Balancing In-Person and By-Mail Voting

Charles Stewart III
MIT Election Data and Science Lab

cstewart@mit.edu
@cstewartiii

NASED
July 9, 2020
Healthy Elections
STANFORD-MIT
HEALTHY ELECTIONS PROJECT

healthyelection.org

Working together to promote integrity, safety, and equal access for the 2020 election

State Reports
Tools
Data
Resources + Research
Voting by Mail
Become a Poll Worker

To address the unprecedented and ongoing threat that the COVID-19 pandemic poses to the 2020 elections, the Stanford-MIT Project on a Healthy Election brings together academics and election administration experts to assess and promote best practices to ensure the election can proceed with integrity, safety, and equal access.

Find our newest pages below, or follow along with our latest additions and updates on Twitter: @HealthyElec

LATEST UPDATES

Become a Poll Worker

JUL 06, 2020
State Updates

Teams of undergraduate, graduate, and law students at Stanford and MIT are hard at work compiling and analyzing reports about the experience of voters and election officials as they navigate voting in the midst of COVID-19. Each state will be added to the menu at the left as they become available.

State pages include primary election after-action reports written by the students. The pages also include links to official reports, reports by citizen groups, commentary, and media accounts that inform an understanding of health-related voting challenges and approaches to meeting them.
Florida

Florida’s 2020 presidential preference primary was held on March 17, just as COVID-19 was becoming a national concern and states began recommending social distancing measures. On that date, Florida had reported only 216 cases of COVID-19. (By early June, the total number of cases was over 58,000). The pandemic had not affected the voting calendar up to that point, although the presidential primary in Ohio, which was also scheduled for March 17, ended up being postponed to late April.

This report addresses three key questions:

- How did Florida voters respond to the onset of COVID-19 (turnout and vote mode) in their presidential preference primary?
- How did Florida voting behavior differ by race, age, and first-time voter status?
- Finally, as the coronavirus crisis increases the need for vote-by-mail (VBM), can we determine whether certain groups have disproportionately seen their VBM ballots unaccepted for counting?

Read the Memo:

Florida Election Memo

State Resources:
- Florida Division of Elections
Research

The elections community has been busy producing research into the myriad of issues that touch upon the needs of voting during the pandemic. This page catalogues some of the most prominent of those reports, written by Healthy Elections and other organizations.

To drill down into further topics, use the drop-down menu to the left.

Public Health Guidance

- Centers for Disease Control, CDC List of State and Territorial Health Department Websites. Website.
- Centers for Disease Control, CDC Recommended Precautions for Preventing Spread of COVID-19 in Election Polling Locations, including Cleaning and Disinfection. Website. March 2020.

Responding to the Pandemic

**Vote-By-Mail Resources**

**The National Vote-By-Mail Landscape**

**Context:** Vote by mail (VBM), sometimes called absentee voting or vote at home, describes systems under which election officials mail ballots directly to some or all registered voters. There are many permutations of vote by mail. Five states have adopted all-mail elections in which ballots are automatically mailed to all registered voters, and voters can typically return their ballot by mail or in person at a vote center or drop box during a designated early voting period through election day. In response to COVID-19, 13 states have enacted legislation that allows mail-in ballot applications to be sent to all registered voters. Vote centers and polling places may also be available for voters who prefer to vote in person. Other states either allow individual voters to register to vote by mail on a permanent basis for all elections or require an application to vote by mail for each election. Some states make absentee voting available only with an excuse defined by law and others do not require any excuse. And some states temporarily have adapted their vote-by-mail rules in response to COVID-19 (such responses are discussed in the next section). This section contains resources that provide overviews of the many types of vote-by-mail systems, as well as information specific to some of the distinct permutations.

**Types of Vote by Mail and Variations Across States**

- “Vote @ Home Intro Flyer: Higher Turnout, Highly Secure, Lower Cost,” National Vote At Home Institute (four-page overview of types of vote by mail, which states implement which, best practices, voter turnout, and costs). [Link](#)
- “Voting by Mail and Absentee Voting,” MIT Election Lab (historical overview, the current system, impact on turnout, and facts). [Link](#)
Tools

The special circumstances surrounding voting during the pandemic present many challenges planning for and running elections. This page provides links to tools based on the expertise of election administrators, business managers, and social science researchers that can help election administrators plan and conduct elections.

