Appendix to the Testimony of Myrna Pérez

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Appendix A

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Ensuring Safe Elections

Federal Funding Needs for State and Local Governments During the Pandemic

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The coronavirus pandemic has changed voting behavior and poses an extraordinary challenge to state and local officials as they seek to ensure that elections in 2020 are fair, safe, and secure. As national policymakers consider how people should vote in light of the pandemic, elections themselves have already changed. Millions of voters are requesting mail ballots, far more than would have been the case otherwise. Many fewer are updating their registrations at government offices. Instead, they register online or find other ways to sign up. Governments face the unforeseen cost of investing in personal protective equipment (PPE) and sanitation supplies to reduce the risk of illness and even death to their workers and voters.[1] Even if no rules change, the 2020 election will be costly.

Congress has already provided some help. On March 27, President Trump signed into law a $2 trillion economic relief package that included $400 million in grants to help states run their elections during the coronavirus disease 2019 (Covid-19) pandemic. This was an important first step. Unfortunately, we now know this is not enough.[2]

In this document we examine the difference between the March 27 federal investment in the electoral process and what will be needed to ensure safe and healthy elections for 2020. We focus on Georgia, Michigan, Missouri, Ohio, and Pennsylvania. These five states have diverging election administration systems and needs, from the number of elections each will hold this cycle to their requirements for absentee voting. Two common themes stand out.

First, what Congress has provided so far is not enough to run safe and secure elections in 2020. Our review shows that the March 27 grants will likely cover anywhere from less than 10 percent of what Georgia officials need to around 18 percent of what Ohio officials need.

Second, local election jurisdictions bear the heaviest burden of protecting voters and workers during the election. In two of the states we examined, local governments must cover over 90 percent of the costs needed to ensure safe and secure elections this year. In all five states, they will bear the overwhelming share of such expenses.

The measures that we appraise in this document are critical. They come from our discussions with numerous election officials in each of the five states we examined. States need help

- developing the infrastructure necessary to support changed voter behavior (e.g., more voters choosing to register online or to vote by mail);

- protecting voters and election workers during elections (e.g., giving poll workers PPE, allowing curbside voting, cleaning polling places, and ensuring that election staff can work off-site as needed without exposing election offices to cyberattacks); and

- educating the public about changes made to election procedures and polling locations (including notice of changed elections, moved polling sites, and new voting options to reduce density at in-person locations).

This report represents the consensus of an ideologically diverse group of organizations: the Alliance for Securing Democracy, the Brennan Center for Justice, Pitt Cyber, and R Street Institute. From interviews with election officials and the vendors who must supply most of the products and services these officials need, it is clear that additional appropriations are necessary to fulfill the goal of free, fair, and safe elections in 2020. Without funding from the federal government, there is little chance that state and local governments can shoulder the financial burden. Indeed, nearly every state and local government in the country faces severe budget challenges this year.[3]

Without congressional leadership, the risk of repeating the problems experienced in recent primaries will increase dramatically. These problems include an inability to timely process ballot applications, closed polling places, and unnecessary sickness and even death for voters and election workers performing their civic duties.[4] Facing an economic downturn, states may soon tighten their belts further on many services. The federal government has the resources to ensure that state and local governments can run free, fair, and safe elections this fall. We urge them to do so as soon as possible.

How We Arrived at Our Estimates

Our estimates of the expenses state and local jurisdictions will incur come from

- interviews with election officials in each of these five states about the costs they have already incurred;

- interviews with vendors and service providers on the costs of other needed products and services that election officials identified, as well as publicly available information about these costs; and

- projections of voter behavior, based on history as well as changes we have seen in elections that have already been held this year.

In all cases, we have documented the sources and assumptions behind our estimates, which are described and discussed in detail in the methodology section found in the appendix.[5]

Georgia

Total registered voters: 6.9 million active voters[6]
2020 cycle elections: primary (June 9), state/federal/local runoff (August 11), general (November 3), state runoff (December 1), federal runoff (January 5)
Total costs: $110.7–$124.4 million
State costs: $42.4–$49 million
Local costs: $68.3–$75.4 million
Federal grant: $10.8 million[7] (9–10 percent)

In response to ongoing warnings by federal and state health officials, Georgia recently delayed its primary election, originally scheduled for March 24, for the second time. The primary is currently scheduled for June 9.[8]

State election officials have taken a leading role during this unprecedented situation. While Georgia was already a no-excuse state, absentee voting was not heavily used by Georgians in the past; during the 2018 general election, 3 percent of registered voters cast their vote by mail .[9] That is almost certain to change. In response, Secretary of State Brad Raffensperger's office has stressed the importance of mail voting, which relieves crowding on Election Day, for public safety reasons: "With social distancing as one of the most important tools for limiting the spread of coronavirus, providing alternatives to voting in person is crucial."[10]

To alleviate the resource burden on county election officials caused by absentee voting spikes during the primary, state officials have taken on some of the costs and election administration duties that would normally be the responsibility of local officials in the primary. Specifically, the state is paying for the printing, packing, and postage costs to send prepopulated[11] absentee ballot applications to every active voter and absentee ballots to every voter whose application is approved by local officials.[12]

These proactive steps have been well received by local election officials,[13] many of whom are faced with staffing stresses[14] or much worse (a Fulton County elections employee died of Covid-19),[15] and government office closures.[16] However, county officials remain primarily responsible for the majority of increased costs associated with administering elections during a pandemic and its aftermath. These increased costs may be a bigger concern in Georgia than in any other state, because Georgia could hold up to five elections this cycle.[17]

Georgia election officials need additional federal funding now to help cover increased election administration costs related to the coronavirus. Multiple local Georgia officials, who are primarily responsible for these costs, joined others from around the country in stating that federal funding provided by the Coronavirus Aid, Relief, and Economic Security (CARES) Act is "simply not enough" and that additional federal funding is critical as they prepare for the elections ahead.[18]

State costs: $42.4–$49 million

- Printing and mailing absentee ballot applications to all registered voters
- Packing and mailing absentee ballots to all voters approved by local officials
- Purchasing and deploying centralized vote-tabulation machines (high-speed scanners)
- Investing in state election infrastructure

Georgia officials have already made significant investments to increase the adoption rate of absentee voting to help minimize the spread of the coronavirus, promote poll worker and voter safety, and minimize the issues voters could encounter on Election Day due to a potential lack of poll workers causing polling place closures and consolidations. For example, at a cost of $3.1 million, state officials are sending absentee voting applications to every active voter in the state.[19] The state is also paying the $1.88–$2.38 in postage and handling costs per absentee ballot mailed to approved absentee ballot applicants.[20] For the primary election, we estimate the cost of mailing absentee ballots will be $3.1–$3.9 million.[21]

State officials are committed to serving Georgia voters and working in conjunction with local election officials through these unprecedented circumstances.[22] They are planning ahead to ensure that all upcoming elections are safe and secure and that Georgia has a resilient election infrastructure that can withstand attack or major spikes in absentee voting.[23] State officials are prepared to continue their voter outreach and absentee ballot distribution efforts if necessary.[24] Assuming Georgia has five elections this cycle, it is estimated that the absentee ballot application printing and mailing costs will be $15.5 million and the printing, packing, and mailing of absentee ballots will be $16–$22.4 million.[25]

In Georgia, the state is responsible for some infrastructure costs and decisions, including voting equipment selection and procurement. However, state officials have worked closely with local officials over the past two years to make key infrastructure improvements across the state.[26] When making these investment decisions, it was reasonable for election officials to assume that absentee voting turnout would remain relatively stable, as no-excuse absentee voting has been available in Georgia over 10 years.[27] For example, 3 percent of registered voters voted absentee by mail in 2018 and 2016.[28]

Current infrastructure is not sufficient for the needs of election officials who are "bracing for the flood of absentee ballots."[29] Local election officials will need additional machinery and equipment, including absentee ballot tabulation machines, to assist with managing the significant spike in absentee voting. The state has already invested approximately $2.1 million in the equipment necessary for county officials to centrally tabulate a significant percentage of total votes cast.[30] With additional federal funding, additional centralized tabulation equipment, to be distributed to county officials across the state, would be a priority.[31] We estimate the total vote-tabulation equipment costs will be $10.3 million.[32]

Additional infrastructure investments, including an online absentee ballot application tool to increase absentee voting security and election integrity, improved absentee ballot tracking systems, and additional load and vulnerability testing for current online systems (which we expect will experience significant spikes in usage rates) will cost an estimated $640,000–$890,000.[33]

Local costs: $68.3–$75.4 million

While state officials are playing an important role in the current crisis, local election officials retain primary responsibility for the majority of election administration costs and responsibilities. Local officials are preparing for a surge in absentee voting with a populace that has historically voted in person and infrastructure that was geared toward this preference lasting for years to come. For example, in 2016 and 2018, around 95 percent of voters cast their ballots in person.[34] Local election officials we interviewed know these numbers are likely to be much lower in the primary election and believe that Covid-19 will likely continue to impact voting preferences in the general election, even if the virus has been contained.[35] Additional infrastructure investments, described below, will be required to accommodate the expected surge in absentee voting.

Conducting absentee ballot education and outreach: $21.3 million

While the state is mailing important information to all voters in the primary, some county officials may decide to supplement these educational outreach efforts at the local level, as some local officials are doing in Iowa, where state officials have also proactively distributed absentee ballot applications to eligible voters.[36] We estimate that reasonable media outreach would cost $5.1 million for the year and that sending informational mailers to all voters would cost $3.2 million per election.[37]

Processing absentee ballot applications and providing prepaid return postage: $4–$5.4 million

Although the state has assumed responsibility for sending

prepopulated absentee ballot applications to all voters, voters remain responsible for the postage required to return the absentee ballot application to the appropriate local official. However, local election officials we interviewed would support paying these postage costs if they received assistance from the federal government to do so.[38] We estimate that prepaid return postage for applications would cost $1.6–$3 million for the general election and $2.4 million in total for the runoff elections. While not included in our estimates as voters did not receive postage prepaid envelopes to return absentee ballot applications for the primaries, we estimate that the return postage costs would have been approximately $1.1 million.[39]

Local officials are currently tackling the deluge of incoming paper applications.[40] Georgia state officials played an important role in minimizing the time required for local officials to process these applications when it voluntarily centralized absentee ballot application printing and mailing by prepopulating the forms with voters' information and, importantly, including a bar code that local officials can scan to greatly expedite processing times.[41]

However, between office closures, the spread of the coronavirus, and an infrastructure built for the state's traditionally low absentee-by-mail turnout, there may be application processing backlogs across the state. "The courthouse may be closed, but I'm at the office and my staff must keep working," said Deidre Holden, Paulding County supervisor of elections and voting.[42]

Processing and tabulating absentee ballots: $28.5–$34.2 million

Once local election officials approve an absentee ballot application, the state's vendor mails absentee ballot packages to the individual voter. In Georgia, absentee ballot packages will include one privacy sleeve, instructions for voting, the paper ballot, and an (outer) envelope in which to return all required materials.[43] The package will be mailed to the voter in one large envelope.[44]

Currently, as with ballot applications, Georgia voters are responsible for the postage costs to return their absentee ballots.[45] Local officials we interviewed would also support providing absentee voters with postage-prepaid envelopes to return their ballots if they received assistance from the federal government to do so.[46] We estimate that the total postage costs to return absentee ballots in the primary will be approximately $2.3 million but did not include this cost in these estimates even though local officials will be responsible for some postage costs as the U.S. Postal Service (USPS) delivers absentee ballots marked as official election mail even if the envelope does not include sufficient postage and subsequently bills the local official recipient.[47] We estimate that return postage could cost $6.9–$11.6 million for the remainder of the cycle.[48]

Ballot drop boxes, which allow voters to securely and conveniently return their voted absentee ballots without incurring postage costs, are standard in almost all states with a high percentage of mail ballots.[49] On April 15, the State Election Board voted unanimously to allow drop boxes, "an option that [allows voters to avoid] human contact during the coronavirus pandemic."[50] In addition, drop boxes will lead to decreased long-term absentee ballot postage return costs and ensure that voters can return their ballot by the deadline, even if the post office experiences service interruptions or the voter does not receive the ballot in sufficient time to return it via USPS under normal delivery circumstances. Drop boxes have proven exceptionally popular in other several other states, including Colorado, where approximately 75 percent of ballots are returned to drop boxes.[51] With sufficient funding, Georgia election officials we interviewed would consider widespread deployment of ballot drop boxes.[52] Statewide secure ballot drop boxes will cost approximately $3–$4 million to purchase, install, and maintain.[53] For these estimates, we assume that drop boxes will be deployed prior to the general election and the percentage of voters who return their ballot by mail may be much lower in the general election than in the primary. The estimated return postage for absentee ballots costs reflect this assumption.

Once an absentee ballot is received, local officials must sort, process, and verify the voter's signature on the outer envelope. To manage the expected significant spike in incoming mail, local election officials will need equipment to assist with this process. The equipment needs, which will vary based on the size of the locality, may include mail-sorting equipment and automated letter openers. After election officials open outer envelopes on Election Day, ballots are removed from their privacy sleeves and then aggregated and tabulated. While the significant spike in the number of ballots to be counted centrally means that many local officials will need additional centralized absentee ballot tabulators (i.e., high-speed scanners), in Georgia these costs are generally paid by the state. Some counties will also need additional space for secure ballot processing and storage.[54] Statewide, the staffing, facilities, non-tabulation equipment, and software that will likely be needed to process returned absentee ballots will cost approximately $18.6 million for the year, including one-time equipment costs.[55]

Building secure remote, offsite, or additional infrastructure: $1.7 million

Election officials' work must continue despite stay-at-home (SAH) orders, social distancing recommendations, limits on nonessential travel, building closures, and public health concerns. To do so, many local election officials may have staff who need to work at home or in temporary office space for periods of time throughout the election cycle. Working remotely can present significant security risks as malicious actors seek to exploit weaker networks and general disruption in routine.[56] Officials may need additional secure workstations to accommodate processing associated with the spike in absentee voting. We estimate that it will cost local election authorities $1.7 million to purchase secure devices and to implement proper cybersecurity protections.[57]

Ensuring healthy and secure in-person voting options: $12.8 million

State and local officials are committed to offering in-person voting options to voters.[58] Local election officials we interviewed are also committed to protecting their poll workers and their voters on Election Day.[59] Reasonable measures to ensure a healthy and safe polling place in a pandemic include sufficient PPE for poll workers, hand sanitizer, gloves, and other cleaning supplies.[60] These measures also include providing plexiglass sneeze guards for poll workers and thoroughly cleaning all polling locations after use.[61] Statewide, these materials will cost approximately $3.8 million total for all elections this cycle.[62]

In addition, local election officials must be prepared for significant poll worker attrition and voter demand for curbside voting options on Election Day. State officials in Alabama have already announced poll worker pay raises, and if they received assistance from the federal government to do so, local Georgia officials we interviewed would also support poll worker pay raises.[63] The total cost for these measures will be approximately $8.9 million total for all elections this cycle.[64]

Michigan

Registered voters: 7.7 million[65]
2020 cycle elections: municipal (May 5), primary (August 4), general (November 3)
Total costs: $94.9–$103.8 million
State costs: $13.5–$17.6 million
Local costs: $81.4–$86.2 million
Federal grant: $11.2 million[66] (11–12 percent)

Michigan's presidential primary was held on March 10. Less than two weeks later, Governor Gretchen Whitmer issued an SAH order,[67] which was recently extended through May 1, 2020.[68]

Secretary of State Jocelyn Benson acted quickly in the wake of the SAH order to address issues associated with the state's upcoming local elections on May 5.[69] First, the secretary encouraged local communities to delay tax and bond proposals until the August election, unless such a move would cause existing critical funds to expire.[70] Next, she took several steps to promote absentee voting for the local elections, including mailing voters an absentee ballot application with a postage-prepaid envelope.[71]

Over the past year, Michigan officials have upgraded key infrastructure in response to the successful 2018 ballot initiative that authorized no-excuse absentee voting starting in 2019. However, consistent with trends in other states that have made this transition,[72] election officials made infrastructure investments assuming only a modest uptick from prior absentee turnout, which was approximately 14 percent of registered voters in 2018.[73]

These recent improvements are not sufficient to meet election officials' needs associated with the expected massive spike in absentee voting due to Covid-19.[74] As Michigan election officials prepare for a surge in absentee voting in 2020,[75] it needs prompt and significant federal investment to ensure that the state's election infrastructure is sufficiently resilient against pandemics or other disruptions.

Michigan election officials need additional federal funding now to help cover increased election administration costs related to the coronavirus. More than a dozen local Michigan election officials, who will be primarily responsible for these additional costs, joined others from around the country in stating that the federal funding provided in the CARES Act is "simply not enough" and that additional federal funding is critical as they prepare for the elections ahead.[76]

State costs: $13.5–$17.6 million

- Printing and mailing absentee ballot applications to eligible voters
- Providing postage-prepaid envelopes for absentee ballot application return
- Assisting with prepaid postage for voters to return absentee ballots
- Investing in state election infrastructure

State officials quickly identified absentee voting as an important component of safely managing the May local elections.[77] "To help ensure both public health and democratic rights are protected" in jurisdictions that go forward

with these elections, state officials "will mail absent voter ballot applications to all [May 5 election eligible] voters with postage-paid return envelope."[78] In addition, the state will assist counties with providing postage-prepaid envelopes in which to return their absentee ballot.[79]

State officials continue to coordinate with state executive and health officials and are exploring options for launching similar efforts in all subsequent elections this year if necessary,[80] which will cost an estimated $6 million in the primary and $6.9–$10.8 million in the general.[81]

Additional infrastructure investments to make absentee voting easier for eligible voters and more secure, including an online absentee ballot application tool to increase absentee voting security and election integrity, improved absentee ballot tracking systems, and additional load and vulnerability testing for current online systems (which we expect will experience significant spikes in usage rates) will cost an estimated $590,000–$790,000.[82]

Local costs: $81.4–$86.2 million

While state officials play an important role in the current crisis, local election officials retain primary responsibility for administering and paying for Michigan elections. With over 1,600 jurisdictions, elections are highly decentralized and resource needs, and concerns, vary across the state. The uncertainty facing election officials is a significant concern. For many local clerks, this will be the very first cycle with no-excuse absentee voting. And, for all clerks, "this is the very first cycle in a pandemic."[83] What election officials do understand is that mail ballot turnout is likely to be dramatically higher than 14 percent for the upcoming elections; those we interviewed believe that Covid-19 will likely continue to impact voting preferences in the primary and general elections, even if the virus has been contained.[84] Election officials across the state need additional infrastructure and other resources to manage the expected surge in absentee voting.

Conducting absentee ballot education and outreach: $9 million

While the state is mailing important information to all May voters, some local officials may decide to supplement these educational outreach efforts. Separately, local officials will need to continue these educational outreach efforts ahead of the primary and the general election through informational mailers and media outreach. We estimate that sending informational mailers to all voters will cost $3.4 million per election and that reasonable media outreach will cost $2.1 million for the year.[85]

Processing absentee ballot applications

Once an application is received, local officials must sort, open, and process the paper applications. As in Georgia, the processing time in Michigan will vary based on whether the application was prepopulated and included a bar code programmed with the applicant's information. While new to Georgia, local Michigan officials we interviewed have sent prepopulated applications, with a bar code, to voters on the permanent absentee ballot application list for several years.[86]

Even with the increased efficiencies associated with prepopulated absentee ballot applications, "you can't undercount the resource needs associated with the absentee ballot applications," warned Tina Barton, Rochester Hills clerk.[87] In Michigan, where officials conduct signature verification not only on the returned absentee ballot envelopes but also on the absentee ballot applications, and file and store individual paper applications, the additional workload is especially challenging as "there's a lot of work required."[88] Also important, this responsibility comes on top of the local official's other ongoing duties. In Michigan, that list is long.[89]

Processing and tabulating absentee ballots: $45–$49.8 million

Once an absentee ballot application is approved, officials mail an absentee ballot package to individual voters. In Michigan, absentee ballot packages include one privacy (inner) envelope, instructions for voting, the paper ballot, and an (outer) envelope in which to return all required materials, as is standard in the remainder of the states we profile. We estimate that associated printing, packing, and mailing costs would be $7–$11.3 million for the year.[90] Michigan voters are currently responsible for the return postage on voted absentee ballots. However, state officials expect to continue assisting locals with providing postage-prepaid envelopes for returned ballots; these postage costs are included in the state cost section above.

As in Georgia and other states, Michigan municipalities and townships will also want to deploy drop boxes for several reasons, including to reduce their long-term postage costs (accounted for in these estimates) and increasing voter convenience. With sufficient funding, local Michigan election officials we interviewed would consider widespread deployment of ballot drop boxes.[91] Statewide secure ballot drop boxes will cost approximately $1.6–$2.1 million to purchase, install, and maintain.[92]

Absentee ballot processing and tabulation requires multiple steps, and officials will need additional resources to handle the expected spike in incoming mail. As Tina Barton notes, "While I consider our office lucky because we have four high-speed tabulators, I still need a long list of supplies, additional equipment, and other resources, from additional crates for absentee ballot and absentee ballot applications storage, ballot bags, storage space,

envelope openers to election officials who are willing to potentially work overnight to assist with absentee ballot tabulation."[93]

Election officials may also need to review the basic logistics of their absentee processing and tabulating plans due to the current social distancing requirements. "We normally have teams of five people at one six-foot table who process absentee ballots. If I can only have two people at a table, then we'll have to set up an assembly line with multiple tables, so instead of six tables, I'll easily need 20. But if this will give my staff and workers the space they need to stay safe, we'll find a way."[94]

Statewide, the staffing, facilities, equipment, and software that will likely be needed to process and tabulate returned absentee ballots amounts to approximately $36.5 million, including one-time equipment purchase costs.[95]

Building secure remote, offsite, or additional infrastructure: $10 million

Election officials' work must continue despite SAH orders, social distancing recommendations, limits on nonessential travel, building closures, and public health concerns. To do so, many local election officials may have staff who need to work at home or in temporary office space for periods of time throughout the election cycle. Working remotely can present significant security risks as malicious actors seek to exploit weaker networks and general disruption in routine.[96] In addition, officials may need additional secure workstations to accommodate processing associated with the spike in absentee voting. We estimate that it will cost local election authorities $10 million to purchase secure devices and to implement proper cybersecurity protections.[97]

Ensuring healthy and secure in-person voting options: $17.3 million

Local officials "are committed to protecting every voter and every vote" and every poll worker.[98] Although local election authorities are facing poll worker attrition, polling location site issues, and other challenges, local officials we interviewed believe it is critical to offer safe in-person voting options.[99] Reasonable measures to ensure a healthy and safe polling place in a pandemic include sufficient PPE for poll workers, hand sanitizer, gloves, single-use pens, and other cleaning supplies (collectively, "healthy polling location materials," or HPLM).[100] These measures also include providing plexiglass sneeze guards for poll workers and thoroughly cleaning all polling locations after use.[101] In addition to these health and safety needs, local officials support increasing the number of poll workers and their pay as a way to support increased demand for Michigan's limited curbside voting assistance services and mitigate the impacts of attrition due to Covid-19 we have seen in other states, but they say they can only do so with sufficient federal support.[102] Statewide, these materials will cost approximately $17.3 million across all elections this year.

Missouri

Total registered voters: 4.2 million[103]
2020 cycle elections: municipal (June 2), primary (August 4), general (November 3)
Total costs: $59.4–$67 million
State costs: $590,000–$790,000
Local costs: $58.8–$66.2 million
Federal grant: 7.6 million[104] (11–13 percent)

On March 18, Governor Michael L. Parson postponed Missouri's municipal elections, originally scheduled for April 7, until June 2, 2020. "Postponing an election is not easy, but we are all in this together. We are thankful to Secretary [of State Jay] Ashcroft and our 116 election authorities for their leadership, cooperation, and commitment to doing what is best for their communities during this time," Parson said.[105]

Ashcroft requested this postponement after working closely with local election officials who expressed concerns about poll worker attrition, the number of sites no longer willing to serve as polling locations, and voter safety.[106] As some local election officials had petitioned the court for individual county election extensions prior to the executive order, the postponement will ensure that all municipal elections will be held on the same day across the state.

Although Missouri is one of a small number of states that require voters to meet certain qualifications to cast an absentee ballot, voters want the option,[107] and many believe that voters concerned about the coronavirus qualify under current law.[108] With multiple local officials now promoting absentee voting as a safety measure,[109] absentee voting is expected to be much greater than in past elections, such as the November 2018 general election, in which 5 percent of registered voters cast an absentee ballot by mail.[110]

Missouri election officials need additional federal funding now to help cover increased election administration costs related to the coronavirus. Multiple local Missouri election authorities across the state, who will be primarily responsible for these additional costs, joined others from around the country in stating that federal funding provided in the CARES Act is "simply not enough" and that additional federal funding is critical as they prepare for the elections ahead.[111]

State costs: $590,00–$790,000

- Investing in state election infrastructure

State officials have already initiated contingency planning to ensure the safe and secure administration of elections in Missouri and are planning to conduct elections even if the situation is "worse than it is now."[112] In fact, Secretary Ashcroft believes that his "job is to make [Missouri elections] happen and make [Missouri elections] happen safely under whatever circumstances we have." As part of these efforts, state officials are having discussions with local election authorities weekly, "if not more often."

Additional infrastructure investments, including an online absentee ballot application tool[113] to increase absentee voting security and election integrity, improved absentee ballot tracking systems, and additional load and vulnerability testing for current online systems (which we expect are likely to experience significant spikes in usage rates), will cost an estimated $590,000–$790,000.[114]

Local costs: $58.8–$66.2 million

In Missouri, local election authorities will be responsible for the majority of coronavirus-related election administration cost increases. The majority of these costs, as well as administration challenges, stem from an infrastructure that was built for the state's historically low absentee voting turnout. Missouri local officials we interviewed expect that absentee voting turnout will be much higher in the primary election than in the past and believe that Covid-19 will likely continue to impact voting preferences in the general, even if the virus has been contained.[115] Additional infrastructure investments will be required to accommodate the expected surge in absentee voting during the entire election cycle.

Conducting voter education and outreach: $7.3 million

Election officials will need to engage in a variety of forms of voter education and outreach. The state has not committed to conducting such outreach, so local educational efforts will be critical. Voters with questions about absentee voting are already inundating local officials with questions about absentee voting. One employee at the St. Louis County Board of Elections received over 100 voicemails in a single day from voters, and local officials are now implementing a plan to distribute the additional voter response workload across the office.[116] We estimate that reasonable media outreach will cost $1.7 million for the year and that sending informational mailers to all voters will cost $1.9 million per election.[117]

Mailing and processing absentee ballot applications: $8.7–$9.6 million

Since Missouri is not adopting an all vote-by-mail model,[118] all voters who qualify and wish to vote absentee must submit an application for an absentee ballot. If Missouri were to follow other states and mail absentee ballot applications to all voters, printing, postage, envelopes, and other needs associated with distributing these applications would cost approximately $2.4 million for each election. If Missouri election authorities were to provide prepaid postage for absentee application returns,[119] as they currently do for absentee ballot returns, the return postage would be approximately $686,000 for the municipal and primary elections, combined, and an additional $900,000–$1.7 million for the general election.[120]

Mailing, processing, and tabulating absentee ballots: $28.6–$35.2 million

Once an absentee ballot application is approved, officials must prepare a standard absentee ballot package for each individual voter.[121] Sufficient and well-trained staff, or experienced contractors, are essential to ensuring that every approved applicant receives all the necessary materials and the correct ballot.[122] The estimated cost of necessary materials, staffing, postage out, and return postage for all upcoming elections is $9.7–$15.8 million,[123] which includes $338,000 in the municipal election, $812,000 in the primary, and $756,000–$1.2 million in the general for return postage.

As in Georgia and other states, Missouri election authorities will also want to deploy drop boxes for several reasons, including to reduce their return postage costs (accounted for in our cost estimates) and increase voter convenience. Missouri election authorities we interviewed would consider widespread deployment of ballot drop boxes if they received assistance from the federal government to do so.[124] Statewide secure ballot drop boxes will cost approximately $1.6–$2.1 million to purchase, install, and maintain.[125]

Once an absentee ballot is returned, local Missouri officials undertake a multistep process to ensure election integrity and accurate tabulation, similar to the process we see in other states. As in Georgia and all other states we interviewed, while the specific needs will vary by county, local officials will need additional equipment, office or warehouse space, staff, and other resources to manage the surge in incoming absentee ballots and applications.[126] We estimate these costs will be approximately $17.3 million, including one-time equipment purchase costs.[127]

Building secure remote, offsite, or additional infrastructure: $1.2 million

Election officials' work must continue despite SAH orders, social distancing recommendations, limits on nonessential travel, building closures, and public health concerns. To do so, many local election officials may have staff who need to work at home or in temporary office space for periods of time throughout the election cycle. Working remotely can present significant security risks as malicious actors seek to exploit weaker networks and general disruption in routine.[128] In addition, officials may need additional secure workstations to accommodate processing associated with the spike in absentee voting. We estimate that it will cost local election authorities $1.2 million to purchase secure devices and to implement proper cybersecurity protections.[129]

Ensuring healthy and secure in-person voting options: $12.9 million

Although local election authorities are facing poll worker attrition, polling location site issues, and other challenges, those we interviewed believe that it is essential to offer their voters safe in-person voting opportunities.[130] Several have signed a letter that asks Congress to ensure they have the resources to protect all of their voters, votes, and poll workers.[131]

They also agree that reasonable measures include HPLM and support increasing the number of poll workers and their pay as a way to support increased demand for curbside voting and mitigate the impacts of attrition due to Covid-19 that we have seen in other states, but they say they can only do so with sufficient federal support.[132] Statewide, we estimate that the total cost for these measures will be approximately $12.9 million total for all elections this cycle.[133]

Ohio

Total registered voters: 7.8 million[134]
2020 cycle elections: primary (April 28),[135] special (August 4), general (November 3)
Total costs: $70–$82.2 million
State costs: $4.2–$4.4 million
Local costs: $65.8–$77.8 million
Federal grant: $12.8 million[136] (16–18 percent)
State grant: $7 million

Ohio voters and election officials faced exceptionally challenging circumstances in the lead-up to the primary, originally scheduled for March 17. After a brief legal battle, and hours before the polls were slated to open, Dr. Amy Acton, director of the Ohio Department of Health, ordered all polling locations closed[137] to "avoid the imminent threat with a high probability of widespread exposure to Covid-19."[138] Ohio lawmakers subsequently rejected Governor Mike DeWine and Secretary of State Frank LaRose's legislative proposal calling for a new election day with "limited in person voting" and decided to only "extend[] mail voting in the state's primaries until April 28."[139]

As only voters who require assistance or do not have a mailing address were able to vote in person in April, most voters who were planning to vote in person on primary day had to vote absentee by mail.[140] In light of the public health concerns associated with Covid-19, LaRose promoted many common-sense and innovative measures and tools to make absentee voting more secure and to increase its voter adoption rate.[141] For example, he worked with newspapers across the state to print absentee ballot applications, which voters can "cut out of the newspaper, fill[] in and mail[]."[142] As part of these efforts, he announced partnerships with dozens of public and private companies, including the Ohio Grocers Association, the AFL-CIO, and Cox Inc., that are "stepping up" to promote absentee voting.[143]

These are important steps, but there is much more to do as local election officials work to manage the huge spike in absentee voting.[144] In Ohio, as in most states across the country, the costs associated with coronavirus-related changes in voting preferences will primarily be the responsibility of local election officials. And officials believe that Covid-19 will likely continue to impact voting preferences in the general election, even if it has been contained.[145]

LaRose has predicted that the 2020 election will see "the highest turnout in our state's history."[146] Although the state legislature appropriated $7 million for costs associated with extending the primary,[147] Ohio election officials still need additional federal funding to help cover increased election administration costs related to the coronavirus. Several local Ohio election officials, including the president and vice president of the Ohio Association of Election Officials, joined others from around the country in stating that funding provided by the CARES Act is "simply not enough" and that additional federal funding is critical as they prepare for the elections ahead.[148]

State costs: $4.2–$4.4 million

- Printing and mailing voter informational postcards for the primary
- Investing in state election infrastructure

Working closely with local officials, state officials have led a significant election infrastructure investment program over the past year and a half. Many of these elec-

tion security improvements will be critical as Ohio voters are more likely to take advantage of online election services, such as online voter registration, over the coming months.

State officials have recommended various additional infrastructure investments aimed at making absentee voting more secure, cheaper to administer, and easier for eligible voters. For example, LaRose has proposed an online absentee ballot application tool, which would allow for Ohioans to request absentee ballots online, with no paper form involved.[149] We estimate that this tool will cost approximately $360,000–$470,000 to develop and maintain, and additional state-level infrastructure investments, including improved absentee ballot tracking systems and additional load and vulnerability testing on online systems, will cost approximately $210,000–$300,000.[150]

Voter education and outreach efforts will also be critical over the coming months. To ensure that voters are aware of the extended absentee voting period for the primary, state officials are planning to "design, print and mail approximately 7.8 million informational postcards to every registered Ohioan that explains to them how to obtain the form necessary to request an absentee ballot."[151] We estimate the associated costs to be $3.6 million.[152]

Local costs: $65.8–$77.8 million

In Ohio, local election authorities will be responsible for the majority of coronavirus-related election administration cost increases. The majority of these costs, as well as administration challenges, stem from an infrastructure that was built for the state's current absentee-by-mail voting turnout.[153] Ohio local officials we interviewed know the level of absentee voting will be much higher in the primary and believe that Covid-19 will likely continue to impact voting preferences in the general, even if it has been contained.[154] Additional infrastructure investments will be required to accommodate the expected surge in absentee voting during the entire election cycle.

Conducting voter education and outreach: $4.8 million

While the state is mailing important information to all voters before the primary, local election officials are usually responsible for the costs associated with mailings and voter education outreach. They will need to engage in a variety of forms of voter education and outreach for the general at minimum. For the general election, we estimate that reasonable media outreach will cost $1.1 million, and individual voter outreach through information mailers will cost $3.6 million.[155]

Mailing and processing absentee ballot application requests and applications: $6.6–$8.3 million

As Ohio is not adopting an all vote-by-mail model,[156] all voters who qualify and wish to vote absentee must submit an application for an absentee ballot. If local Ohio officials follow other states and mail absentee ballot applications to all voters,[157] printing, postage, return postage, envelopes and other needs associated with distributing these applications will cost approximately $6.6–$8.3 million for the general election.[158]

Although Governor DeWine and Secretary LaRose supported a proposal to provide all voters with postage-prepaid envelopes to return absentee ballot applications, the legislature refused to fund this request. If they received assistance from the federal government to do so, local officials we interviewed would also support providing voters with postage-prepaid envelopes to return absentee ballot applications, and these costs are included in the above total.[159]

Mailing, processing, and tabulating absentee ballots: $40.4–$50.7 million

Once an absentee ballot application is approved, officials must prepare a standard absentee ballot package for each individual voter.[160] Sufficient and well-trained staff, or experienced contractors, are essential to ensuring that every approved applicant receives all the necessary materials and the correct ballot.[161] The estimated cost for necessary materials, staffing, and postage is $5.9 million in the primary election and $6.7–$12.8 million in the general.[162]

In Ohio, voters will receive a postage-prepaid envelope in which to return their ballot for the primary, but local officials are not required to provide postage-prepaid envelopes for absentee ballot return in the general. In fact, under current state law, locals are prohibited from providing postage.[163] However, if they received assistance from the federal government to do so and if another exemption were granted for the general, local election officials we interviewed would support providing postage-prepaid envelopes to voters.[164] For the primary, we estimate that local officials will incur an additional $1.8 million in return postage costs for the April 28 primary and an additional $1–$3.9 million for the general.[165]

As in Georgia and other states, Ohio counties will also want to deploy drop boxes for several reasons, including to reduce their postage costs (accounted for in these estimates) and increase voter convenience. If they received assistance from the federal government to do so, Ohio election authorities we interviewed would consider widespread deployment of ballot drop boxes.[166] Statewide secure ballot drop boxes will cost approximately $4.5–$5.9 million to purchase, install, and maintain.[167]

Once an absentee ballot is returned, local Ohio officials

undertake a multistep process to ensure election integrity and vote-tabulation accuracy. As in other states we interviewed, local officials will need additional equipment, office or warehouse space, staff, and other resources to manage the surge in incoming absentee ballots and applications.[168] We estimate these costs will be approximately $20.5 million, including one-time equipment purchase costs.[169]

Building secure remote, offsite, or additional infrastructure: $1.2 million

Election officials we interviewed in Ohio are considering various options to immediately expand the capacity of their infrastructure in order to continue their vital work as absentee ballot applications and returned ballots continue to pour into their offices.[170] Kim Smith, the deputy director of elections in Defiance County, is considering increasing the number of workstations at her office by 50 percent so temporary staffers can assist with the processing. New workstations cost approximately $2,000, including the licensing fees for the state absentee ballot processing software and equipment costs.[171]

Ensuring healthy and secure in-person voting options: $12.7 million

Several local election officials have joined together to argue that more federal funds are needed to ensure the safety and security of all voters, poll workers, and votes.[172] Although local election authorities are facing poll worker attrition, polling location site issues, and other challenges, those we interviewed are committed to offering in-person voting in subsequent 2020 elections and agree that HPLM are reasonable measures.[173]

Keeping poll workers safe is of particular importance to Defiance County's director of elections, Tonya Wichman, who relies on many friends and family members to serve as poll workers.[174] She explained, "[Poll workers] make my job possible, they make democracy possible, and work from 5:30 in the morning until at least 8:00 at night for not what they deserve but what we can offer them as a paycheck."

For reasons similar to those described by local officials in Michigan and Georgia, local Ohio officials we interviewed would support increasing the number of poll workers and their pay, but they say they can only do so with sufficient federal support.[175] The total cost to locals for these changes is estimated at $12.7 million for the general election.[176]

Pennsylvania

Registered voters: 8.5 million[177]
2020 cycle elections: primary (June 2), general (November 3)
Total costs: $79.1–$90.1 million
State costs: $17.5–$17.9 million
Local costs: $61.6–$72.2 million
Federal grant: $14.2 million[178] (16–18 percent)

On March 25, Pennsylvania Governor Tom Wolf and the state legislature agreed to postpone the state's primary election, which was originally scheduled for April 28, to June 2. In response to local election officials who were "pulling fire alarms all over the place"[179] about the election administration challenges facing their offices, such as government office closures and poll worker attrition, the legislation postponing the election also provided local officials with decision-making authority over several election administration matters, such as the establishment of vote centers and polling location consolidation, in the primary.[180]

In the wake of the postponement, Wolf issued a statewide SAH order through April 30;[181] it has since been extended through May 8.[182] Voter registration and absentee ballot[183] application windows are currently open for the primary, but in the last month, with some local offices still closed and others facing residual staffing effects, furloughs, or other challenges,[184] "that means voters aren't being registered, absentee ballot applications aren't being processed, and other election preparations aren't moving forward."[185] Only with sufficient resources will election officials be able to manage the backlog that is likely being created.[186]

In the past year, Pennsylvania upgraded key infrastructure to accommodate the change in the state law in 2019 to allow no-excuse vote by mail. However, consistent with trends in other states,[187] election officials made infrastructure investments assuming only a modest uptick from prior absentee-by-mail turnout, which was 2 percent of registered voters in 2018.[188] These recent improvements alone are not sufficient to meet election officials' needs, or voters' expectations, associated with the expected massive spike in absentee voting due to Covid-19.[189] Without immediate additional resources, one local official we interviewed expressed concerns that the primary could be a "catastrophe."[190] Given the fundamental shift in voting preferences in 2020 expected by the Pennsylvania officials we interviewed[191] and the likelihood of unprecedented turnout in November, there must be prompt and significant federal investment in the state's election infrastructure to ensure a system that is sufficiently resilient against pandemics or other emergencies.[192]

State costs: $17.5–$17.9 million

- Mailing voter information notices
- Launching voter education efforts
- Investing in state election infrastructure
- Purchasing Covid-19 precinct protection kits
- Implementing accessible ballot-marking tool so that voters with disabilities can utilize mail-in voting

Working closely with local officials, state officials have led a significant election infrastructure investment program over the past year and a half. Many of these election security improvements will be critical to safely and securely administering upcoming elections as Pennsylvania voters are more likely to take advantage of online election services, such as online voter registration, over the coming months.

