COVID-19 Modeling
September 29, 2020

Presentation available at:
dfr.vermont.gov
1,000,000+
Covid-19 Deaths World Wide

Source: Johns Hopkins University—September 28, 2020
National: New Cases Last 14 Days

Source: Raw data from Johns Hopkins University—September 29, 2020
Vermont Data
Vermont Weekly Totals

Lowest confirmed case total for any two week period since late May

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

Source: Vermont Department of Health - September 28, 2020
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 - September 28, 2020
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

Source: Vermont Department of Health - September 29, 2020
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 - September 29, 2020
Vermont Testing

7-Day Rolling Test Average

Source: Vermont Dept. of Health - September 29, 2020; results reported to VDH daily
Many Tests & Few Infections

Few Tests & Few Infections

Many Tests & Many Infections

Few Tests & Many Infections

US States by Infections and Tests per Capita

Tests per 100K vs. Average Infections

Many Tests & Few Infections

Few Tests & Few Infections

Many Tests & Many Infections

Few Tests & Many Infections

Infections per 100K vs. Average Tests
Vermont Forecast September 29 to November 3

Source: Oliver Wyman Forecast Model - September 28, 2020
Avoiding Complacency
In Vermont
IHME Model - US Projection to January 1, 2021
(detected and undetected)

Youyang Gu Model - US Projection to November 1, 2020
(detected and undetected)
Quebec Daily Infections (7-Day Moving Average)

Source: Raw data from Johns Hopkins University—September 27, 2020
Wedding on August 7, 2020

Initial wedding event in Millinocket, Maine

- 62 attendees (state cap of 50)
- 18 attendees later test positive (no deaths)
- Indoors
- Few masks
- Little social distancing

Source: Maine CDC; Portland Press Herald
Outbreak Analysis

Maplecrest Rehabilitation Center

- Connected cases: **39**
- Deaths: **7**

On August 11, an infected sibling of wedding attendee works 10 hour shift at Maplecrest Rehab Center in Madison, Maine.

Employee works overnight shift despite reporting 4 symptoms and failing health screening.

Management does not check symptoms log.

Source: Maine CDC; Portland Press Herald
Outbreak Analysis

**York County Jail**

- Connected cases: **at least 85**
- Deaths: **0**

Infected wedding attendee works 200 miles south at York County Jail in Alfred, Maine.

Jail management did not require inmates or staff to wear face coverings.

No temperature checks or additional screening for staff entering jail.

Jail continued to accept new inmates, even after disease was detected in facility.

Source: Maine CDC; Portland Press Herald; Bangor Daily News
Outbreak Analysis

Calvary Baptist

- Cases: at least 10
- Deaths: 0

Congregation of Calvary Baptist in Sanford includes pastor who officiated Millinocket wedding and six families who attended initial event.

Indoor service and choir singing without masks.

Pastor continues to encourage no mask wearing.

Source: Maine CDC; Portland Press Herald
Outbreak Analysis

York County Outbreaks

- York County Jail: 85
- Portsmouth Naval Shipyard: 18
- Sanford High School: 13
- Sanford American Legion funeral reception: 12
- Calvary Baptist Church: 10
- Brink Chiropractic Clinic: 3
- Ogunquit Beach Lobster House: 3

The “virus has achieved a certain level that it's everywhere in wide circulation across [York] county... I am extremely, extremely concerned.”