For the most part, these tools were developed by Healthy Elections collaborators and other proven experts in the field to meet either long-standing election administration challenges, or to meet the distinct public health challenges to voting during the pandemic. If you wish to know more about these tools, including assistance in using them, please contact the tool developers.

Tools for managing mail ballots

Democracy Works:

- **Ballot Scout**: Ballot Scout helps election offices add USPS Intelligent Mail barcodes to absentee ballot envelopes, which allows administrators and voters to track every ballot with the same ease as an Amazon package.
Tools

- Tools for managing mail ballots
- Tools for the design of healthy in-person polling places
- Tools for communicating with voters
- Tools for gathering data
- Data analysis tools

Tools for managing mail ballots

Democracy Works:

- **Ballot Scout**: Ballot Scout helps election offices add USPS Intelligent Mail barcodes to absentee ballot envelopes, which allows administrators and voters to track every ballot with the same ease as an Amazon package.
Mail Ballot Usage in 2016 and 2020 Primaries

Data as of 7/6/2020

Data graphed are the percentages of ballots cast by mail in the 2016 and 2020 primaries. Only states with primaries both years included. Data are incomplete and still being gathered.

Graph source: MIT Election Data and Science Lab
### From the Pennsylvania Primary

How likely are you to vote by mail in the November election?

<table>
<thead>
<tr>
<th>Mode in the Primary</th>
<th>Very Likely</th>
<th>Somewhat Likely</th>
<th>Somewhat Unlikely</th>
<th>Very Unlikely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voted on Election Day</td>
<td>8%</td>
<td>6%</td>
<td>10%</td>
<td>76%</td>
</tr>
<tr>
<td>Voted by Mail</td>
<td>46%</td>
<td>35%</td>
<td>13%</td>
<td>7%</td>
</tr>
<tr>
<td>Didn’t Vote</td>
<td>17%</td>
<td>25%</td>
<td>16%</td>
<td>42%</td>
</tr>
</tbody>
</table>
How the Tech Heads Can Help

+ Provide guidance about demand for mail ballots—how many and who.
+ Logistical guidance about managing mail-ballot operations
+ Guidance about siting polling places to maximize access
+ Logistical guidance about designing safe polling places
An Example
Ward 10, Precinct 2, Cambridge Massachusetts
Graham and Parks Elementary School
Two Related Questions + COVID-19

+ Are there enough check-in stations, voting booths, and scanners to meet demand for the voters who show up?
+ How long will voters have to wait, given how many show up and how the polling place is resourced?

+ How does COVID-19 change the answers to these two questions?
The Elbow of Death
Visiting an Old Friend
Tools for the design of healthy in-person polling places

Caltech/MIT Voting Technology Project

- Tool for Managing Polling Place Capacity with Social Distancing
  - Polling places will allow fewer people inside with social distancing measures. This will increase both physical line lengths and wait times, which may require finding new places for voters to wait. This tool can be used to estimate outside queue capacity needs, estimate average wait times, and estimate how many voters will wait too long.

- Line Optimization and Poll Worker Management Calculator
  - This tool, developed at the request of the Presidential Commission on Election Administration, uses queueing theory to calculate the minimal number of poll books or voting booths in a polling place so as to satisfy a service target on maximum waiting times. The tool has both a web interface, which allows the exploration of simple models, and an Excel spreadsheet download, which allows jurisdiction-wide planning. Instructional videos are also included.

- Report on Managing Polling Place Resources
  - This report provides a gentle introduction to queueing theory as applied to polling places. It includes a protocol for gathering data that is needed to provide inputs into some of the tools linked to from this site.

Center for Tech and Civic Life

- Polling Place Resource Planner: A free program to help you estimate resource needs at a polling place

University of Rhode Island VOTES

- COVID-19 Model: Simulate your in-person Election Day(s) system to help make more informed decisions with COVID-19.

- Visual Simulation Models: Simulate your in-person Election Day(s) system to help make more informed decisions.

Tools for communicating with voters

Democracy Works
**Description**

This tool uses queueing theory to calculate the minimal number of service stations at a process step in a polling place so as to satisfy a service target on maximum waiting times. A process step could be the act of voting, in which case the service stations correspond to voting machines or voting booths.