Most importantly, in September of 2019, the Pennsylvania Department of State deployed a new online absentee ballot application tool, the OABAT. Not only does the OABAT make the absentee voting process more secure through an indirect connection with the state voter registration database, but it also significantly reduces the county staff time required to process applications. A paper absentee ballot application takes approximately 7–10 times longer to process than a paperless application.[193]

However, state officials have much work to do to prepare for elections in a pandemic. First, Pennsylvania officials are planning to invest in substantive voter education and outreach efforts. These efforts are of particular importance in Pennsylvania, given that no-excuse voting by mail was only introduced recently and, historically, only a small percentage of Pennsylvania voters have cast their votes by mail.[194]

These efforts are also important to public — and poll worker — safety on election day.[195] With state and local election officials bracing for polling location consolidations and closures across the commonwealth,[196] those who vote by mail or absentee will decrease in-person Election Day turnout and thereby make it easier to conduct in-person voting in compliance with health officials' social distancing recommendations. Due to limited resources, state officials plan to spend in advance of the primary election approximately $1 million on modest but critical educational outreach efforts and an additional $1.3 million to send informational mailers to every eligible-voter household in the commonwealth.[197] In addition, state officials plan to provide Covid-19 precinct protection kits to the counties at a cost of approximately $1.2 million.[198] For these estimates, we assume that the state will also provide these kits to local election officials in the general election.

Additional outreach will be required before the general election and, with sufficient federal resources, state officials would likely double or triple those efforts.[199] Reasonable media outreach for the general election will cost at least $1.5 million and informational mailers will cost another $1.3 million.[200] State officials will continue to monitor public health conditions in conjunction with health-care experts in the coming months and, if necessary, would consider mailing vote-by-mail applications with postage-prepaid envelopes to voters in the fall at an estimated cost of $8 million.[201] State officials would also need at least $780,000–$1.2 million to obtain absentee ballot tracking software, enhanced voter lookup tools, additional load and vulnerability testing for the state's online voter registration database, and upgrades to its online absentee ballot application.[202] They are also working to implement an accessible remote ballot-marking tool so that voters with disabilities can utilize mail-in voting, which will cost approximately $1.2 million.[203] Given the limited time to develop and deploy these tools and the difficulty of integrating them with existing legacy systems, these costs could be as high as $2.5 million.[204]

Local costs: $61.6–$72.2 million

In Pennsylvania, local election authorities will be responsible for the majority of coronavirus- related election administration cost increases. While they are appreciative of the recent federal financial assistance, multiple local Pennsylvania officials joined others from around the country in stating that it was "simply not enough."[205] The majority of these costs, as well as administration challenges, stem from an infrastructure that was built for the state's historically low absentee-by-mail voting turnout;[206] officials reasonably assumed that the state's move to no-excuse absentee voting would result in a gradual increase in its use, as we have seen in states across the country.[207] Pennsylvania has seen a vast increase in absentee applications — already more than six times those from the previous presidential primary, in 2016.[208] Officials we interviewed know the level of absentee voting will continue to grow in the primary and believe that Covid-19 will likely continue to impact voting preferences in the general, even if it has been contained.[209] Additional infrastructure investments will be required to accommodate the expected surge in absentee voting during the entire election cycle.

Mailing and processing absentee ballot applications

Although the state sent informational postcards to all eligible-voter households with important information about the primary election, including how to apply for an absentee ballot, it is possible that local election officials are printing and mailing absentee-by-mail applications to voters before the primary. However, we are not including estimated costs for doing so in the primary as, due to the availability of the online absentee ballot application tool in Pennsylvania, some localities may decide against mailing out applications to all voters, or decide to only mail paper applications to universes of voters that might not be eligible to use the OABAT.[210]

Mailing, processing, and tabulating absentee ballots: $36.3–$47 million

Once an absentee ballot application is approved, officials must prepare a standard absentee ballot package for each individual voter.[211] Sufficient and well-trained staff, or experienced contractors, are essential to ensuring that every approved applicant receives all the necessary materials and the correct ballot.[212] The estimated cost for necessary materials, staffing, postage out, and return postage is $7.3 million for the primary election and $7.9–$17 million for the general.[213]

As with the other states we profile, localities will also want to deploy drop boxes for several reasons, including to reduce their postage costs (accounted for in these estimates) and increase voter convenience. If they received assistance from the federal government to do so, Pennsylvania officials we interviewed would consider widespread deployment of ballot drop boxes.[214] Statewide secure ballot drop boxes will cost approximately $5.1–$6.6 million to purchase, install, and maintain.[215]

Once an absentee ballot is returned, local officials undertake a multistep process to ensure election integrity and accurate vote tabulation, similar to the process we see in many other states that face similar struggles. In Pennsylvania, as in every state we interviewed, while the specific needs will vary by county, local officials will need additional equipment, office or warehouse space, staff, and other resources to manage the surge in incoming absentee ballots and applications.[216] Statewide, the staffing, facilities, equipment, and software that will likely be needed to process and tabulate returned absentee ballots is approximately $16.1 million, including one-time equipment purchase costs.[217]

Building secure remote, offsite or additional infrastructure: $1.1 million

Election officials' work must continue despite SAH orders, social distancing recommendations, limits on nonessential travel, building closures, and public health concerns. To do so, many local election officials may have staff who need to work at home or in temporary office space for periods of time throughout the election cycle. Working remotely can present significant security risks as malicious actors seek to exploit weaker networks and general disruption in routine.[218] In addition, officials may need additional secure workstations to accommodate processing associated with the spike in absentee voting. We estimate that it will cost local election authorities $11. million to purchase secure devices and to implement proper cybersecurity protections.[219]

Ensuring healthy and secure in-person voting options: $24.2 million

While local officials are authorized to consolidate up to 60 percent of existing polling places in the primary due to the pandemic — or further, if approved by the Department of State[220] — every locality is still required to conduct in-person voting. State and local election officials we interviewed are dedicated to protecting their poll workers and their voters on Election Day and agree that HPLM are reasonable measures.[221] For these estimates, we assume that the state is taking on the costs associated with these materials for both the primary and general elections.

For reasons similar to those of their colleagues in other states, local Pennsylvania officials we interviewed support increasing the number of poll workers and their pay but say they can only do so with sufficient federal support.[222] And Berks, Lehigh, and Philadelphia Counties, which are required to provide language assistance at the polls,[223] may need to contract for remote interpreter services to ensure compliance on Election Day. The state also provides remote interpreter services to improve language access on Election Day.[224] The total cost to locals for these changes is estimated at $24.2 million for both elections.[225]

TABLE 1

Estimated Costs for Georgia

	LOW-END ESTIMATE	HIGH-END ESTIMATE
State total	**$110,741,555**	**$124,430,160**
State costs	$42,403,860	$49,034,290
Local costs	$68,337,695	$75,395,870
Secure online systems		
Online absentee request systems (development and maintenance)	$360,000	$470,000
Ballot-tracking systems and voter notification	$100,000	$200,000
Online voter registration capacity and testing	$150,000	$170,000
Voter lookup tools and vulnerability testing	$30,000	$50,000
Mail ballot distribution		
Mailing absentee applications		
Absentee ballot applications (November)	$3,102,000	$3,102,000
Return postage (November)	$1,569,750	$2,982,525
Absentee ballot applications (other elections)	$12,408,000	$12,408,000
Return postage (other elections)	$2,421,900	$2,421,900
Mailing absentee ballots		
Absentee ballots (November)	$4,540,200	$10,920,630
Return postage (November)	$1,690,500	$6,423,900
Absentee ballots (Other elections)	$11,463,660	$11,463,660
Return postage (Other elections)	$5,216,400	$5,216,400
Drop boxes	$2,128,000	$3,040,000
Drop box maintenance	$912,000	$912,000

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Mail ballot processing and tabulation		
Automated letter openers	$138,000	$138,000
Mail-sorting equipment	$4,600,000	$4,600,000
High-speed scanners	$10,250,000	$10,250,000
Processing and storage facilities	$2,050,000	$2,050,000
Processing staff (all elections)	$11,491,200	$11,491,200
Computers and technology	$326,300	$326,300
In-person voting		
PPE and health (all elections)	$2,256,750	$2,256,750
Plexiglass sneeze guards (one-time expenditure)	$796,500	$796,500
Postelection cleaning services (all elections)	$796,500	$796,500
Single-use pens (all elections)	$0	$0
Poll worker pay increase (all elections)	$5,073,300	$5,073,300
Interpreter services (all elections)	$327,600	$327,600
Expanded curbside voting (all elections)	$3,547,500	$3,547,500
Public education		
Informational mailers to all voters (all elections)	$16,200,000	$16,200,000
Media outreach (all elections)	$5,059,952	$5,059,952
Secure remote working and off-site infrastructure		
Remote-working devices, security protections, and maintenance	$1,735,543	$1,735,543

Note: The cost of return postage during the primary election is not included.

TABLE 2

Estimated Costs for Michigan

	LOW-END ESTIMATE	HIGH-END ESTIMATE
State total	**$94,945,253**	**$103,778,403**
State costs	$13,540,937	$17,595,693
Local costs	$81,404,316	$86,182,710
Secure online systems		
Online absentee request systems (development and maintenance)	$360,000	$470,000
Ballot-tracking systems and voter notification	$50,000	$100,000
Online voter registration capacity and testing	$150,000	$170,000
Voter lookup tools and vulnerability testing	$30,000	$50,000
Mail ballot distribution		
Mailing absentee applications		
Absentee ballot applications (November)	$4,481,580	$4,481,580
Return postage (November)	$1,615,366	$3,069,195
Absentee ballot applications (other elections)	$4,481,580	$4,481,580
Return postage (other elections)	$745,554	$745,554
Mailing absentee ballots		
Absentee ballots (November)	$4,782,639	$9,087,013
Return postage (November)	$839,668	$3,240,595
Absentee ballots (other elections)	$2,207,372	$2,207,372
Return postage (other elections)	$787,189	$787,189
Drop boxes	$1,106,000	$1,580,000
Drop box maintenance	$474,000	$474,000

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Mail ballot processing and tabulation		
Automated letter openers	$293,000	$293,000
Mail-sorting equipment	$5,400,000	$5,400,000
High-speed scanners	$17,350,000	$17,350,000
Processing and storage facilities	$3,470,000	$3,470,000
Processing staff (all elections)	$9,424,800	$9,424,800
Computers and technology	$521,300	$521,300
In-person voting		
PPE and health (all elections)	$1,630,980	$1,630,980
Plexiglass sneeze guards (one-time expenditure)	$1,439,100	$1,439,100
Postelection cleaning services (all elections)	$575,640	$575,640
Single-use pens (all elections)	$5,735,777	$5,735,777
Poll worker pay increase (all elections)	$5,373,750	$5,373,750
Interpreter services (all elections)	$9,450	$9,450
Expanded curbside voting (all elections)	$2,578,500	$2,578,500
Public education		
Informational mailers to all voters (all elections)	$6,882,033	$6,882,033
Media outreach (all elections)	$2,149,533	$2,149,553
Secure remote and off-site infrastructure		
Remote-working devices, security protections, and maintenance	$10,000,442	$10,000,442

TABLE 3

Estimated Costs for Missouri

	LOW-END ESTIMATE	HIGH-END ESTIMATE
State total	**$59,412,659**	**$67,013,321**
State costs	$590,000	$790,000
Local costs	$58,822,659	$66,223,321
Secure online systems		
Online absentee request systems (development and maintenance)	$360,000	$470,000
Ballot-tracking systems and voter notification	$50,000	$100,000
Online voter registration capacity and testing	$150,000	$170,000
Voter lookup tools and vulnerability testing	$30,000	$50,000
Mail ballot distribution		
Mailing absentee applications		
Absentee ballot applications (November)	$2,385,217	$2,385,217
Return postage (November)	$901,578	$1,712,998
Absentee ballot applications (other elections)	$4,770,434	$4,770,434
Return postage (other elections)	$686,276	$686,276
Mailing absentee ballots		
Absentee ballots (November)	$4,439,896	$8,435,803
Return postage (November)	$755,834	$2,872,169
Absentee ballots (other elections)	$3,379,623	$3,379,623
Return postage (other elections)	$1,150,672	$1,150,672
Drop boxes	$1,113,000	$1,590,000
Drop box maintenance	$477,000	$477,000

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Mail ballot processing and tabulation		
Automated letter openers	$102,000	$102,000
Mail-sorting equipment	$2,900,000	$2,900,000
High-speed scanners	$7,250,000	$7,250,000
Processing and storage facilities	$1,450,000	$1,450,000
Processing staff (all elections)	$5,359,200	$5,359,200
Computers and technology	$226,200	$226,200
In-person voting		
PPE and health (all elections)	$1,908,420	$1,908,420
Plexiglass sneeze guards (one-time expenditure)	$1,122,600	$1,122,600
Postelection cleaning services (all elections)	$673,560	$673,560
Single-use pens (all elections)	$3,105,320	$3,105,320
Poll worker pay increase (all elections)	$3,315,400	$3,315,400
Interpreter services (all elections)	$0	$0
Expanded curbside voting (all elections)	$2,806,500	$2,806,500
Public education		
Informational mailers to all voters (all elections)	$5,589,575	$5,589,575
Media outreach (all elections)	$1,745,863	$1,745,863
Secure remote and off-site infrastructure		
Remote-working devices, security protections, and maintenance	$1,208,491	$1,208,491

TABLE 4

Estimated Costs for Ohio

	LOW-END ESTIMATE	HIGH-END ESTIMATE
State total	**$70,001,871**	**$82,166,652**
State costs	$4,201,913	$4,401,913
Local costs	$65,799,959	$77,764,740
Secure online systems		
Online absentee request systems (development and maintenance)	$360,000	$470,000
Ballot-tracking systems and voter notification	$50,000	$100,000
Online voter registration capacity and testing	$130,000	$150,000
Voter lookup tools and vulnerability testing	$30,000	$50,000
Mail ballot distribution		
Mailing absentee applications		
Absentee ballot applications (November)	$4,730,203	$4,730,203
Return postage (November)	$1,888,595	$3,588,330
Absentee ballot applications (other elections)		
Return postage (other elections)		
Mailing absentee ballots		
Absentee ballots (November)	$6,711,603	$12,752,047
Return postage (November)	$1,026,644	$3,901,246
Absentee ballots (other elections)	$5,872,653	$5,872,653
Return postage (other elections)	$1,796,626	$1,796,626
Drop boxes	$3,150,000	$4,500,000
Drop box maintenance	$1,350,000	$1,350,000

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Mail ballot processing and tabulation		
Automated letter openers	$88,000	$88,000
Mail-sorting equipment	$6,400,000	$6,400,000
High-speed scanners	$7,600,000	$7,600,000
Processing and storage facilities	$1,520,000	$1,520,000
Processing staff (all elections)	$4,636,800	$4,636,800
Computers and technology	$280,800	$280,800
In-person voting		
PPE and health (all elections)	$1,513,680	$1,513,680
Plexiglass sneeze guards (one-time expenditure)	$2,671,200	$2,671,200
Postelection cleaning services (all elections)	$534,240	$534,240
Single-use pens (all elections)	$2,103,441	$2,103,441
Poll worker pay increase (all elections)	$3,886,700	$3,886,700
Interpreter services (all elections)	$0	$0
Expanded curbside voting (all elections)	$2,028,500	$2,028,500
Public education		
Informational mailers to all voters (all elections)	$7,263,825	$7,263,825
Media outreach (all elections)	$1,134,401	$1,134,401
Secure remote and off-site infrastructure		
Remote-working devices, security protections, and maintenance	$1,243,960	$1,243,960

Note: Estimates do not include costs associated with absentee applications and in-person voting for the April 28 primary election.

TABLE 5

Estimated Costs for Pennsylvania

	LOW-END ESTIMATE	HIGH-END ESTIMATE
State total	**$79,054,774**	**$90,104,119**
State costs	$17,480,000	$17,870,000
Local costs	$61,574,774	$72,234,119
Secure online systems		
Online absentee request systems (development and maintenance)	$500,000	$750,000
Ballot-tracking systems and voter notification	$100,000	$200,000
Online voter registration capacity and testing	$150,000	$170,000
Voter lookup tools and vulnerability testing	$30,000	$50,000
Mail ballot distribution		
Mailing absentee applications		
Absentee ballot applications (November)	$3,300,000	$3,300,000
Return postage (November)	$4,700,000	$4,700,000
Absentee ballot applications (other elections)		
Return postage (other elections)		
Mailing absentee ballots		
Absentee ballots (November)	$6,802,425	$12,924,608
Return postage (November)	$1,077,201	$4,093,363
Absentee ballots (other elections)	$5,539,118	$5,539,118
Return postage (other elections)	$1,754,298	$1,754,298
Drop boxes	$3,549,000	$5,070,000
Drop box maintenance	$1,521,000	$1,521,000

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Mail ballot processing and tabulation		
Automated letter openers	$64,000	$64,000
Mail-sorting equipment	$5,100,000	$5,100,000
High-speed scanners	$5,900,000	$5,900,000
Processing and storage facilities	$1,180,000	$1,180,000
Processing staff (all elections)	$3,616,200	$3,616,200
Computers and technology	$219,700	$219,700
In-person voting		
PPE and health (all elections)	$2,400,000	$2,400,000
Plexiglass sneeze guards (one-time expenditure)	$2,746,800	$2,746,800
Postelection cleaning services (all elections)	$1,098,720	$1,098,720
Single-use pens (all elections)	$4,444,606	$4,444,606
Poll worker pay increase (all elections)	$6,842,700	$6,842,700
Interpreter services (all elections)	$2,157,750	$2,157,750
Expanded curbside voting (all elections)	$6,865,500	$6,865,500
Public education		
Informational mailers to all voters (all elections)	$2,600,000	$2,600,000
Media outreach (all elections)	$2,500,000	$2,500,000
Secure remote and off-site infrastructure		
Remote-working devices, security protections, and maintenance	$1,095,756	$1,095,756

Note: Total and state costs include implementing a remote ballot marking tool at a cost of $1.2 million.

Appendix: Methodology

Our estimates of the expenses state and local jurisdictions confront come from (1) interviews with election officials in each of these states about the costs they have already incurred; (2) interviews with vendors and service providers about the costs of other needed products and services that election officials identified, as well as publicly available information about these costs; and (3) projections of voter behavior, based on prior history, as well as changes we have already seen in recent elections. Below are the assumptions and sources of our cost estimates.

Securing Online Systems

Costs included: online absentee ballot request systems, ballot-tracking systems, and added capacity, vulnerability testing, and maintenance for all online election systems.

Based on interviews with state election officials, we determined whether each state currently has all of the necessary systems for online absentee ballot requests and ballot tracking. When unable to obtain confirmation from state election officials, we used publicly available information about state systems to make our assumptions.[226] Even where these systems are already in place in some form, additional resources for vulnerability testing will be needed given the importance of these remote tools if in-person interaction becomes difficult or impossible. Existing systems will also need upgrades to meet the increased demand for mail voting, and states will require additional server space and IT support. Cost estimates were based on interviews with election officials and information from technology vendors.

We estimate that secure online absentee ballot request systems will cost each state $300,000–$350,000 to develop and another $60,000–$120,000 to maintain.[227] Of the states that we analyzed in this report, only Pennsylvania has an online absentee ballot request system already.[228] However, Pennsylvania officials plan to spend $500,000–$750,000 on needed upgrades and enhancements to this system before November.[229]

For Georgia and Pennsylvania, we estimate that it will cost $100,000–$200,000 to purchase and improve absentee ballot tracking systems that notify voters when their ballot has cleared each step in the delivery and counting process.[230] Because Michigan, Missouri, and Ohio have more extensive ballot-tracking systems in place already,[231] we estimate that they will each need only $50,000–$100,000 to add additional notification features and prepare these systems for increased use.

Online voter registration (OVR) capacity and vulnerability testing costs generally depend on whether the state's voter registration database is a "top-down" or "bottom-up" system. Georgia, Michigan, Missouri, and Pennsylvania all have "top-down" systems and Ohio has a "bottom-up" system.[232] We estimate that capacity and vulnerability testing will cost $150,000–$170,000 for each "top-down" state and $130,000–$150,000 for each "bottom-up" state.[233]

Finally, we estimate that vulnerability testing for voter lookup tools — including for registration status and polling place location — will cost $30,000–$50,000 for each state.[234]

Mail Ballot Distribution

Costs included: mailing absentee applications and absentee ballots (including materials, envelopes, postage, and staffing) and additional drop boxes for ballot return.

Mailing Absentee Applications We estimated how much it would cost each state to mail an absentee ballot application with prepaid return postage to every voter for each election. For the cost of return postage, we assumed that election officials would pay only for applications actually returned by mail.

Where available, we used 2020 voter registration statistics for each state to determine the number of voters that would receive an absentee application. In Ohio, where we could not find publicly available voter registration numbers for 2020, we used 2018 voter registration numbers from the Election Administration and Voting Survey (EAVS).[235] Because Georgia has already committed to sending absentee applications to all active registered voters for the primary election, we used active registered voters as the baseline for this state rather than total registered voters.

For most states, we assumed that the number of applications returned by mail would be equal to the number of mail ballots cast in each election. We assumed that turnout in each election would be consistent with corresponding elections in 2016. For Georgia, we assumed turnout would be 32 percent in the primary, 10 percent in the primary runoff, 70 percent in the general, 22 percent in the state runoff, and 40 percent in the federal runoff. For Michigan, we assumed turnout would be 20 percent in the primary and 65 percent in the general. For Missouri, we assumed turnout would be 10 percent in the

municipal, 24 percent in the primary, and 67 percent in the general. For Ohio, we assumed turnout would be 42 percent in the primary and 72 percent in the general. For Pennsylvania we assumed turnout would be 38 percent in the primary and 70 percent in the general. We also assumed that mail ballots would make up 75 percent of votes cast in primary, runoff, and local elections, and 50–95 percent of votes cast in the November general election. This range reflects how much uncertainty there is regarding what the public health threat will be this fall.

Based on interviews with election officials, we estimated that the cost of printing and sending out absentee ballot requests ranges from $0.45 to $0.60 per voter.[236] The cost of prepaid return postage was estimated at $0.65 per voter, which includes an estimate of the processing and handling fee charged by USPS.[237] Where states have already committed to certain practices or funds associated with mailing absentee applications or ballots for an upcoming election, we used those available cost estimates. For Pennsylvania, we used an $8 million estimate for mailing applications with return postage that was provided by state officials.[238]

Mailing Absentee Ballots For the cost of mailing absentee ballots, we first set projected baselines for the amount of resources each state would need in an election under "normal" circumstances — that is, with no public health crisis. We determined the number of absentee ballots cast as a percentage of registered voters using 2018 EAVS data and used this to determine the number of absentee ballots that would be cast in 2020 with similar absentee ballot use patterns. For Pennsylvania, which recently adopted no-excuse absentee voting, we used a 10 percent absentee vote rate. We then subtracted this number from the total number of registered voters to determine the supply of additional absentee ballot materials that would be needed to have enough for all voters.[239] These numbers were then multiplied by absentee ballot material costs per voter and reduced by expected turnout, as explained below.

We also set projected baselines for the number of paper ballots that would be printed under normal circumstances. These baselines were set according to the number of ballots that would be printed for absentee voting (using the same methodology as described above for absentee ballot materials) and for in-person voting. To determine the number of ballots that would be printed for in-person voting, we used the number of voters in jurisdictions that use hand-marked paper ballots as their primary voting system[240] and the minimum number of ballots that these jurisdictions must print under state law.[241] We then subtracted this number from the total number of registered voters to determine the supply of additional absentee ballot materials that would be needed to have enough for all voters.[242] These numbers were then multiplied by absentee ballot costs per voter and reduced by expected turnout, as explained below.

We then estimated the costs associated with the measures, equipment, and other accommodations state and local officials will need to best manage the expected significant increase in mail voting due to Covid-19. We conducted interviews with local election officials to obtain estimates for many of the discrete costs we relied on to create these estimates. When necessary and possible, we used averages drawn from multiple election officials.

Based on interviews from election officials and publicly available sources, we estimate the cost of materials for absentee ballots (ballots, envelopes, instructions, etc.) will range from $1.25 to $1.89 per voter.[243] To estimate the additional staffing costs needed to address the spike in absentee voting, we assumed that jurisdictions with fewer than 25,000 voters would need one additional temporary worker ($1,200) and jurisdictions with 25,000 or more voters would need three additional temporary workers ($3,600) for a period of approximately two weeks to assist with assembling absentee ballot packets.

For the cost of mailing absentee ballots, we assumed that turnout for each election would be consistent with recent corresponding elections. For Georgia, we assumed turnout would be 32 percent in the primary, 10 percent in the primary runoff, 70 percent in the general, 22 percent in the state runoff, and 40 percent in the federal runoff. For Michigan, we assumed turnout would be 20 percent in the primary and 65 percent in the general. For Missouri, we assumed turnout would be 10 percent in the municipal, 24 percent in the primary, and 67 percent in the general. For Ohio, we assumed turnout would be 42 percent in the primary and 72 percent in the general. For Pennsylvania we assumed turnout would be 38 percent in the primary and 70 percent in the general.

We also assumed that mail ballots would make up 75 percent of votes cast in primary, runoff, and local elections, and 50–95 percent of votes cast in the November general election. This range reflects how much uncertainty there is regarding what the public health threat will be this fall.

Election officials we interviewed emphasized that postage costs vary based on several variables, including the length of the ballot. For these estimates, we assume that postage costs for sending absentee ballots ranged from $1.15 to $2.38 per voter for each ballot sent, and $0.80 to $1.40 per voter for each ballot returned.[244] When estimating the cost of return postage for the November general election, our lower-range estimates assume that half of voters who vote by mail return their ballot using a drop box. Specifically, we assumed that 50–95 percent of the total number of estimated voters will cast an absentee ballot, but to determine our estimated postage costs for the November, we assumed that only half of this popula-

tion, or as few as 25 percent, will return their ballot by mail.

Ballot Drop Boxes For ballot drop boxes, we estimate that each election jurisdiction will need one drop box for every 15,000 voters.[245] We assume that the county (or jurisdiction) office can operate as one secure drop-off site for each of these jurisdictions at minimal cost, and determined the number of drop boxes that would be needed in addition to the county office to meet the ratio of one drop-off site per 15,000 voters. Drop boxes were estimated at $7,000–$10,000 to purchase and install, plus another $3,000 to maintain. These estimates are taken from costs associated with drop boxes in Washington State, where their use is widespread.[246] While some drop boxes can be found at lower costs, we chose this price point because these drop boxes offer structural protection against physical damage, fires, ballot theft, and tampering.[247]

Mail Ballot Processing and Tabulation

Costs included: automated letter openers, mail-sorting equipment, high-speed scanners, additional processing and storage facilities, and additional processing staff.

Local jurisdictions will need more equipment, space, and staff to handle a substantial increase in absentee ballot use. We determined the estimated cost for each jurisdiction based on the number of voters.[248]

We estimate that automated letter openers will cost $1,000 per unit[249] and that every jurisdiction with more than 5,000 voters will need one. We estimate that mail-sorting equipment will cost $100,000 per jurisdiction and will be needed by every jurisdiction with more than 25,000 voters.[250] We estimate that high-speed scanners will cost $50,000 for every jurisdiction with 5,000 to 25,000 voters and $100,000 for every jurisdiction with more than 25,000 voters.[251] We estimate that expanded facilities will cost $10,000[252] for every jurisdiction with 5,000 to 25,000 voters and $20,000[253] for every jurisdiction with more than 25,000 voters. We estimate that additional processing staff will cost $16,800[254] for every jurisdiction with 5,000 to 25,000 voters and $42,000[255] for every jurisdiction with more than 25,000 voters. Finally, we estimate that additional computers for processing will cost $1,300 for every jurisdiction with 5,000 to 25,000 voters and $3,900 for every jurisdiction with more than 25,000 voters.

Even in jurisdictions that have some of this technology, such as high-speed scanners, in place, election officials will likely need to purchase additional units or units that can handle higher capacity, given that each of these states has had relatively low rates of mail voting in the past.

In-Person Voting

Costs included: PPE for poll workers, cleaning supplies, plexiglass sneeze guards, postelection cleaning services, single-use pens, poll worker pay increases, remote interpreter services, and expanded curbside voting.

We determined cost estimates for a set of polling place cleaning and health supplies recommended by health professionals, and estimated costs for each state based on their numbers of precincts and poll workers in recent elections.[256] Based on interviews with election officials, information from vendors, and publicly available information, we estimate that personal protective equipment (PPE) and cleaning supplies would cost an additional $170 per precinct, that plexiglass sneeze guards would cost an additional $300 per precinct, and that postelection cleaning services would cost an additional $60 per precinct. The cost of PPE and cleaning supplies is set to the amount that Pennsylvania officials will spend per "kit" that includes various PPE supplies and other cleaning products,[257] and the estimated costs of plexiglass sneeze guards[258] and postelection cleaning services[259] were determined from a sample of prices from vendors of these services and equipment as well as guidance from health experts. We estimate the cost of single-use pens for all voters using hand-marked paper ballots to cast their vote at a rate of $0.50 each.[260] This estimate was also determined based on a sample of prices from election supply vendors. We used the estimated number of voters in jurisdictions that use hand-marked paper ballots as the baseline for single-use pen estimates.[261]

For the cost of PPE and cleaning supplies in Pennsylvania, we use a $1.2 million per election estimate that was provided to us by state officials.[262]

We assumed a $100 pay increase for every poll worker in order to help with recruitment. We relied on 2018 EAVS data to determine the estimated number of poll workers in each state.[263] Election officials we interviewed expressed broad agreement that poll workers are currently underpaid, that pay increases would be helpful for recruitment, and that $100 pay increases would reasonably further these efforts.

We also determined the cost of providing language interpretation services by phone to every precinct covered under section 203 of the Voting Rights Act. We estimated that these services would cost $700 per precinct, based on information from vendors. This estimate was determined by looking at a sample of rates from professional interpreter services. [264]

Finally, we estimated costs associated with expanded curbside voting at an additional $500 per polling location, which would cover two additional poll workers and needed materials.[265] This estimate takes into account best practice, which requires a bipartisan team of two poll workers to meet voters outside of polling locations for

curbside voting. While poll worker pay varies considerably from state to state and sometimes even from county to county, $200 per poll worker represents an approximate nationwide average when taking into account desired pay increases.[266]

Public Education

Costs included: informational mailers to all voters and media outreach.

We estimate the costs of sending every registered voter an informational mailer for each election at a rate of $0.45 per voter,[267] and the costs of general media outreach for the election cycle at a rate of $0.14 per voter. The costs were determined from interviews with election officials, as well as comparable outreach efforts, such as for the 2020 census.[268]

For Pennsylvania, we used total cost estimates for informational mailers and media outreach that were provided to us by state officials.[269]

We recognize that voter education and outreach costs used for the purpose of this analysis are conservative estimates.[270] Election procedures are likely to undergo substantial changes over the year due to the evolving and unprecedented public health crisis. Given the low rates of absentee use in these states, many voters will be voting by mail for the first time. We fully support a robust education campaign to ensure that all voters understand how to safely cast their vote in 2020.

Secure Remote and Offsite Infrastructure

Costs included: computers, endpoint protection, multifactor authentication, VPN, and tech maintenance.

These estimates include the costs of setting up and maintaining a virtual private network (VPN) in each election jurisdiction, as well as the cost of providing secure devices with endpoint protection and multifactor authentication to access state election networks.

We estimate that these purchases and upgrades will cost $4,733 for jurisdictions with fewer than 3,500 voters, $8,870 for jurisdictions with 3,500 to 100,000 voters, and $32,040 for jurisdictions with more than 100,000 voters. Costs were determined based on interviews with state cybersecurity staff and technology vendors.[271]

Endnotes

1 There have been several instances of poll workers testing positive for Covid-19 soon after elections. See e.g., John Keilman, "After Chicago poll worker dies from COVID-19 and others test positive, city warns voters they might have been exposed to virus at polling places," *Chicago Tribute*, Apr. 13, https://www.chicagotribune.com/coronavirus/ct-chicago-poll-worker-dies-covid-cornavirus-20200413-rz-55vqpo6jfbxn7e4i6vkj6n2y-story.html; Gary Fineout, "2 Florida primary poll workers test positive for coronavirus," *Politico*, Mar. 26, 2020, https://www.politico.com/states/florida/story/2020/03/26/2-florida-primary-poll-workers-test-positive-for-coronavirus-1269261.

2 Moreover, some states are concerned that they will not be able to access the federal funds because of constraints put on the money. National Association of Secretaries of State, "NASS President Paul Pate & President-elect Maggie Toulouse Oliver Open Letter to Congress and American Voters on COVID-19 Election Preparations," Mar. 25, 2020, https://www.nass.org/node/1824.

3 Stateline Article, " 'We Have No Money': Coronavirus Slams State Taxes," Pew Charitable Trusts, Apr. 2, 2020, https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2020/04/02/we-have-no-money-coronavirus-slams-state-taxes ("Few state economists and budget analysts have calculated the fiscal impact of the pandemic so far, and it's hard at this early stage to say how big the drop off in tax collections will be, said Brian Sigritz, director of state fiscal studies for the National Association of State Budget Officers, a Washington, D.C.-based membership organization. But the early estimates don't look good, he said. 'It looks like the drop-off that states could be facing this time could be more severe than the Great Recession.'").

4 See, e.g., Keilman, "After Chicago poll worker dies from COVID-19 and others test positive, city warns voters they might have been exposed to virus at polling places"; Fineout, "2 Florida primary poll workers test positive for coronavirus."

5 All totals and subtotals listed in state profiles reflect cost estimates in the state estimate chart. Because of rounding, estimates listed in state profiles may not add up to the subtotals listed in state profiles.

6 Georgia Secretary of State, "Active Voters by Race and Gender as of April 1, 2020 (By County with Statewide Totals)," accessed Apr. 16, 2020, https://sos.ga.gov/index.php/Elections/voter_registration_statistics.

7 U.S. Election Assistance Commission, "2020 Cares Act Grants," accessed Apr. 16, 2020, https://www.eac.gov/payments-and-grants/2020-cares-act-grants.

8 Georgia Secretary of State, "Raffensperger Announces Postponement of Primary Election Until June 9," Apr. 9, 2020, https://sos.ga.gov/index.php/elections/raffensperger_announces_postponement_of_primary_election_until_june_9.

9 U.S. Election Assistance Commission, *Election Administration And Voting Survey 2018 Comprehensive Report: A Report to the 116th Congress*, June 2019, 29 and 55, https://www.eac.gov/sites/default/files/eac_assets/1/6/2018_EAVS_Report.pdf; see also Mark Niesse, "Voters mailed absentee ballot request forms for May 19 Georgia primary," *Atlanta Journal Constitution*, Apr. 10, 2020, https://www.ajc.com/news/state--regional-govt--politics/voters-mailed-absentee-ballot-request-forms-for-may-georgia-primary/hc0FkOo85uVCALbWvQUo9L.

10 Georgia Secretary of State, "Raffensperger Takes Unprecedented Steps to Protect Safety and Voter Integrity in Georgia," Mar. 24, 2020, https://sos.ga.gov/index.php/elections/raffensperger_takes_unprecedented_steps_to_protect_safety_and_voter_integrity_in_georgia.

11 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

12 Georgia Secretary of State, "Raffensperger Takes Unprecedented Steps to Protect Safety and Voter Integrity in Georgia"; Niesse, "Voters mailed absentee ballot request forms for May 19 Georgia primary."

13 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

14 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

15 Mark Niesse, "Elections employee dies of COVID-19 ahead of Georgia primary," *Atlanta Journal-Constitution*, Apr. 23, 2020, https://www.ajc.com/news/state--regional-govt--politics/elections-employee-dies-covid-ahead-georgia-primary/tCXDJ2abT6QTqu6r1qEv8L.

16 Camden County, Georgia, Alert Center, "County Office Buildings Temporarily Closed," Mar. 20, 2020, https://www.co.camden.ga.us/AlertCenter.aspx?AID=County-Office-Buildings-Temporarily-Clos-101.

17 Georgia Secretary of State, "2020 State Elections and Voter Registration Calendar," accessed Apr. 13, 2020, https://sos.ga.gov/admin/uploads/2020_Short_Calendar.pdf; Isaac Sabatei, "Election 2020: Inside Georgia's Senate Races," *Atlanta Journal Constitution*, Apr. 9, 2020, https://www.ajc.com/news/state--regional-govt--politics/election-2020-inside-georgia-senate-races/OO1k28vHPPHaNJgIEAznDL (noting "7 Democrats qualified to run" in the Democratic primary for U.S. Senate); Jessica Taylor, "Georgia Senate Special Election Moves From Likely to Lean Republican," *Cook Political Report*, Jan. 31, 2020, https://cookpolitical.com/analysis/senate/georgia-senate/georgia-senate-special-election-moves-likely-lean-republican ("If no candidate receives a majority (which seems all but certain), the top two finishers will advance to a runoff on January 5, 2021.").

18 Georgia election officials have signed a letter in support of additional federal elections funding: Deidre B. Holden (Supervisor of Elections and Registration, Paulding County), Joseph Kirk (Director of Elections, Bartow County). See Brennan Center for Justice, "Election Officials Call for More Election Funding in Next Stimulus Bill," last updated Apr. 16, 2020, https://www.brennancenter.org/our-work/research-reports/election-officials-call-more-election-funding-next-stimulus-bill.

19 Niesse, "Voters mailed absentee ballot request forms for May 19 Georgia primary."

20 Niesse, "Voters mailed absentee ballot request forms for May 19 Georgia primary"; Kevin Rayburn (Deputy Elections Director and Deputy General Counsel, Georgia Secretary of State), Gabriel Sterling (Voting System Implementation Manager, Georgia Secretary of State), Chris Harvey (Elections Director, Georgia Secretary of State), interview with Brennan Center for Justice, Apr. 17, 2020.

21 See attached state estimate chart and methodology section for detailed calculations.

22 Kevin Rayburn (Deputy Elections Director and Deputy General Counsel, Georgia Secretary of State), Gabriel Sterling (Voting System Implementation Manager, Georgia Secretary of State), Chris Harvey (Elections Director, Georgia Secretary of State), interview with Brennan Center for Justice, Apr. 17, 2020.

23 Kevin Rayburn (Deputy Elections Director and Deputy General Counsel, Georgia Secretary of State), Gabriel Sterling (Voting System Implementation Manager, Georgia Secretary of State), Chris Harvey (Elections Director, Georgia Secretary of State), interview with Brennan Center for Justice, Apr. 17, 2020.

