatality Data
Weekly Covid-19 Deaths In Vermont

Source: Vermont Department of Health—September 7, 2021 (week ending)
Monthly Covid-19 Deaths In Vermont

Source: Vermont Department of Health—September 7, 2021; deaths attributed to month in which death occurred rather than reported
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

86.6% Of Eligible Vermonters Have Started Vaccination

+2,526 Since Last Week

477,260 Vermonters with at Least 1 Dose

73,690 Eligible Vermonters still to be vaccinated

Source: CDC—September 7, 2021
### Vermont CDC Vaccine Scorecard

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

Source: CDC—September 7, 2021
Vermont is 1st in the Country in Vaccines Administered Per 100K

Source: CDC—September 7, 2021
86.6% of Eligible Vermonters Have Started Vaccination, Placing Vermont 3rd Nationally.

Source: CDC—September 7, 2021
77.4% of Eligible Vermonters Are Fully Vaccinated, Placing Vermont 1st Nationally

Source: CDC—September 7, 2021
76.5% of Vermonters Have Started Vaccination, Placing Vermont 1st Nationally

Source: CDC—September 7, 2021
68.3% of Vermonters Fully Vaccinated, Placing Vermont 1st Nationally

Source: CDC—September 7, 2021
94.7% of 65 & Over Vermonters Fully Vaccinated, Placing Vermont 1st Nationally

Source: CDC—September 7, 2021
Vermonters initiating vaccination decreased 6.8% in the last week.

Source: CDC—September 7, 2021
Vermont Vaccination Progress
By Age Band

Source: Vermont Dept. of Health—September 8, 2021; *based on 2019 census estimates; state data may differ from CDC reporting
Regional Data
Regional Cases

7.6% Decrease in New Cases
(Caution: Labor Day-related data anomalies)

New Cases August 23rd to August 30th

- Vermont: 968
- Maine: 1,719
- Rhode Island: 2,170
- New Hampshire: 2,435
- Quebec: 3,679
- Connecticut: 4,659
- Massachusetts: 10,941
- New York: 33,143

New Cases August 31st to September 6th

- Vermont: 1,135
- Maine: 2,026
- Rhode Island: 2,167
- New Hampshire: 2,242
- Connecticut: 3,066
- Quebec: 4,538
- Massachusetts: 7,490
- New York: 32,539

Sources: State Health Departments & CTV National News (Quebec)
Change in Northeast Regional Weekly Case Growth

Source: State Health Departments & CTV National News (Quebec)
Weekly Regional Cases

Sources: State Health Departments & CTV National News (Quebec) (includes: CT, ME, MA, NH, NY, QC, RI & VT)
National Data
National COVID-19 Cases
(Caution: Labor Day Related Data Anomalies)

-8.4% Decrease
Over the last 7 days

152,141
7-Day Average

Source: Covid Tracking Project; NYT & CDC—September 7, 2021
Change in National Weekly Case Growth

Source: CDC, NYT, & Covid Tracking Project
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

Vermont has among the lowest percentage of hospital beds in use for Covid-19 in US

Source: HHS—September 7, 2021
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

Vermont Coronavirus Growth Rate

- Rolling 3-Day Avg % Growth
- Rolling 7-Day Avg % Growth

Source: Vermont Department of Health
Percentage of New Positive Tests

Percent Tests Yielding New Positive COVID-19 Cases

- % Positive Tests
- 5% Positive Warning
- Rolling 7-day Avg

Source: Vermont Department of Health
Hospital & Critical Care Beds

ICU Use & Capacity

- Green: Open ICU Buffer
- Red: COVID ICU
- Yellow: non-COVID ICU

Source: Vermont Department of Health
Vermont Testing

7-Day Rolling Test Average

Source: Vermont Department of Health; results reported to VDH daily