In this case, the tool can help to decide the required number of voting machines or booths to satisfy a service target; alternatively, the tool will determine the waiting time consequences from an allocation decision that sets the number of voting machines.

The tool can also be used for the process steps at which a voter checks in or checks out from the polling place. For instance, for the check-in step, the tool can be used to determine the number of poll workers needed and/or determine the waiting times given a decision on number of poll workers assigned to check in. In addition to using the tool on this web page, you can download an Excel spreadsheet that will perform the same calculations. One advantage of the spreadsheet is that it is easier to analyze multiple precincts at one time.

Developers: Stephen Graves and Rong Yuan

**Enter Data**

- **Select** Check-In, Voting Machine
- **Clear Data**
- **Precinct**
  - Arrival rate (voters per hour) [1,10000]
  - Average time for check-in (minutes) [0.100]
  - Number of Check-In Stations [1,100]
  - Maximum wait-time target (minutes) [1,60]
  - Service level (%)

Please add rows by pressing the + Add Precinct button.

**Calculate**

**Results**

- **Clear Data**
- **Precinct**
  - Average Wait Time (minutes)
  - Percent of voters that wait longer than the target
  - Number of Check-In Stations required to meet the service level

Table has no data

- **Download Excel Macro**
- **Close Calculator and return to main page**
## Enter Data

Select: **Check-In**  **Voting Machine**

### Clear Data

<table>
<thead>
<tr>
<th>Precinct #</th>
<th>Arrival rate (voters per hour) $[1,10000]$</th>
<th>Average time for check-in (minutes) $[0,100]$</th>
<th>Number of Check-In Stations $[1,100]$</th>
<th>Maximum wait-time target (minutes) $[1,60]$</th>
<th>Service level (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-2</td>
<td>115</td>
<td>.75</td>
<td>2</td>
<td>30</td>
<td>95</td>
</tr>
</tbody>
</table>

[Calculate Button]
<table>
<thead>
<tr>
<th>Precinct</th>
<th>Average Wait Time (minutes)</th>
<th>Percent of voters that wait longer than the target</th>
<th>Number of Check-In Stations required to meet the service level</th>
<th>Alert</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-2</td>
<td>0.8</td>
<td>0.0</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>
## Scenarios

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Arrival rate (voters/hr.)</th>
<th>Average check-in time</th>
<th>Number of check-in stations</th>
<th>Average wait time (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Covid</td>
<td>115</td>
<td>.75</td>
<td>2</td>
<td>0.8</td>
</tr>
<tr>
<td>50% mail voting, same check-in time</td>
<td>75</td>
<td>.75</td>
<td>2</td>
<td>0.2</td>
</tr>
<tr>
<td>50% mail voting, slightly longer check-in</td>
<td>75</td>
<td>1.00</td>
<td>2</td>
<td>0.6</td>
</tr>
<tr>
<td>Much longer check-in</td>
<td>75</td>
<td>1.25</td>
<td>2</td>
<td>2.0</td>
</tr>
<tr>
<td>Much, much longer check-in</td>
<td>75</td>
<td>1.50</td>
<td>2</td>
<td>10.9</td>
</tr>
<tr>
<td>Precinct</td>
<td>Arrival rate</td>
<td>Average time to vote</td>
<td>Current Number of voting stations</td>
<td>Maximum wait-time target</td>
</tr>
<tr>
<td>----------</td>
<td>--------------</td>
<td>----------------------</td>
<td>----------------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Precinct 1</td>
<td>70</td>
<td>0.75</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>Precinct 2</td>
<td>70</td>
<td>1</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>Precinct 3</td>
<td>70</td>
<td>1.25</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>Precinct 4</td>
<td>70</td>
<td>1.5</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>Precinct 5</td>
<td>70</td>
<td>1.75</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>Precinct 6</td>
<td>70</td>
<td>2</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>Precinct 7</td>
<td>90</td>
<td>0.75</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>Precinct 8</td>
<td>90</td>
<td>1</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>Precinct 9</td>
<td>90</td>
<td>1.25</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>Precinct 10</td>
<td>90</td>
<td>1.5</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>Precinct 11</td>
<td>90</td>
<td>1.75</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>Precinct 12</td>
<td>90</td>
<td>2</td>
<td>2</td>
<td>30</td>
</tr>
</tbody>
</table>
Tools for the design of healthy in-person polling places

Caltech/MIT Voting Technology Project

- **Tool for Managing Polling Place Capacity with Social Distancing**
  - Polling places will allow fewer people inside with social distancing measures. This will increase both physical line lengths and wait times, which may require finding new places for voters to wait. This tool can be used to estimate outside queue capacity needs, estimate average wait times, and estimate how many voters will wait too long.