24 Kevin Rayburn (Deputy Elections Director and Deputy General Counsel, Georgia Secretary of State), Gabriel Sterling (Voting System Implementation Manager, Georgia Secretary of State), Chris Harvey (Elections Director, Georgia Secretary of State), interview with Brennan Center for Justice, Apr. 17, 2020.

25 See attached state estimate chart and methodology section for detailed calculations.

26 Brad Raffensperger (Georgia Secretary of State), Jordan Fuchs (Deputy Secretary of State, Georgia Secretary of State), Ryan Germany (General Counsel, Georgia Secretary of State), Kevin Hamilton (Deputy Elections Director, Georgia Secretary of State), Kelvin Williams (Elections Coordinator, Gwinnett County), Joseph Kirk (Elections Supervisor, Bartow County), Deb Cox (Supervisor of Elections, Lowndes County), Georgia Election Cybersecurity Roundtable, Georgia Secretary of State, Feb. 19, 2020.

27 2005 Georgia Laws Act 53 (H.B. 244).

28 See U.S. Election Assistance Commission, "2016 EAVS Data Brief: Georgia," accessed Apr. 13, 2020, https://www.eac.gov/sites/default/files/eac_assets/1/6/Georgia_-_EAVS_2016_Data_Brief_-_508.pdf; U.S. Election Assistance Commission, "2018 EAVS Data Brief: Georgia," accessed Apr. 13, 2020, https://www.eac.gov/sites/default/files/eac_assets/1/6/EAVS_2018_Data_Brief_GA.pdf.

29 Mark Niesse, "Georgia elections chief launches effort against mail-in voting fraud," *Atlanta Journal Constitution*, Apr. 6, 2020, https://www.ajc.com/news/state--regional-govt--politics/georgia-elections-chief-launches-effort-against-mail-voting-fraud/uKcFoPbbLnFC0A4nXihaLI.

30 Kevin Rayburn (Deputy Elections Director and Deputy General Counsel, Georgia Secretary of State), Gabriel Sterling (Voting System Implementation Manager, Georgia Secretary of State), Chris Harvey (Elections Director, Georgia Secretary of State), interview with Brennan Center for Justice, Apr. 17, 2020.

31 Kevin Rayburn (Deputy Elections Director and Deputy General Counsel, Georgia Secretary of State), Gabriel Sterling (Voting System Implementation Manager, Georgia Secretary of State), Chris Harvey (Elections Director, Georgia Secretary of State), interview with Brennan Center for Justice, Apr. 17, 2020.

32 See attached state estimate chart and methodology section for detailed calculations.

33 See attached state estimate chart and methodology section for detailed calculations.

34 Around 95 percent of overall turnout was in person. See "2016 EAVS Data Brief: Georgia"; "2018 EAVS Data Brief: Georgia".

35 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

36 Paul Pate (Iowa Secretary of State), "Paul Pate on States Considering Voting Changes Amid Coronavirus Pandemic," interview by Steve Scully, *Washington Journal*, C-SPAN, Apr. 5, 2020, https://www.c-span.org/video/?470912-3/washington-journal-paul-pate-discusses-potential-voting-amid-coronavirus-pandemic.

37 See attached state estimate chart and methodology section for detailed calculations.

38 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

39 Although USPS has agreed to deliver voted absentee ballots to election officials if the voter failed to provide sufficient postage, "the Postal Service didn't answer questions about whether it would deliver absentee request forms without postage." See Mark Niesse, "Mailed ballots in Georgia will be counted, even without a stamp," *Atlanta Journal-Constitution*, Apr. 14, 2020, https://www.ajc.com/news/state--regional-govt--politics/mailed-ballots-georgia-will-counted-even-without-stamp/4P04UcxpZuJ1jZVXgDbixO.

40 Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

41 Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

42 Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020.

43 Mark Niesse, "Georgia absentee ballots changed to remove inner envelope," *Atlanta Journal-Constitution*, Apr. 27, 2020, https://www.ajc.com/news/state--regional-govt--politics/georgia-absentee-ballots-changed-remove-inner-envelope/5VCLguuvNOR2qb4zTctOLK/.

44 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

45 Although voters are asked to pay postage to return their absentee ballot, USPS "mail carriers are told to deliver ballot envelopes labeled as 'official election mail'" even if they don't have sufficient postage. USPS will subsequently bill county officials for the postage costs. See Niesse, "Mailed ballots in Georgia will be counted, even without a stamp."

46 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

47 Niesse, "Mailed ballots in Georgia will be counted, even without a stamp."

48 See attached state estimate chart and methodology section for detailed calculations.

49 Ten states provide ballot drop boxes in some or all counties: Arizona, California, Colorado, Kansas, Montana, Nebraska, New Mexico, Oregon, Utah, and Washington. See National Conference of State Legislatures, "Voting Outside the Polling Place: Absentee, All-Mail and other Voting at Home Options," last updated Apr. 14, 2020, https://www.ncsl.org/research/elections-and-campaigns/absentee-and-early-voting.aspx#provide.

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51 Judd Choate (Director of Elections, Colorado Department of State), interview by Brennan Center for Justice, Mar. 31, 2020; see also Charles Stewart III, *2016 Survey of the Performance of American Elections: Final Report*, Massachusetts Institute of Technology, 2016,

https://dataverse.harvard.edu/file.xhtml?persistentId=doi:10.7910/DVN/Y38VIQ/2NJDL9&version=1.0 (according to 2016 survey data, 73 percent of Colorado voters returned their ballots to some physical location, such as a drop box or local election office; moreover, according to Choate, Colorado has over 400 drop boxes statewide and has dedicated another $125,000 in 2018 Help America Vote Act funds to more boxes).

52 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

53 See attached state estimate chart and methodology section for detailed calculations.

54 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

55 See attached state estimate chart and methodology section for detailed calculations.

56 Cybersecurity and Infrastructure Security Agency, "UK and US Security Agencies Issue Covid-19 Cyber Threat Update," Apr. 8, 2020, https://www.cisa.gov/news/2020/04/08/uk-and-us-security-agencies-issue-covid-19-cyber-threat-update.

57 See attached state estimate chart and methodology section for detailed calculations.

58 See, e.g., Georgia Secretary of State, "Raffensperger Takes Unprecedented Steps to Protect Safety and Voter Integrity in Georgia."

59 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

60 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

61 Alabama Secretary of State, "Congress Appropriates $400 Million to Prepare States for Election Day amid Coronavirus Concerns," Mar. 30, 2020, https://www.sos.alabama.gov/newsroom/congress-appropriates-400-million-prepare-states-election-day-amid-coronavirus-concerns; City of Madison Clerk's Office, "Twelve Things for Voters to Know on Election Day," Apr. 5, 2020, https://www.cityofmadison.com/news/twelve-things-for-voters-to-know-on-election-day.

62 See attached state estimate chart and methodology section for detailed calculations.

63 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

64 See attached state estimate chart and methodology section for detailed calculations.

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Department of State, accessed Apr. 13, 2020, https://mvic.sos.state.mi.us/VoterCount.

66 U.S. Election Assistance Commission, "2020 Cares Act Grants," https://www.eac.gov/payments-and-grants/2020-cares-act-grants.

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68 "Gov. Whitmer extends Michigan's stay-at-home order until May 1," WXYZ, Apr. 13, 2020, https://www.wxyz.com/news/coronavirus/gov-whitmer-extends-stay-at-home-order-until-may-1.

69 Office of Secretary of State Jocelyn Benson, "Secretary of State to mail absent voter ballot applications to all May 5 voters," Mar. 23, 2020, https://www.michigan.gov/sos/0,4670,7-127-93094-522761--,00.html.

70 Gus Burns, "Michigan sending absentee ballot applications to all May 5 election voters because of coronavirus outbreak," *MLive*, Mar. 23, 2020, https://www.mlive.com/public-interest/2020/03/michigan-sending-absentee-ballots-to-all-voters-for-may-5-election-because-of-coronavirus-outbreak.html.

71 Office of Secretary of State Jocelyn Benson, "Secretary of State to mail absent voter ballot applications to all May 5 voters"; see also Gus Burns, "Michigan sending absentee ballot applications to all May 5 election voters because of coronavirus outbreak," *MLive*, Mar. 23, 2020, https://www.mlive.com/public-interest/2020/03/michigan-sending-absentee-ballots-to-all-voters-for-may-5-election-because-of-coronavirus-outbreak.html ("Voting by mail protects public health, is highly accessible, and was clearly mandated by Michiganders when they overwhelmingly voted in 2018 to amend our state constitution and afford everyone this right.").

72 See, e.g., Katie Galioto, "1.1 million Illinois voters have cast ballots so far, surpassing 2014 early vote counts," *Chicago Tribune*, Nov. 5, 2018, https://www.chicagotribune.com/politics/elections/ct-met-illinois-early-voting-20181018-story.html ("There was a slight increase in the rate of people voting early in 2014 compared with 2010. This could be a product of the state's efforts to make voting more convenient. . . . The state also introduced 'no-excuse' mail voting in 2010 to give residents the chance to vote from the comfort of their own home without specifying a reason for being absent from the polls.").

73 14 percent of registered voters in Michigan voted by mail in 2018. See U.S. Election Assistance Commission, *Election Administration And Voting Survey 2018 Comprehensive Report: A Report to the 116th Congress*, June 2019, 29 and 55, https://www.eac.gov/sites/default/files/eac_assets/1/6/2018_EAVS_Report.pdf.

74 Ronald Brownstein, "The Most Important 2020 States Already Have Vote by Mail," *Atlantic*, Apr. 11, 2020, https://www.theatlantic.com/politics/archive/2020/04/voting-mail-2020-race-between-biden-and-trump/609799 ("Jocelyn Benson, Michigan's secretary of state and a Democrat, expressed a broad consensus among local officials when she told me, 'We will certainly see people voting by mail more than ever before in our state.'").

75 Tina Barton, (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020; Chris Swope (City Clerk, Lansing, Michigan), interview by Brennan Center for Justice, Apr. 13, 2020.

76 Many Michigan election officials have signed a letter in support of additional federal elections funding, including Michelle L. Anzaldi (Clerk, Pittsfield Charter Township), Erica Armstrong (City Clerk, City of Midland), Tina Barton (City Clerk, Rochester Hills), Judy A. Bigney (Clerk, Algoma Township), Lisa Borgacz (City Clerk, City of Mount Clemens), Cynthia A. Bower (City Clerk, Taylor), Louise D. Burke (Deputy Clerk, Charter Township of York Washtenaw County), Sarah J Bydalek (City Clerk, City of Walker), Jill A. Domingo (City Clerk, City of Albion), Kathy Funk (Clerk, Charter Township of Flint), Mary Gillis (Deputy Clerk, Scio Township), Lisa Kay Hathaway (City Clerk, City of Grosse Pointe Woods), Evan Hope (Clerk, Delhi Township), Cathy Lane (Township Clerk, Charter Township of Grand Blanc), Lisa Lawitzke (Deputy Clerk, Bellevue Township), Richard LeBlanc (City

Clerk, City of Westland), Janice Pockrandt (Deputy City Clerk, Center Line), Sheila Reitz (Clerk, Township of Buchanan, Berrien County), Melanie D. Ryska (City Clerk, Sterling Heights), Lawrence S. Stec (City Clerk, City of Wyandotte), Julia K. Stonestreet (Clerk, Spring Arbor Township), Chris Swope (Clerk, Lansing), Elizabeth Whitt (Township Clerk, Conway Township), Sandy Winans (Clerk, Woodhull Township). See Brennan Center for Justice, "Election Officials Call for More Election Funding in Next Stimulus Bill," last updated Apr. 16, 2020, https://www.brennancenter.org/our-work/research-reports/election-officials-call-more-election-funding-next-stimulus-bill.

77 Office of Secretary of State Jocelyn Benson, "Secretary of State to mail absent voter ballot applications to all May 5 voters."

78 Office of Secretary of State Jocelyn Benson, "Secretary of State to mail absent voter ballot applications to all May 5 voters."

79 Office of Secretary of State Jocelyn Benson, "Secretary of State to mail absent voter ballot applications to all May 5 voters."

80 Jonathan Brater (Director of Elections, Michigan Secretary of State), interview by Brennan Center for Justice, Apr. 17, 2020.

81 See attached state estimate chart and methodology section for detailed calculations.

82 See attached state estimate chart and methodology section for detailed calculations.

83 Chris Swope (City Clerk, Lansing, Michigan), interview by Brennan Center for Justice, Apr. 13, 2020.

84 Tina Barton, (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020; Chris Swope (City Clerk, Lansing, Michigan), interview by Brennan Center for Justice, Apr. 13, 2020.

85 See attached state estimate chart and methodology section for detailed calculations.

86 Chris Swope (City Clerk, Lansing, Michigan), interview by Brennan Center for Justice, Apr. 13, 2020; Tina Barton, (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020.

87 Tina Barton, (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020.

88 Tina Barton, (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020.

89 Tina Barton (City Clerk, Rochester Hills, Michigan), "Interview 5: Handling Absentee Ballot Requests for Increased Voting by Mail," interview by Ben Hovland (Commissioner, U.S. Election Assistance Commission), Apr. 15, 2020, https://www.youtube.com/watch?v=CvbP7K4-VoE&feature=youtu.be ("My current staff isn't going to be able to handle 30,000 absentee ballot applications all coming back at the same time. We're also issuing death certificates, (currently at a higher than usual rate), providing administrative support for city council and boards and commissions, overseeing and managing all city FOIAs (Freedom of Information Act), issuing liquor licenses after reviewing applications, managing local cemeteries, issuing passports, and this year, I'm in charge of the census. . . . [And] in some smaller communities, the local clerks also have municipal or township accounting responsibilities.").

90 See attached state estimate chart and methodology section for detailed calculations.

91 Tina Barton, (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020; Chris Swope (City Clerk, Lansing, Michigan), interview by Brennan Center for Justice, Apr. 13, 2020.

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93 Tina Barton, (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020.

94 Tina Barton, (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020.

95 See attached state estimate chart and methodology section for detailed calculations.

96 Cybersecurity and Infrastructure Security Agency, "UK and US Security Agencies Issue Covid-19 Cyber Threat Update," Apr. 8, 2020, https://www.cisa.gov/news/2020/04/08/uk-and-us-security-agencies-issue-covid-19-cyber-threat-update.

97 See attached state estimate chart and methodology section for detailed calculations.

98 See Brennan Center for Justice, "Election Officials Call for More Election Funding in Next Stimulus Bill," last updated Apr. 16, 2020, https://www.brennancenter.org/our-work/research-reports/election-officials-call-more-election-funding-next-stimulus-bill.

99 Tina Barton, (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020; Chris Swope (City Clerk, Lansing, Michigan), interview by Brennan Center for Justice, Apr. 13, 2020.

100 Tina Barton, (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020; Chris Swope (City Clerk, Lansing, Michigan), interview by Brennan Center for Justice, Apr. 13, 2020.

101 Alabama Secretary of State, "Congress Appropriates $400 Million to Prepare States for Election Day amid Coronavirus Concerns"; City of Madison Clerk's Office, "Twelve Things for Voters to Know on Election Day."

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104 U.S. Election Assistance Commission, "2020 Cares Act Grants," https://www.eac.gov/payments-and-grants/2020-cares-act-grants.

105 Missouri Governor, "Governor Parson Announces April 7 Municipal Elections Postponed Until June 2 in Response to Covid-19," Mar. 18, 2020, https://governor.mo.gov/press-releases/archive/governor-parson-announces-april-7-municipal-elections-postponed-until-june-2.

106 Secretary of State Jay Ashcroft, "This Week in Missouri Politics Coronavirus Update with Secretary of State Jay Ashcroft," interview by Scott Faughn, *Missouri Times*, Mar. 31, 2020, https://www.facebook.com/themissouritimes/videos/290768858576590.

107 Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Brianna Lennon (County Clerk, Boone County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020. Shane Schoeller (County Clerk, Greene County, Missouri), Madison McFarland (Elections Coordinator, Greene County, Missouri), interview by Brennan Center for Justice, Mar. 30, 2020.

108 See, e.g., Jason Hancock, "Will coronavirus outbreak mean more Missourians can cast absentee ballots?," *Kansas City Star*, Mar. 17, 2020, https://www.kansascity.com/news/politics-government/article241275436.html; Missouri State Conference of the National Association for the Advancement of Colored People et al. v. State of Missouri et al., https://www.aclu.org/legal-document/missouri-naacp-v-missouri-complaint-0; see also Mo. Code § 115.294 ("Other provisions of law to the contrary notwithstanding, no absentee ballot shall be rejected for failure of the voter to state on the ballot envelope his reason for voting an absentee ballot.").

109 See, e.g., Kevin Jenkins, "County clerk says 'vote absentee,'" *Daily Journal Online*, Mar. 30, 2020, https://dailyjournalonline.com/news/local/county-clerk-says-vote-absentee/article_7e3b74e2-fbdc-52bc-b610-9e8c2219fb7e.html (St. Francois County); Rudi Keller, "Missouri municipal elections delayed to June 2," *Examiner*, Mar. 18, 2020, https://www.examiner.net/news/20200318/missouri-municipal-elections-delayed-to-june-2 (Boone County).

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And Voting Survey 2018 Comprehensive Report: A Report to the 116th Congress, June 2019, 29 and 55, https://www.eac.gov/sites/default/files/eac_assets/1/6/2018_EAVS_Report.pdf.

111 Many Missouri election officials have signed a letter in support of additional federal elections funding, including Kay Brown (Clerk/Election Authority, Christian County), Christina Buie (Clerk, Monroe County), Batina Dodge (Clerk, Scotland County), Lauri Ealom (Director, Kansas City Board of Elections), Eric Fey (Director of Elections, St. Louis County), Jared W. Kutz (Clerk/Election Authority, Perry County), Stephanie Lebron (Clerk, Iron County), Brianna Lennon (Clerk, Boone County), Jackie Morris (Clerk, Sullivan County), Shane Schoeller (Clerk, Greene County), Susette M. Taylor (Clerk, Atchison County; President-Elect, Missouri Association of Counties), and Diane Thompson (Clerk and Election Authority, Johnson County). See Brennan Center for Justice, "Election Officials Call for More Election Funding in Next Stimulus Bill," Mar. 31, 2020, https://www.brennancenter.org/our-work/research-reports/election-officials-call-more-election-funding-next-stimulus-bill.

112 Ashcroft, "This Week in Missouri Politics," interview by Faughn.

113 At least one Missouri county has already developed an online absentee ballot application that enables voters to securely apply for an absentee ballot paperlessly. Brianna Lennon (Clerk, Boone County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020.

114 See attached state estimate chart and methodology section for detailed calculations.

115 Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Brianna Lennon (County Clerk, Boone County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Shane Schoeller (County Clerk, Greene County, Missouri), Madison McFarland (Elections Coordinator, Greene County, Missouri), interview by Brennan Center for Justice, Mar. 30, 2020. The potential impact in Missouri could be greater than in other states because the deadline to request an absentee ballot is two weeks prior to the election (compared to one week in many other states). Voters are now aware of how fast the health environment can change and may opt to request an absentee ballot in higher percentages in Missouri because of the longer period during which circumstances could change drastically.

116 Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 18, 2020.

117 See attached state estimate chart and methodology section for detailed calculations.

118 Ashcroft, "This Week in Missouri Politics," interview by Faughn.

119 Although some counties currently provide voters with postage-prepaid envelopes to return their absentee ballot applications, county budget-makers did not assume that there would be a significant spike in absentee voting, as is expected due to the coronavirus. Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020.

120 See attached state estimate chart and methodology section for detailed calculations.

121 Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Brianna Lennon (County Clerk, Boone County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Shane Schoeller (County Clerk, Greene County, Missouri), Madison McFarland (Elections Coordinator, Greene County, Missouri), interview by Brennan Center for Justice, Mar. 30, 2020; Cameron Gerber, "Missouri elections during the coronavirus pandemic: Q&A with a county clerk," *Missouri Times*, Apr. 9, 2020, https://themissouritimes.com/missouri-elections-during-the-coronavirus-pandemic-qa-with-a-county-clerk.

122 Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Brianna Lennon (County Clerk, Boone County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020. Shane Schoeller (County Clerk, Greene County, Missouri), Madison McFarland (Elections Coordinator, Greene County, Missouri), interview by Brennan Center for Justice, Mar. 30, 2020.

123 Although state law requires local officials to provide return postage for absentee ballots (Mo. Stat. § 115.285), local appropriators did not plan for a significant spike in absentee voting and associated local costs due to the coronavirus. Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Brianna Lennon (County Clerk, Boone County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020. Shane Schoeller (County Clerk, Greene County, Missouri), Madison McFarland (Elections Coordinator, Greene County, Missouri), interview by Brennan Center for Justice, Mar. 30, 2020. As Missouri's absentee turnout is traditionally low, our estimates include the total expected costs and do not subtract what we expect will be the small amount local officials have allocated for return postage. See attached state estimate chart and methodology section for detailed information.

124 Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Brianna Lennon (County Clerk, Boone County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020. Shane Schoeller (County Clerk, Greene County, Missouri), Madison McFarland (Elections Coordinator, Greene County, Missouri), interview by Brennan Center for Justice, Mar. 30, 2020.

125 See attached state estimate chart and methodology section for detailed calculations.

126 Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Brianna Lennon (County Clerk, Boone County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020. Shane Schoeller (County Clerk, Greene County, Missouri), Madison McFarland (Elections Coordinator, Greene County, Missouri), interview by Brennan Center for Justice, Mar. 30, 2020.

127 See attached state estimate chart and methodology section for detailed calculations.

128 Cybersecurity and Infrastructure Security Agency, "UK and US Security Agencies Issue Covid-19 Cyber Threat Update," Apr. 8, 2020, https://www.cisa.gov/news/2020/04/08/uk-and-us-security-agencies-issue-covid-19-cyber-threat-update.

129 See attached state estimate chart and methodology section for detailed calculations.

130 Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Brianna Lennon (County Clerk, Boone County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Shane Schoeller (County Clerk, Greene County, Missouri), Madison McFarland (Elections Coordinator, Greene County, Missouri), interview by Brennan Center for Justice, Mar. 30, 2020.

131 Many Missouri election officials have signed a letter in support of additional federal elections funding, including Kay Brown (Clerk/Election Authority, Christian County), Christina Buie (Clerk, Monroe County), Batina Dodge (Clerk, Scotland County), Lauri Ealom (Director, Kansas City Board of Elections), Eric Fey (Director of Elections, St Louis County), Jared W. Kutz (Clerk/Election Authority, Perry County), Stephanie Lebron (Clerk, Iron County), Brianna Lennon (Clerk, Boone County), Jackie Morris (Clerk, Sullivan County), Shane Schoeller (Clerk, Greene County), Susette M. Taylor (Clerk, Atchison County; President-Elect, Missouri Association of Counties), Diane Thompson (Clerk and Election Authority, Johnson County). See Brennan Center for Justice, "Election Officials Call for More Election Funding in Next Stimulus Bill," Mar. 31, 2020, https://www.brennancenter.org/our-work/research-reports/election-officials-call-more-election-funding-next-stimulus-bill.

132 Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020;

Brianna Lennon (County Clerk, Boone County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Shane Schoeller (County Clerk, Greene County, Missouri), Madison McFarland (Elections Coordinator, Greene County, Missouri), interview by Brennan Center for Justice, Mar. 30, 2020.

133 See attached state estimate chart and methodology section for detailed calculations.

134 Ohio Secretary of State, "Larose Announces Latest Early Voting Numbers of the 2020 Primary," Mar. 3, 2020, https://www.ohiosos.gov/media-center/press-releases/2020/2020-03-03.

135 Zach Montallero, "Ohio to run all-mail primary through April 28," *Politico*, Mar. 25, 2020, https://www.politico.com/news/2020/03/25/ohio-vote-by-mail-primary-election-149012 (Ohio lawmakers "have extended mail voting in the state's primaries until April 28").

136 U.S. Election Assistance Commission, "2020 Cares Act Grants," https://www.eac.gov/payments-and-grants/2020-cares-act-grants.

137 Dan Merica, "Ohio governor announces polls will be closed Tuesday over coronavirus," CNN, Mar. 17, 2020, https://www.cnn.com/2020/03/16/politics/ohio-primary/index.html.

138 Veronica Stracqualursi, "Ohio secretary of state: 'It was simply untenable' to tell Ohioans go to the polls amid coronavirus," CNN, Mar. 17, 2020, https://www.cnn.com/2020/03/17/politics/ohio-secretary-of-state-primary-polls-close-cnntv/index.html.

139 Montallero, "Ohio to run all-mail primary through April 28" (Ohio lawmakers "have extended mail voting in the state's primaries until April 28").

140 See 2020 Ohio Laws File 30 (Am. Sub. H.B. 197); see also Gannett Ohio, "Action required: Ohio voters must take the first step to obtain mail-in ballot for primary," *Daily Record*, Apr. 4, 2020, https://www.the-daily-record.com/news/20200404/action-required-ohio-voters-must-take-first-step-to-obtain-mail-in-ballot-for-primary.

141 See, e.g., Ohio Secretary of State, "Larose Announces Latest Early Voting Numbers of the 2020 Primary,"

(LaRose promotes providing voters with postage pre-paid envelopes to return their absentee ballot applications).

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143 Frank LaRose (@FrankLaRose), "Throughout this crisis, Ohio has once again cemented its place as a national leader. We're at our best when we work together, and these organizations have stepped up to make sure Ohioans will have their voice heard," Twitter, Apr. 9, 2020, 5:11 p.m., https://twitter.com/FrankLaRose/status/1248357961682092037?s=20.

144 Megan Alley, "Ohio's primary election moves to April 28 all-mail vote amid COVID-19 pandemic," *Clermont Sun*, Apr. 4, 2020, https://www.clermontsun.com/2020/04/04/ohios-primary-election-moves-to-april-28-all-mail-vote-amid-covid-19-pandemic.

145 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020; Amber Lopez (Deputy Director, Clark County, Ohio), interview by Brennan Center for Justice, Apr. 14, 2020.

146 Bonnie Meibers, "Is your vote safe? Secretary of State says Ohio is 'best prepared' state in nation," *Dayton Daily News*, Jan. 14, 2020, https://www.daytondailynews.com/news/local-govt--politics/your-vote-safe-secretary-state-says-ohio-best-prepared-state-nation/84XTxXZxEd1L5zxcNsIhYI.

147 See 2020 Ohio Laws File 30 (Am. Sub. H.B. 197).

148 Many Ohio election officials have signed a letter in support of additional federal elections funding, including Jason Baker (Director, Clark County Board of Elections), Sally Krisel (Deputy Director, Hamilton County Board of Elections), Amber Lopez (Deputy Director, Clark County Board of Elections), Sherry Poland (Director, Hamilton County Board of Elections), Kimberly Smith (Deputy Elections Director, Defiance County), Tonya Wichman (Elections Director, Defiance County), Michelle L. Wilcox (President, Ohio Association of Election Officials; Director, County Board of Elections, Auglaize County). See Brennan Center for Justice, "Election Officials Call for More Election Funding in Next Stimulus Bill," Mar. 31, 2020, https://www.brennancenter.org/our-work/research-reports/election-officials-call-more-election-funding-next-stimulus-bill.

149 See S.B. 318, 133rd Gen. Assemb., Reg. Sess. (Ohio 2018).

150 See attached state estimate chart and methodology section for detailed calculations.

151 See, e.g., Ohio Secretary of State, "Larose Announces Latest Early Voting Numbers of the 2020 Primary."

152 See attached state estimate chart and methodology section for detailed calculations.

153 In Ohio, 11 percent of registered voters voted by mail in 2018. See U.S. Election Assistance Commission, *Election Administration And Voting Survey 2018 Comprehensive Report: A Report to the 116th Congress*, June 2019, 29 and 55, https://www.eac.gov/sites/default/files/eac_assets/1/6/2018_EAVS_Report.pdf.

154 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020; Amber Lopez (Deputy Director, Clark County, Ohio), interview by Brennan Center for Justice, Apr.14, 2020.

155 See attached state estimate chart and methodology section for detailed calculations.

156 Ohio, "Action required: Ohio voters must take the first step to obtain mail-in ballot for primary".

157 Ohio Rev. Code Ann. § 3501.05 (Westlaw through File 30 of the 133rd General Assembly 2019-2020) ("The secretary of state may mail unsolicited applications for absent voter's ballots to individuals only for a general election and only if the general assembly has made an appropriation for that particular mailing. Under no other circumstance shall a public office, or a public official or employee who is acting in an official capacity, mail unsolicited applications for absent voter's ballots to any individuals.").

158 See attached state estimate chart and methodology section for detailed calculations.

159 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020; Amber Lopez (Deputy Director, Clark County, Ohio), interview by Brennan Center for Justice, Apr. 14, 2020.

160 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020; Amber Lopez (Deputy Director, Clark County, Ohio), interview by Brennan Center for Justice, Apr. 14, 2020.

161 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020; Amber Lopez (Deputy Director, Clark County, Ohio), interview by Brennan Center for Justice, Apr. 14, 2020.

162 See attached state estimate chart and methodology section for detailed calculations.

163 Ohio Rev. Code Ann. § 3509.03 (Westlaw through File 30 of the 133rd General Assembly 2019-2020); Ohio Rev. Code Ann. § 3511.02 (Westlaw through File 30 of the 133rd General Assembly 2019-2020); Ohio Secretary of State, Election Official Manual, 2019, 194, https://www.ohiosos.gov/globalassets/elections/directives/2019/dir2019-11_eom.pdf ("No board is permitted to pre-pay return postage for any type of absentee ballot application.").

164 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020; Amber Lopez (Deputy Director, Clark County, Ohio), interview by Brennan Center for Justice, Apr. 14, 2020.

165 See attached state estimate chart and methodology section

for detailed calculations.

166 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020; Amber Lopez (Deputy Director, Clark County, Ohio), interview by Brennan Center for Justice, Apr. 14, 2020.

167 See attached state estimate chart and methodology section for detailed calculations.

168 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020; Amber Lopez (Deputy Director, Clark County, Ohio), interview by Brennan Center for Justice, Apr. 14, 2020.

169 See attached state estimate chart and methodology section for detailed calculations.

170 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020; Amber Lopez (Deputy Director, Clark County, Ohio), interview by Brennan Center for Justice, Apr. 14, 2020.

171 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), email message to Derek Tisler, Apr. 2, 2020.

172 Many Ohio election officials have signed a letter in support of additional federal elections funding, including Jason Baker (Director, Clark County Board of Elections), Sally Krisel (Deputy Director, Hamilton County Board of Elections), Amber Lopez (Deputy Director, Clark County Board of Elections), Sherry Poland (Director, Hamilton County Board of Elections), Kim Smith (Deputy Elections Director, Defiance County), Lisa Welch (Director, Holmes County Board of Elections), Tonya Wichman (Elections Director, Defiance County), Michelle L. Wilcox (President, Ohio Association of Election Officials; Director, County Board of Elections, Auglaize County). See Brennan Center for Justice, "Election Officials Call for More Election Funding in Next Stimulus Bill," last updated Apr. 21, 2020, https://www.brennancenter.org/our-work/research-reports/election-officials-call-more-election-funding-next-stimulus-bill.

173 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020; Amber Lopez (Deputy Director, Clark County, Ohio), interview by Brennan Center for Justice, Apr. 14, 2020.

174 Tonya Wichman (Director, Defiance County Board of Elections, Ohio), letter emailed to Dr. Amy Acton (Director of Health, Ohio Department of Health), Mar. 27, 2020 (forwarded to Liz Howard on Mar. 17, 2020), (noting Defiance County poll workers include "my father with a heart condition, my mother with respiratory issues, my aunt/godmother with health issues, my boss from my part time job I work on the side with heart issues, my son who [has to take] a vacation day from his job to help me before he [goes] home to his wife and one year old son, our choir accompanist from my church, three of my former teachers from school, a high school student I work with at the local dairy bar, two former teammates of my college daughter, friends from outside of work and an entire group of people that I truly consider to be friends not just people who work at the polls. These people make my job possible, they make democracy possible and work from 5:30 am in the morning until at least 8:00 at night for not what they deserve but what we can offer them as a paycheck.").

175 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020; Amber Lopez (Deputy Director, Clark County, Ohio), interview by Brennan Center for Justice, Apr. 14, 2020.

176 See attached state estimate chart and methodology section for detailed calculations.

177 Pennsylvania Department of State, "Voter registration statistics by county," last updated on Mar. 14, 2020, https://www.dos.pa.gov/VotingElections/OtherServicesEvents/VotingElectionStatistics/Pages/VotingElectionStatistics.aspx.

178 U.S. Election Assistance Commission, "2020 Cares Act Grants," https://www.eac.gov/payments-and-grants/2020-cares-act-grants.

179 Jonathan Lai, "Pennsylvania elections officials are pleading with the state to move the primary: 'We're pulling fire alarms all over the place,'" Philadelphia Inquirer, Mar. 17, 2020, https://www.inquirer.com/health/coronavirus/postpone-pa-primary-election-coronavirus-20200317.html.

180 2020 Pa. Legis. Serv. Act 2020-12 (S.B. 422).

181 Pennsylvania Governor Tom Wolf, "Order for Individuals of the Commonwealth to Stay at Home," Apr. 1, 2020, https://www.governor.pa.gov/wp-content/uploads/2020/04/20200401-GOV-Statewide-Stay-at-Home-Order.pdf; see also Office of Governor Tom Wolf, "Gov. Wolf, Sec. of Health: Pennsylvania on Statewide Stay-at-Home Order Beginning at 8 PM Tonight," Apr. 1, 2020, https://www.governor.pa.gov/newsroom/gov-wolf-sec-of-health-pennsylvania-on-statewide-stay-at-home-order-beginning-at-8-pm-tonight-most-prudent-option-to-stop-the-spread.

182 Ron Southwick, "Gov. Tom Wolf extends Pa. stay-at-home order to May 8 but plans to ease some restrictions," *Penn Live*, Apr. 20, 2020, https://www.pennlive.com/coronavirus/2020/04/update-on-coronavirus-in-pa-watch-gov-tom-wolf-and-secretary-of-health-live.html.

183 Pennsylvania uses two distinct types of mail voting: absentee ballots and mail-in ballots. Voters with a qualified excuse may use absentee ballots, while voters without a qualifying excuse use mail-in ballots. This report uses the term "absentee ballot" to refer to both types of ballots.

184 Lai, "Pennsylvania elections officials are pleading with the state to move the primary"; Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020; Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020.

185 Lai, "Pennsylvania elections officials are pleading with the state to move the primary."

186 Jonathan Lai (Journalist, *Philadelphia Inquirer*), "Something I'm watching: More than 1/3 of Philly absentee ballot applications have not yet been processed. 23,888 processed. 12,909 pending. Elections staff might have to work the weekend to keep processing ballots, executive director Joe Lynch said at meeting today," Twitter, Apr. 15, 2020, 12:31 p.m., https://twitter.com/Elaijuh/status/1250461783392956417.

187 See, e.g., Katie Galioto, "1.1 million Illinois voters have cast ballots so far, surpassing 2014 early vote counts," *Chicago Tribune*, Nov. 5, 2018, https://www.chicagotribune.com/politics/elections/ct-met-illinois-early-voting-20181018-story.html ("There was a slight increase in the rate of people voting early in 2014 compared with 2010. This could be a product of the state's efforts to make voting more convenient. . . . The state also introduced 'no-excuse' mail voting in 2010 to give residents the chance to vote from the comfort of their own home without specifying a reason for being absent from the polls.").

188 U.S. Election Assistance Commission, *Election Administration And Voting Survey 2018 Comprehensive Report: A Report to the 116th Congress*, June 2019, 29, https://www.eac.gov/sites/default/files/eac_assets/1/6/2018_EAVS_Report.pdf.

189 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology,, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020; Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020; Jeff Greenburg (Director of Elections, Mercer County, Pennsylvania), interview by Brennan Center for Justice, Apr. 2, 2020.

190 Jeff Greenburg (Director of Elections, Mercer County,

Pennsylvania), interview by Brennan Center for Justice, Apr. 2, 2020.

191 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020; Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020; Jeff Greenburg (Director of Election Security and Technology, Mercer County, Pennsylvania), interview by Brennan Center for Justice, Apr. 2, 2020.

192 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020.

193 Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020.

194 Jonathan Lai and Julia Terruso, "Voting by mail is a safe option during coronavirus. Here's what you need to know about absentee ballots in Pennsylvania and New Jersey," *Philadelphia Inquirer*, updated Apr. 1, 2020, https://www.inquirer.com/politics/election/coronavirus-vote-by-mail-absentee-ballots-pennsylvania-new-jersey-20200401.html ("most voters have never [cast an absentee by mail ballot]").

195 Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020; Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020; Jeff Greenburg (Director of Elections, Mercer County, Pennsylvania), interview by Brennan Center for Justice, Apr. 2, 2020.

196 See 2020 Pa. Legis. Serv. Act 2020-12 (S.B. 422) (authorizing polling location consolidation during the primary); Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020; Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020; Jeff Greenburg (Director of Elections, Mercer County, Pennsylvania), interview by Brennan Center for Justice, Apr. 2, 2020.

197 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020 (noting that voter education and outreach are an important priority, and that if they received assistance from the federal government to do so, they would supplement these voter education and outreach efforts).

198 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020.

199 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020.

200 See attached state estimate chart and methodology section for detailed calculations.

201 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 23, 2020.

202 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10,2020.

203 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020.

204 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020.

205 Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020; Jeff Greenburg (Director of Elections, Mercer County, Pennsylvania), interview by Brennan Center for Justice, Apr. 2, 2020; see also Brennan Center for Justice, "Election Officials Call for More Election Funding in Next Stimulus Bill," last updated Apr. 21, 2020, https://www.brennancenter.org/our-work/research-reports/election-officials-call-more-election-funding-next-stimulus-bill.

206 Absentee by mail turnout accounted for just 2 percent of overall turnout in Pennsylvania in 2018. See U.S. Election Assistance Commission, *Election Administration and Voting Survey 2018 Comprehensive Report: A Report to the 116th Congress*, June 2019, 29 and 55, https://www.eac.gov/sites/default/files/eac_assets/1/6/2018_EAVS_Report.pdf.

207 See, e.g., Katie Galioto, "1.1 million Illinois voters have cast ballots so far, surpassing 2014 early vote counts," *Chicago Tribune*, Nov. 5, 2018, https://www.chicagotribune.com/politics/elections/ct-met-illinois-early-voting-20181018-story.html ("There was a slight increase in the rate of people voting early in 2014 compared with 2010. This could be a product of the state's efforts to make voting more convenient. . . . The state also introduced 'no-excuse' mail voting in 2010 to give residents the chance to vote from the comfort of their own home without specifying a reason for being absent from the polls.").

208 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020 (supplemental information provided April 24, 2020).

209 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020; Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020; Jeff Greenburg (Director of Elections, Mercer County, Pennsylvania), interview by Brennan Center for Justice, Apr. 2, 2020. Some Pennsylvania local officials have even pushed for the June primary to be conducted entirely by mail. Emily Previti, "Counties home to more than a third of Pennsylvania voters calling for mail-only primary," *PA Post*, Apr. 17, 2020, https://papost.org/2020/04/17/counties-home-to-more-than-a-third-of-pennsylvania-voters-calling-for-mail-only-primary.

210 See attached state estimate chart and methodology section. Because Pennsylvania has an online absentee ballot request system, low-end estimates assume that only voters without a PennDOT ID return their applications by mail. High-end estimates assume that all voters return their applications by mail. Low-end estimates provided by Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020.