- Dr. Nirav Shah, Maine CDC Director, 9/24/20

Source: Maine CDC; Portland Press Herald
Outbreak Numbers

- Cases connected to Millinocket wedding: **At least 180**
- Connected deaths: **8**
- New cases in York are being identified at nearly **twice** the rate as the previous surges in early April and close to **triple** the current statewide average
- Sanford, pop. 22,000, makes up 44% of Maine’s new cases

Risk Factors Identified by Maine CDC

- Lack of social distancing and mask wearing by individuals
- Institutional failures in following guidelines and regulations
- Complacency

Source: Maine CDC; Portland Press Herald
K-12 & Higher Education Update
WalletHub analysis ranks Vermont as safest state to reopen schools

### Safest States to Reopen Schools

<table>
<thead>
<tr>
<th>Overall Rank (1=Best)</th>
<th>State</th>
<th>Total Score</th>
<th>‘Risk of COVID-19 Infections’ Rank</th>
<th>‘Health &amp; Financial Infrastructure’ Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vermont</td>
<td>80.48</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Maine</td>
<td>74.65</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Pennsylvania</td>
<td>69.66</td>
<td>6</td>
<td>6</td>
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<tr>
<td>4</td>
<td>Massachusetts</td>
<td>69.27</td>
<td>5</td>
<td>21</td>
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<td>5</td>
<td>New Hampshire</td>
<td>68.65</td>
<td>4</td>
<td>26</td>
</tr>
<tr>
<td>6</td>
<td>Rhode Island</td>
<td>66.85</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>Ohio</td>
<td>66.54</td>
<td>7</td>
<td>16</td>
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<tr>
<td>8</td>
<td>New Jersey</td>
<td>65.69</td>
<td>8</td>
<td>20</td>
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<tr>
<td>9</td>
<td>Connecticut</td>
<td>65.47</td>
<td>19</td>
<td>2</td>
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<tr>
<td>10</td>
<td>Nebraska</td>
<td>64.71</td>
<td>15</td>
<td>7</td>
</tr>
</tbody>
</table>

Covid-19 Cases in K-12 Public Schools Across Northern New England

**Vermont**
4 Cases; 1 Presumed Positive

- 1 at Williamstown Middle & High School
  Williamstown, VT
- 1 at Hartford High School
  Hartford, VT
- 2 at Crossett Brook Middle School
  Duxbury, VT

**New Hampshire**
53 Cases
36 Schools

**Maine**
32 Cases
15 Schools

Source: VDH; New Hampshire School Dashboard; and public reporting
Weekly Test Results for Vermont Colleges & Universities
September 21 to September 28

- 8,679 tests on 8/28/2020 with 25 cases
- 18,401 tests on 9/4/2020 with 8 cases
- 15,030 tests on 9/11/2020 with 5 cases
- 12,833 tests on 9/17/2020 with 4 cases
- 2,192 tests on 9/22/2020 with 1 case
- 24,228 tests on 9/29/2020 with 4 cases
Cumulative Test Results for Vermont Colleges & Universities as of September 28, 2020

81,363 Tests Administered

47 Positive Tests

0.06% Positivity Rate
# Northern New England Higher Education Update

<table>
<thead>
<tr>
<th>State</th>
<th>Total</th>
<th>Positives</th>
<th>Positivity Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Hampshire*</td>
<td>165,309</td>
<td>222</td>
<td>0.13%</td>
</tr>
<tr>
<td>Maine*</td>
<td>60,738</td>
<td>43</td>
<td>0.07%</td>
</tr>
<tr>
<td>Vermont</td>
<td>81,363</td>
<td>47</td>
<td>0.06%</td>
</tr>
</tbody>
</table>

* Includes colleges & universities that publicly provide COVID-19 testing data
# Individual Test Results for Vermont Colleges & Universities as of September 28, 2020