- **Line Optimization and Poll Worker Management Calculator**
  - This tool, developed at the request of the Presidential Commission on Election Administration, uses queuing theory to calculate the minimal number of poll books or voting booths in a polling place so as to satisfy a service target on maximum waiting times. The tool has both a web interface, which allows the exploration of simple models, and an Excel spreadsheet download, which allows jurisdiction-wide planning. Instructional videos are also included.

- **Report on Managing Polling Place Resources**
  - This report provides a gentle introduction to queuing theory as applied to polling places. It includes a protocol for gathering data that is needed to provide inputs into some of the tools linked to from this site.

Center for Tech and Civic Life

- **Polling Place Resource Planner**: A free program to help you estimate resource needs at a polling place

University of Rhode Island VOTES

- **COVID-19 Model**: Simulate your in-person Election Day(s) system to help make more informed decisions with COVID-19.

- **Visual Simulation Models**: Simulate your in-person Election Day(s) system to help make more informed decisions.

Tools for communicating with voters

Democracy Works
Polling places will allow fewer people inside with social distancing measures. This will increase both physical line lengths and wait times, which may require finding new places for voters to wait.

**Use This Tool To:**

- Estimate outside queue capacity needs
- Estimate average wait times
- Estimate how many voters wait too long

**Example Maximum Queue Size Calculation**

- Room Capacity: 25
- Non-Voters in Room: 9
- Voter Processing Points: 8
- Inside Queue Capacity: 8
<table>
<thead>
<tr>
<th>Polling Place</th>
<th>Room Capacity</th>
<th>Non-voters in Room</th>
<th>Voter Processing Points</th>
<th>Inside Queue Capacity</th>
<th>Number of Check-In Stations</th>
<th>Average time for check-in</th>
<th>Arrival rate</th>
<th>Target wait time</th>
<th>Alert</th>
<th>Delete Row</th>
</tr>
</thead>
<tbody>
<tr>
<td>COVID 1</td>
<td>26</td>
<td>9</td>
<td>15</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>75</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COVID 2</td>
<td>26</td>
<td>9</td>
<td>15</td>
<td>2</td>
<td>2</td>
<td>1.25</td>
<td>75</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COVID 3</td>
<td>26</td>
<td>9</td>
<td>15</td>
<td>2</td>
<td>2</td>
<td>1.5</td>
<td>75</td>
<td>30</td>
<td>!</td>
<td></td>
</tr>
<tr>
<td>COVID 4</td>
<td>26</td>
<td>9</td>
<td>15</td>
<td>2</td>
<td>2</td>
<td>1.75</td>
<td>75</td>
<td>30</td>
<td>!</td>
<td></td>
</tr>
</tbody>
</table>
## Results

<table>
<thead>
<tr>
<th>Precinct</th>
<th>Average Total Wait Time (minutes)</th>
<th>Average Total Queue Length (people)</th>
<th>Average Outside Queue Length (people)</th>
<th>Percent of time room is full</th>
<th>Chance Voter Waits Longer than Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>COVID 1</td>
<td>0.6</td>
<td>0.8</td>
<td>0.3</td>
<td>19%</td>
<td>0%</td>
</tr>
<tr>
<td>COVID 2</td>
<td>2.0</td>
<td>2.5</td>
<td>1.5</td>
<td>42%</td>
<td>0%</td>
</tr>
<tr>
<td>COVID 3</td>
<td>10.9</td>
<td>13.6</td>
<td>12.0</td>
<td>80%</td>
<td>7%</td>
</tr>
<tr>
<td>COVID 4</td>
<td>--</td>
<td>NaN</td>
<td>--</td>
<td>NaN%</td>
<td>NaN%</td>
</tr>
</tbody>
</table>

ERROR: Data entered produces unstable results! On average the number of people that arrive exceeds the number of people that the system can handle. To make the system stable, decrease the arrival rate or the time to vote, or increase the number of stations in the system.