211 Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020; Jeff Greenburg (Director of Elections, Mercer County, Pennsylvania), interview by Brennan Center for Justice, Apr. 2, 2020.

212 Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020; Jeff Greenburg (Director of Elections, Mercer County, Pennsylvania), interview by Brennan Center for Justice, Apr. 2, 2020.

213 See attached state estimate chart and methodology section for detailed calculations.

214 Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020; Jeff Greenburg (Director of Elections, Mercer County, Pennsylvania), interview by Brennan Center for Justice, Apr. 2, 2020.

215 See attached state estimate chart and methodology section for detailed calculations.

216 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10,2020; Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020; Jeff Greenburg (Director of Elections, Mercer County, Pennsylvania), interview by Brennan Center for Justice, Apr. 2, 2020.

217 See attached state estimate chart and methodology section for detailed calculations.

218 Cybersecurity and Infrastructure Security Agency, "UK and US Security Agencies Issue Covid-19 Cyber Threat Update," Apr. 8, 2020, https://www.cisa.gov/news/2020/04/08/uk-and-us-security-agencies-issue-covid-19-cyber-threat-update.

219 See attached state estimate chart and methodology section for detailed calculations.

220 2020 Pa. Legis. Serv. Act 2020-12 (S.B. 422).

221 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020; Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020.

222 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020; Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020.

223 U.S. Department of Justice, "About Language Minority Voting Rights," accessed Apr. 17, 2020, https://www.justice.gov/crt/about-language-minority-voting-rights.

224 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020.

225 See attached state estimate chart and methodology section for detailed calculations.

226 For an overview of which states have online absentee ballot request systems, see "Preparing for an Election Under Pandemic Conditions," Brennan Center for Justice, last updated Apr. 23, 2020, https://www.brennancenter.org/our-work/research-reports/preparing-election-under-pandemic-conditions. For more information on available methods for requesting absentee ballots in each state analyzed in this report, see Georgia Secretary of State, "Absentee Voting in Georgia," accessed Apr. 22, 2020, https://sos.ga.gov/index.php/Elections/absentee_voting_in_georgia; Michigan Secretary of State, "Absentee Voting," accessed Apr. 22, 2020, https://www.michigan.gov/sos/0,4670,7-127-1633_8716_8728-21037--,00.html; Missouri Secretary of State, "Absentee Voting," accessed Apr. 22, 2020, https://www.sos.mo.gov/elections/goVoteMissouri/howtovote#absentee; Ohio Secretary of State, "Absentee Voting," accessed Apr. 22, 2020, https://www.ohiosos.gov/elections/voters/absentee-voting; Pennsylvania Voter Services, "Ballot Request Application," accessed Apr. 22, 2020, https://www.pavoterservices.pa.gov/OnlineAbsenteeApplication/#/OnlineAbsenteeBegin. For an overview of which states have online systems for tracking absentee ballots, see National Conference of State Legislatures, "Voting Outside the Polling Place: Absentee, All-Mail and other Voting at Home Options," last updated Apr. 14, 2020, https://www.ncsl.org/research/elections-and-campaigns/absentee-and-early-voting.aspx#systems.

227 Dave Leichtman (Director, Program Strategy, Defending Democracy at Microsoft), interview by Brennan Center for Justice, Apr. 15, 2020; Matt Davis (former Chief Information Officer, Virginia Department of Elections), interview by Brennan Center for justice, Mar. 27, 2020. Our estimates assume that higher costs may be faced by states to develop and implement these tools given the short time frame before the general election and the anticipated high use of these systems.

228 Pennsylvania Voter Services, "Ballot Request Application," https://www.pavoterservices.pa.gov/OnlineAbsenteeApplication/#/OnlineAbsenteeBegin.

229 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020.

230 Matt Davis (former Chief Information Officer, Virginia Department of Elections), interview by Brennan Center for Justice, Mar. 27, 2020.

231 See "Voting Outside the Polling Place: Absentee, All-Mail and other Voting at Home Options" (absentee ballot tracking systems are mandated by state law in Michigan and Missouri); Ohio Secretary of State, "Track Your Ballot," accessed Apr. 23, 2020, https://www.ohiosos.gov/elections/voters/toolkit/ballot-tracking/.

232 U.S. Election Assistance Commission, "Statewide Voter Registration Systems," Aug. 31, 2017, https://www.eac.gov/statewide-voter-registration-systems.

233 Matt Davis (former Chief Information Officer, Virginia Department of Elections), interview by Brennan Center for Justice, Mar. 27, 2020.

234 Matt Davis (former Chief Information Officer, Virginia Department of Elections), interview by Brennan Center for Justice, Mar. 27, 2020.

235 U.S. Election Assistance Commission, *Election Administration And Voting Survey 2018 Comprehensive Report: A Report to the 116th Congress*, June 2019, 55, https://www.eac.gov/sites/default/files/eac_assets/1/6/2018_EAVS_Report.pdf.

236 The State of Georgia is spending $480,000 to print absentee ballot requests and $2.6 million to mail absentee ballots to 6.9 million active voters. Niesse, "Voters mailed absentee ballot request forms for May 19 Georgia primary"; Kevin Rayburn (Deputy Elections Director and Deputy General Counsel, Georgia Secretary of State), Gabriel Sterling (Voting System Implementation Manager, Georgia Secretary of State), Chris Harvey (Elections Director, Georgia Secretary of State), interview with Brennan Center for Justice, Apr. 17, 2020. Green County, Missouri, estimates that it will cost $0.56 per voter to print and mail absentee applications. Shane Schoeller (County Clerk, Greene County, Missouri), interview by Brennan

Center for Justice, Mar. 30, 2020. Defiance County, Ohio, estimates that it will cost $0.50 per voter to print and mail absentee applications. Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020.

237 Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020.

238 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020.

239 Using this methodology, we determined the following baselines for absentee ballot materials and postage: 6,559,909 (Michigan); 3,923,862 (Missouri); 7,129,470 (Ohio); 7,694,291 (Pennsylvania). For Georgia, we used the full number of active registered voters (6.9 million), so that total estimated costs would be consistent with estimates publicly released by the state.

240 Verified Voting, "The Verifier – Polling Place Equipment – November 2020," https://www.verifiedvoting.org/verifier.

241 Mich. Admin. Code R 168.774 (Michigan); V.A.M.S. 115.247 (Missouri); Directive 2016-22, Election Official Manual 4-14, https://www.sos.state.oh.us/globalassets/elections/directives/2016/dir2016-22_eom-ch_04.pdf (Ohio); 2019 Pa. Laws 77 (Pennsylvania).

242 Using this methodology, we determined the following baselines for absentee ballot materials and postage: 1,559,341 (Michigan); 1,007,141 (Missouri); 3,653,556 (Ohio); 1,846,807 (Pennsylvania). These numbers represent the additional ballots that would be needed for a total supply equal to 120 percent of registered voters, to account for ballot spoilage and the need to allocate resources between mail and in-person voting.

243 Rochester Hills, Michigan, spends $0.30 per voter for ballots and $0.85 per voter on envelopes. Tina Barton (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020. Greene County, Missouri, spends $1.50 per voter on envelopes and $0.10 per voter to print absentee ballot instructions. Shane Schoeller (County Clerk, Greene County, Missouri), interview by Brennan Center for Justice, Mar. 30, 2020. Defiance County, Ohio, spends $1.70 per voter to outsource ballot printing and absentee packet assembly. Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020.

244 The State of Georgia is spending $1.88–$2.38 per absentee ballot sent in postage and handling costs, and officials estimate that return postage could cost up to $1.40 per ballot. Niesse, "Voters mailed absentee ballot request forms for May 19 Georgia primary"; Kevin Rayburn (Deputy Elections Director and Deputy General Counsel, Georgia Secretary of State), Gabriel Sterling (Voting System Implementation Manager, Georgia Secretary of State), Chris Harvey (Elections Director, Georgia Secretary of State), interview with Brennan Center for Justice, Apr. 17, 2020. Boone County, Missouri, spends about $1.15 per ballot in return postage. Brianna Lennon (County Clerk, Boone County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020. Defiance County, Ohio, estimates that each ballot sent costs $1.20 in postage. Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020.

245 The Cybersecurity and Infrastructure Security Agency (CISA) Elections Infrastructure Government Coordinating Council and Sector Coordinating Council's Joint COVID Working Group recommends that jurisdictions have one drop box for every 15,000–20,000 registered voters. Cybersecurity and Infrastructure Security Agency, "Ballot Drop Box," https://www.cisa.gov/sites/default/files/publications/ballot_drop-box_final-508.pdf. The State of Washington, where drop boxes are widely used, requires one drop box per 15,000 registered voters. Washington Secretary of State, *Ballot Drop Boxes in All Communities*, May 19, 2017, https://www.sos.wa.gov/_assets/elections/auditorsctp/17-01%20ballot%20drop%20boxes%20in%20all%20communities.pdf.

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253 An estimated rental cost of $10,000 per month for two months.

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255 25 additional workers for 14 days at $15 per hour.

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REPORT

Estimated Costs of Covid-19 Election Resiliency Measures

Jason Redmond/AFP/Getty

SUMMARY: Proper planning can ensure that the pandemic does not prevent a free and fair election. To be effective, funding is urgently needed.

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UPDATE 4/18/2020: *On March 19, the Brennan Center published a preliminary estimate of the cost of adapting the country's voting systems and practices to ensure that the coronavirus pandemic wouldn't interfere with safe and secure election in November. Our estimate: approximately $2 billion. Importantly, this estimate did not include*

the cost of ensuring the safety and security of the many other statewide and local elections that will occur throughout 2020.

Since our March estimate, new guidance from health professionals has led election officials to take extra actions to ensure the health of their workers and voters, including providing protective gear — such as gloves and masks — to all poll workers and offering curbside voting. Most election offices also have had additional IT costs associated with ensuring that staff can perform critical functions remotely and securely.

Given the costs associated with protecting state and local elections with the new recommended health protections and technology costs, as well as for safely running dozens of additional elections this year, states and localities will need many more resources in 2020 than our preliminary estimate for the November election.

Accordingly, the Brennan Center recommends that Congress make available at least $4 billion to ensure all elections between now and November are free, fair, safe, and secure.

There is no question that the Covid-19 pandemic presents a difficult and, in many ways, unprecedented challenge to America's elections. The Brennan Center has offered a **detailed plan** to ensure that the pandemic does not prevent a free and fair election. Implementing that plan must begin now. Below, we provide a preliminary cost estimate to implement all aspects of our plan, which could cost up to $2 billion nationwide.[1] Of course, the Brennan Center plan is not an exhaustive list, and states will have additional needs to ensure all of their citizens can vote with confidence during this pandemic.

Ensuring vote-by-mail option is available to all voters

Total estimated cost: $982 million–$1.4 billion

The following costs should be considered when increasing the option of mail voting to all voters across the country:

Ballot printing. Increasing the number of voters using vote by mail will require printing a larger number of ballots, absentee envelopes, and other materials. Jurisdictions should print enough ballots and ballot envelopes for 120 percent of registered voters to ensure sufficient ballots for all voters even if there are surges in voter registration close to the election and voters who change their minds and decide to vote in person instead of casting their ballot by mail. ***Estimated cost: $54 million–$89 million***

- Based on cost estimates provided by three ballot printing vendors, we estimate that the cost to print a ballot ranges from 21.4 cents per ballot to 35 cents per ballot. We multiplied these costs by 254 million registered voters, 120 percent of the registered voters in the United States, to obtain our estimate.

Postage costs. The costs of both sending and receiving ballots should be covered by the U.S. Postal Service (USPS). ***Estimated cost: $413 million–$593 million***

- We estimate the cost of mailing voters their ballots (including additional materials, such as return envelopes, instructions, and other informational materials) will cost $1.15–$2.00 per registered voter, or $243,455,000–$423,400,000 in total. This estimate is derived from interviews with election officials and

ballot printing vendors (estimates varied widely, from $0.65 in Virginia to over $2.00 in California). In addition, voters will need to return their ballots. The cost per ballot will be less because additional materials will not be included in the return. Using an average of 80 cents per ballot for voters to return ballots, we estimate an additional $170 million to provide voters with prepaid postage for voters to return their ballots.

Drop boxes for absentee ballots and appropriate security. Jurisdictions should offer secure drop boxes in accessible locations for voters to drop off ballots directly. Drop boxes must be equipped with adequate security measures, such as cameras. ***Estimated cost: $82 million–$117 million for purchase and installation (excluding current infrastructure in vote-by-mail states) and $35 million–$47 million for operation and maintenance (excluding current infrastructure)***

- We know that at least four states — California, Colorado, Oregon, and Washington — already have drop boxes in place statewide. **Washington State** requires at least one ballot box per 15,000 registered voters. In Pierce County, Washington, ballot boxes provided by the company Laserfab **cost** between $7,000 and $10,000 to purchase and install. Snohomish County, Washington, which uses the same ballot boxes, estimates an annual ongoing operating and maintenance **cost** of approximately $3,000 per ballot box in a typical nonpresidential election year and $4,000 per ballot box in a presidential election year. Accounting for the four states that already have ballot boxes in place statewide, we estimate that 11,666 ballot boxes would be needed nationwide (~175 million registered voters/15,000 registered voters). To arrive at our cost estimate, we multiplied these various ballot box costs by 11,666 ballot boxes.

Secure electronic absentee ballot request technology. Voters must be allowed to request absentee ballots in person or through the mail, and states should offer additional methods to request ballots online or by phone. These costs must also include an increased use of online ballot delivery for uniformed and overseas citizens absentee (UOCAVA) voters. ***Estimated cost: $16.7 million (excluding current infrastructure)***

- Costs of obtaining or developing a secure electronic absentee ballot application tool vary widely, but we estimate an average of $325,000 per state, if the state currently has online voter registration (39 states and DC have **OVR**). For the purpose of estimating an online absentee ballot application tool cost, we assume that all states have OVR, since we account for the cost of implementing OVR in a different section of this document. We know that at least two states, Virginia and Pennsylvania, already have this tool and that in three states, Colorado, Oregon and Washington, voters do not need to apply to receive an absentee ballot. Therefore, we multiplied $325,000 by 46 (45 states and DC) to obtain a total cost estimate of $7 million to implement secure online absentee ballot tools nationwide.
- We estimate a cost of $100,000 per state per year to provide a secure, online blank ballot delivery service, which allows voters to mark their absentee ballot on a computer before printing it. This assures accessibility for voters with disabilities. We estimate that at least 25 percent of states already offer a service like this. We multiplied $100,000 by 37 states to obtain a cost estimate of $3,700,000 for this service.
- We estimate the total cost for secure electronic absentee ballot request technology/tool + annual cost for electronic vote-by-mail technology to be $2,300,000 + $3,700,000, or $6 million total.

Ballot tracking. Ballot tracking software should be used to provide confidence that ballots are reaching the appropriate destination in a timely manner. Jurisdictions should also set up a texting service for ballot tracking information, which will provide voters with reminders, confirmations of receipt, and confirmations of acceptance. ***Estimated cost: $4.2 million (excluding current infrastructure)***

- We estimate that at least 25 percent of states already have basic ballot tracking software. We estimate that this software will cost $50,000 per state. (38 states x $50,000 = $1,900,000). We are providing a

separate estimate for the text delivery service, which only a handful of states currently utilize: $50,000 per state. This estimate includes setting up the platform plus costs of messages. (45 states x $50,000 = $2,250,000)

Improvements to absentee ballot processing. To manage the increase in absentee ballots, some jurisdictions will need to purchase resources that include signature verification technology, high-volume mail processing and sorting equipment, and high-speed ballot scanners. ***Estimated cost: $120 million–$240 million***

- Approximately 15 percent of local jurisdictions in the country have more than 25,000 voters (15 percent of 8,000 jurisdictions is 1,200 jurisdictions). High-speed scanners for tabulating absentee ballots cost in the range of $50,000 to $100,000 per unit. This gives a range of $60,000,000 to $120,000,000 for high-speed tabulators nationwide. The cost for high-speed automated mail sorting equipment is assumed to be in a similar range and also would only be needed in jurisdictions with more than 25,000 voters. This gives a range of $60,000,000 to $120,000,000 for high speed mail processing equipment nationwide.

Additional facilities. Jurisdictions will require substantially more space for ballot processing and storage.***Estimated cost: $92 million***

- A surge in absentee ballots will require jurisdictions to set up an additional location for ballot processing. Most local election offices are not large enough to handle these needs and will likely need to obtain commercial space. For this estimate, we assume lease of a commercial space for 60 days to cover pre- and postelection processing work. For 85 percent of locals that have fewer than 25,000 voters (6,800 locals), we estimate rental costs of $5,000 per month for a total of $10,000. For the 15 percent of jurisdictions that are larger (1,200 locals), we estimate $10,000 per month for a total of $20,000. This gives us an estimated cost of $92,000,000.

Additional staffing to support absentee ballot processing. Staff will be needed for processing ballots and duplicating ballots onto the stock required for tabulation. ***Estimated cost: $164.6 million***

- Assumptions include that additional seasonal staff will be needed to process absentee ballots before, during, and after Election Day for a total of 14 days. Hourly rate is assumed to be at least $15 per hour for eight hours of work per day. This would be $1,680 per additional worker. For jurisdictions under 25,000 voters, we assume 10 additional staff for a total of 68,000 seasonal workers. For jurisdictions larger than 25,000 voters, we assume 25 additional staff for a total of 30,000 seasonal workers. This would require $164,640,000 in additional staffing support nationwide.

Maintaining in-person voting

Total estimated cost: $271.4 million

Providing everyone with the option to vote by mail will not replace all in person voting by November. The handful of states that have all-mail elections took many years to get there. As we saw in the Iowa caucus, putting too much strain on an entirely new system is sure to result in breakdowns and failures. Furthermore, there are millions of Americans who will not be able to cast a private and independent vote by mail: people without Internet and mail access, those who need language assistance to vote, and people with disabilities who rely on voting machines to

cast their ballots among them. There is **evidence** that the absence of in-person voting options could **disproportionately** and negatively impact Black, Latino, and young voters. We must maintain the safety-valve of in person voting, but in a way that reduces density and ensures health. To do so, the following costs must be incurred:

Polling facilities that meet public health standards. Poll workers will need additional resources to clean and sanitize all facilities, machines, and resources. Polling places that use hand-marked paper ballots may wish to give voters single-use pens. Jurisdictions may also incur costs due to the need to change polling locations close to Election Day if public health requires, or to acquire access to backup polling locations. ***Estimated cost: $29.2 million (funding for all states, even though some states may already be paying for some of this cost)***

- Cleaning supplies would cost an estimated $20 per precinct. A sample of three states with no-excuse absentee voting (Illinois, North Carolina, and Ohio) had an average of one precinct for every 1,454 registered voters. Cleaning supplies would therefore cost $0.013 per registered voter. Providing a single-use ballot-marking pen to every voter would cost about $0.50 per registered voter, if every registered voter voted in person. This will be a much lower cost if vote by mail increases. Estimate is based off of pens for 25 percent of registered voters. While this still may be high considering the number of voters using absentee ballots and voting machines, the estimate will help to cover additional facility costs.

Increased poll worker support. Jurisdictions must hire poll workers beyond the normal amount to overcome day-of absences. Poll worker pay may need to increase to provide an incentive for serving in-person voting. ***Estimated cost: $140 million (funding for pay raises for current level of poll workers in each state, and full payment for additional poll workers in each state)***

- A sample of three states with no excuse absentee voting (Illinois, North Carolina, and Ohio) had an average of one poll worker for every 208 registered voters, or about 1 million poll workers nationally. Increasing poll worker hiring by 20 percent as well as providing a raise, bringing pay from about $100 to $200 a day, would cost $100 million in raises for current levels of staffing and $40 million for the additional 20 million workers.

Professional interpreters. Jurisdictions will need to offer language assistance by phone in case bilingual poll workers are absent or unavailable. ***Estimated cost: $43 million (funding for interpretive services for all counties covered under Section 203)***

- This estimate would cover interpreter services at a cost of $700 per day for each precinct located in a county covered under Section 203 of the Voting Rights Act. Notably, this estimate only covers interpreter services on Election Day, not during early voting periods.

Increased provisional materials. Jurisdictions should prepare for a surge in provisional voting due to delays in the processing of voter registration applications. ***Estimated cost: $21 million (funding for all provisional envelope printing, even though states and locals are already covering some of this cost)***

- Supplying enough provisional envelopes for 25 percent of registered voters at a cost of $0.40 per envelope would cost $21 million nationally.

Voter wait time tools. States and counties that use vote centers for in-person voting should develop online voter wait time tools to reduce lines and crowding. ***Estimated cost: $1.2 million (funding for all states that allow vote centers)***

- A mobile app that tracks wait times for one Texas county took 50 hours to develop in 2014. Our total estimate assumes average rates of mobile app development at $16 per hour and assumes that the time of

development increases with the size of the jurisdiction.

Expanded early voting. Jurisdictions should expand early voting options to reduce lines and administrative stress on Election Day. This will increase all of the costs of in-person voting considered above. ***Estimated cost: $37 million (funding for states that don't already have early in-person voting)***

- In 2010, Maryland counties spent **$2.6 million** to conduct early voting for a one-week period prior to the election, according to a legislative fiscal analysis. This represented $0.74 per registered voter. Adjusted for inflation, this would be $3.1 million in 2020, or $0.89 per registered voter. For a two-week period of early voting, this would then be $1.77 per registered voter. Excluding the all-mail states, there are 20.7 million voters in states that do not have early in-person voting. Expanding early voting to these voters would therefore cost an estimated $36.6 million. More money may be needed to expand early voting periods in states that offer in-person early voting for less than two weeks.

Developing and bolstering online registration

Total estimated cost: $85.9 million

In the months and weeks before every presidential election, millions of Americans update their voter registration information or register to vote for the first time. Covid-19 could severely disrupt this process, making it difficult for Americans to submit timely registration applications elections officials to process those applications. The outbreak will certainly reduce access to government offices that provide voter registration services.

States should adopt and bolster online voter registration systems (**and they should consider implementing same-day registration**, the costs of which will likely not be significant). Bolstering online registration will include the following costs:

Implementation of online registration for states where not used already. Thirty-nine states and DC have either fully implemented online voter registration or are in the process of doing so. The other states should do so before November. ***Estimated cost: $3.7 million***

- A 2014 survey of states by the Pew Charitable Trusts found that 11 of 13 states that had implemented online voter registration spent an average of $240,000 in initial startup costs. Two outliers reported $0 (Kansas) and $1.8 million (California). Since one of the remaining jurisdictions to implement online voter registration is a very high population state (Texas), an increased estimate for costs in Texas of $1 million is appropriate. $3.4 million was then adjusted for inflation to $3.7 million.

  Note: some states may not be able or willing to move to online registration systems in time for the November election. These states will need to invest in public campaigns, voter outreach, education, and mailings to ensure voter registration is fully up to date. We do not believe the cost of these measures will be significantly less than our estimates for adoption of online registration.

Capacity and vulnerability testing. Online voter registration systems should be tested and their capacity bolstered to ensure that they can handle surges in web traffic. ***Estimated cost: $82.2 million***

- A 2017 U.S. Election Assistance Commission (EAC) survey found that 15 states have either "bottom-up" or "hybrid" voter registration databases. For these states, added testing will be required, as individual counties that maintain their own online voter registration systems will need to conduct capacity and vulnerability testing of those systems. We estimate that capacity testing will cost approximately $25,000–$60,000 per jurisdiction and vulnerability testing will cost approximately $80,000–$100,000 per jurisdiction. Six states with bottom-up systems have 421 counties total for a total of 421 county and 6 state systems. County level systems are on the high end ($100,000) for vulnerability testing but midrange ($40,000) for load testing. Nine states have hybrid systems. In Texas, 39 counties operate their own system. Using this as a predictor of the average number of individual systems, we estimate 109 county and 9 state systems across those nine states, which also are on the high end ($100,000) for vulnerability testing but midrange ($40,000) for load testing. Thirty-four states operate top-down systems (North Dakota does not have registration) and DC is added for 35, each of which is on the high end for load testing ($60,000) and vulnerability testing ($100,000), adding up to $82.2 million

Public education

Total estimated cost: $252.1 million

Fear and confusion around a pandemic create a fertile environment for fear, disinformation, and efforts to manipulate the electoral process for improper purposes and partisan gain. State officials, advocates, and citizens should take steps to reassure citizens that voting will be safe and to guard against the use of Covid-19 to suppress voters or otherwise manipulate the election. The following costs should be considered:

Public education campaigns. Jurisdictions must inform voters of all changes to voting rules and all options available to register and vote. This must include advertising in non-English languages. ***Estimated cost: $250 million***

- Only five states have essentially moved to an all or primarily vote-by-mail system. The rest, plus DC, will need to launch public education campaigns that include mailers, television, radio, social, and other media, all in multiple languages. The 2020 Census similarly involves significant changes that the public must learn about, such as an online option and multilanguage advertising needs. For the 2020 Census, California is spending about $2.52 per person who was counted in the 2010 Census, while New York City is spending about $0.50 per person. Houston and Harris County in Texas are jointly spending $4 million dollars, or about $0.88 per person. Similar levels of spending per voting-age member of the population — about 77 percent of the total population — would result in costs of between $129 million and $643 million. Our estimate for voter education about options during the Covid-19 pandemic is on the lower end of this range, even though these levels are over and above spending undertaken by the Census Bureau and independent organizations to ensure an accurate count.

Strengthened voter resources. Jurisdictions must provide accessible and easily used tools for voters to look up polling locations and registration status in order to proactively counter misinformation or malicious attacks to government systems. ***Estimated cost: $2.1 million***

- Capacity testing on these websites should cost approximately $40,000 per state plus DC and Puerto Rico.

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Endnotes

1. Our estimates are conservative because they do not include cost estimates for Puerto Rico. We did not include Puerto Rico in our estimates because we relied on data from the most recent Election Administration and Voting Survey, which Puerto Rico did not participate in, as it did not conduct a federal election in 2018. Congress should of course provide funding for Puerto Rico to implement Covid-19 plans.

President Michael Waldman on Recent Police Killings and Civil Unrest

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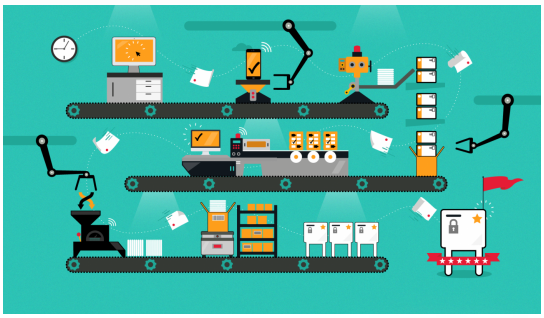
RESOURCE

Preparing for Election Day: Deadlines for Running a Safe Election



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State and local election officials must begin making critical purchases in a matter of weeks in order to ensure free, fair, and safe elections in November.

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PUBLISHED: May 11, 2020

The Brennan Center has outlined a **detailed plan** for ensuring fair and safe elections during the Covid-19 pandemic. But implementing that plan will take time, and election jurisdictions will need to purchase and deploy critical equipment and supplies months before this November's election. This document identifies some of those key items, explains critical deadlines, and details the potential dangerous consequences of missing those

deadlines. (This is not an exhaustive list. For example, it does not cover timelines for purchasing personal protective equipment [PPE] for poll workers.)

In addition to the Brennan Center plan, this document draws from three main sources: election officials who have previously implemented some of these items, vendors who provide the identified hardware or support, and a "**vote by mail project timeline**" created by the Cybersecurity and Infrastructure Security Agency's (CISA) Elections Infrastructure Government Coordinating Council (GCC) and Sector Coordinating Council (SCC).

State and local election officials must begin making purchases in a matter of weeks in order to ensure free, fair, and safe elections this fall.

Online Voter Registration system capacity:

Begin implementation no later than May

What is it?

Online voter registration (OVR) systems allow voters to submit their applications by using a website instead of a paper form. In most cases, the system validates applications by comparing the information provided on the online registration form against information from other state databases such as from the Department of Motor Vehicles (DMV). Most states have enacted legislation to authorize online voter registration, while others have made online voter registration available without enabling legislation. [1]

Forty states and the District of Columbia currently offer OVR, and two additional states have approved OVR but have not yet implemented the system. [2]

Why is this important?

This year, social distancing protocols will likely lead to an increased use of OVR systems, as fewer people register or update their registration information with third-party organizations or at DMV offices, which may be closed. However, states are confronting some shortcomings and challenges as they upgrade and expand their systems. Without sufficient capacity that has been properly load tested, OVR systems can fail when too many people attempt to use the system at once. When this occurs, voters cannot register or update their information, and election offices must use intensive resources to resolve these issues during a critical time in the election cycle. To accommodate the surge in OVR activity, many states will need to expand the capacities of their existing systems, and some states will need to create an online option for voters for the first time. States launching OVR for the first time may need to deploy limited options to handle the most frequent types of transactions, such as address changes.

What are the deadlines, and what could go wrong?

Historically during presidential election years, registration rates begin increasing around August and peak in early to mid-October, in advance of state voter registration deadlines. [3]

For states with existing OVR systems, it will likely take three to four months to test and deploy upgrades for additional capacity. For those currently without OVR, three to four months should be enough time to deploy limited OVR capabilities to reduce dependence on paper registration forms. [4]

States should deploy a fully operational system no later than **mid-July** and perform load and stress tests by the **beginning of August** to ensure that the system can handle more website visitors while also detecting malicious requests. Accordingly, states must begin the implementation of new OVR systems or upgrades to existing systems no later than **May** so that they are ready for a surge in online transactions. When evaluating an OVR system solution, states must develop a schedule that accounts, at a high level, for system analysis, product development, integration, testing, and deployment.

OVR website failures may convince voters that there is a broader election system failure and consequently discourage them from registering altogether. Other voters may submit paper registration forms, which adds to the data-entry demands on election staff and increases error rates in the registration database. Delaying OVR improvements increases the risk of system failure and may prevent people from exercising their right to vote.

Online absentee applications:

Begin implementation no later than mid-July

What is it?

Online absentee ballot applications allow individual voters to request an absentee ballot electronically, without submitting paper forms. There are various possible methods for voters to apply online—by submitting a scanned absentee ballot application to a designated email address; by submitting a fillable PDF form with an electronic signature; or by submitting online through an OVR-type system. Allowing online absentee applications will produce faster processing times.

Why is this important?

While most states have implemented OVR, only 15 have expanded the use of that technology to absentee ballot requests statewide. [5] Before they can implement technological solutions, many states will have to adjust administrative requirements related to the submission of absentee ballot requests, such as removing arbitrary requirements for a "wet ink" signature on applications. Without an online absentee ballot request system, election officials will have to process more paper submissions, as voters follow social distancing advice from health

officials. This will require additional data-entry time and for election staff to access locations where applications are being submitted, even as they attempt to comply with social distancing protocols. Electronic submissions can reduce data-entry times and related errors and can allow election staff to process applications remotely.

What are the deadlines, and what could go wrong?

States should deploy fully operational online absentee application systems no later than **August**, when these requests are expected to begin surging.

Many of the recommendations for an OVR system apply to online absentee application systems. If an OVR system exists at the state level, there may be an opportunity to reuse its computer code as a foundation for the mail-in ballot request system. Conversely, jurisdictions could add a ballot request feature to the online voter registration form. These jurisdictions must begin upgrading and testing the capacity of their systems by **mid-July**.[6]

Other jurisdictions may need to build a standalone system external to the statewide system, and if so, must account for the additional analysis, infrastructure, and time required to securely collect and transfer data to the voter registration database(s). These jurisdictions must begin developing online request tools immediately.[7]

Election officials have estimated that processing a paper absentee request form takes seven to ten times longer than processing an online request.[8] Ohio's recent primary election demonstrates what can go wrong when states fail to make online absentee request tools available to voters seeking to comply with social distancing protocols. Elections staff in Ohio were flooded with far more paper request forms than in a typical election year, and many voters reported not receiving their ballots for weeks after requesting them. The only option for these voters was to venture out of their homes and vote provisionally at county election offices, in contradiction to public health recommendations to remain at home and avoid public spaces.[9] Meanwhile, in Wisconsin, nearly 1 percent of voters who requested a mail ballot had not received one by election day.[10]

Ballot Printing:

Place orders by mid-June

What is it?

Ballot printing is the process of printing election-specific data and contests onto individual sheets of paper so that voters can mark their choices and cast a ballot.

States will likely need to print a vastly increased quantity of blank ballots in response to a surge of by-mail voting requests during the Covid-19 crisis. In smaller election offices in states that have minimal or restrictive vote by mail options, ballot printing may only require a modest amount of print-on-demand equipment in their local office

to meet the usual demand. However, given the unprecedented current circumstances, a large number of election jurisdictions will likely need to work with third-party professional printers to fulfill much larger ballot printing orders.

Why is this important?

While printing ballots might seem like a "generic" printing process, experienced providers of election services follow exacting specifications for paper ballots that support the requirements of automated scanning software and hardware. If election jurisdictions wait too long to establish a working relationship with an experienced ballot printing provider, or if they submit their ballot printing orders too late, there may be an inadequate capacity or supply in the ballot printing marketplace to meet the needs of election officials.

What are the deadlines, and what could go wrong?

Major providers of ballot printing services have noted that ballots must be printed by September 2020 for the November 2020 election. However, the printing process also includes inserting blank mail ballots into multi-part envelope "kits," which involves a complex assembly process and a production workflow that begins earlier. According to major printing and mail-house vendors, the deadline for setting up customer accounts, designing envelopes and artwork, preparing voter registration data and ballot quantities, and ordering necessary paper supplies should be **no later than mid-June**.[11] Vendors have suggested that with proper planning and lead time, they can manage paper supplies without supply chain issues, but that they must know the scope of production no later than mid-summer.[12]

If election officials and their print and mail vendors do not allocate enough time to print significantly more blank ballots and to assemble their accompanying by-mail packets, voters may be unable to mark and return their mail ballot by the election deadlines.

High-Speed Scanners:

Submit purchase orders by May

What are they?

High-speed scanners read and tabulate absentee ballots in large batches at much higher speeds than precinct-based scanners. A tabulator in a precinct can scan approximately a dozen ballots per minute, while high-speed scanners can read as many as 300 ballots per minute. However, high-speed scanners are usually 8 to 10 times more expensive than precinct scanners.[13] Election jurisdictions with more than 50,000 voters typically require high-speed scanners, and counties that already have this equipment may need more scanning stations due to higher-than-expected rates of mail ballot voting.[14]

Why is this important?

Absentee voting rates for the 2020 presidential election are expected to increase significantly compared to previous cycles. This trend has already impacted presidential primaries. For example, Wisconsin received more than five times the number of absentee votes during its presidential primary this April than it did in 2016.[15] More than a month before the June primary, Georgia has already received more than twenty times the number of mail ballot requests as it did in 2016.[16] The significant increase in absentee ballots means that election jurisdictions will have to count more ballots at a central location. (In contrast, in-person ballots are counted onsite at polling places.)

What are the deadlines, and what could go wrong?

Election vendors work with specialized manufacturers to fill orders for high-speed scanners. This process can take four to five months assuming there are no manufacturing supply chain issues impacting production. In order for scanners to be delivered by October 2020—the timeline required for election officials to perform necessary logic and accuracy testing on the devices—officials need to submit their purchase orders by **May 2020.**

If there is a shortage of high-speed scanners, jurisdictions will need to use precinct-level scanners to process absentee ballots. This will require either more scanners, more space, and more personnel to process absentee ballots, or significantly more time to tabulate ballots and obtain results.[17] In turn, this could drastically delay the reporting of election results compared to prior cycles, potentially by days or even weeks.

Ballot Drop Boxes:

Submit purchase orders by end of July

What are they?

Ballot drop boxes are locked structures operated by election officials for voters to drop off mail-in ballots. They provide a secure and convenient way for voters to return their completed ballots without using return postage or relying on the postal service. Ballot drop boxes are typically monitored by election staff or by 24-hour surveillance cameras to ensure that ballots are not tampered with or stolen. Vote-by-mail states rely heavily on ballot drop boxes. In Colorado, for example, nearly three quarters of all ballots were returned by drop box during the 2016 general election.[18]

Why is this important?

Voters often express greater confidence in drop box return because they can see that election officials received their ballots securely and on time.[19] Additionally, because they do not require return postage, drop boxes can provide significant cost savings for local governments.

Jurisdictions should provide one ballot drop box for every 15,000 to 20,000 voters.[20] At a minimum, every election jurisdiction should provide drop boxes at its main county or city office building.[21] There should also be drop boxes at other locations that are convenient for voters, such as public transportation stops, college campuses, grocery stores, and public buildings such as libraries and community centers. Depending on the selected locations, election officials may need to obtain permits or approvals before installing drop boxes.

What are the deadlines, and what could go wrong?

Election officials must decide in advance how many ballot drop box units they will need and where they will be located. They must account for the time it will take to manufacture, deliver, and install these units. Election officials must also plan for adequate staffing and maintenance for these structures.

Given manufacturing time and increased demand, it can take four to six weeks for secure outdoor drop boxes to arrive.[22] On average, the full deployment process could take up to six to eight weeks in total, which includes additional time for installing each unit and acquiring all security equipment needed to monitor each drop box. In previous elections, some counties have needed even more time to roll out ballot drop boxes.[23] Finally, election officials will need to recruit additional staff members to monitor, maintain, and collect ballots from drop boxes. They should complete the hiring process by **September 2020** to allow time for training.

Jurisdictions should make siting decisions and purchase drop boxes and supplies by **the end of July 2020.**

Supply Chain Planning: Chronological Summary of Important Deadlines

May

Begin implementation of online voter registration systems, for those states that do not already have them
Begin implementation of online absentee ballot application systems, for those states that do not already have a statewide online voter registration system to which a request function for mail ballot applications can be added
Submit purchase orders for any additional high-speed scanners

June

Place ballot printing and “envelope kit” orders no later than mid-June

July

Deploy fully operational online voter registration systems

For states that already have online voter registration and are simply adding new online absentee ballot application functionality, begin implementation by mid-July

Submit purchase orders for ballot drop boxes no later than the end of July

August

Complete load and stress testing of online voter registration systems by early August

Deploy fully operational online absentee application systems

This publication benefitted from the work of Edward Perez and Frank Reyes. Perez, global director of technology development at the OSET Institute, is an election administration analyst to the Brennan Center for Justice's Election Reform Program. Reyes, a former congressional innovation fellow and technology policy advisor for the U.S. House Committee on Homeland Security, is a technology advisor to the Brennan Center for Justice's Election Reform Program.

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4. Matthew Davis (former Chief Information Officer, Virginia Department of Elections), interview by Brennan Center for Justice, Apr. 30, 2020.

5. Five additional states send mail ballots to all voters automatically, with no need for a request. See Brennan Center for Justice, "Preparing Your State for an Election Under Pandemic Conditions".

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7. Kentucky announced plans to create an online portal on April 24, 2020. See Governor Andy Beshar, "Executive Order 2020-296, State of Emergency Relating to Kentucky Elections," Apr. 24, 2020, https://governor.ky.gov/attachments/20200424_Executive-Order_2020-296_SOE-Relating-to-Elections.pdf.

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23. California Secretary of State, "SOS November 2020 Election Taskforce: Meeting Minutes, November 2020," Mar. 31, 2020 (citing current turnaround times at vendor American Security Cabinet).