<table>
<thead>
<tr>
<th>College / University</th>
<th>Total Tests</th>
<th>Total Positives</th>
<th>Dashboard / Public Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middlebury College</td>
<td>6,735</td>
<td>2</td>
<td><a href="https://www.middlebury.edu/office/midd2021/covid-reporting-dashboard">https://www.middlebury.edu/office/midd2021/covid-reporting-dashboard</a></td>
</tr>
<tr>
<td>University of Vermont</td>
<td>50,065</td>
<td>28*</td>
<td><a href="https://www.uvm.edu/returntocampus/uvm-weekly-testing-report">https://www.uvm.edu/returntocampus/uvm-weekly-testing-report</a></td>
</tr>
<tr>
<td>Norwich University</td>
<td>7,013</td>
<td>5</td>
<td><a href="https://www.norwich.edu/news/psa">https://www.norwich.edu/news/psa</a></td>
</tr>
<tr>
<td>Northern Vermont University</td>
<td>2,896</td>
<td>0</td>
<td><a href="https://www.northernvermont.edu/nvu-during-covid-19">https://www.northernvermont.edu/nvu-during-covid-19</a></td>
</tr>
<tr>
<td>Saint Michael's College</td>
<td>2,529</td>
<td>1</td>
<td><a href="https://www.smcvtr.edu/return-to-campus/">https://www.smcvtr.edu/return-to-campus/</a></td>
</tr>
<tr>
<td>Sterling College</td>
<td>86</td>
<td>0</td>
<td>Does not have a public dashboard at this time</td>
</tr>
<tr>
<td>Vermont College of Fine Arts</td>
<td>7</td>
<td>0</td>
<td>Does not have a public dashboard at this time</td>
</tr>
<tr>
<td>Vermont Law School</td>
<td>161</td>
<td>0</td>
<td>Remote learning for Fall 2020 - Some students using campus facilities</td>
</tr>
<tr>
<td>Albany College of Pharmacy</td>
<td>99</td>
<td>0</td>
<td><a href="https://www.acphs.edu/health-safety">https://www.acphs.edu/health-safety</a></td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>81,363</strong></td>
<td><strong>47</strong></td>
<td></td>
</tr>
</tbody>
</table>

Note: Goddard College & Community College of Vermont are remote for Fall 2020

* Reconciling data that could possibly remove up to 6 cases from the UVM count.
Regional Data
Regional Monitoring: New Cases Week Over Week

19.37% Increase in New Confirmed Cases

Positive Cases Sept. 14th to Sept. 20th

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>New Cases Last 7 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vermont</td>
<td>25</td>
</tr>
<tr>
<td>Maine</td>
<td>203</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>241</td>
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<tr>
<td>Rhode Island</td>
<td>773</td>
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<tr>
<td>Connecticut</td>
<td>1129</td>
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<tr>
<td>Massachusetts</td>
<td>2694</td>
</tr>
<tr>
<td>Quebec</td>
<td>2866</td>
</tr>
<tr>
<td>New York</td>
<td>5530</td>
</tr>
</tbody>
</table>

Positive Cases Sept. 21st to Sept. 28th

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>New Cases Last 7 days</th>
</tr>
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<tbody>
<tr>
<td>Vermont</td>
<td>26</td>
</tr>
<tr>
<td>Maine</td>
<td>202</td>
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<tr>
<td>New Hampshire</td>
<td>258</td>
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<tr>
<td>Rhode Island</td>
<td>741</td>
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<tr>
<td>Connecticut</td>
<td>1118</td>
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<tr>
<td>Massachusetts</td>
<td>3215</td>
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<tr>
<td>Quebec</td>
<td>4523</td>
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<tr>
<td>New York</td>
<td>5985</td>
</tr>
</tbody>
</table>

Regional Monitoring:
Week Over Week Case Growth Since May 21, 2020

Fifth straight week in which cases have increased in the Northeast

Weekly Cases in the Northeast

Travel Map Update
Updated Travel Map

Source: Raw data from Johns Hopkins University—September 28, 2020 (dynamic map available at Vermont ACCD site)
**Improving:** Moving from Yellow or Red to Green

**Worsening:** Moving to Yellow or Red
Updated Travel Map

Population From "Green" Counties

- July 12, 2020: 11,500,000
- July 26, 2020: 6,900,000
- August 9, 2020: 4,800,000
- August 23, 2020: 5,200,000
- September 6, 2020: 5,200,000
- September 20, 2020: 4,200,000