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BRENNAN CENTER FOR JUSTICE

MEMORANDUM

To: Interested Parties

Re: How to Protect the 2020 Vote from the Coronavirus

Date: March 16, 2020

This document benefited from the input of multiple election officials and voting rights experts. It may be updated to account for new developments and comments.

The coronavirus disease 2019 (Covid-19) presents a difficult and novel challenge to the administration of the 2020 general election. Recent election emergencies have largely been caused by catastrophic weather events, and our country has done little election planning for pandemics. Unlike a hurricane, a pandemic does not have a discrete and relatively predictable end point. And avoiding large-scale social contact is a central feature of combating the crisis. These elements create distinct challenges for election officials on top of the significant and ongoing threats to the security of our election infrastructure.

Given the scope of the challenge, large-scale preparation, backed by the concerted support of the government and the public, is needed immediately to ensure that the 2020 election is free, fair, accessible, and secure. We will need substantial modifications to our election procedures, substantial flexibility, and a substantial infusion of resources to ensure that every eligible American can register and vote safely, securely, accessibly, and as conveniently as possible; to ensure that every ballot cast by an eligible voter counts; to maintain the security of the election; and to ensure the safety of election workers. Below we outline the critical changes needed to ensure the election works.

The key recommendations fall into five categories: (1) polling place modification and preparation; (2) expanded early voting; (3) a universal vote-by-mail option; (4) voter registration modification and preparation, including expanded online registration; and (5) voter education and manipulation prevention. We recommend that each state government establish an election pandemic task force to determine how best to implement relevant policy recommendations in their state. State and local officials must understand the laws and emergency rules applicable to their jurisdictions and consider appropriate adjustments to ensure that election officials have the authority needed to accomplish these modifications. For its part, Congress should immediately appropriate funds to ensure that election officials have the resources needed to make the needed adjustments to their voting systems. Congress should also establish baseline national rules to

ensure that every eligible American can vote safely, securely, and accessibly in the midst of the pandemic. In the absence of Section 5 of the Voting Rights Act, care must be taken to ensure that changes are nondiscriminatory and do not negatively impact access for communities of color.

1. Polling Places

People without Internet and mail access, those who need language assistance to vote, and people with disabilities who rely on voting machines to cast a private and independent ballot may be disenfranchised if polling places are closed. To ensure that everyone can vote, jurisdictions should do their best to keep polling places open and safe for voters and election workers alike, and they should take steps to guard against long lines and mass confusion.

a. Polling place siting

- To the extent permissible under public health mandates, jurisdictions that offer polling place voting must continue to do so. Many people do not wish to, do not know how to, do not have access to, or cannot use mail voting.
    - In particular, Native American tribes should be permitted to designate buildings on reservations that can be used to register to vote and pick up and submit ballots (as would be provided by the Native American Voting Rights Act).
    - Polling sites are also critical for the operation of same-day registration, real-time address updates, and provisional balloting for certain individuals.

- Preparations should be made now to modify polling place siting decisions to account for Covid-19.
    - Polling places are routinely sited in buildings that primarily serve communities identified as high risk for serious Covid-19 illness, like senior care facilities. Alternative locations should be immediately identified in case the health risk is too great to use those locations in November and, in the event of a change, voters should immediately be given individualized notice of the change, with a second notice to be given within weeks of the November election. Funding should be provided to account for increased rental costs and costs associated with making new polling sites accessible to people with disabilities.
    - If polling places are moved out of senior care facilities or other residential sites, plans should be implemented to ensure that the residents of those facilities are able to cast a ballot.
    - In determining modifications to polling location plans, election administration officials must assess the impact of voting changes on vulnerable communities and ensure that polling place location changes increase, not limit, accessibility for racial and language minority voters as well as students and voters with disabilities.

- Where there is insufficient access to polling places, states should add vote centers where every ballot in a jurisdiction is available on demand. This will require immediate funding to set up the necessary technology.

b. Healthy polling places

- Polling places will need to be sanitized to prevent transmission of the virus, in compliance with the guidance issued by government health agencies.
    - The Centers for Disease Control and Prevention (CDC) has issued guidance for preventing transmission of Covid-19 at polling places, including that poll workers should stay home if they are sick, clean frequently touched surfaces, disinfect potentially contaminated surfaces after cleaning, wash hands frequently, and clean and disinfect voting machines and other equipment.
        - The U.S. Election Assistance Commission (EAC) has posted guidance from vendors regarding the cleaning of voting machines.
    - Polling places should be equipped with soap, water, and drying materials and an alcohol-based hand sanitizer.
    - Procedures should be established to ensure that hand sanitizer use does not jam ballot scanners.
    - Ballot-marking procedures should be established to minimize viral transmission. For instance, where possible, voters should be provided with disposable pens to mark paper ballots and should also be encouraged to bring their own pens to the polling place. Election officials should consult with their machine vendors to determine whether Q-tips or other disposable devices can be used to mark votes, instead of voters using their fingers.

- To comply with government health organizations' recommended social distancing policies, polling places will require reconfiguration to allow substantial space between voting privacy booths, distance between poll workers, etc.
    - Increased funding and preparation will be needed for resources such as additional machines, additional staff, and larger voting spaces.
    - Reconfiguration plans should account for voters with disabilities to ensure these voters do not face extra burdens by the placement of voting equipment and check-in stations.

- Adequate polling place resources, including voting machines, ballots, and poll workers, should be provided to minimize lines, since crowds and exposure time are key determinants of the likelihood of contracting viruses, and since long lines are in part a function of inadequate election day resources. (This is particularly critical since the CDC recently recommended canceling gatherings of 50 people or more for eight weeks.)
    - Increased funding for and deployment of polling place resources is needed to minimize lines.
    - Resource plans should include recruitment of additional poll workers to account for potential absences due to sickness or fear of Covid-19.
        - Plans may include recruiting workers who were displaced or laid off due to the effects of Covid-19 and nonessential federal, state and local workers (who do not have a conflict of interest), expanding student and bilingual poll worker programs, using temporary staffing agencies, and relaxing poll worker qualifications.

        - Funding should be provided to increase incentive compensation for poll workers and to pay overtime to poll workers working to process lines that remain after poll closing hours.
        - Jurisdictions should also consider recruiting additional poll workers who can serve as "greeters" to triage different types of voters — for example, identifying voters who are there to drop off a ballot as opposed to casting a ballot on a machine, or those who need language assistance.
    - Resource plans should also account for online or webinar-based trainings of poll workers.
    - Jurisdictions that are required to provide language assistance in languages other than English should hire professional interpreters to offer assistance by phone at any stage of the voting process where translation is needed.
    - Curbside voting options should be made available, especially for voters with disabilities or illnesses who may not be able to leave their vehicles. (Note that as a general matter, curbside voting is not a legal cure to inaccessible polling locations.)

- Jurisdictions should prepare for a surge in provisional voting due to delays in processing of voter registration applications, voter confusion resulting from polling site closures and consolidation, and unfamiliarity with absentee voting.
    - Poll workers must receive additional training on provisional voting procedures, including training to ensure that every person who presents themselves as eligible to vote has a right to cast a provisional ballot.
    - Election officials should stock extra provisional envelopes, provisional voter affidavits, and provisional voter notices of rights in all languages the jurisdiction is required to offer under Section 203 of the Voting Rights Act.
    - To account for anticipated concerns about the safety of certain polling places in states that have strict precinct voting requirements, provisional ballots cast by voters registered in the jurisdiction, but cast in the wrong precinct, should count for the races on which the voter is eligible to vote, and states should suspend restrictions that would prevent voters' ballots from counting.

2. <u>Early In-Person Voting</u>

- States should expand early voting options to reduce long lines and administrative stress on Election Day.
    - States that do not offer early in-person voting should implement it for this year — either by creating an early voting program or by modifying their existing absentee voting program to allow voters to cast absentee ballots in person.
    - States that offer early in-person voting should expand the number of locations at which it is offered and extend the days and hours on which it is offered.
    - Ideally, states should offer at least two weeks of early in-person voting, but states should offer a minimum of five days, including at least one Saturday and one Sunday.

- Voters should be encouraged to vote in advance of Election Day to minimize crowding of polling places.

- A significant infusion of resources is needed to expand flexible early voting, allow for ballots on demand in states that choose to offer early voting at vote centers, and implement technologies, like online wait time apps, that can help direct voters to locations with the shortest lines.

3. Mail Voting

a. Mail voting option for all, at no cost

- Mail-in ballot options should be extended to all voters.
  - All voters should be offered the option to cast their ballot by mail (with multiple submission options, as provided below), so as to enable voters to avoid lines at the polls and exposure to Covid-19.
    - However, in-person voting options consistent with public health must also be maintained.
  - Inactive and recently purged voters (who may have been improperly removed from the rolls) should be sent provisional ballots by mail if they request a mail ballot.
  - In the few states that have appropriate voter list and election infrastructure and widespread mail voting, it may be appropriate for election authorities to arrange to automatically send mail ballots to every registered voter, while maintaining in-person options for those who cannot vote by mail.
  - Given that mail-in voting may be the only option for people who need assistance or are immune-compromised to cast a ballot, states must allow voters who cannot vote in person — particularly people with disabilities, illness, or language assistance needs — to obtain assistance completing and submitting ballots from individuals they designate.
  - An immediate infusion of resources is needed for mail ballot tracking software, as well as for additional facilities costs for mail ballot processing and ballot duplication efforts.

- Voters should not bear the return postage cost for absentee ballots.
  - In addition, absentee ballots without postage should be delivered by the U.S. Postal Service.

- Jurisdictions should order adequate paper ballots and absentee ballot envelopes to account for the potential need to mail ballots to every registered voter.
  - At a minimum, enough paper ballots and absentee ballot envelopes should be printed to cover 120 percent of the number of registered voters in the jurisdiction at the time the ballots and envelopes are ordered. This will account for the anticipated surge in voter registrations before the presidential election and should

accommodate spikes in turnout for voters changing their minds and deciding to vote in person during early voting periods or at a polling place on Election Day.
    - Jurisdictions that are required to provide language assistance under Section 203 of the Voting Rights Act must provide ballots and other voting materials, including updates about the changes to election procedures, in all required languages. These jurisdictions should also offer language assistance by phone.
  - Covid-19 could unexpectedly impact printing vendor capacity, and officials should order ballots as soon as possible.
    - Voting system vendors should ensure there are enough commercial printers that know the vendor ballot specifications to meet additional demand and that election officials have the specifications so they too can print ballots as needed.
    - Where possible, states should use no-glue envelopes and instruct voters not to lick envelopes.

b. Requesting, receiving, and returning mail ballots

Options for requesting, receiving, and returning mail-in ballots should be expanded, while maintaining the security of the voting system.

- States should offer multiple methods of requesting mail-in ballots, including online, in person, by phone, and by mail.
  - States generally allow voters to request mail-in ballots in person or through the mail, but a number of states supplement these request methods. At least one supplemental method should be offered to voters in affected jurisdictions.
  - Jurisdictions should consider establishing secure processes by which voters who are unable to leave their homes can be offered an option to receive a blank ballot electronically.
    - In states that have tabulators that work only with certain ballots, email printed ballots should be an option of last resort (and will have to be counted by hand or duplicated before scanning).
    - Funding should be provided for this purpose, including for the duplication of ballots and the implementation of secure electronic technology for transmittal of blank ballots.
    - Web portals for online absentee ballot requests should be screen-reader compatible for voters with visual impairments.

- Secure options for returning ballots should be expanded.
  - States should offer voters drop boxes in accessible locations, if they are able to do so securely. Outside of government offices, drop boxes should be equipped with secure cameras.
  - Voters should also be offered secure curbside drop-off options at polling places.
  - States should allow voters who are unable to leave their homes to designate individuals to return their completed ballots.

- Deadlines for mail-in ballots to be requested and returned should be relaxed.

    - Voters in jurisdictions affected by Covid-19 should be permitted to request a mail-in ballot as close as possible to Election Day.
    - Mail-in ballot receipt deadlines should be extended to account for delays in U.S. Mail, ballot drop box retrieval, or other administrative processing delays caused by Covid-19. The receipt deadlines must not be extended so far as to prevent compliance with the federal Electoral College deadlines, though Congress should extend those deadlines.

c. Processing and counting mail ballots

- Election canvassing and certification deadlines should be extended to account for delays in receiving and processing mail-in ballots, and ballot processing times should be adjusted.
    - Election canvassing and certification deadlines should be extended to account for broader use of vote by mail, extended mail-in ballot deadlines, and disruptions to U.S. Mail service, while remaining consistent with (also extended) federal Electoral College deadlines.
    - In addition, while the CDC has stated, with respect to packages from China, that "there is likely very low risk of spread from products or packaging that are shipped over a period of days or weeks at ambient temperatures," it is conceivable that election officials will decide to quarantine mail-in ballots prior to canvassing them. Deadlines should be extended further to account for that.
    - Election officials should be permitted to begin processing mail-in ballots prior to the close of polls on Election Day, in order to save time and reduce the overall administrative burden.
    - While it would be completely inappropriate to move Election Day either nationally or in a particular state, the deadlines for counting ballots and resolving election disputes can and should be extended to ensure a fair and accurate count before the end of the year. Specifically, Congress should extend the Electoral College deadlines, merging or moving closer together the December 8, 2020 "safe harbor" deadline for states to resolve controversies over the appointment of electors and the December 14 meeting of the electors, and extending these deadlines to occur closer to the end of the calendar year.

- Reasonable, uniform processes for evaluating the validity of mail ballots should be implemented to prevent widespread disenfranchisement as a result of an uptick in mail ballots.
    - Uniform processes for signature matching should be implemented and funding for signature matching software should be provided. Because signature matching can lead to voter disenfranchisement, especially for voters with disabilities and illnesses, voters whose signatures are found not to match should be offered timely

notice and a meaningful opportunity to cure or prove that they personally cast the ballot.
    - Ballots should not be rejected based on technical defects that do not substantially relate to ensuring that the ballot was actually completed and cast by the voter.
    - Mail ballot requirements that necessitate in-person interaction — such as getting an absentee ballot notarized or witnessed, or curing defects with an absentee at a government office — should be modified.

- Mail ballot processing and administrative capacity should be expanded.
    - An immediate infusion of funding is needed to expand capacity to process a surge in the number of mail ballots, including purchasing high-speed ballot scanners and automated mail sorting systems, securing additional warehouse space to store the additional equipment and supplies needed for mail balloting, and increasing election staff to process mail ballots and ballot applications.
    - In jurisdictions that are required to provide language assistance pursuant to Section 203 of the Voting Rights Act, language assistance hotlines should be set up to provide general information and answer questions in mandated languages.

4. Voter Registration

Covid-19 may severely disrupt the ability of Americans to register to vote and elections officials to process registration applications. Quarantines, illnesses, and social distancing will likely reduce access to government offices that provide voter registration services or lead to postal service disruptions, particularly in the critical weeks leading up to voter registration deadlines, when most registrations typically occur.

a. Bolster online registration

- Online voter registration (OVR) systems must be bolstered to ensure they can accommodate a surge in use.
    - OVR systems should be tested and their capacity bolstered to ensure that they can handle surges in web traffic.
    - In the jurisdictions that manually process online registrations, OVR systems should be automated end to end, so that both the submission and the processing of registration applications occur electronically.
        - This will require a significant infusion of resources immediately
        - If registration processing is still manual, then jurisdictions will need a significant increase in staffing to process registrations, and contingency plans will be needed to ensure that registrations are processed if government offices close.

- States that link OVR systems to department of motor vehicle (DMV) databases should ensure that citizens without DMV records can still register online.
    - Ideally, states should ensure that the existing OVR system is capable of processing online registrations for registrants without DMV records (capturing

signatures from other government databases or allowing voters to provide signatures when they first vote).
    - Alternatively, states should provide a secure alternative electronic method to register to vote for those who cannot access the OVR system.

- States that do not have OVR should work to set up such a system immediately.
    - This will require a significant infusion of resources in the short term.
    - If that is not achievable, states should set up alternative electronic systems for registration.

b. Increase staffing

- Voter registration processing capacity should be enhanced with additional staffing to address a surge in voter interest and major disruptions to normal processes.
    - States that offer same-day registration (SDR) should prepare for an even greater surge in same-day registrations, if voters were unable to register in advance due to government office closures.
    - States without SDR should anticipate needing additional polling place staffing on Election Day to accommodate emergency addition of an SDR option.

c. Flexible registration deadlines

- States should prepare to extend voter registration deadlines in light of anticipated government office shutdowns, online access difficulties, and breakdowns in other voter registration systems.
    - An extension should be mandatory if large numbers of voters are unable to leave their homes, if government registration offices close, or if there are disruptions to online service as the voter registration deadline approaches.
    - If disruptions continue beyond the extended voter registration deadline, states should offer same-day registration and voting for voters affected by disruptions.

- Voters who submit timely registrations should be permitted to vote and have their votes counted, even if mail disruptions prevent their registrations from reaching election officials. To accomplish this, states should adopt one of the following options:
    - allow SDR for all voters in this election;
    - offer SDR (with a regular ballot) for voters who affirm that they submitted timely registrations or were unable to do so due to Covid-19; or
    - provide a provisional ballot to voters who affirm that they submitted timely registrations and ensure that those ballots are counted in a manner that does not penalize registrants for disruptions to the mail delaying receipt of voter registrations.
    - States should also count all provisional ballots cast by voters whose registrations were delayed by mail disruptions. In the event of mail disruptions, postmark dates alone should not be considered dispositive of timeliness, and election officials

should accept other indications by the U.S. Postal Service that the ballot was mailed on or before the close of polls on Election Day.

5. <u>Voter Education and Manipulation Prevention</u>

Fear and confusion around a pandemic create a fertile environment for disinformation and efforts to manipulate the electoral process for improper purposes and partisan gain. State officials, advocates, and citizens should take steps to guard against the use of Covid-19 to suppress voters or otherwise manipulate the election.

- States and localities should be clear and transparent about changes to voting rules.

- Aggressive public education campaigns must be mounted to inform voters regarding changes to voting rules and options.
    - Enhanced advertising in languages other than English should be provided to ensure that all voters understand changes to voting rules and options.
    - Election websites should be made fully accessible to voters with disabilities.
    - Funding will be needed to reach large numbers of voters affected by changes to voting rules and options.

- States will also need to plan to combat disinformation about voting rules changes, including strengthening the resiliency of tools for voter information like polling place lookup websites.

President Michael Waldman on Recent Police Killings and Civil Unrest

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ANALYSIS

Both Parties Must Protect the November Election from Covid-19

Associated Press

Holding an election safely and accessibly during a pandemic shouldn't be a partisan issue. It's a patriotic duty.

Michael Waldman

April 3, 2020

*This originally appeared in **USA Today**.*

Once again, President Donald Trump has said out loud the stuff you aren't supposed to say — this time about Democrats' failed push to include more early and mail voting in the coronavirus package he signed last week. "The things they had in there were crazy," Trump **complained** on "Fox and Friends." "They had things, levels of voting that if you'd ever agreed to it, you'd never have a Republican elected in this country again."

At least Trump doesn't pretend solemn worry about voter fraud. He doesn't rehash his boast that he really won the popular vote when you **"deduct" millions of illegal voters**, or insist that people cast ballots repeatedly by "**changing their shirts**." Instead, he's matter of fact about it all: The more voters there are, the worse he and his party will fare. That's unseemly, at best, for an elected official in a constitutional democracy.

A sharpened strategy to restrict the vote comes at the worst possible time, just when election systems are placed under extraordinary stress by the challenge of running an election during a pandemic.

Voting by mail is not a partisan issue

Turnout in 2018 was the highest in a midterm in **over a century**, and experts expected record levels this year. But participation plunged in the Illinois primary when the virus first hit two weeks ago. By contrast, **Arizona and Florida**, which allowed early and mail in voting, saw much higher participation. Only strong action can make it so voters can fully participate this year.

To make voting safe in November, states will need to make it possible for everyone to vote by mail. (Today, **17 states** lack that easy step.) The Brennan Center set **out a plan** now endorsed by 900 **political scientists**. For those who want to vote in person, expanded early voting is needed, with upgraded polling place security and sanitation. Deadlines for counting ballots will need to shift, since mail ballots take longer. And a public education campaign will have to alert citizens about new options and rules. All this would **cost $2 billion**.

The **$400 million** in a $2 trillion bill fell short of basic goals. Congress should pass the rest in its next funding package.

Now the action **must turn to states**. Some, such as Colorado or Oregon, vote nearly entirely by mail. California already sees nearly **two-thirds of votes** cast by mail. Other states lag far behind. In New York, for example, **only 4% of votes are cast absentee**. In some places, governors can move unilaterally. In others, now-scattered legislators must decide.

The country has only a few weeks for states to step up. Already, Republican and Democratic officials have **asked for more** help from Washington. These issues are often not particularly partisan in many states. Vote by mail, for example, has been widely supported, and is not seen as benefiting either party. One out of three voters casts ballots other than on Election Day, even before the pandemic. That's consumer demand in action.

Both parties should seek high turnout

That's why Trump's injection of partisan self-interest is especially ill advised. This is an issue shrouded in euphemism and cant. One of the president's top political aides admitted in taped remarks to an audience of Wisconsin Republicans **earlier this year**, "Traditionally it's always been Republicans suppressing votes in places. Let's start protecting our voters. We know where they are. ... Let's start playing offense a little bit." The official, Justin Clark, explained that he was actually decrying the false notion that Republicans engaged in voter suppression. One is reminded of the Marx Brothers line: "**Who are you going to believe, me or your own eyes**?"

There will be plenty of time and room for partisan brawling between now and November. You can't take politics out of politics. But it is illegitimate to aim to win by blocking your opponent's supporters from the polls, rather than turning out your own vote. And the civic function of running elections should be embraced by all parties.

In 1864, Abraham Lincoln was determined to hold the election amid the Civil War, even though he thought he would lose. (He wrote his cabinet a sealed letter explaining what they should do in the event of an expected

Democratic victory.) Lincoln explained to a crowd celebrating his victory, "**The election was a necessity**. We cannot have free Government without elections, and if the rebellion could force us to forego or postpone a national election, it might fairly claim to have already conquered and ruined us."

We can't let the coronavirus conquer our democracy in 2020. Making it possible for voters to cast ballots is a core patriotic duty.

President Michael Waldman on Recent Police Killings and Civil Unrest

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OPINION

Don't Let Democracy Be a Victim of the Virus

David McNew/Getty

An election campaign without an in-person component can diminish the voices of ordinary Americans and inflate the power of money. We must guard against that.

Zachary Roth

April 6, 2020

Amid the coronavirus crisis, democracy advocates are working overtime to ensure that the 2020 election can be conducted safely, freely, and fairly. The Brennan Center's **comprehensive plan** is centered on expanding online voter registration, extending registration deadlines, making vote-by-mail available to all, and providing safe in-person voting options. You should read it in full — then call on your state and national representatives to make it a reality.

But as foundational as voting is, a truly robust democracy also involves all of the in-person grassroots organizing activities that drive political campaigns —knocking doors, attending rallies and meetings, and gathering signatures, even down to standing at busy intersections or street corners holding signs. And all of those, of course, are now threatened by the social isolation guidelines that we all need to be following. That's a problem. An election campaign without an in-person component is one that inevitably diminishes the voices of ordinary

Americans and inflates the power of money — mostly in the form of the TV and online ads that will rush in to fill the void.

True, this could be worrying over nothing. Things could be more or less back to normal by the summer, allowing for a relatively smooth election process. But there are no guarantees — especially given the possibility that the virus recedes with the warmer weather, then resurges in the fall. So, it's not too early to start thinking about how to ensure that, in this crucial election year, grassroots democracy isn't yet another victim of the crisis.

Of course, one way to do that, which is already underway, is to start reimagining democratic engagement for the coronavirus era. People may not be able to mingle with candidates in person, but an online town hall offers the next best thing. If live conventions can't take place this summer, the parties should be figuring out now how to ensure that virtual ones still leave room for input from the rank and file. In recent years, technology has raised some serious challenges for democracy, but it also now allows us to forge connections in ways that were unimaginable just a few decades ago, and that can help preserve some of the most important forms of political participation.

It's also crucial to stay vigilant about things like freedom of speech and assembly, and the right to protest. For several years, there's been a push from some state governments, and the Trump administration, to crack down on grassroots activism. Bills have been **offered** that boost penalties for blocking roads or highways, make it harder to hold drivers liable if they injure protesters who are blocking traffic, and allow protesters to be sued for the costs of policing their protests.

And the Trump administration in 2018 **considered** new rules that would have severely limited the right to demonstrate in Washington, including charging protest organizers a fee. Now, amid the coronavirus threat, it's crucial we ensure that sensible public health measures that temporarily limit public gatherings aren't cynically turned into permanent restrictions on fundamental democratic rights — as may currently be **happening** in a range of other countries, and not only authoritarian ones.

Then there's the impact of the virus on the numerous campaigns to advance voter initiatives. Over the last decade, state and local ballot measures have emerged as perhaps the single most effective tactic for advancing progressive goals, on everything from democracy reform to criminal justice to healthcare access to a livable wage. They also have offered rare and inspiring examples of grassroots democracy in action — average Americans mobilizing to create change at a time when Washington feels less responsive to voters than ever. This year, robust campaigns were already underway to place on the ballot measures that would increase access to voter registration in Arizona, end gerrymandering in Oklahoma, raise the minimum wage in Ohio and Florida, establish paid leave in Colorado, and expand Medicaid in Missouri, among many others.

But thanks to the virus, that avenue for progress is threatened. When states began ordering lockdowns in mid-March, these campaigns were gearing up for, or in a few cases had already started, the major organizing challenge of gathering the signatures needed to qualify for the ballot over the spring and summer. (Florida, for instance, requires signatures from registered voters totaling 8 percent of all votes in the last presidential election, which comes to over 766,000 this year.) Now, they're scrambling to adjust. Some campaigns are looking into the feasibility of gathering signatures by mail. Others are pressing state officials to extend the deadline, or lower the threshold, for signatures.

Chris Melody Fields, the executive director of the Ballot Initiative Strategy Center, which supports progressive ballot measures across the country, acknowledged that qualifying for the ballot this year just became a far heavier lift, though she stressed that the work would continue regardless.

"If some of these measures do not qualify this year, we have to look at other options," she said. "But the important thing to remember is these issues remain critically important, and that opportunity will maybe shift to 2021 or 2022."

Still, what happens this year matters too. When a person doesn't exercise the muscles in their body, those muscles grow weaker. It's the same here: if we have an election campaign that's dominated even more than usual by TV and internet ads, and without a vibrant in-person component, we begin to gradually lose the capacity for popular democracy. In the end, the idea of ordinary people coming together to make change — by knocking doors for a candidate, by attending a protest or rally, by gathering signatures for a ballot measure — starts to seem futile. Even amid all the challenges we face right now, we shouldn't let that happen.

The views expressed are the author's own and not necessarily those of the Brennan Center.

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OPINION

Local Governments Are Stepping Up to Ease Voting

Where states are slow to act, cities and counties can make sure their voters can safely cast a ballot this year, writes Brennan Center Fellow Zachary Roth.

Elaine Thompson/AP

Zachary Roth

April 29, 2020

Over the last decade, local governments — especially larger cities — have emerged as trailblazers for progressive policies, on everything from raising the minimum wage to protecting public health to fighting discrimination. Now, they could be poised to play a crucial role in helping to build an election process that's safe, fair, and accessible amid the Covid-19 pandemic.

The Brennan Center has laid out the **key solutions** we need: expanded online voter registration, extended deadlines, and giving everyone both a vote-by-mail option and a safe in-person voting option. And the good news is that some states have taken the first steps to get there.

Virginia this month passed a voting overhaul that, among other steps, lets voters cast a mail ballot without an excuse. New Hampshire still requires an excuse for mail voting, but officials there said this month that concerns

about Covid-19 would **qualify**. And North Carolina moved quickly to **expand** access to online registration through the DMV.

But some states have been slower to act. Wisconsin failed to extend the deadline for receiving mail ballots for its primary this month, disenfranchising thousands of voters who didn't get their ballots in time. And Texas has so far rebuffed calls to extend vote by mail to everyone. A judge **ruled** this month that fear of catching Covid-19 is a good enough reason to use a mail ballot, but the state is expected to appeal. (President Trump, meanwhile, has **falsely** claimed that vote-by-mail opens the door to widespread fraud and has argued against making voting easier in response to the pandemic on the grounds that doing so would hurt Republicans, which is **not the case**.)

Inaction means that millions of would-be voters who can't vote by mail could be forced to choose this fall between their health and their democratic rights. But in recent weeks, local governments have been taking important steps — sometimes in the face of opposition from state leaders.

Perhaps no state exemplifies this dynamic better than Pennsylvania. The GOP-controlled state legislature recently rejected a measure to send mail ballots to all registered voters. But the state's two largest local governments are taking their own steps to get their voters mail ballots.

Philadelphia city commissioners **voted** this month to provide prepaid postage with all mail ballots for the state primary in June — helping Philly voters avoid being disenfranchised because they don't want to risk their health with a trip to the post office. And Allegheny County, which includes Pittsburgh, will **send** mail ballot applications — also with prepaid postage — to all registered voters. (Though, in a sign that there is more work to do, Allegheny County is also **proposing** to reduce in-person voting locations by 85 percent). In both counties, the increased access to mail ballots may stay in place for the fall general election.

In Florida, where vote by mail is well established and widely used (including by President Trump), Miami-Dade, Broward, and Palm Beach Counties all **plan** to send mail ballot applications to all registered voters. Together, the three counties make up over a quarter of the state's electorate.

And the city council in Milwaukee, the biggest city in the state that's perhaps most likely to determine the presidential election, **voted** last week to do the same thing — with pre-paid postage included.

At least one local government effort to expand access to voting has brought pushback from the state. When Arizona's largest county, Maricopa, last month announced plans to mail absentee ballots to all registered voters not already signed up to get one, the state claimed Maricopa lacked the authority to do the mailing, and a court **blocked** the move.

Of course, relying on local governments is an imperfect approach, since voters in other parts of the state don't benefit. It can also lead to voters getting conflicting information and being confused about the rules that apply to them. That's why state-level action is the best solution. But don't be surprised if local efforts start to spread — thanks, improbably enough, to the power of partisanship.

So far, they've mostly come from large cities, whose voters and elected officials tend to skew Democratic. That could cause Republican-leaning counties in those same states to worry that their voters will be at a disadvantage

in statewide races unless they adopt the same reforms, creating a race to the top. In swing states, where a few thousand voters either way could determine the presidential race, that dynamic figures to be especially strong.

There could even be a longer-term impact. If local governments see that they can play a major role in making voting easier, it could open up a promising new path for expanding voting access, even once the pandemic subsides — especially in states that have resisted modernizing their systems. For instance, local governments in states that don't offer online voter registration may this year start to explore whether they can legally do so. And if they move forward with it, they're unlikely to scrap it once the virus is beaten.

Still, let's not get ahead of ourselves. For now, some pioneering city and county governments are recognizing that they can help with the urgent task of ensuring that the 2020 election is safe and fair. In this all-hands-on-deck environment, it's a trend that deserves to catch on widely.

The views expressed are the author's own and not necessarily those of the Brennan Center.

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Saving Democracy from the Coronavirus

Quick and concerted action is needed to ensure that Covid-19 does not prevent millions from voting in November.

Jeff Kowalsky/Getty

Michael Waldman

Wendy R. Weiser

March 14, 2020

*This is part of the Brennan Center's **response to the coronavirus**.*

*This op-ed originally appeared in the **Los Angeles Times**.*

As the coronavirus upends American life and threatens public health, it's endangering the elections we use to choose our representatives as a free people. On Friday, Louisiana announced it would postpone its presidential primary to June. Other states have closed polling places, including those in senior facilities.

Our election system is utterly unready to deal with a pandemic. States that have primaries coming up in the next week or two are rapidly taking steps to keep voters safe from potential infection at polling places, putting in place

cleaning procedures and expanding polling areas to allow social distancing between voters. But as the virus spreads over time, that may not be enough.

This pandemic does not have an end date. But there's time to reduce risks if Congress and state legislatures act now. Quick and concerted action, backed by a significant infusion of federal resources, is needed to ensure that COVID-19 does not prevent millions from voting in November — a situation this country must avoid at all costs. Even for states with primaries in May or June, there's still time to put in place flexible electoral procedures that allow for safer voting methods.

For a comprehensive plan to protect the 2020 election from Covid-19, click here.

Start with voter registration. In the past, registration required physically filling out pieces of paper. Today 39 states allow voters to register online. The remaining states should do so, too, which will require federal dollars to add an online option. Those that already register voters online should bolster their current systems so officials don't have to manually process the records. And states will need to loosen registration deadlines to account for government office closures and delays.

Even before the pandemic, too many polling places have been shut down, leading to long lines and confusion. COVID-19 might force many more. After Hurricane Sandy hit New York and New Jersey in 2012, many voters had to go to new and unfamiliar sites. And long lines on election day could lead to dangerous exposure for voters and poll workers.

To prevent this, officials should keep existing polling places open, consistent with public health and protection needs. But if they can't, they must let people know where their new sites will be as soon as possible. That's especially important when it comes to voting sites at senior homes. And the voting period should be extended, preferably over two weeks, to prevent long lines and allow for social distancing.

For the millions of voters who will be unable or unwilling to go to a polling place this year, there needs to be a universal option of voting by mail. In states where election officials do not already have the authority to provide this option, this will require action by state legislatures or Congress or emergency orders by state executives. Voters should be given the chance to ask for mail-in ballots in myriad ways — on the phone, online, by letter. Officials should print enough ballots so that every possible voter could get one.

Security for mail-in ballots is critical, too. Secure drop boxes could be installed at government offices or other locations to avoid tampering and bolster confidence. Deadlines should be extended so that all mail-in ballots are counted. While mail voting should be available to all, in-person balloting is still the most accessible and secure option for many Americans. For those in many Native American communities, it is the only one. We should do what we can to retain the in-person option.

Unlike primary elections, which states can move, the presidential election date was set by a federal law in the 1840s and applies uniformly across the country. Presidents are sworn in on Jan. 20, and a shift would leave little time for a transition. That's why it's critical we take the steps needed to ensure that everyone can vote safely and securely in November.

We've never had to run an election beset by a public health emergency of this kind. But we've had to cast ballots amid crisis and disruption before. In 1864, during the Civil War, Abraham Lincoln was determined to maintain free

elections, even though he believed he might lose. “We cannot have free government without elections; and if the rebellion could force us to forgo, or postpone a national election it might fairly claim to have already conquered and ruined us,” he wrote.

With the same spirit, we can make sure this devastating pandemic does not undermine our democracy.

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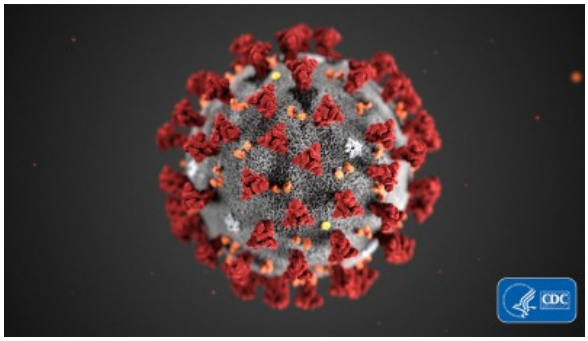

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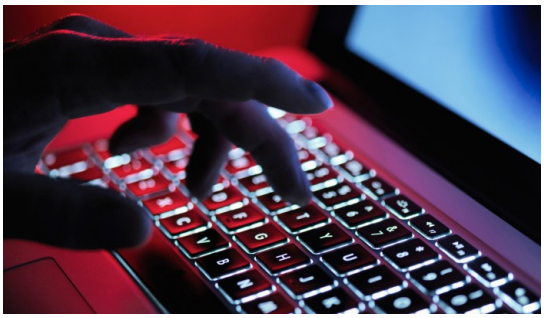

Andrew Brookes/Getty

Companies touting internet voting as secure and reliable can't back up their claims.

Lawrence Norden Frank Reyes

May 21, 2020

There has been **growing buzz** around the potential for internet voting as states struggle with preparing to conduct safe and fair elections during the Covid-19 pandemic. Companies selling online voting systems promise a "silver bullet" to deal with voting during the pandemic: a new technology that will allow people to vote from their homes, a safe distance from others.

Unfortunately, there is no magical solution for running elections during a pandemic. Ensuring voters and election workers can be safe will require **money, work, and time**. States and localities need substantial resources to ensure they can handle more mail balloting and keep polling places safe.

Indeed, given all the other changes election officials and voters are facing this year, there couldn't be a *worse* time to try to add a risky, unproven technology like internet voting into our elections, particularly when **we know** that hostile actors have not given up on disrupting our democracy.

Not during a crisis

Leading experts in cybersecurity, computer science, and election infrastructure agree that current technology cannot guarantee secure and reliable voting online. Many states, along with the Department of Defense for service members overseas, have experimented with internet-based voting platforms only to **have abandoned them** due to security vulnerabilities and ballooning implementation costs.

On May 7, a group of scientists reiterated these concerns in a **letter** to the Department of Homeland Security. The following day, DHS, the FBI, and the Election Assistance Commission issued **guidance** to states warning about the "significant security risk" of internet-based voting systems.

Many of the existing pilot programs have only involved a very small number of voters. West Virginia's program in 2018 tallied just 144 ballots, with the secretary of state **extolling** its success, and leading the governor to **permit** election officials to create an electronic voting system for people with physical disabilities this year. Such limited results are insufficient to justify large expansions.

Yet a spokesman for the state of New Jersey **said** that a limited rollout of internet voting in its summer primary could be "essentially a pilot for if we need to use it more broadly in the future." (After a **lawsuit** and **opposition** from election integrity groups, the state dropped plans for internet voting this summer, but left open the possibility of using it this November.)

During the best of times, implementing fundamental security practices for election system technologies continues to be a challenge. Amid a pandemic and presidential election is not the time to try out this unproven technology.

Limited resources

When state and local budgets are so strained, funding online voting pilot programs isn't a good use of government funding. The Brennan Center has **recommended** that Congress allocate $4 billion to help state and local governments implement the necessary upgrades just to protect voters from both the coronavirus and cyberattacks this year. That's where all available resources need to go.

And IT personnel in these jurisdictions are already under pressure to maintain existing election systems. Rolling out and supporting a brand new one would be an unnecessary distraction that would weaken the entire system overall.

Hostile actors have not stopped threatening our elections

It may be difficult to remember now, but a few months ago, one of the biggest threats to safe elections was from hostile nations like Russia, which engaged in a widespread attack against our election infrastructure in 2016. That threat hasn't disappeared merely because we're in the middle of a pandemic.

Indeed, Federal intelligence agencies **continue to warn** that "Russia, China, Iran, and other foreign malicious actors all will seek to interfere in the voting process." As Sen. Richard Burr (R-NC), then chairman of the Senate

Intelligence Committee recently **noted** after the committee put out its April 2020 assessment of Russian interference in American elections, "With the 2020 presidential election approaching, it's more important than ever that we remain vigilant against the threat of interference from hostile foreign actors."

Online criminals have also been **busy exploiting** vulnerabilities resulting from the displacement caused by Covid-19, such as targeting people working from home. Hacking into an internet voting system to hold it for ransom or simply to sow chaos is a serious danger.

The need for federal leadership

The short-term problem of running an election during a pandemic and the longer-term problem of ensuring states and localities do not embrace insecure internet voting schemes hawked by private vendors both require federal solutions.

Right now, states need billions of dollars to ensure voters and election workers can participate safely in the 2020 elections. That includes everything from buying enough personal protective equipment and sanitizers at hundreds of thousands of polling places — for voters who choose to or must vote in person — to creating the infrastructure to securely and efficiently handle tens of millions of extra mail ballots.

In the longer term, the push for internet voting by vendors selling new systems to the public will continue. Strapped state and local election officials shouldn't be left on their own to figure out whether a system is secure and reliable.

It is possible that one day, we can develop such a system. But currently, there are no generally accepted benchmarks to evaluate the security of online voting pilots that jurisdictions occasionally try. When this year's elections are over, Congress should consider how key federal agencies, in partnership with the elections community and technology providers, can establish a risk management framework specifically for online voting systems that would allow election officials to rely on something more than the promises of private vendors looking to sell their product.

Until that happens, no one should be using such systems, especially as a knee-jerk response to a pandemic.

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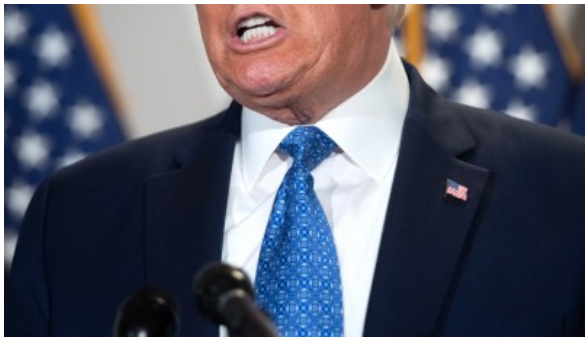

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May 22, 2020

Max Feldman

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RESOURCE

Preparing Your State for an Election Under Pandemic Conditions

Here's a 50-state breakdown of what policies states already have and still need in order to best protect the November 2020 election from the Covid-19 pandemic.

Alex Adelman/Getty

LAST UPDATED: May 29, 2020
PUBLISHED: March 24, 2020

*This is part of the Brennan Center's **response to the coronavirus**.*

The Brennan Center has laid out **steps** election administrators should undertake to ensure that voting is accessible, safe, and secure in the face of the Covid-19 pandemic. The tables below show where states currently stand on some of our key recommendations concerning:

Voter Registration
In-Person Voting
Mail-Ballot Voting
The Counting of Mail Ballots

Voters and advocates can assess how their state stacks up and where change is needed. For those who want a more general overview of how prepared your state is for the November election, please consult the first table directly below.

The information in the tables below will be updated as states adopt and implement new election reforms for the November election.

Preparing for an Election Under Pandemic Conditions

STATE	NUMBER OF REGISTERED VOTERS (2018)	MAIL BALLOTS RETURNED AS PERCENT OF TURNOUT (2018)	ALL VOTERS CAN VOTE BY MAIL WITHOUT AN EXCUSE	ONLINE MAIL BALLOT REQUEST AVAILABLE STATEWIDE***	VOTE CENTERS ON ELECTION DAY (IN AT LEAST SOME COUNTIES)	IN-PERSON EARLY OR ABSENTEE VOTING	ONLINE VOTER REGISTRATION	SAME DAY REGISTRATION
AL	3,465,352	3%	✗	✗	✗	✗	√	✗
AK	624,467	9%	√	✗	✗	√	√	✗
AZ	4,276,891	79%	√	√	√	√	√	✗
AR	1,786,840	2%	✗	✗	√	√	✗	✗
CA	25,167,218	66%	Vote by Mail*	Vote by Mail*	√	√	√	√
CO	3,953,613	95%	Vote by Mail*	Vote by Mail*	√	√	√	√
CT	2,369,335	6%	✗	✗	✗	✗	√	√
DE	695,014	4%	✗	√	✗	✗	√	✗
DC	617,046	4%	√	√	✗	√	√	√
FL	14,126,722	31%	√	√	✗	√	√	✗
GA	6,944,851	6%	√	✗	✗	√	√	✗
HI	756,751	56%	Vote by Mail*	Vote by Mail*	√	√	√	√
ID	917,609	12%	√	√	✗	√	√	√
IL	8,751,060	9%	√	✗	✗	√	√	√
IN	4,500,196	33%	✗	✗	√	√	√	✗
IA	2,193,813	24%	√	✗	Local & Special Elections	√	√	√
KS	1,835,473	16%	√	✗	Not Implemented	√	√	✗
KY	3,402,905	2%	✗	✗	✗	✗	√	✗
LA	2,992,170	3%	✗	√	✗	√	√	✗
ME	1,057,967	29%	√	√	✗	√	✗	√
MD	3,954,027	5%	√	√	✗	√	√	√
MA	4,574,967	3%	✗	✗	✗	√	√	✗
MI	7,471,088	24%	√	✗	✗	√	√	√
MN	3,422,515	24%	√	✗	✗	√	√	√
MS	2,079,732	7%	✗	✗	✗	✗	✗	✗
MO	4,127,333	8%	✗	✗	✗	✗	√	✗
MT	706,173	72%	√	✗	✗	√	✗	√
NE	1,219,276	24%	√	✗	✗	√	√	✗
NV	1,773,566	9%	√	✗	√	√	√	√
NH	988,148	8%	√	✗	✗	✗	✗	√
NJ	5,869,078	13%	√	✗	✗	√	Not Implemented	✗
NM	1,261,639	63%	√	√	√	√	√	Not Implemented
NY	12,695,763	4%	✗	✗	✗	√	√	✗
NC	7,095,209	3%	√	✗	✗	√	√	Early Voting Only
ND	N/A**	29%	√	√	√	Some Counties	N/A**	N/A**
OH	8,070,917	21%	√	✗	✗	√	√	✗
OK	2,120,843	6%	√	√	✗	√	Not Implemented	✗
OR	2,748,232	100%	Vote by	Vote by	√	√	√	✗

			Mail*	Mail*				
PA	8,607,748	4%	√	√	X	√	√	X
RI	781,478	7%	√	X	X	X	√	X
SC	3,538,580	4%	X	X	X	√	√	X
SD	594,453	26%	√	X	√	√	X	X
TN	4,163,359	2%	X	X	√	√	√	X
TX	15,615,925	6%	X	X	√	√	X	X
UT	1,658,457	90%	Vote by Mail*	Vote by Mail*	√	√	√	√
VT	489,385	10%	√	√	X	√	√	√
VA	5,666,627	3%	√	√	X	√	√	X
WA	4,841,431	98%	Vote by Mail*	Vote by Mail*	√	√	√	√
WV	1,245,827	2%	X	X	X	√	√	X
WI	3,442,004	6%	√	√	X	√	√	√
WY	283,941	30%	√	X	√	√	X	√

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Note: *In Vote by Mail states, all voters receive their ballots by mail automatically. California will send all voters a mail ballot for the November election only
** North Dakota does not have voter registration

Voter Registration

Covid-19 may severely disrupt Americans' ability to register to vote and elections officials' capacity to process voter registration applications. Quarantines and social distancing measures will likely reduce access to government offices that provide voter registration services and could lead to postal service disruptions, particularly in the critical weeks leading up to voter registration deadlines, when most registrations typically occur. The table below outlines voter registration deadlines, the existence of and access to online voter registration, and whether states allow voters to register in-person past the deadline for the November election.

Voter Registration

STATE	NUMBER OF REGISTERED VOTERS (2018)	ONLINE VOTER REGISTRATION	SAME DAY REGISTRATION	DEADLINE TO REGISTER WHEN NOT REGISTERING IN PERSON
AL	3,465,352	√	X	15 days
AK	624,467	√	X	30 days
AZ	4,276,891	√	X	29 days
AR	1,786,840	X	X	30 days
CA	25,167,218	√	√	15 days
CO	3,953,613	√	√	8 days
CT	2,369,335	√	√	7 days
DE	695,014	√	X	24 days
DC	617,046	√	√	21 days
FL	14,126,722	√	X	29 days
GA	6,944,851	√	X	29 days
HI	756,751	√	√	29 days
ID	917,609	√	√	25 days
IL	8,751,060	√	√	28 days by mail; 16 days online
IN	4,500,196	√	X	29 days
				10 days for general

IA	2,193,813	√	√	election; 11 days for all other elections
KS	1,835,473	√	X	21 days
KY	3,402,905	√	X	29 days
LA	2,992,170	√	X	30 days by mail; 20 days online
ME	1,057,967	X	√	21 days
MD	3,954,027	√	√	21 days
MA	4,574,967	√	X	20 days
MI	7,471,088	√	√	15 days
MN	3,422,515	√	√	21 days
MS	2,079,732	X	X	30 days
MO	4,127,333	√	X	27 days
MT	706,173	X	√	30 days
NE	1,219,276	√	X	18 days
NV	1,773,566	√	√	28 days for in-person or by mail; Thursday before election for online
NH	988,148	X	√	6-13 days (deadline varies by township)
NJ	5,869,078	Not Implemented	X	21 days
NM	1,261,639	√	Not Implemented	28 days
NY	12,695,763	√	X	25 days
NC	7,095,209	√	Early Voting Only	25 days
ND	N/A*	N/A*	N/A*	N/A*
OH	8,070,917	√	X	30 days
OK	2,120,843	Not Implemented	X	25 days
OR	2,748,232	√	X	21 days
PA	8,607,748	√	X	15 days
RI	781,478	√	X	30 days
SC	3,538,580	√	X	30 days
SD	594,453	X	X	15 days
TN	4,163,359	√	X	30 days
TX	15,615,925	X	X	30 days
UT	1,658,457	√	√	11 days
VT	489,385	√	√	No deadline
VA	5,666,627	√	X	22 days for primaries and general election; 14 days for special elections; 7 days for a special election called

In-Person Voting

Safe and healthy polling places will be **a critical part of our election infrastructure** in November. People without internet and mail access, those who need language assistance to vote, and people with disabilities who rely on voting machines to cast a private and independent ballot will be disenfranchised if polling places are closed. To ensure that everyone can vote, jurisdictions should do their best to keep polling places open and safe for voters and election workers alike, expand early voting, and guard against long lines and mass confusion by adding vote

centers that can serve a variety of voter needs. The table below identifies states that currently offer early voting and vote centers for general elections.

In-Person Voting

STATE	VOTE CENTERS ON ELECTION DAY (IN AT LEAST SOME COUNTIES)	IN-PERSON EARLY OR ABSENTEE VOTING
AL	✗	✗
AK	✗	√
AZ	√	√
AR	√	√
CA	√	√
CO	√	√
CT	✗	✗
DE	✗	✗
DC	✗	√
FL	✗	√
GA	✗	√
HI	√	√
ID	✗	√
IL	✗	√
IN	√	√
IA	Local & Special Elections	√
KS	Not Implemented	√
KY	✗	✗
LA	✗	√
ME	✗	√
MD	✗	√
MA	✗	√
MI	✗	√
MN	✗	√
MS	✗	✗
MO	✗	✗
MT	✗	√
NE	✗	√
NV	√	√
NH	✗	✗
NJ	✗	√
NM	√	√
NY	✗	√
NC	✗	√
ND	√	Some Counties
OH	✗	√
OK	✗	√
OR	√	√
PA	✗	√
RI	✗	✗
SC	✗	√
SD	√	√
TN	√	√
TX	√	√
UT	√	√
VT	✗	√
VA	✗	√
WA	√	√
WV	✗	√
WI	✗	√

WY		√			√	

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Requesting and Returning Vote-by-Mail Ballots

A mail-ballot option should be extended to all voters this November to minimize voters' exposure to Covid-19 and reduce lines and crowds at the polls. Options for requesting, receiving, and returning mail ballots should be expanded while maintaining the security of the voting system. The table below includes which states allow all voters to cast a mail ballot as well as which states allow voters to request a mail ballot online, the state deadline for requesting a mail ballot, and whether states have burdensome ID or witness requirements.

Requesting and Returning Vote-by-Mail Ballots

STATE	ALL VOTERS CAN VOTE BY MAIL WITHOUT AN EXCUSE	ONLINE MAIL BALLOT REQUEST AVAILABLE STATEWIDE**	DEADLINE FOR RECEIPT OF MAIL BALLOT REQUEST WHEN MAILED***	NO ID REQUIREMENT TO VOTE BY MAIL****	NO NOTARY OR WITNESS REQUIREMENT FOR RETURN OF MAIL BALLOT	PRE-PAID POSTAGE STATEWIDE
AL	X	X	5 days before election (12 PM)	X (Application)	X (2 witnesses or 1 authorized official)	X
AK	√	X	10 days before election (12 PM)	√	X (1 witness or 1 authorized official)	X
AZ	√	√	11 days before election (5 PM)	√	√	√
AR	X	X	7 days before election (12 PM)	X (ID or sworn statement with ballot)	√	X
CA	Vote by Mail*	Vote by Mail*	Vote by Mail*	√	√	√
CO	Vote by Mail*	Vote by Mail*	Vote by Mail*	√	√	X
CT	X	X	1 day before election (12 PM)	√	√	X
DE	X	√	7 days before election (12 PM)	√	√	√
DC	√	√	4 days before election (12 PM)	√	√	X
FL	√	√	Postmark 10 days before election (5 PM)	√	√	X
GA	√	√	4 days before election (12 PM)	√	√	X
HI	Vote by Mail*	Vote by Mail*	Vote by Mail*	√	√	√
ID	√	√	11 days before election (12 PM)	√	√	X
IL	√	X	5 days before election (12 PM)	√	√	X
IN	X	X	12 days before election (12 PM)	√	√	√
IA	√	X	10 days before general election; 11 days for all other elections (5 PM)	√	√	√
KS	√	X	7 days before election (12 PM)	X (Application)	√	X
KY	X	X	7 days before election (12 PM)	√	√	X

LA	✗	√	4 days before election (12 PM)	√	✗ (1 witness)	✗
ME	√	√	3 business days before election (12 PM)	√	√	✗
MD	√	√	7 days before election (12 PM)	√	√	✗
MA	✗	✗	1 day before election (12 PM)	√	√	✗
MI	√	✗	4 days before election (5 PM)	√	√	✗
MN	√	✗	1 day before election (12 PM)	√	✗ (1 witness or notary public)	√
MS	✗	✗	None	√	✗ (authorized official)	✗
MO	✗	✗	13 days before election (12 PM)	√	✗ (notary public)	√
MT	√	✗	1 day before election (12 PM)	√	√	✗
NE	√	✗	12 days before election (6 PM)	√	√	✗
NV	√	✗	14 days before election (5 PM)	√	√	√
NH	√	✗	1 day before election (5 PM)	√	√	✗
NJ	√	✗	7 days before election (12 PM)	√	√	✗
NM	√	√	5 days before election (5 PM)	√	√	√
NY	✗	✗	7 days before election (12 PM)	√	√	✗
NC	√	✗	7 days before election (12 PM)	√	✗ (2 witnesses or 1 notary public)	✗
ND	√	√	1 day before election (12 PM)	✗ (Application)	√	✗
OH	√	✗	3 days before election (12 PM)	√	√	✗
OK	√	√	6 days before election (5 PM)	√	✗ (notary public)	✗
OR	Vote by Mail*	Vote by Mail*	Vote by Mail*	√	√	√
PA	√	√	7 days before election (5 PM)	√	√	✗
RI	√	✗	21 days before election (12 PM)	√	✗ (2 witnesses or 1 notary public)	Unclear; Depends on SOS
SC	✗	✗	4 days before election (12 PM)	√	✗ (1 witness)	✗
SD	√	✗	1 day before election (5 PM)	X (Notarized oath or ID with application)	√	✗
TN	✗	✗	7 days before election (12 PM)	√	√	✗
TX	✗	✗	11 days before election (12 PM)	√	√	✗
UT	Vote by Mail*	Vote by Mail*	Vote by Mail*	√	√	✗
VT	√	√	1 day before election (5 PM)	√	√	✗
VA	√	√	11 days before election (5 PM)	√	✗ (1 witness)	✗
WA	Vote by Mail*	Vote by Mail*	Vote by Mail*	√	√	√
WV	✗	✗	6 days before election (12 PM)	√	√	√
WI	√	√	5 days before election (5 PM)	✗ (Application)	✗ (1 witness)	√
WY	√	✗	1 day before election (12 PM)	√	√	✗

election (12 PM)

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Note: * In Vote by Mail states, all voters receive their ballots by mail automatically. California will send all voters a mail ballot for the November election only
** In some states, online mail ballot request is available in some counties but not all
*** For mailed requests for a vote-by-mail ballot to be sent to voter. Online and in-person requsts may have different deadlines

Counting Vote-by-Mail Ballots

Nationwide, over 430,000 mail ballots were rejected in 2018 because of mail delays, minor technical defects, and voter errors in completing a mail ballot, among other reasons. Rejected ballots hit underrepresented communities hardest. In some states, Black, Latino, Asian, and other minorities have had their mail ballots rejected at much higher rates than white voters. The table below includes which states currently accept ballots that were cast on time but arrived late, the rules around fixing signature problems, and the percentage of cast ballots that were submitted through the mail in the state in 2018.

Counting Vote-by-Mail Ballots

STATE	ACCEPTS LATE ARRIVING MAILED BALLOTS POSTMARKED BY ELECTION DAY	STATES PROVIDE NOTICE AND OPPORTUNITY TO CURE SIGNATURE DEFECT AFTER ELECTION DAY	MAIL BALLOTS RETURNED AS PERCENT OF TURNOUT (2018)
AL	✗	✗	3%
AK	√ (Up to 10 days post election)	✗	9%
AZ	✗	Mismatch signature only. Notice through "reasonable and meaningful attempt" to contact voter. Voters must cure by 5 days after Election Day.	79%
AR	✗	✗	2%
CA	√ (Up to 3 days post election)	√ (Mismatch and missing signatures. At least 8 days notice for voters. Voters must cure by 5 PM, 2 days prior to certification of election)	66%
CO	✗	√ (Mismatch and missing signatures. At least 2 days notice for voters. Voters must cure by 8 days after Election Day)	95%
CT	✗	✗	6%
DE	√ (Up to 7 days post election)	✗	4%
DC	✗	✗	4%
FL	✗	√ (Mismatch and missing signatures. Notice "as soon as practicable" to voters. Voters must cure by 5 PM, 2 days after Election Day)	31%
GA	✗	Pending	6%
HI	✗	√ (Mismatch and missing signatures. Notice to voters. Voters must cure by 5 days after Election Day)	56%
ID	✗	✗	12%
IL	√ (Up to 14 days post election)	√ (Mismatch and missing signatures. Notice within 2 days of rejection. Voters must cure by 14 days after Election Day)	9%
IN	✗	✗	33%
IA	✗	✗	24%
KS	√ (Up to 3 days post election)	√ (Mismatch and missing signatures. Notice to voters. Voters must cure by 3 days after Election	16%

		Day)	
KY	✗	✗	2%
LA	✗	✗	3%
ME	✗	✗	29%
MD	√ (Up to 10 days post election)	✗	5%
MA	✗	✗	3%
MI	✗	✗	24%
MN	✗	✗	24%
MS	✗	✗	7%
MO	✗	✗	8%
MT	✗	✗	72%
NE	✗	✗	24%
NV	√ (Up to certification deadline)	√ (Mismatch and missing signatures. Notice to voters. Voters must cure by 7 days after Election Day)	9%
NH	✗	✗	8%
NJ	√ (Up to 2 days post election)	✗	13%
NM	✗	✗	63%
NY	✗	✗	4%
NC	√ (Up to 3 days post election)	✗	3%
ND	✗	✗	29%
OH	✗	√ (Mismatch and missing signatures. Notice to voters. Voters must cure by 7 days after Election Day)	21%
OK	✗	✗	6%
OR	✗	√ (Mismatch and missing signatures. Notice to voters. Voters must cure by 14 days after Election Day)	100%
PA	✗	Unclear	4%
RI	✗	√ (Mismatch and missing signatures. At least 6 days notice to voters. Voters must cure by 7 days after Election Day)	7%
SC	✗	✗	4%
SD	✗	✗	26%
TN	✗	✗	2%
TX	√ (Up to 1 day post election)	Optional procedure at discretion of county.	6%
UT	✗	Mismatch signature only. At least 7 days notice for voters. Voters must cure by 5 PM, day before canvass.	90%
VT	✗	✗	10%
VA	√ (Up to 3 days post election)	✗	3%
WA	√ (No deadline for arrival if postmarked	√ (Mismatch and missing signatures. Notice to	

President Michael Waldman on Recent Police Killings and Civil Unrest

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ANALYSIS

Americans of All Stripes Want a Mail Ballot Option

As the president wages a disinformation campaign against mail voting, nearly 80 percent of Americans want a mail ballot option this November.

Jason Redmond

Michael Waldman

April 10, 2020

As the coronavirus looms over the 2020 election, President Trump has begun to attack vote by mail. Unfortunately for him, that's a losing argument. A strong majority of Americans — including 57 percent of Republicans — want the opportunity to safely cast their votes by mail without having to wait in long lines or crowds.

A new Brennan Center poll **finds** that four out of five Americans believe states should give all voters the option of unexcused mail ballots during the November election. The poll, conducted by the Benenson Strategy Group between March 22 and 24, reached a representative sample of 1,550 adults, 90 percent of whom were registered voters. Our poll tracks a recent Reuters/Ipsos poll that **found** 72 percent of Americans, including 65 percent of Republicans, want a mail ballot option for November 3.

Vote by mail is only one solution. It would not be possible to shift to this exclusively nationwide by November, even if it were a good idea. Many voters **want or need to vote in person**. Election Day itself, of course, cannot be postponed without a new federal statute — and that would be utterly illegitimate. There must be ample early voting opportunities nationwide. That, too, is broadly popular, according to the new Brennan Center poll. Two-thirds of Americans — including 43 percent of Republicans and 65 percent of independents — also support allowing Election Day to take place over a time period of as much as two weeks to ensure that no one has to wait in long lines.

This, of course, makes sense: Americans do not want to put their health in jeopardy by going to crowded polling places if the virus has a resurgence this fall. Trump, however, sees a dark conspiracy afoot. He **says** vote by mail creates a "[t]remendous potential voter fraud" and that it "doesn't work out well for Republicans."

Both are untrue.

Much of the country already votes by mail ballots with infinitesimal fraud. Five states run their elections almost entirely by vote by mail. In 28 states and the District of Columbia, voters have the right to request a no-excuse absentee ballot. In some of these states — including California and Arizona — most citizens vote from home.

There is also no evidence that vote by mail benefits one party more than another. It's used in Republican Utah and narrowly divided Colorado. Conservative publications and groups, such as the ***Washington Times***, ***National Review***, and the **American Enterprise Institute**, have published pieces in favor of vote by mail. If the president believes vote by mail is "corrupt," he has a funny way of showing it.

In any case, we have no choice.

Wisconsin shows what can happen all across the country in November. In the Badger State, voters can cast ballots by mail, but the volume of last-minute requests swelled the number of mail ballots issued to nearly 1.3 million from around 250,000 four years ago, overwhelming the system. The state's conservative supreme court then blocked the governor's move to postpone voting, and the U.S. Supreme Court overturned a lower court decision that would have allowed more ballots to be counted. In Milwaukee, the number of polling places dropped from 178 to 5. Primary day saw the horrifying specter of people risking their health to wait in line to vote.

Congress has a chance to avoid more debacles in November. The Brennan Center has **issued a plan** for a free, fair, secure, and safe election in 2020. We've **estimated the cost**: at least $2 billion — and that's just for November. Congress acted in the third coronavirus stimulus bill, appropriating $400 million to go to states to help them prepare. Now Congress must do more, appropriating all needed funds. States have limited time to get ready.

Without action, it's hard to escape the conclusion that the president and his acolytes hope to use the crisis to collapse turnout. If they do, they will discover they are running up against a solid wall of support for needed voting changes — support from Republicans, Democrats, and independents. Voters want to vote. Politicians should let them.

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RESOURCE

Bipartisan Support for Expanded Mail Voting for 2020 Elections

Jason Redmond/Getty

There is strong bipartisan consensus on the need to expand mail voting in the face of the current pandemic.

Dominique Erney

Wendy R. Weiser

PUBLISHED: April 15, 2020

Ensure Every American Can Vote

Voting Reform

In the face of the current pandemic, there is no question that widespread use of mail voting is necessary to hold free, fair, and safe elections. The American public, from across the political spectrum, broadly supports increased mail voting this year.

Yet President Trump has **criticized** the practice saying: "Republicans should fight very hard when it comes to state wide mail-in voting. Democrats are clamoring for it. Tremendous potential for voter fraud, and for whatever reason, doesn't work out well for Republicans." Contrary to President Trump's **protestations**, mail voting is

secure and does **not harm** Republicans (who vote by mail at high rates) or any other constituency. And he is incorrect that Republicans do not support expanded use of mail ballots this year.

In fact, there is strong bipartisan consensus on the issue. Democratic political leaders have been near-unanimous in their call for expanding mail voting. And as we document below, with selected quotes, reporting, and polling, it enjoys widespread support among Republican election officials, political leaders, and voters.

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Republican Voters Support Mail Voting Option

72% of all U.S. adults said that they would support a requirement for mail in ballots as a way to protect voters, including 65% of Republicans, according to a Reuters poll conducted in early April 2020. -- **https://www.reuters.com/article/us-usa-election-poll-idUSKBN21P3G0**

A Brennan Center/Benenson poll conducted on March 22-24, 2020 found that four out of five Americans believe states should give all voters the option of voting mail ballots without having to provide an excuse during the November election. 57% of Republicans surveyed agreed that "all states should be required to allow vote by mail or unexcused absentee ballots to ensure people can vote with ease and without being in long lines or crowds." **https://www.brennancenter.org/our-work/research-reports/pulse-america-poll**

Republican Party Leaders Promote Mail Voting

According to the *Washington Post*, "Republicans have a long history of persuading their voters to cast ballots by mail." **Haley Barbour**, the former RNC chairman and Mississippi governor, said the party's vote-by-mail operation "long predated" his tenure at the party's helm, from 1993 to 1997. -- **https://www.washingtonpost.com/politics/gop-pushes-voting-by-mail--with-restrictions--as-trump-attacks-it-as-corrupt/2020/04/12/526057a4-7bf8-11ea-a130-df573469f094_story.html**

"Voting by mail is an easy, convenient and secure way to cast your ballot," read a mail piece the **Republican National Committee** distributed across [Pennsylvania]. "Return the attached official Republican Party mail-in ballot application to avoid lines and protect yourself from large crowds on Election Day." --

https://www.washingtonpost.com/politics/gop-pushes-voting-by-mail--with-restrictions--as-trump-attacks-it-as-corrupt/2020/04/12/526057a4-7bf8-11ea-a130-df573469f094_story.html

Former RNC chairman **Michael Steele** co-authored an op-ed arguing that "the current emergency demands expanded use of vote-by-mail," and that "democracy depends on it." -- **https://www.washingtontimes.com/news/2020/mar/24/conservatives-must-get-behind-vote-by-mail-options/**

The chairs of both the **Indiana Republican Party** and Indiana Democratic Party wrote a joint letter to the state election commission asking for expanded access to absentee voting this year by making it easier for voters to request absentee ballots. -- **https://dailyjournalonline.com/news/national/govt-and-politics/indiana-officials-considering-delay-of-may-primary-election/article_074ca255-7818-52a8-a105-2e72798c0318.html**

Republican Elected Political Leaders Support Mail Voting

Nebraska Governor Pete Ricketts (R)

"[Mail voting is] a great way for people to be able to vote" at a time when Nebraskans confront the coronavirus pandemic threat, Ricketts said. "I'd encourage people to take advantage of that," the governor said. -- **https://journalstar.com/news/state-and-regional/govt-and-politics/ricketts-encourages-vote-by-mail-eyes-gradual-easing-of-covid-19-restrictions-possibly-in-may/article_2770d931-fa51-591f-b04b-d5e516a72888.html**

Maryland Governor Larry Hogan (R)

"It would endanger public health to allow thousands of people to assemble … and it would put Marylanders at risk," Hogan said on March 17th at a press conference. "I am directing the state board of elections to develop a comprehensive plan by April 3 to conduct the primary election in a way that protects public health and preserves the integrity of the Democratic process in our state." -- **https://www.politico.com/news/2020/03/17/maryland-postpones-april-28-primary-election-over-coronavirus-133776**

When announcing expanded mail voting for Maryland's primary in a news conference, Governor Hogan said, "Free and fair elections are the very foundation of American democracy, and our ultimate goal must be to do everything possible to ensure the voice of every Marylander is heard in a safe and secure manner." -- **https://www.baltimoresun.com/politics/elections/bs-md-pol-primary-hogan-decision-20200410-rvphpqz4mjfqdpnfrhjrifyqxm-story.html**

New Hampshire Governor Chris Sununu (R)

When announcing a guidance memo to address voting during the pandemic, Sununu said: "Number one, the ability for folks to vote absentee if they so choose, based on the COVID-19 epidemic, and our state has an immense amount of flexibility. Basically, if you feel more comfortable voting absentee because of the outbreak, or your inability, or nervousness just about appearing in person to vote, you can vote absentee and obtain an absentee ballot. So, we have a very flexible system." -- **https://nymag.com/intelligencer/2020/04/in-nh-covid-ruled-a-disability-justifying-voting-by-mail.html**

Ohio Governor Mike DeWine (R)

When asked about President Trump's comments on mail voting, Governor DeWine said, "You know, we postponed the election, or we expanded the election basically, because we didn't think it was safe, but yes, it's safe for people to vote in Ohio and we're asking them to do that." -- **https://radio.wosu.org/post/dewine-defends-ohios-vote-mail-process-after-attacks-president-trump#stream/0**

Republican Mayors in Wisconsin

In response to coronavirus, three Wisconsin mayors, including Republican Mayors **Dean Kaufert** of Neenah, WI and **Timothy Hanna** of Appleton, WI, called for the state's primary to be held completely by mail: **https://www.greenbaypressgazette.com/story/news/2020/03/20/coronavirus-green-bay-fox-valley-mayors-call-election-changes/2883666001/**

Republican Leadership in Alaska

Governor Mike Dunleavy signed a bill, passed by the state's majority Republican legislature, that allows for expanded mail voting in Alaska's 2020 elections. -- **http://www.akleg.gov/basis/Bill/Detail/31?Root=SB241**

Republican Chief Election Officials

Washington Secretary of State Kim Wyman (R)

Secretary Wyman co-authored an op-ed with Arizona Secretary of State Katie Hobbs (D) calling for additional election funding, in part to expand mail voting: "In order to make voting widely accessible, especially in the middle of this national emergency, it is imperative that all states have the flexibility to mail ballots to every eligible voter -- wherever they may be taking shelter." -- **https://www.cnn.com/2020/03/31/opinions/covid-19-states-billions-election-safety-hobbs-wyman/index.html**

On a call with U.S. Senators and a bipartisan group of secretaries of state, Wyman said: "Election officials, lawmakers, and other leaders across the political spectrum must come together to work on sustainable solutions to maintain access to democracy while keeping voters, election workers, and our voting systems safe. As states work to ensure every eligible person has an opportunity to vote in the upcoming elections, increased absentee voting and vote-by-mail must be options on the table." --

https://www.klobuchar.senate.gov/public/index.cfm/news-releases?ID=1FDF8546-E052-4BEF-8170-304FCC2DCDA5

"Washington state's vote-by-mail system is accessible, secure, fair, and instills confidence in our voters. Despite the coronavirus outbreak mounting during the last few days of our presidential primary voting period in early March, our voters still had an opportunity to cast ballots thanks to vote-by-mail." -- **https://www.klobuchar.senate.gov/public/index.cfm/news-releases?ID=1FDF8546-E052-4BEF-8170-304FCC2DCDA5**

"[W]e actually compare every single signature of every single ballot that comes in and we compare it and make sure that it matches the one on their voter registration record." -- **https://cbsaustin.com/news/coronavirus/new-calls-to-change-the-way-we-vote-in-the-midst-of-a-pandemic**

"When you look at states that are vote by mail, you have a mix of blue and red and states," she said. -- **https://www.nytimes.com/2020/04/10/us/politics/vote-by-mail.html**

Georgia Secretary of State Brad Raffensperger

"I am acting today [to expand access to absentee voting] because the people of Georgia, from the earliest settlers to heroes like Rev. Dr. Martin Luther King, Jr. and Congressman John Lewis, have fought too long and too hard for their right to vote to have it curtailed. Georgia has faced challenges before and overcome them, and we can do so again through the grit and ingenuity that has made America a shining example for democracies around the world." -- **https://sos.ga.gov/index.php/elections/raffensperger_takes_unprecedented_steps_to_protect_safety_and_voter_integrity_in_georgia**

Ohio Secretary of State Frank LaRose (R)

In response to a tweet by President Trump that mail voting increases the risk of "crime and VOTER FRAUD," Secretary LaRose said, "I can tell you that's not the case in Ohio. As I've said, we're fortunate that we've been doing vote by mail for a long time. We know how to do it, and we know how to get it done securely." -- **https://twitter.com/FrankLaRose/status/1249378551217950720**

In an April 9th video promoting the state's first all-mail elections, Secretary LaRose said: "I reject this notion that I think comes from days gone by, when people say it's not good for Republicans when there's high turnout. The highest turnout presidential election we ever had was 2016. The highest turnout gubernatorial election we ever had was 2018." -- **https://www.nytimes.com/2020/04/10/us/politics/vote-by-mail.html**

A statement from Maggie Sheehan, Secretary LaRose's spokesperson, reads: "Though we are preparing for every possible scenario, our expectation and hope is that we'll be able to have a normal election in November. That said, it's fortunate that Ohio has a long history of running secure elections, and that includes decades of voting by mail. From voter-specific ballot tracking and frequently maintained voter rolls to security measures at county boards of elections where ballots are handled and stored by a bipartisan team of election officials, Ohioans can be confident that their vote-by-mail ballots are as safe and secure as the votes cast on Election Day." -- **https://www.washingtonpost.com/opinions/2020/04/10/trump-is-lying-about-voter-fraud-again-republicans-dont-fall-it/**

Utah Director of Elections Justin Lee (R)

"Being a very red state, we haven't seen anything that helps one party over another at all. We've heard less concern about voter fraud than about whether every ballot that should get counted does get counted." -- **https://www.washingtonpost.com/politics/paloma/the-trailer/2020/04/02/the-trailer-the-fear-and-politics-around-expanding-voting-by-mail/5e84980e602ff10d49ada414/**

In Utah, Trump's complaints baffled Justin Lee, the state's elections director. "The only fraud the state finds are scattered examples of one spouse signing for another. The mail system hasn't hurt Republicans at all…[p]eople are turning out, 90% are using it in a very red state," Lee said. "I don't see any problems for us." -- **https://www.weirtondailytimes.com/covid-19-the-latest/2020/04/trump-differs-with-gop-allies-on-mail-in-voting/**

Iowa Secretary of State Paul Pate (R)

"We're going to be aggressively promoting and encouraging folks: 'Please vote by mail through the absentee process,'" Secretary Pate said. "That's the avenue we think they should consider doing … for safety reasons, if anything else." -- **https://wcfcourier.com/news/local/govt-and-politics/iowa-election-officials-pushing-vote-by-mail-for-june-primary/article_33d9e303-f176-5657-b87c-26e1c5438372.html**

West Virginia Secretary of State Mac Warner (R)

"The Governor, Attorney General, county clerks and I have zealously worked together within state law to balance health concerns with the ease of voting," Warner said. "We have determined that the absentee voting process is the safest method. By sending an absentee application to all registered voters, it encourages voters to participate in the election in the safest manner possible without having to leave their house. Your ballot box is as close as your mailbox." -- **https://www.whsv.com/content/news/West-Virginia-launches-plan-to-send-absentee-ballot-applications-to-all-voters-569129731.html**

The statewide mailing of absentee voting applications [in West Virginia] will give every eligible voter the chance to vote "while protecting the health of voters, county clerks' staff members, election workers, and the general public, while maximizing participation in the May 12 Primary Election," Warner said in a release. -- **https://www.whsv.com/content/news/West-Virginia-launches-plan-to-send-absentee-ballot-applications-to-all-voters-569129731.html**

Kentucky Secretary of State Michael Adams (R)

"It's my concern, after an exhaustive process of consultation with our county clerks, the State Board of Elections and others, that we need to at least be prepared to have an expanded absentee balloting system available by June 23," Adams said in a press release. "I'd like us to be able to prepare in advance for a situation where we have limited in-person voting and expanded voting by mail." -- **https://twitter.com/KYSecState/status/1245474003248128000**

On April 24, when announcing the plan for expanded mail voting for Kentucky's primary, Secretary Adams said, "Voters across the political spectrum will be pleased with this plan to protect both democracy and public health.

I'm grateful to Governor Beshear for his leadership, and his working in good faith with me toward ensuring a successful and safe election." -- **https://kentucky.gov/Pages/Activity-stream.aspx?n=GovernorBeshear&prId=139**

Oregon Secretary of State Bev Clarno (R)

"Because Oregon votes by mail we do not have to be concerned about social distancing issues at polling places that so many other states are struggling with." -- **https://www.opb.org/news/article/oregon-primary-coronavirus-vote-by-mail/**

Republican Local Election Officials Ask for Additional Funding

In a letter to Congress, local election officials, dozens of whom are Republican, called for Congress to allocate funding to enable election officials to make the adjustments needed to the election system to run safe, secure and resilient elections in the face of the coronavirus. -- **https://www.brennancenter.org/our-work/research-reports/election-officials-call-increased-election-funding**

Lisa Marra, president of the Elections Officials of Arizona, and Virginia Ross, president of the Arizona Recorders Association—both membership groups that represent election officials in all 15 counties in Arizona—co-authored an op-ed calling for expanded mail voting options: "As election professionals, we are committed to ensuring that the rest of the elections in 2020 are accurate, secure and safe for voters, anticipating the COVID-19 pandemic could continue requirements around social distancing for the remainder of the year. On behalf of the Arizona Recorders Association and the Election Officials of Arizona, we believe it is crucial that the Legislature extend our ability to hold ballot-by-mail elections for state and federal elections, a practice already authorized for jurisdictional elections. It is the best way to ensure Arizona voters are safe during this pandemic and have the certainty of the continuity of our democracy." -- **https://www.azcentral.com/story/opinion/op-ed/2020/04/08/arizona-all-mail-election-2020-wouldnt-ruin-its-integrity/2957970001/**

Additional Key Reporting

As Trump Rails Against Mail Voting, Some Allies Embrace It by Nicholas Riccardi, AP News

Even As Trump Denounces Vote By Mail, GOP In Florida And Elsewhere Relies On It by Greg Allen, NPR

How to Hold Elections During a Pandemic by Rachel Kleinfeld and Josh Kleinfeld, National Review

Vote by Mail, Just This Once by Mona Charen, National Review

President Michael Waldman on Recent Police Killings and Civil Unrest

READ THE STATEMENT

RESOURCE

Covid-19 Should Be a Legitimate 'Excuse' to Vote by Mail

In the 16 states that require an excuse to vote by mail, fear of the coronavirus should become an acceptable reason for receiving a mail ballot for the November election.

Ted S. Warren/AP

Max Feldman

Eliza Sweren-Becker

Wendy R. Weiser

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Ensure Every American Can Vote

Voting Reform

Covid-19 means that states will have to run the 2020 general election differently. The Brennan Center has published a **detailed plan** outlining the changes needed to run a safe and fair election during a pandemic. Among other things, states will need to dramatically expand the use of mail voting, ensuring that every eligible voter has the option of voting by mail ballot.

Thirty-four states and the District of Columbia already **offer** all voters the opportunity to vote using a mail ballot, either because they have "no-excuse" absentee voting or because they conduct their elections primarily by mail ballots. In these states — which include every battleground state for 2020 — it is clear that every voter is already legally entitled to obtain a mail ballot this November without any statutory change.

The remaining **16 states** allow voters to cast a mail ballot only if they meet certain criteria — typically, that the voters will be away from their home county on Election Day, that they are serving abroad in the military, or that they are ill, disabled, or hospitalized. In each of these states, however, Covid-19 should qualify as an excuse applicable to all voters. In every state, a voter's illness or disability constitutes a valid reason for an absentee ballot. Whether or not voters have actually fallen ill from the coronavirus, the fact that most voters are likely either asymptomatic carriers, at risk for contracting the virus, or at risk for complications from the virus should be sufficient to meet the existing statutory requirements.

Indeed, some state statutes expressly allow for absentee ballots where there is a risk that voters will become ill. In Mississippi, for example, a voter may cast an absentee ballot if the voter's "attendance at the voting place could reasonably cause danger to himself or others." In Texas, a voter may obtain a mail ballot if the voter "has a sickness or physical condition that prevents the voter from appearing at the polling place on election day without a likelihood of . . . injuring the voter's health." In short, **Covid-19 should serve as a valid "excuse" that entitles every voter to an absentee ballot under existing law**, and authorities in every "excuse" state should make that clear now.

In a growing number of states, election officials and governors have already interpreted their absentee voting laws broadly to permit all voters to cast a ballot by mail in the primaries. These same interpretations should apply in November, assuming Covid-19 will still be around, as experts predict. Those states are:

Alabama: On March 13, 2020, Secretary of State John Merrill **said** that all voters "who are concerned about contracting or spreading an illness or have an infirmity may vote by absentee" in the state's primary.
Arkansas: **According to** a county election official, the state board of elections "is taking the position that warnings from public health officials to avoid large gatherings of people when possible is a sufficient basis for voters who ordinarily would not qualify for absentee voting to do so in the" state's primary runoff election.
Delaware: On March 24, 2020, Gov. John Carney issued an **executive order** that mandated that the qualification of "sick or physically disabled" shall also apply to anyone who is self-quarantining or social distancing to avoid exposure to or stop the spread of Covid-19.
Indiana: The state election commission has **implemented** no-excuse absentee voting by mail. The commission has the power to authorize voters to vote by absentee ballot "if the commission determines that an emergency prevents the person from voting in person at a polling place."
New York: Gov. Andrew Cuomo issued an **executive order** providing that "temporary illness" — an excuse under the state's absentee voting law — includes "the potential for contraction of the COVID-19 virus" for the state's primary election.
Texas: A state court issued a **temporary injunction** on April 17, 2020, allowing all voters to cast a mail-in ballot under a portion of the Texas election code allowing absentee ballots for voters who cite a disability, as a result of Covid-19. The ruling is expected to be appealed by the state.
West Virginia: On March 18, 2020, Secretary of State Mac Warner said that voters who are worried about the coronavirus can apply to vote absentee in the state's primary, and he has **encouraged** them to do so. Secretary Warner **did so** on the basis of a legal opinion from the state Attorney General saying that Warner's emergency powers are "broad and flexible" and can be applied to the election.

In several other states, there is already precedent for interpreting the absentee ballot law to allow for broad access to absentee ballots during the pandemic:

Connecticut: Secretary of State Denise Merrill opined that Covid-19 qualifies as an illness under the state's absentee ballot law and on March 13, 2020, she **requested** that the governor issue an executive order expressly allowing voters to obtain absentee ballots for the primary under that provision.
Massachusetts: During the primary elections, Secretary of the Commonwealth William Galvin **treated** self-quarantined voters as hospitalized for purposes of the state's emergency absentee voting law (though these voters were **required** to have their absentee ballots hand-returned to their polling places).
Missouri: Election officials have been divided over whether fear of Covid-19 is sufficient to qualify for an absentee ballot, but a state appellate court has said that the state law provision allowing absentee voting if the voter "expects to be prevented from going to the polls to vote on election day due to … [i]ncapacity or confinement due to illness or physical disability" should be construed broadly. According to the court, the "statutes do not require the voter to entertain a good faith expectation, but simply allow the voter to state that he expects to be ill or disabled." [1]
New Hampshire: Interpreting a state law allowing voters with physical disabilities to cast absentee ballots, Deputy Secretary of State David Scanlan **said** that that the definition of disability "could be expanded in a crisis to accommodate a pandemic situation across the country."

In sum, there are only 16 states that require voters to have an excuse before casting an absentee ballot. Nearly half of those states have already made clear that Covid-19 provides a valid excuse entitling voters to receive mail ballots, at least during the primary elections. Election officials, governors, and courts all have the authority to clarify that every eligible voter is entitled to an absentee ballot during the pandemic without making any changes to state statutes. They should use that authority now.

Endnotes

1. *State v. Redpath*, 668 S.W.2d 99, 103 (Mo. Ct. App. 1984).

President Michael Waldman on Recent Police Killings and Civil Unrest

READ THE STATEMENT

ANALYSIS

The False Narrative of Vote-by-Mail Fraud

Mail ballots are essential for holding a safe election amid Covid-19, and security concerns can be easily addressed.

Jason Redmond

Wendy R. Weiser

Harold Ekeh

April 10, 2020

If we are to have safe, healthy, and fair elections this year in the face one of the worst pandemics in a century, Americans must make widespread use of mail ballots. **Election administrators** and other **leaders** from across the political spectrum have **urged** support to make the **necessary adjustments** to their election infrastructure. They recognize we have no choice. Most Americans, including a majority of Republicans, **agree**.

President Trump and his allies, however, are **pushing back** against this option, raising spurious claims that fraudulent mail ballots will contaminate the election. "I think a lot of people cheat with mail-in voting," Trump **said** earlier this week. "Mail in voting is a terrible thing. . . . I think if you vote, you should go," he later **added**, not long after he **requested** a vote-by-mail ballot for the Florida primary. Shortly afterward, Republican National Committee Chairwoman Ronna McDaniel **echoed** the president in a Fox News op-ed. (This is in sharp contrast to

former chairman Michael Steele, who **coauthored an op-ed arguing** that "the current emergency demands expanded use of vote-by-mail," and that "democracy depends on it.")

Trump's claims are wrong, and if used to prevent states from taking the steps needed to ensure public safety during November's election, they will be deadly wrong. Mail ballot fraud is incredibly rare, and legitimate security concerns can be easily addressed.

Mail balloting is not a newfangled idea; it was already deeply embedded in the American electoral system before the coronavirus hit. In the last two federal elections, roughly one out of every four Americans **cast a mail ballot**. In five states — Colorado, Hawaii, Oregon, Utah, and Washington — mail balloting has been the **primary method** of voting. In 28 additional states, all voters have had the right to vote by mail ballot if they choose, without having to provide any reason or excuse. Over time, a growing number of voters have chosen that option. Since 2000 more than **250 million votes** have been cast via mailed-out ballots, in all 50 states, according to the Vote at Home Institute. In 2018, more than **31 million Americans** cast their ballots by mail, about 25.8 percent of election participants.

Despite this dramatic increase in mail voting over time, fraud rates remain infinitesimally small. None of the five states that hold their elections primarily by mail has had any voter fraud scandals since making that change. As the *New York Times* editorial board **notes**, "states that use vote-by-mail have encountered essentially zero fraud: Oregon, the pioneer in this area, has sent out more than 100 million mail-in ballots since 2000, and has documented only about a dozen cases of proven fraud." Rounded to the seventh decimal point, that's 0.0000001 percent of all votes cast. An exhaustive investigative journalism **analysis** of all known voter fraud cases identified only 491 cases of absentee ballot fraud from 2000 to 2012. As election law professor Richard L. Hasen **notes**, during that period "literally billions of votes were cast." While mail ballots are more susceptible to fraud than in-person voting, **it is still more likely for an American to be struck by lightning than to commit mail voting fraud.**

States have multiple tools to address valid security concerns and protect election integrity when it comes to mail ballots. And recent technologies and strategies have significantly enhanced the security of mail balloting.

Identity verification: The principal method used to detect and prevent fraud is the mail ballot envelope itself, where each voter must include personal identifying information (such as address, birthday, and driver's license number or last four digits of a Social Security number). In most states, that information includes a signature that can be used to **match** against the voter rolls. The voter's remaining personal information is also matched against the information stored on the voter rolls. As Kim Wyman, Washington's Republican secretary of state, **explained**, "we actually compare every single signature of every single ballot that comes in and we compare it and make sure that it matches the one on their voter registration record." This is a long-standing and well-established practice to ensure that the ballot received was indeed cast by the correct voter. It's important to note though that there are best and worst practices with signature matching. When done incorrectly, it can disenfranchise eligible voters. Done correctly — with signature matching software, bipartisan review by officials trained in signature verification, and outreach to flagged voters — it is an effective deterrent for fraud.

Bar codes: Most election jurisdictions now use some form of bar code on their ballot envelopes. These bar codes allow election officials to keep track of ballot processing and help voters know whether their ballot has been received. Bar codes also allow states to identify and eliminate duplicate ballots if a voter casts more than one, whether mistakenly or corruptly.

Ballot tracking through the U.S. Postal Service: In many jurisdictions, including California, Colorado and Florida, ballot envelopes are equipped with **intelligent mail bar codes** linked to the postal service that enable voters and election officials alike to track an envelope from drop-off to delivery and processing at the local administrator's office. Denver's elections division reported that **17,931 people** used its system to track the status of their ballots during the November 2013 election. While relatively new, these ballot tracking systems are now readily available and are easily operable at scale. This way, if a voter says they never received their ballot, states can better determine whether the ballot was delivered, replace the ballot as appropriate, and ensure the original is flagged as compromised and not counted.

Secure drop-off locations and drop boxes: Multiple ballot return options limit the opportunity for ballot tampering by fostering voter independence in returning a ballot. A common layer of security to ensure that ballots are not stolen or tampered with — at least for voters who can leave their homes — is secure drop-off locations. In places where all or most voters receive ballots by mail, many voters do not mail completed ballots; rather, they opt to drop their ballots off at secure polling sites. According to the **Survey of the Performance of American Elections** at Harvard University in 2016, 73 percent of voters in Colorado, 59 percent in Oregon, and 65 percent in Washington returned their ballots to some physical location, such as a drop box or local election office.

Ballot drop-off locations help maintain a secure chain of custody as the ballot goes from the voter to the local election office. And when drop boxes are put outside of government offices, one security measure is to **equip** them with security cameras to monitor ballot traffic and ensure that the boxes are not breached. (Drop boxes in government buildings benefit from **existing** video security systems.) In addition to preventing fraud, secure drop-off locations enable voters to be confident that their ballots will be received on time.

Harsh penalties: Anyone who commits voter fraud using a mail ballot risks severe criminal and civil **penalties**: up to five years in prison and $10,000 in fines for each act of fraud under federal law, in addition to any state penalties. In **Oregon**, for example, voting with or signing another person's ballot is a Class C felony punishable by up to five years in prison. These penalties provide a strong deterrent to voter fraud; it makes no sense to risk such significant punishment for one additional vote.

Postelection audits: In 2018, a review of returned absentee ballot records helped identify anomalies in the election results of Bladen County, North Carolina, enabling election officials to **uncover** election interference by a political operative who stole and tampered with mail ballots. **Postelection audits**, which many jurisdictions are starting to adopt, would more systematically enable election officials to identify any irregularities or misconduct in the vote. Audits typically use statistical techniques to review a sample of ballots cast in an election to ensure that votes were recorded and tallied accurately. Since audits can only be meaningfully carried out when there is a voter-verified paper record of each vote, mail ballots (which are paper-based), are conducive to effective audits. Postelection audits are already **widely used** in states that use mail voting and are a **best security practice** for all elections regardless.

Polling sites as a fail-safe: Finally, if there are concerns that an eligible voter's mail ballots could be lost or uncounted, **in-person polling sites** provide a mechanism to correct problems, provide essential services, and ensure that every eligible voter can cast a valid ballot. No system that relies on mail balloting can operate without accessible in-person voting sites, both for those who cannot or will not vote by mail and as a fail-safe to the inevitable problems that may arise. Election administration glitches, mail delivery problems, and data errors can prevent voters from receiving or submitting their ballots. Other voters, including many on Native American

reservations, simply lack reasonable **access to mail**. And inconsistent ballot counting practices cause mail ballots in some communities to be rejected unfairly, or at higher rates. These are problems of access and administration, not fraud. And they can be readily solved at polling sites.

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Trump Targets Michigan to Push His Latest Lie on Imagined Mail-in Voting Fraud

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Voting by mail is an essential option for a safe and fair election during Covid-19. The president seems to disagree, despite all evidence to the contrary.

Max Feldman

May 22, 2020

On Wednesday, President Trump **tweeted** that he would withhold federal funds from Michigan, in response to the secretary of state promising to deliver absentee ballot applications to all of Michigan's voters. This threat — which is wrongheaded and unconstitutional — came the same day the state suffered **devastating floods**.

As a matter of public policy, the pronouncement is damaging and nonsensical. As a matter of propaganda, however, it makes more sense. The president managed, with extraordinary economy, to cram numerous inaccuracies, falsehoods, threats, and hypocrisies into fewer than 280 characters. He is the Hemingway of election lies.

First, Trump claimed that Michigan was sending absentee ballots to all voters. Not so. Michigan is sending absentee ballot *applications* to all voters. (The president apparently realized his mistake and deleted the tweet hours later, replacing it with a new one.)

Michigan has **no-excuse absentee voting**: every registered voter in the state is already entitled by law to cast a ballot by mail. In the midst of the coronavirus pandemic — the defining characteristic of which is the need to maintain social distancing — the secretary of state reasonably decided to deliver absentee ballot applications to voters rather than forcing them to, say, go to a government office to obtain one.

Contrary to the president's suggestion, this is well within the scope of her legal authority. Moreover, it is a sound policy choice — one that **numerous** other election officials, both Republican and Democratic, have made in response to Covid-19, including in states like Iowa, Georgia, Nebraska, and West Virginia.

Second, Trump connected absentee voting with "voter fraud." This charge is part of a years-long effort by the president to use the myth of widespread voter fraud to undermine potentially adverse election results.

In 2016, the president **told us**, without any evidence, that millions of people had voted illegally in the election. In 2018, **he told us** that in-person voting was where fraud took place — that "people get in line that have absolutely no right to vote and they go around in circles." Now it is mail voting that's the problem. In Trump's telling, our entire election system is rife with fraud. But the **facts** contradict that claim. Studies have shown repeatedly that fraud by voters is not a significant problem in American elections.

Mail-in voting, specifically, is a **secure method** of voting that has been widely used in our elections for many years and has garnered support from both parties. Indeed, a recent **Brennan Center poll** found that four out of five Americans think that all voters should have a mail ballot option for Election Day, including 57 percent of Republicans. Every state allows at least some of its voters to cast mail-in ballots, and most states allow all voters to cast mail-in ballots. And as many people have pointed out, Trump himself **votes by mail**.

Third, it is notable that the president chose to attack Michigan over absentee voting. Michigan's no-excuse absentee voting policy was not passed by politicians — it was overwhelmingly **adopted** by the voters themselves in 2018. Trump's attacks on this system are, thus, doubly undemocratic.

Furthermore, the irony of the president threatening retaliation against a state official for executing her state's election laws is rich, given that for some time, the president's allies have decried any congressional attempt to expand voting access as a "**federal takeover**" of state election functions.

The big lie here is that election officials are pushing absentee voting as part of some sort of plot to undermine the election. The reality is the exact opposite. In the face of the unprecedented threat to our elections from Covid-19, they are taking commonsense steps to ensure that Americans do not have to risk their lives in order to vote in November.

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Voter Purges in an Increasingly Vote-by-Mail World

In response to the likely increase in mail voting due to Covid-19, the Brennan Center has created guidelines to ensure voter purges don't disenfranchise eligible voters.

by Eliza Sweren-Becker and Myrna Pérez

As Americans stay safe at home and election administrators grapple with how to conduct elections during a pandemic, anti-voter groups continue to bring lawsuits seeking to compel aggressive voter roll purges — with at least four lawsuits in the last five months — particularly in swing states and in areas with large populations of voters of color.

In every state but one, voters are required to be registered before being able to cast a ballot. State and local election administrators across the country regularly remove or "purge" voters from the rolls as a part of maintaining voters rolls that are accurate and up to date. But all too often, a purge is erroneous and goes wrong, and eligible voters are removed from the rolls, frequently with no notice or knowledge until they show up at the polls to vote. There was cause for alarm even before Covid-19 turned our election methods upside down. The country was purging more voters (an increase that outpaces increases in population and registration), and purge rates had increased in jurisdictions with a history of racial discrimination after the Supreme Court weakened federal protections against discrimination in voting.

Now, the risks posed by erroneous purges are exacerbated as election officials confront the novel coronavirus because state and federal proposals, such as they are, largely rely on vote-by-mail options. But under current vote-by-mail systems, voters who are wrongly purged from the rolls have less opportunity to rectify the error and cast their ballots than when voting in person (when provisional ballots are available), raising the risk that eligible voters will be denied their right to vote.

Under federal law, states may conduct systematic purges up until 90 days before a federal election. Given some states' primary schedules, there are still states that could be conducting large-scale purges in the coming weeks without running afoul of federal law.

To ensure that mail balloting systems do not increase purge-related disenfranchisements, election administrators should focus on: (1) reducing erroneous purges, (2) adapting in-person protections for purged voters to mail ballot systems, and (3) ensuring that eligible purged voters can still cast a ballot that counts at the polls.

(1) Reduce Erroneous Purges

The completeness and quality of the voter registration list takes on increased importance in a mail ballot system because the list will form the basis of who gets a mail ballot. As such, election administrators must ensure they use smart practices when cleaning their rolls.

- *Use good source data.* The quality and accuracy of the information from other sources, like criminal conviction lists or data from interstate data sharing programs, should be routinely audited or checked. Some sources, like the Kansas-administered Crosscheck program or out-of-date lists of purported noncitizens, are too unreliable to use. For example, in 2019, a federal judge stopped Texas's "ham-handed" attempt to purge more than 95,000 purported noncitizens from the rolls because the state failed to account for the thousands of Texans that become naturalized citizens every year.
    - Consult back up. Election administrators should test the accuracy of their sources by looking at different sources of information, rather than assuming one source is flawless. Even sources contemplated by Congress for purges, like the National Change of Address database or the Social Security Administration's Death Master File, have error rates.
    - Right-size the reliance. Use of the list should be adjusted in accordance with the list's reliability.

- *Use thoughtful matching criteria.* When purge lists are developed by matching names on the voter registration list to names from another source, false positive matches can arise. Texas saw this in 2012, when a comparison of the voter registration rolls to the Social Security Administration's Death Master File resulted in an erroneous purge.
    - Match across multiple fields. To steer clear of false positive matches, election officials should require matches across many fields — like first name, last name, address, date of birth, social security number, and driver's license number — before flagging as ineligible. A matching name and address are not sufficiently unique; neither are a matching name and birthday. Shared birthdays, for example, are so common that in a group of 180 people, it's more likely than not that two people will have been born on the exact same day.
    - Avoid list comparisons that use weak matches. The controversial and currently defunct Interstate Crosscheck System used loose matching criteria (first name, last name, and date of birth) to create lists of voters who purportedly moved out of state.

- *Complete ALL systematic purges 90 days before any federal, state, or local election.* Federal law requires that any program to systematically remove ineligible voters from the rolls must take place no later than 90 days before a federal primary or general election. That's because voters and election administrators need time to identify and correct any purge mistakes.
    - Ninety days for all. While federal law requires systematic maintenance to be completed by 90 days before *federal* elections, the logic behind that blackout period applies equally to state and local elections as well.

- Challenges also should occur far in advance. Purges by another name — for example, voter challenges — need to comply with the federal timeline for purging. For example, in North Carolina, a federal court ruled in 2016 that local boards of elections likely violated federal law when they systematically removed hundreds of voters through citizen-initiated challenge procedures less than 90 days before the general election.

- *Don't get rushed into a purge*. There has been an increase in activist groups threatening election administrators with legal action based on allegations that the jurisdiction is not purging aggressively enough. An unplanned and rushed purge in response to these threats does nothing to increase voter confidence in a state's purge practices.

- *Provide public and private notice of purges*. In order to remove a voter based on a change in residence, federal law requires that election administrators provide individualized notice and an opportunity to respond or vote that spans two federal elections before removal. Not only is individualized notice essential, but widespread public notice before undertaking a purge can prevent a state from making serious mistakes.

(2) Adapt In-Person Protections for Purged Voters to Mail Ballot Systems

Because of the novel coronavirus, many more voters are expected to use vote-by-mail options this year. Indeed, one survey reports 66 percent of adults as saying they wouldn't feel comfortable going to a polling place to vote this year. As calls for expanded access to mail voting grow, election administrators must ensure that the turn to mail voting does not disenfranchise purged voters.

- *Affirmatively send mail ballot applications to inactive voters (and remember, if you're sending mail* ballots *to all registered voters, inactive voters are registered voters too)*. States have different terms for voters who are on a pathway for removal but cannot be legally removed yet. Many states refer to these voters as "inactive voters." Because these voters have not been removed, they remain eligible and still have time to adjust their status back to "active." Therefore, they should not be penalized by being deprived of the opportunity to vote by mail in the middle of a health crisis.
    - If a voter is deemed inactive because of specific evidence that the voter is no longer eligible, states transitioning to mail voting should send *provisional* ballots to all such inactive voters who request a mail ballot.

- *Use mail ballot requests in numerous ways.* Eligible voters shouldn't have to fill out multiple forms to get on the rolls. And erroneously purged voters shouldn't bear the burden of a mistaken removal. A request for a mail ballot should qualify as:
    - An activity that moves a voter from the inactive list to the active list.
    - A response to an NVRA notice (*see* 52 U.S.C. § 20507(d)) sufficient to prevent the voter from being removed.
    - An application to register if submitted by a never-registered person and the mail ballot request is received before book closing and contains sufficient information

for registration. In states where the mail ballot application does not contain enough information for registration, the voter should be sent an application to register to vote or update their voter registration.
    - Grounds to reinstate a voter purged for change of address, if the address provided on the mail ballot request is the same as the address provided when the voter was registered. This request is affirmative evidence that a voter did not move.

- *Account for changing circumstances when contemplating a purge*. Covid-19 has forced many people into new and temporary living situations at new addresses, and the pandemic is already straining the Postal Service.
    - Undeliverability should not result in removal. If a mail ballot or ballot application is undeliverable, do not purge a voter.
    - Reissue Notice. Any voter warned of their potential removal in a notice sent in 2020 pursuant to Section 8 of the National Voter Registration Act (52 U.S.C. § 20507(d)) should also receive notice in 2021.

(3) Polling Place Fail-Safes

Even as increased access to vote-by-mail is a key part of the response to Covid-19, safe and healthy polling places are also critical. Giving every voter access to a mail ballot option will not replace all polling place voting, and it should not come at the expense of access to polling places, particularly because communities and demographic groups with poor mail access are used to voting in-person, prefer to do so, and will not be willing or able to vote by mail. That means polling places still need to be prepared to assist purged voters who remain eligible in casting a ballot that counts.

Election administrators should:

- *Provide clear instructions and adequate training* to poll workers on the provisional balloting requirements of the Help America Vote Act. Poll workers should be familiar with the circumstances that trigger the use of provisional ballots, know how to walk a voter through the process, and understand that every provisional voter must be given information on how to check if their ballot was counted.

- *Never turn away voters from polls* because their names are not on the voter rolls. Under federal law, would-be voters who are not on the rolls or whose eligibility is in question always have the right to cast provisional ballots.
    - Inactive voters must be able to vote. Voters who remain eligible but have been transferred to a state's list of "inactive" voters should be able to cast a ballot that will count.

- *Make paper copies of purge lists and voting history available* at polling places so errors can be identified and poll workers can find the names of erroneously purged voters and allow them to cast regular ballots.

- *Ensure every polling place has adequate resources* to offer provisional voting, including enough poll workers (including bilingual poll workers where required) and a sufficient number of provisional ballot materials to accommodate a surge in provisional voting due to erroneous purges, hacking, or other Election Day disruptions.
    - Prepare for uncertainty. With policy changing rapidly to adjust to Covid-19, jurisdictions should prepare for a surge in provisional voting due to delays in processing of voter registration applications, delays in processing and delivery of mail ballot applications, voter confusion resulting from polling site closures and consolidation, and unfamiliarity with absentee voting.

- *Count provisional ballots* unless there's clear and convincing evidence someone is *not* eligible. When a voter attests to their eligibility, a designation of "canceled" (or "removed" or "purged"), standing alone, is not enough to reject a provisional ballot given inherent errors in list maintenance or other registration database disruptions.
    - Consult other evidence. Election administrators should look to other sources — like motor vehicle records, court records, or original registration applications — for evidence of ineligibility before rejecting any provisional ballot.

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EXPLAINER

Why a Vote-by-Mail Option Is Necessary

Vote by mail is one essential way to ensure the 2020 election can go on safely, securely, and on time.

Scott Olson

Matthew Harwood

LAST UPDATED: April 16, 2020
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Ensure Every American Can Vote

Voting Reform

As the coronavirus ravages the country, presidential primary elections have been among the casualties. At least 16 states have **already delayed** some elections or allowed citizens to vote by mail with extended deadlines.

The latter move has helped renew a contentious debate in Washington, DC, and across the country: should a vote-by-mail option be widely available in all states before the 2020 presidential election to help protect voters and poll workers from Covid-19?

The Brennan Center believes it should, as do many state and local election officials of both parties. President Trump warned that these changes would lead to "**levels of voting**" that would hurt him and his party, even though Republicans have long supported the option. Recognizing that argument could not be sustained publicly, the president now worries about fraud, claiming "a lot of people cheat with mail in voting."

In fact, much of the country votes by mail already. (Indeed, so does President Trump, who votes by absentee ballot.) There is ample experience to show that a vote-by-mail option is safe and gives citizens the ability to participate.

More broadly, the coronavirus has given us no choice. If we want to have an election that is free, fair, secure, and safe, we must have the option for people to vote by mail in November.

Why is vote by mail necessary?

The coronavirus has made congregating in small, enclosed spaces dangerous. At many polling places, voters — particularly of color and from poorer communities — already wait in long, crowded lines to vote. During a pandemic, such lines would force citizens to choose between their health and their right to vote.

We must be able to run a free, fair, and safe election in November. Dr. Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases, has already warned that the virus will almost certainly "**strike again**" this fall. That makes vote by mail an essential way for voters to stay safe while exercising their right to choose who governs them. To ignore, and even block, a solution that maintains our electoral system would be democratic malpractice.

The nation already had **a preview** of what an election should not look like under pandemic conditions in Wisconsin's April 7 presidential primary. A critical shortage of poll workers. Shuttered polling locations. Long lines made even longer because of social distancing. People in protective masks. Members of the National Guard **staffing** the remaining polling stations.

To make sure that vote by mail and other critical capacity-building can be implemented in time for November, we have to start putting new processes in place now. Unlike primaries, the general election can't be moved. That's why the Brennan Center has asked Congress to provide at least $4 billion for states to use in this fight. Those funds will enable states to protect election integrity in November. Since our founding, neither war nor pestilence has ever prevented Americans from voting. We can't let the coronavirus break that streak.

Isn't vote by mail a radical departure from how U.S. elections are conducted?

Much of the country now votes by mail. It's already deeply embedded into the American electoral system.

Twenty-three percent of ballots were cast by mail in 2016, and twenty-six percent of ballots were cast by mail in 2018. Five states — Hawaii, Utah, Oregon, Washington, and Colorado — will run all-mail elections this year. And in 28 states and the District of Columbia, any voter has the right to request a mail ballot without excuse in November. Some of these — like California — are big states that have made vote-by-mail a core way they run elections.

Many more states have a vote-by-mail option, but they are ill-equipped to handle the significant increase in the number of ballots that would come in amid the pandemic. They need, first and foremost, funds from the federal

government.

Currently, 17 states — including Alabama, New York, and New Hampshire — **need to change** their policies to guarantee that all who want to vote by mail in November can. Restricting who can vote by mail this year at best makes voting unnecessarily difficult, and at worst puts their citizens at unnecessary risk of catching the coronavirus. If these states are to provide all voters a vote-by-mail option before the November election, they must start preparations now.

Won't fraud discredit elections where vote by mail is widespread?

No. There is **no evidence** that voting by mail results in significant fraud. As with in-person voting, the threat is infinitesimally small.

As Sen. Michael Bennet of Colorado **reminded** President Trump after he opposed vote by mail on fraud grounds, "Mr. President, we've had vote by mail in Colorado for years. We don't have fraud. But we do have the second highest turnout in America."

What security measures can be taken to protect against vote-by-mail fraud?

There are many. The ballot envelope itself can be designed to prevent fraud. Voters have to sign the envelope, and that signature can be compared to the one that's already on file for the voter. It's important to note, though, that there are best and worst practices with signature matching. When done incorrectly, it can disenfranchise eligible voters. Done correctly — which includes a review by a bipartisan group of election officials — it can be an effective deterrent for fraud.

States can also track ballots in transit. Much like a FedEx package, the ballot comes with a barcode that allows election officials and voters to track where the ballot is throughout the process. Most people who vote this way, however, do not send in ballots by mail. Instead, they drop them off at secure government offices or other locations. According to **MIT's election lab**, in 2016:

> 73% of voters in Colorado, 59% in Oregon and 65% in Washington returned their ballots to some physical location such as a drop box or local election office. Even among those who returned their ballots by mail in these states, 47% dropped off their ballot at a U.S. Post Office or neighborhood mailbox rather than having their own postal worker pick it up at home.

These drop boxes can be made more secure with cameras or other security measures.

Finally, post-election audits can identify any irregularities that may remain. In 2018, a congressional election in North Carolina was marred by absentee ballot misconduct by a Republican political operative, requiring a revote. That misconduct was caught by a state post-election investigation.

Is universal vote by mail the solution for the 2020 election?

The Brennan Center has not called for voting only by mail in 2020. Even if it were a good idea, it would be impossible to implement it in such a short time. Fully participatory elections in many states will require ample in-person voting opportunities. At a time of pandemic, that means adequate early voting so that people do not crowd polling places on Election Day.

Moreover, some communities don't have reliable access to the mail. Many Native American reservations, for example, don't have addresses recognized by the U.S. Postal Service and therefore residents must rely on P.O. boxes far from their homes for mail. Some voters also rely on assistance — whether it's translation or specially designed machines for those with disabilities — to cast their ballots.

The goal for every member of Congress, every state legislature, and every election official should be simple: ensure that anyone who has the right to vote can exercise that right as simply and safely as possible. This shouldn't be a partisan issue but a patriotic duty. Vote by mail is just one option among many to accomplish that goal.

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ANALYSIS

With Mail Ballots More Important During Covid-19, Improper Voter Purges Can Do Even More Damage

What happened in Iowa shows how Americans can be disenfranchised.

Megan Jelinger/Getty

Rebecca Ayala

May 8, 2020

As the coronavirus pandemic continues, election administrators across the country are moving to **expand** mail voting options for upcoming votes. For example, Iowa has **begun** sending absentee ballot request forms for the June primary to active voters.

This policy will make it easier for voters to cast a ballot by mail, but improper voter roll purges mean that not all voters will receive a ballot request form. That's because in Iowa, people with past convictions aren't allowed to vote, and until this year, the state used error-riddled conviction data for kicking eligible voters off the rolls.

Although the state has **adopted** a plan to reduce the risk of future errors, it does not have a plan to notify and assist voters who were erroneously removed.

Iowa's mistakes are part of a larger story: purges based on faulty criminal history data continue to threaten eligible voters nationwide. In 2000, for example, Florida election officials removed thousands of voters from the rolls based on an error-filled **list** of voters who were supposedly ineligible due to felony convictions. Alarmingly, one **study** found that Florida's list contained mistakes that disproportionately targeted African-American voters for removal from the rolls. Some Florida election administrators even refused to use the list because of its extreme inaccuracies. Six years later, Arkansas incorrectly **flagged** almost 4,000 voters for removal from the rolls due to a felony conviction — yet not one individual had been convicted of a felony.

The stakes in Iowa are especially high because it is the **last state** in the country with a policy of permanently and categorically banning those with past convictions from voting. If it is going to maintain such a draconian policy, Iowa has a special responsibility to administer it in a way that doesn't also ensnare eligible voters.

Last year, a *Des Moines Register* **investigation** revealed serious flaws in Iowa's database of individuals with felony convictions who were barred from voting. According to the investigation, some voters removed from the rolls had actually not been convicted of felonies. Some Iowans reported never receiving a notification that they were kicked off the rolls.

Those problems bumped up against federal and state law. The **National Voter Registration Act** (also known as the "motor voter" law) regulates how states manage their voter registration rolls. For example, it requires states to maintain "accurate and current" rolls and mandates that any activities that states conduct to remove voters must be "uniform [and] nondiscriminatory." Furthermore, **Iowa law** requires a voter whose registration is cancelled because of a felony conviction be given notice, which should have provided yet another layer of protection.

Three main problematic policies contributed to the removal of eligible voters in Iowa. First, bad data that misidentified felony convictions was making its way from the courts to county election officials. One official summed up this process as a "garbage in, garbage out" approach, but insisted that the secretary of state's office was just a "pass through," and therefore not responsible.

Second, the state was taking a decentralized approach — asking county officials to identify and correct errors arising from state lists — instead of stemming the flow of inaccurate information from the sources.

And third, counties were using weak criteria to compare those who had reportedly committed felonies with the list of eligible voters, resulting in false positive matches. The secretary of state's office even acknowledged to county auditors that these matches were based on "minimal information," such as a voter's first name and date of birth. When limited criteria are used, there is a risk the match may be inaccurate and result in the wrongful removal of an eligible voter from the rolls.

After months of advocacy, thanks in part to the League of Women Voters of Iowa, Secretary of State Paul Pate introduced a **strategy** and adopted an administrative **rule** aimed at ensuring these errors don't happen again. County registrars are now required to send a notice of removal to a voter's address by forwardable mail, which will hopefully make the notice more likely to get into the voter's hands.

He also adopted a **rule** governing the purge process. It requires his office to review a conviction record and determine that a crime was in fact a felony before adding an individual to the list of those to be removed and passing on the information to county election officials.

Pate also committed to review *all* past cases before Election Day this November and confirm whether those who have been disenfranchised were properly removed from the rolls.

Although these are good initial steps, there are additional **improvements** that the secretary's office should implement to ensure that faulty criminal history data doesn't result in wrongfully purged voters.

First, Iowa should use stronger matching criteria. The new rule simply requires county registrars to *review* potential matches based on four criteria, but does not actually require these administrators to *match* the first name, last name, date of birth, and social security number of a voter with a felony conviction to the same criteria found in the state's voter registration database. If election officials continue to use weak matching criteria, eligible voters can again get caught up in these purges.

Second, Pate should provide notice to all those who were erroneously removed in the past and help them to re-register. He has committed to the time-intensive review of thousands of cases and should take the relatively minimal next steps to fix any mistakes that the office identifies during the coming months. Without providing notice and an opportunity to re-register for voters, eligible voters who were purged improperly will not receive an absentee ballot request form for the upcoming state primary and may be disenfranchised.

Further, as Iowa moves to expand absentee voting, the state should proactively provide absentee ballot request forms to both active and inactive voters to ensure those erroneously removed have an opportunity to request and cast a ballot that counts this June.

Iowa already has **Election Day** registration and individuals who aren't on the rolls may cast **provisional** ballots at the polls. Iowa should ensure that there are fail-safe options that allow people who were erroneously purged to vote, including to cast their ballots by mail. Indeed, this is something that every state should do.

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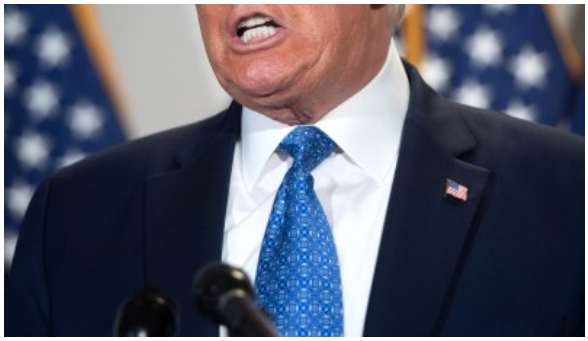

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10 Voter Fraud Lies Debunked

GET THE FACTS: American elections are clean and trustworthy despite what President Trump and others claim.

Drew Angerer/Getty

Max Feldman

PUBLISHED: May 27, 2020

Mail voting has taken on new importance as a crucial strategy for protecting voters' safety amid the Covid-19 pandemic. As if on cue, President Trump and his surrogates have claimed that mail voting is rife with fraud, and that efforts to expand access to mail voting — **like Michigan's**, for example — are illegitimate. That is incorrect: as the Brennan Center has **explained**, fraud in mail voting remains extremely rare, and none of the states that hold their elections primarily by mail have had voter fraud scandals since implementing the systems.

These claims of widespread fraud are nothing more than old wine in new bottles. President Trump and his allies have long claimed, without evidence, that different aspects of our elections are infected with voter fraud. Before mail voting, they pushed similar false narratives about noncitizen voting, voter impersonation, and double voting in order to enact laws that reduce turnout and discredit adverse election results.

Here are 10 of the most egregious voter fraud claims of the past five years.

1. Trump Lies About Noncitizens Voting After Losing Popular Vote

Weeks after being elected in 2016, the president **tweeted**: "In addition to winning the electoral college in a landslide, I won the popular vote if you deduct the millions of people who voted illegally."

In the aftermath of the 2016 election, the Brennan Center **researched and rebutted** claims of widespread noncitizen voting. The ensuing report found only about 30 incidents of suspected noncitizen voting that were referred for further investigation or prosecution out of 23.5 million votes tabulated in the 42 jurisdictions studied, which were selected because of their high rates of noncitizen residents. In other words, noncitizen votes accounted for no more than 0.0001 percent of the 2016 votes in these jurisdictions.

2. Trump Blames 2016 New Hampshire Loss on Out-of-State Voters

For years, the president and his allies have tried to **explain** his loss in the Granite State by alleging that nonresident students were bused in from neighboring states to vote illegally.

The **Brennan Center** and a **number of journalists** have **rebutted this claim** — as did **New Hampshire Secretary of State Bill Gardner**, who was a member of Trump's own voter fraud commission. An investigation by the New Hampshire attorney general found virtually **zero evidence** of voter fraud in the state. Even though Trump's claim was baseless, it has had a harmful effect on elections. Since 2016, the state has enacted **two laws** to make it **more difficult** for students to register and to vote. Furthermore, Trump has revived the claim, **repeating** it at a New Hampshire rally in February 2020.

3. Activist Group Falsely Accuses Virginia Citizens of Voter Fraud

In 2016 and 2017, an activist group called the Public Interest Legal Foundation (PILF) published two documents — Alien Invasion of Virginia and Alien Invasion II, replete with flying saucers on the cover — claiming that thousands of noncitizens had registered and voted illegally in Virginia. PILF has **targeted jurisdictions** around the country, urging them to purge their voter rolls more aggressively.

The PILF documents **misidentified** lawfully registered U.S. citizens as noncitizens. Furthermore, PILF **doxed** these individuals, exposing their names, home addresses, and, in some cases, telephone numbers and email addresses. Voting rights advocates brought a **lawsuit** in response, arguing that the documents' inaccurate claims were defamatory and also constituted voter intimidation, a violation of federal law. PILF initially fought the lawsuit but ultimately settled after an early **loss** in the litigation. As part of the **settlement**, PILF took down from its websites

the exhibits that referenced individual voters, and PILF's president issued a written apology to the plaintiffs in the lawsuit.

4. Bad Social Science Props Up Noncitizen Voter Myth

In 2017, presidential press secretary Sean Spicer **used** a study, authored by professors at Old Dominion University and George Mason University, to justify Trump's claims that widespread voter fraud marred the 2016 election. The study claimed that up to 14 percent of noncitizens had voted in recent elections, based on an analysis of the **Cooperative Congressional Election Study** (CCES), which surveys tens of thousands of Americans about their election experience.

According to the scholars who run the **CCES**, the authors of the Old Dominion study **misused** CCES data to reach their conclusions. In surveys like the CCES, some individuals respond incorrectly to the survey's questions. As a result, a small number of citizens were misclassified as noncitizens. The authors of the discredited study failed to account for this "measurement error," rendering their study "**irresponsible social science**" that "should never have been published in the first place." The CCES scholars **concluded** that "the likely percent of non-citizen voters in recent US elections is 0."

5. Trump Alleges Widespread Voter Impersonation After 2018 Midterms

In November 2018, the president **claimed**: "The Republicans don't win and that's because of potentially illegal votes. When people get in line that have absolutely no right to vote and they go around in circles. Sometimes they go to their car, put on a different hat, put on a different shirt, come in and vote again."

The **Brennan Center**, alongside academics and journalists, have **investigated claims** of **voter-impersonation fraud** (which happens when an ineligible voter pretends to be an eligible voter at the polls) and found that it **almost never happens**. A Brennan Center **report** determined that Americans are more likely to be struck by lightning than to commit voter-impersonation fraud. **Follow-up** work by Loyola Law School's Justin Levitt found just 31 credible instances of impersonation fraud from 2000 to 2014 out of more than 1 billion ballots cast.

6. Conservative Organization Compiles Misleading Database

In 2017, members of President Trump's doomed voter fraud commission relied on a Heritage Foundation database that claimed to contain evidence of approximately 1,100 instances of voter fraud.

The Brennan Center **analyzed** this database and found that the claims were "grossly exaggerated" and "devoid of context." There were only 10 cases involving in-person voter-impersonation fraud and only 41 involving noncitizen voting. Put in context, the think tank inadvertently undermined claims of widespread voter fraud. In the period covered by the database, which stretched back to the Truman era, more than 3 billion votes were cast in federal elections alone, along with many more in state and local elections. Thus, the cases identified in the database made up an infinitesimally small portion of the overall number of votes cast. Less than seven months after its inception, **Trump's** voter fraud **commission was disbanded**.

7. Florida Senator Cries Fraud to Undermine Vote-Counting Process

In 2018, Rick Scott — at the time the governor of Florida — claimed without evidence that there was "**rampant fraud**" in the U.S. Senate election he ended up winning. This was a stark example of candidates in close races making wild fraud allegations to discredit the vote-counting process.

Scott's **claims** of **fraud** were **quickly** and **widely rejected**, including by members of his own administration. For example, election monitors from Scott's administration **reported** that they saw no evidence of fraud in Broward County, a focal point of Scott's accusations. A state judge, in an emergency lawsuit brought by the Scott campaign, also **said** that he had seen no evidence of fraud. Ultimately, in April 2020, the Florida Department of Law Enforcement **closed** lengthy investigations into these issues, finding no evidence to support Scott's allegations of widespread fraud.

8. Kobach Pushes Myth of Noncitizen Voter Registration in Kansas

During a 2018 federal court trial, then–Secretary of State Kris Kobach claimed there were approximately 18,000 noncitizens on the Kansas voter rolls in order to justify his state's documentary proof of citizenship (DPOC) law.

A federal district court rejected Kobach's claim that the "**best estimate**" available was that 18,000 noncitizens were on Kansas voter rolls. The former secretary of state's claim drew from the analysis of an expert witness he had hired to support his case, but the court found that the analysis "**suffer[ed] from flaws that give it little probative value**." After trial, the court found that only 39 noncitizens had successfully registered to vote between 1999 and 2013 (before the DPOC law was put in place) — just 0.002 percent of all registered voters. The law blocked **more than 31,000 Kansans** from registering to vote between 2013 and 2016. The **court struck** it **down**, holding that it **violated federal law**, and the Tenth Circuit Court of Appeals **affirmed** this decision in April 2020. The court also **ordered** Kobach to attend legal training classes, in response to his repeated violation of court rules.

9. Texas Secretary of State Uses Flawed Lists to Justify Voter Purges

In 2019, then–Secretary of State David Whitley **declared** that 95,000 noncitizens were on Texas's voter rolls and accused 58,000 of them of casting a ballot. **State officials** and **the president** seized on these statistics to suggest that new voting laws, including voter ID laws, were needed. In addition, Whitley started **forwarding** lists of names to county election officials so that they could be purged from the rolls.

Almost immediately, county officials complained that the lists were **inaccurate**. A federal court quickly **intervened** to halt any purges that were based on the lists. Whitley had developed his lists by **comparing** driver's license records with the state's voter rolls. But noncitizens can first obtain driver's licenses and later naturalize, making them eligible to register to vote. This happens frequently, especially in Texas, where **55,000 people** become citizens each year. Whitley eventually **apologized** for the lists and **resigned**. Even though Trump amplified the claims when they were first aired, he never issued a correction when they were proven inaccurate.

10. Kentucky Governor Alleges Fraud to Challenge Reelection Outcome

In 2019, Gov. Matt Bevin lost his reelection campaign. He immediately sought a **recanvass** of the votes, claiming without evidence that there were "**significant irregularities**" in the election process. These claims appear to have been part of an effort to build momentum to **challenge the election outcome** before the state legislature.

The governor and his **supporters** alleged that the election results were contaminated by **voter fraud** and improper administration (such as absentee ballots being "**illegally counted**"). Online trolls and Twitter bots **shared** the unfounded narrative. None of Bevin's **vague and varied claims were substantiated**, and GOP leadership quickly **called on** Bevin to concede.

Appendix D

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READ THE STATEMENT

RESOURCE

Voters Need Safe and Sanitary In-Person Voting Options

Despite the coronavirus, states must make every effort to offer meaningful access to safe polling locations for in-person voting.

Eva Marie Uzcategui/Getty

Raúl Macías

Myrna Pérez

PUBLISHED: March 31, 2020

The Brennan Center has **laid out** the critical adjustments that must be made to our voting system to ensure safe and fair elections this November in the midst of the Covid-19 pandemic. Increased access to vote-by-mail is a key part of the plan, as many voters may face quarantine and illness. Safe and healthy polling places are also critical: giving every voter access to a mail ballot option will not replace all polling place voting, and it should not come at the expense of access to polling places. The anticipated shift to large-scale mail voting will put significant strains on our election systems; polling sites serve as a fail-safe to correct any problems that may arise and ensure eligible citizens can vote.

In the ordinary course, new voting procedures typically cause disruptions and problems the first time they are used. This problem will be compounded by the sheer magnitude of the shift to mail-voting, coupled with the chaos and confusion caused by the virus. The reality is that many voters, especially in communities and demographic groups with poor mail access, are used to voting in-person, prefer to do so, and will not be willing or able to vote by mail. Those voters will need safe and healthy in-person voting options this November.

A nationwide, mail only election is not realistic.

The 2020 general election is only seven months away — it is not realistic to expect that every state will be able to fully adopt a vote-by-mail system that is accessible to all voters by then. There are only five states that currently send every voter a vote-at-home ballot (Colorado, Hawaii, Oregon, Utah, and Washington). Only four other states (Arizona, California, Montana, and New Mexico) received a majority of ballots by mail in 2018. In fact, 27 states and the District of Colombia received **fewer than 10 percent** of votes by mail in 2018.

An all-mail election for those jurisdictions would entail between a 10-fold and 60-fold increase in mail-voting. While it is critical that those jurisdictions afford every voter the opportunity to receive a mail ballot, many jurisdictions may not be able to do so without significant gaps. They also may not be able to handle the administrative load effectively if every voter takes that opportunity. Even states that typically hold their elections primarily by mail offer in-person voting opportunities, though not as much as would be needed in states without a mail-voting culture.

A change of this magnitude will undoubtedly create a lot of confusion and error for voters and election administrators. Mail-voting without polling places would also lead to widespread disenfranchisement. For **example**, nationwide, over 430,000 mail ballots were rejected in 2018 because of mail delays, minor technical defects, and voter errors, among other reasons. And the impact can hit **underrepresented** communities hardest: in some states, Black, Latino, **Asian**, and other minorities have had their vote-by-mail ballots rejected at much higher rates than white voters.

When things go wrong, polling sites provide a necessary fail-safe in mail ballot systems.

As states ramp up vote-by-mail options, polling sites are needed as a back up to address problems with mail voting, so that voters who do not receive their mail ballots or have a problem with their ballots can still vote. Problems are inescapable, both because of the dramatic changes to the voting process this year and because of inevitable errors and glitches in mail-voting systems. Polling sites serve as a critical backup to address these problems and resolve eligibility questions. They may be the only option for most voters who do not receive their mail ballots or experience problems with those ballots.

Transition glitches: When states roll out new election reforms or systems, they typically experience transition problems. For example, the lines in Los Angeles during the primary were attributed, at least in part, to the roll-out of new voting technology and the introduction of vote centers. The meltdown in the vote-counting process in the Democratic Iowa caucuses was due largely to the use of a new and untested reporting app. The sheer magnitude of the changes required this year to allow for widespread mail-voting will compound the problem. To the extent that glitches in the system prevent voters from obtaining their ballots by mail, polling place voting may be their only option for participating.

Data errors: Data entry errors — especially as election workers, many of them temporary, are rushing to process voter registration applications and mail ballot applications — could prevent voters from receiving their ballots. Errors as small as a mistyped or transposed number or a "St" instead of an "Ave," either on a voter's application or made in the data entry process, could lead to a ballot never arriving at the correct address. In some jurisdictions, the number of errors on existing voter rolls may be especially high. In 2012, the Pew Center on the States **found** that 1 in 8 voter-registration records in the United States had significant errors.

Mail-delivery problems: Even when an elections office has a voter's correct address, her ballot may not reach her on time or at all, through no fault of the voter's. Even without a pandemic, mail ballots may be lost, delayed, or deemed undeliverable. For example, if a voter's name is not listed on the mailbox, or the mailbox is full, postal workers may be reluctant to deliver mail there. This is more likely this year as Covid-19 has forced many people into new and temporary living situations. Ordinary mail disruptions will also be greater. Mail delays have **increased** in recent years. And the pandemic is already **straining** the postal service. There may also be **disruptions** to the post office workforce **caused** by Covid-19. Polling places ensure that voters facing these problems can vote, too.

Eligibility issues: States ought to relax voter identification or other documentation requirements during the pandemic, as it will be difficult or impossible for voters to obtain identification amidst government office shutdowns. Nonetheless, some states likely will not do so, and there may be circumstances in which certain voters will need to verify their identities. Under some state mail voting systems, voters are **required** to include a copy of their identification when they return their ballots. Without relaxing those draconian rules, voters without access to copying or printing equipment could be shut out. Polling places not only allow voters to show their identification to an election worker, but they also allow voters who do not have the required ID to take advantage of fail-safe procedures to demonstrate their identities and vote. And voters who do not receive a mail ballot because of eligibility questions can more easily resolve those issues in person at a polling place than by mail.

Some voters cannot, or do not want to, vote by mail.

Many Americans do not have access to reliable mail delivery, and many do not have conventional mailing addresses for ballot delivery. Eliminating polling sites would completely disenfranchise these voters. Ineffective mail service is **more common** in poor and minority communities as well as in **rural communities**. Many Native American reservations do not have residential street addresses that are recognized by the postal services, and the residents on those reservations have to rely on P.O. boxes that are far from their homes, often shared with multiple families. Many homeless people also do not have ready access to reliable mail service.

Other voters, who are accustomed to visiting their Election Day polling place to cast a ballot, will be reluctant or even suspicious of casting their vote any other way. This is especially true for Latino, African-American, and younger voters in some states, who use vote-by-mail at **lower rates** than other voters. For some of these voters, the choice is driven by distrust in the post office. One **study** found that voters of color were far less likely to trust the post office than white voters. Even in states where vote-by-mail is widely available, a significant number of voters choose to deliver their completed ballots to polling sites, instead of returning them through the mail.

Many essential voter services work best when they are provided at polling places.

For many voters, the services they need to vote privately and independently are available at polling sites and are more challenging to access via mail.

Voters with disabilities: Voting by mail is difficult or impossible for people with certain visual and dexterity disabilities without substantial assistance. In contrast, specially-designed voting machines available at polling sites allow voters with disabilities to vote privately and independently. Indeed, **studies** find that the majority of voters with disabilities **prefer** to vote in-person.

Voters needing language assistance: More than **16 million** Americans rely on the legally mandated **bilingual assistance** and translated materials they get at polling sites to vote. While it is critical that states provide similarly translated materials by mail, there will undoubtedly be gaps. And, in any event, voters with language assistance needs will not have an election worker proficient in their language in front of them to ask questions unless they go to a polling place.

Voters needing to register on the day they vote: Voters in 20 states use some form of "Election-Day registration," which means that a voter can register and vote on the same day. The **consensus** among political scientists is that turnout in states that have adopted this policy is as much as five percentage points higher than in other states, particularly among young people, people with low incomes, and people of color. The current crisis only elevates the importance of this option, as millions of voters will have difficulty accessing voter registration, and voters displaced by the pandemic will need to register at their new residences. Election Day registration is currently only available in person. If polling places are shut down, many prospective voters will find themselves shut out of the election as a result.

Covid-19 poses an unprecedented challenge to election administration. Expanded access to vote-by-mail is a critical component of any plan to address the crisis, but it cannot be the only component. We do not know what the state of the pandemic will be in November, but states must make every effort to continue to offer meaningful access to in-person voting polling locations that are safe and sanitary.

BRENNAN CENTER FOR JUSTICE

MEMORANDUM

To: Interested Parties

Re: How to Protect the 2020 Vote from the Coronavirus

Date: March 16, 2020

This document benefited from the input of multiple election officials and voting rights experts. It may be updated to account for new developments and comments.

The coronavirus disease 2019 (Covid-19) presents a difficult and novel challenge to the administration of the 2020 general election. Recent election emergencies have largely been caused by catastrophic weather events, and our country has done little election planning for pandemics. Unlike a hurricane, a pandemic does not have a discrete and relatively predictable end point. And avoiding large-scale social contact is a central feature of combating the crisis. These elements create distinct challenges for election officials on top of the significant and ongoing threats to the security of our election infrastructure.

Given the scope of the challenge, large-scale preparation, backed by the concerted support of the government and the public, is needed immediately to ensure that the 2020 election is free, fair, accessible, and secure. We will need substantial modifications to our election procedures, substantial flexibility, and a substantial infusion of resources to ensure that every eligible American can register and vote safely, securely, accessibly, and as conveniently as possible; to ensure that every ballot cast by an eligible voter counts; to maintain the security of the election; and to ensure the safety of election workers. Below we outline the critical changes needed to ensure the election works.

The key recommendations fall into five categories: (1) polling place modification and preparation; (2) expanded early voting; (3) a universal vote-by-mail option; (4) voter registration modification and preparation, including expanded online registration; and (5) voter education and manipulation prevention. We recommend that each state government establish an election pandemic task force to determine how best to implement relevant policy recommendations in their state. State and local officials must understand the laws and emergency rules applicable to their jurisdictions and consider appropriate adjustments to ensure that election officials have the authority needed to accomplish these modifications. For its part, Congress should immediately appropriate funds to ensure that election officials have the resources needed to make the needed adjustments to their voting systems. Congress should also establish baseline national rules to

ensure that every eligible American can vote safely, securely, and accessibly in the midst of the pandemic. In the absence of Section 5 of the Voting Rights Act, care must be taken to ensure that changes are nondiscriminatory and do not negatively impact access for communities of color.

1. Polling Places

People without Internet and mail access, those who need language assistance to vote, and people with disabilities who rely on voting machines to cast a private and independent ballot may be disenfranchised if polling places are closed. To ensure that everyone can vote, jurisdictions should do their best to keep polling places open and safe for voters and election workers alike, and they should take steps to guard against long lines and mass confusion.

a. Polling place siting

- To the extent permissible under public health mandates, jurisdictions that offer polling place voting must continue to do so. Many people do not wish to, do not know how to, do not have access to, or cannot use mail voting.
    - In particular, Native American tribes should be permitted to designate buildings on reservations that can be used to register to vote and pick up and submit ballots (as would be provided by the Native American Voting Rights Act).
    - Polling sites are also critical for the operation of same-day registration, real-time address updates, and provisional balloting for certain individuals.

- Preparations should be made now to modify polling place siting decisions to account for Covid-19.
    - Polling places are routinely sited in buildings that primarily serve communities identified as high risk for serious Covid-19 illness, like senior care facilities. Alternative locations should be immediately identified in case the health risk is too great to use those locations in November and, in the event of a change, voters should immediately be given individualized notice of the change, with a second notice to be given within weeks of the November election. Funding should be provided to account for increased rental costs and costs associated with making new polling sites accessible to people with disabilities.
    - If polling places are moved out of senior care facilities or other residential sites, plans should be implemented to ensure that the residents of those facilities are able to cast a ballot.
    - In determining modifications to polling location plans, election administration officials must assess the impact of voting changes on vulnerable communities and ensure that polling place location changes increase, not limit, accessibility for racial and language minority voters as well as students and voters with disabilities.

- Where there is insufficient access to polling places, states should add vote centers where every ballot in a jurisdiction is available on demand. This will require immediate funding to set up the necessary technology.

b. Healthy polling places

- Polling places will need to be sanitized to prevent transmission of the virus, in compliance with the guidance issued by government health agencies.
    - The Centers for Disease Control and Prevention (CDC) has issued guidance for preventing transmission of Covid-19 at polling places, including that poll workers should stay home if they are sick, clean frequently touched surfaces, disinfect potentially contaminated surfaces after cleaning, wash hands frequently, and clean and disinfect voting machines and other equipment.
        - The U.S. Election Assistance Commission (EAC) has posted guidance from vendors regarding the cleaning of voting machines.
    - Polling places should be equipped with soap, water, and drying materials and an alcohol-based hand sanitizer.
    - Procedures should be established to ensure that hand sanitizer use does not jam ballot scanners.
    - Ballot-marking procedures should be established to minimize viral transmission. For instance, where possible, voters should be provided with disposable pens to mark paper ballots and should also be encouraged to bring their own pens to the polling place. Election officials should consult with their machine vendors to determine whether Q-tips or other disposable devices can be used to mark votes, instead of voters using their fingers.

- To comply with government health organizations' recommended social distancing policies, polling places will require reconfiguration to allow substantial space between voting privacy booths, distance between poll workers, etc.
    - Increased funding and preparation will be needed for resources such as additional machines, additional staff, and larger voting spaces.
    - Reconfiguration plans should account for voters with disabilities to ensure these voters do not face extra burdens by the placement of voting equipment and check-in stations.

- Adequate polling place resources, including voting machines, ballots, and poll workers, should be provided to minimize lines, since crowds and exposure time are key determinants of the likelihood of contracting viruses, and since long lines are in part a function of inadequate election day resources. (This is particularly critical since the CDC recently recommended canceling gatherings of 50 people or more for eight weeks.)
    - Increased funding for and deployment of polling place resources is needed to minimize lines.
    - Resource plans should include recruitment of additional poll workers to account for potential absences due to sickness or fear of Covid-19.
        - Plans may include recruiting workers who were displaced or laid off due to the effects of Covid-19 and nonessential federal, state and local workers (who do not have a conflict of interest), expanding student and bilingual poll worker programs, using temporary staffing agencies, and relaxing poll worker qualifications.

        - Funding should be provided to increase incentive compensation for poll workers and to pay overtime to poll workers working to process lines that remain after poll closing hours.
        - Jurisdictions should also consider recruiting additional poll workers who can serve as "greeters" to triage different types of voters — for example, identifying voters who are there to drop off a ballot as opposed to casting a ballot on a machine, or those who need language assistance.
    - Resource plans should also account for online or webinar-based trainings of poll workers.
    - Jurisdictions that are required to provide language assistance in languages other than English should hire professional interpreters to offer assistance by phone at any stage of the voting process where translation is needed.
    - Curbside voting options should be made available, especially for voters with disabilities or illnesses who may not be able to leave their vehicles. (Note that as a general matter, curbside voting is not a legal cure to inaccessible polling locations.)

- Jurisdictions should prepare for a surge in provisional voting due to delays in processing of voter registration applications, voter confusion resulting from polling site closures and consolidation, and unfamiliarity with absentee voting.
    - Poll workers must receive additional training on provisional voting procedures, including training to ensure that every person who presents themselves as eligible to vote has a right to cast a provisional ballot.
    - Election officials should stock extra provisional envelopes, provisional voter affidavits, and provisional voter notices of rights in all languages the jurisdiction is required to offer under Section 203 of the Voting Rights Act.
    - To account for anticipated concerns about the safety of certain polling places in states that have strict precinct voting requirements, provisional ballots cast by voters registered in the jurisdiction, but cast in the wrong precinct, should count for the races on which the voter is eligible to vote, and states should suspend restrictions that would prevent voters' ballots from counting.

2. <u>Early In-Person Voting</u>

- States should expand early voting options to reduce long lines and administrative stress on Election Day.
    - States that do not offer early in-person voting should implement it for this year — either by creating an early voting program or by modifying their existing absentee voting program to allow voters to cast absentee ballots in person.
    - States that offer early in-person voting should expand the number of locations at which it is offered and extend the days and hours on which it is offered.
    - Ideally, states should offer at least two weeks of early in-person voting, but states should offer a minimum of five days, including at least one Saturday and one Sunday.

- Voters should be encouraged to vote in advance of Election Day to minimize crowding of polling places.

- A significant infusion of resources is needed to expand flexible early voting, allow for ballots on demand in states that choose to offer early voting at vote centers, and implement technologies, like online wait time apps, that can help direct voters to locations with the shortest lines.

3. Mail Voting

a. Mail voting option for all, at no cost

- Mail-in ballot options should be extended to all voters.
  - All voters should be offered the option to cast their ballot by mail (with multiple submission options, as provided below), so as to enable voters to avoid lines at the polls and exposure to Covid-19.
    - However, in-person voting options consistent with public health must also be maintained.
  - Inactive and recently purged voters (who may have been improperly removed from the rolls) should be sent provisional ballots by mail if they request a mail ballot.
  - In the few states that have appropriate voter list and election infrastructure and widespread mail voting, it may be appropriate for election authorities to arrange to automatically send mail ballots to every registered voter, while maintaining in-person options for those who cannot vote by mail.
  - Given that mail-in voting may be the only option for people who need assistance or are immune-compromised to cast a ballot, states must allow voters who cannot vote in person — particularly people with disabilities, illness, or language assistance needs — to obtain assistance completing and submitting ballots from individuals they designate.
  - An immediate infusion of resources is needed for mail ballot tracking software, as well as for additional facilities costs for mail ballot processing and ballot duplication efforts.

- Voters should not bear the return postage cost for absentee ballots.
  - In addition, absentee ballots without postage should be delivered by the U.S. Postal Service.

- Jurisdictions should order adequate paper ballots and absentee ballot envelopes to account for the potential need to mail ballots to every registered voter.
  - At a minimum, enough paper ballots and absentee ballot envelopes should be printed to cover 120 percent of the number of registered voters in the jurisdiction at the time the ballots and envelopes are ordered. This will account for the anticipated surge in voter registrations before the presidential election and should

accommodate spikes in turnout for voters changing their minds and deciding to vote in person during early voting periods or at a polling place on Election Day.
    - Jurisdictions that are required to provide language assistance under Section 203 of the Voting Rights Act must provide ballots and other voting materials, including updates about the changes to election procedures, in all required languages. These jurisdictions should also offer language assistance by phone.
  - Covid-19 could unexpectedly impact printing vendor capacity, and officials should order ballots as soon as possible.
    - Voting system vendors should ensure there are enough commercial printers that know the vendor ballot specifications to meet additional demand and that election officials have the specifications so they too can print ballots as needed.
    - Where possible, states should use no-glue envelopes and instruct voters not to lick envelopes.

b. Requesting, receiving, and returning mail ballots

Options for requesting, receiving, and returning mail-in ballots should be expanded, while maintaining the security of the voting system.

- States should offer multiple methods of requesting mail-in ballots, including online, in person, by phone, and by mail.
  - States generally allow voters to request mail-in ballots in person or through the mail, but a number of states supplement these request methods. At least one supplemental method should be offered to voters in affected jurisdictions.
  - Jurisdictions should consider establishing secure processes by which voters who are unable to leave their homes can be offered an option to receive a blank ballot electronically.
    - In states that have tabulators that work only with certain ballots, email printed ballots should be an option of last resort (and will have to be counted by hand or duplicated before scanning).
    - Funding should be provided for this purpose, including for the duplication of ballots and the implementation of secure electronic technology for transmittal of blank ballots.
    - Web portals for online absentee ballot requests should be screen-reader compatible for voters with visual impairments.

- Secure options for returning ballots should be expanded.
  - States should offer voters drop boxes in accessible locations, if they are able to do so securely. Outside of government offices, drop boxes should be equipped with secure cameras.
  - Voters should also be offered secure curbside drop-off options at polling places.
  - States should allow voters who are unable to leave their homes to designate individuals to return their completed ballots.

- Deadlines for mail-in ballots to be requested and returned should be relaxed.

    - Voters in jurisdictions affected by Covid-19 should be permitted to request a mail-in ballot as close as possible to Election Day.
    - Mail-in ballot receipt deadlines should be extended to account for delays in U.S. Mail, ballot drop box retrieval, or other administrative processing delays caused by Covid-19. The receipt deadlines must not be extended so far as to prevent compliance with the federal Electoral College deadlines, though Congress should extend those deadlines.

c. Processing and counting mail ballots

- Election canvassing and certification deadlines should be extended to account for delays in receiving and processing mail-in ballots, and ballot processing times should be adjusted.
    - Election canvassing and certification deadlines should be extended to account for broader use of vote by mail, extended mail-in ballot deadlines, and disruptions to U.S. Mail service, while remaining consistent with (also extended) federal Electoral College deadlines.
    - In addition, while the CDC has stated, with respect to packages from China, that "there is likely very low risk of spread from products or packaging that are shipped over a period of days or weeks at ambient temperatures," it is conceivable that election officials will decide to quarantine mail-in ballots prior to canvassing them. Deadlines should be extended further to account for that.
    - Election officials should be permitted to begin processing mail-in ballots prior to the close of polls on Election Day, in order to save time and reduce the overall administrative burden.
    - While it would be completely inappropriate to move Election Day either nationally or in a particular state, the deadlines for counting ballots and resolving election disputes can and should be extended to ensure a fair and accurate count before the end of the year. Specifically, Congress should extend the Electoral College deadlines, merging or moving closer together the December 8, 2020 "safe harbor" deadline for states to resolve controversies over the appointment of electors and the December 14 meeting of the electors, and extending these deadlines to occur closer to the end of the calendar year.

- Reasonable, uniform processes for evaluating the validity of mail ballots should be implemented to prevent widespread disenfranchisement as a result of an uptick in mail ballots.
    - Uniform processes for signature matching should be implemented and funding for signature matching software should be provided. Because signature matching can lead to voter disenfranchisement, especially for voters with disabilities and illnesses, voters whose signatures are found not to match should be offered timely

notice and a meaningful opportunity to cure or prove that they personally cast the ballot.
    - Ballots should not be rejected based on technical defects that do not substantially relate to ensuring that the ballot was actually completed and cast by the voter.
    - Mail ballot requirements that necessitate in-person interaction — such as getting an absentee ballot notarized or witnessed, or curing defects with an absentee at a government office — should be modified.

- Mail ballot processing and administrative capacity should be expanded.
    - An immediate infusion of funding is needed to expand capacity to process a surge in the number of mail ballots, including purchasing high-speed ballot scanners and automated mail sorting systems, securing additional warehouse space to store the additional equipment and supplies needed for mail balloting, and increasing election staff to process mail ballots and ballot applications.
    - In jurisdictions that are required to provide language assistance pursuant to Section 203 of the Voting Rights Act, language assistance hotlines should be set up to provide general information and answer questions in mandated languages.

4. Voter Registration

Covid-19 may severely disrupt the ability of Americans to register to vote and elections officials to process registration applications. Quarantines, illnesses, and social distancing will likely reduce access to government offices that provide voter registration services or lead to postal service disruptions, particularly in the critical weeks leading up to voter registration deadlines, when most registrations typically occur.

a. Bolster online registration

- Online voter registration (OVR) systems must be bolstered to ensure they can accommodate a surge in use.
    - OVR systems should be tested and their capacity bolstered to ensure that they can handle surges in web traffic.
    - In the jurisdictions that manually process online registrations, OVR systems should be automated end to end, so that both the submission and the processing of registration applications occur electronically.
        - This will require a significant infusion of resources immediately
        - If registration processing is still manual, then jurisdictions will need a significant increase in staffing to process registrations, and contingency plans will be needed to ensure that registrations are processed if government offices close.

- States that link OVR systems to department of motor vehicle (DMV) databases should ensure that citizens without DMV records can still register online.
    - Ideally, states should ensure that the existing OVR system is capable of processing online registrations for registrants without DMV records (capturing

signatures from other government databases or allowing voters to provide signatures when they first vote).
    - Alternatively, states should provide a secure alternative electronic method to register to vote for those who cannot access the OVR system.

- States that do not have OVR should work to set up such a system immediately.
    - This will require a significant infusion of resources in the short term.
    - If that is not achievable, states should set up alternative electronic systems for registration.

b. Increase staffing

- Voter registration processing capacity should be enhanced with additional staffing to address a surge in voter interest and major disruptions to normal processes.
    - States that offer same-day registration (SDR) should prepare for an even greater surge in same-day registrations, if voters were unable to register in advance due to government office closures.
    - States without SDR should anticipate needing additional polling place staffing on Election Day to accommodate emergency addition of an SDR option.

c. Flexible registration deadlines

- States should prepare to extend voter registration deadlines in light of anticipated government office shutdowns, online access difficulties, and breakdowns in other voter registration systems.
    - An extension should be mandatory if large numbers of voters are unable to leave their homes, if government registration offices close, or if there are disruptions to online service as the voter registration deadline approaches.
    - If disruptions continue beyond the extended voter registration deadline, states should offer same-day registration and voting for voters affected by disruptions.

- Voters who submit timely registrations should be permitted to vote and have their votes counted, even if mail disruptions prevent their registrations from reaching election officials. To accomplish this, states should adopt one of the following options:
    - allow SDR for all voters in this election;
    - offer SDR (with a regular ballot) for voters who affirm that they submitted timely registrations or were unable to do so due to Covid-19; or
    - provide a provisional ballot to voters who affirm that they submitted timely registrations and ensure that those ballots are counted in a manner that does not penalize registrants for disruptions to the mail delaying receipt of voter registrations.
    - States should also count all provisional ballots cast by voters whose registrations were delayed by mail disruptions. In the event of mail disruptions, postmark dates alone should not be considered dispositive of timeliness, and election officials

should accept other indications by the U.S. Postal Service that the ballot was mailed on or before the close of polls on Election Day.

5. Voter Education and Manipulation Prevention

Fear and confusion around a pandemic create a fertile environment for disinformation and efforts to manipulate the electoral process for improper purposes and partisan gain. State officials, advocates, and citizens should take steps to guard against the use of Covid-19 to suppress voters or otherwise manipulate the election.

- States and localities should be clear and transparent about changes to voting rules.

- Aggressive public education campaigns must be mounted to inform voters regarding changes to voting rules and options.
    - Enhanced advertising in languages other than English should be provided to ensure that all voters understand changes to voting rules and options.
    - Election websites should be made fully accessible to voters with disabilities.
    - Funding will be needed to reach large numbers of voters affected by changes to voting rules and options.

- States will also need to plan to combat disinformation about voting rules changes, including strengthening the resiliency of tools for voter information like polling place lookup websites.

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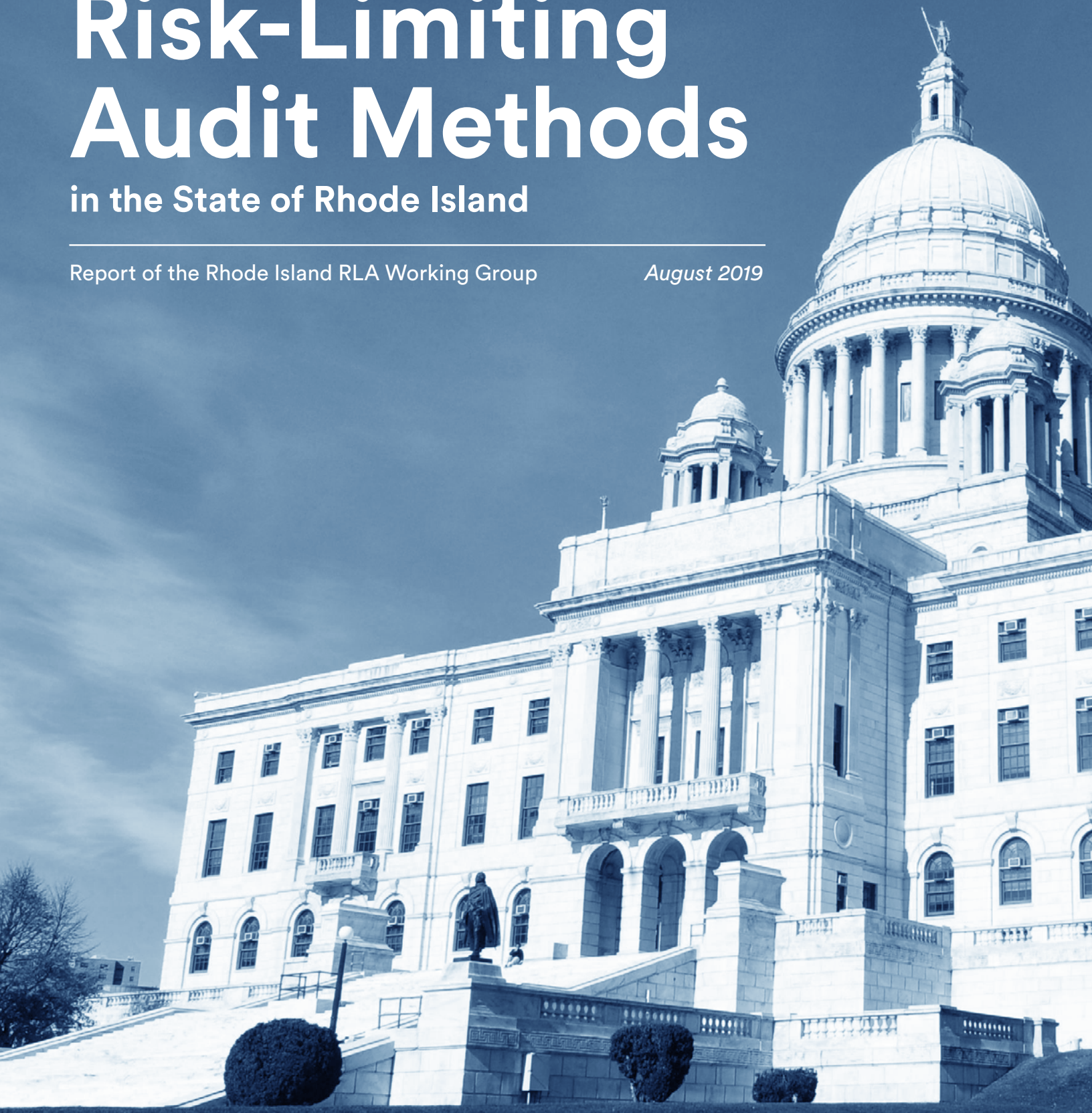
Pilot Implementation Study of

Risk-Limiting Audit Methods

in the State of Rhode Island

Report of the Rhode Island RLA Working Group

August 2019



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Executive Summary

In October 2017, Rhode Island Governor Gina Raimondo signed into law a groundbreaking election security measure. Now, state law requires Rhode Island election officials to conduct risk-limiting audits, the "gold standard" of post-election audits, beginning with the 2020 primary. A risk-limiting audit ("RLA") is an innovative, efficient tool to test the accuracy of election outcomes. Instead of auditing a predetermined number of ballots, officials conducting an RLA audit enough ballots to find strong statistical evidence that outcomes are correct. The law, enacted in the aftermath of two critical events relating to the 2016 elections, stems from decades of advocacy aimed at increasing the efficiency, transparency, and verifiability of political contests in the state. Rhode Island is now the second state, joining trailblazing Colorado, to mandate use of this modern tool statewide.

Following the law's enactment, a group of professionals with expertise in election security and election administration formed the Rhode Island Risk-Limiting Audit ("RIRLA") Working Group. As its name suggests, the RIRLA Working Group was established to assess the conditions in Rhode Island to help the state as it prepares to implement the law. The RIRLA Working Group recommended – and Rhode Island officials agreed – that the state should conduct pilot RLAs in advance of the 2020 deadline. The Rhode Island Board of Elections chose January 2019 as the date for the pilots and, based on several factors, selected Bristol, Cranston, and Portsmouth, Rhode Island as participating municipalities.

Leading up to the pilots, the RIRLA Working Group had regular conference calls, meetings, and other correspondence to gain greater familiarity with Rhode Island's election laws, practices, and voting equipment. In partnership with the state, the RIRLA Working Group set a goal to plan and develop a trio of pilot audits that would both meet the state's needs and adhere to the Principles and Best Practices for Post-Election Tabulation Audits. Ultimately, the RIRLA Working Group drafted three separate audit protocols, step-by-step instructions to guide those who would conduct the RLAs over the course of two days.

On January 16 and 17, the Rhode Island Board of Elections and members of the RIRLA Working Group met in Providence, RI to conduct the pilot risk-limiting audits. In conducting three unique RLAs – a ballot-level comparison, a ballot polling, and a batch comparison audits – the partnership sought to:

- **Familiarize** election officials with RLAs and provide them some comfort with conducting them through a hands-on learning experience;
- **Evaluate** Rhode Island's election facilities, equipment, and other resources to determine their adequacy for administering RLAs;
- **Emulate** the actual environment and real-world circumstances in which the RLAs would be conducted, including by having officials manage unanticipated scenarios that could arise;
- **Time** the various audit steps and compile the data to compare the relative efficiency of the separate audit approaches;
- **Ascertain** any gaps or deficiencies that might hinder the initial rollout and implementation of RLAs or the state's ability to conduct them beyond 2020;
- **Make a set of recommendations** to help officials conduct RLAs pursuant to state law and best audit practices.

This report tells that story. It details how, through a collaborative effort, Rhode Island successfully conducted three pilot RLAs. It provides a general overview of RLAs, including the advantages and disadvantages of each method. The report describes the history of election administration in Rhode Island, which has led to the environment in which elections are conducted in the state today. It also lays out the essential components of the audits – their design, software tools, and presentation – and provides the results of the audits. Finally, the report describes some of the key lessons learned throughout the process, and it makes recommendations, specifically that Rhode Island pursue ballot-level comparison audits, so that state officials and the public move towards RLAs seamlessly and to improve the state's experience with RLAs in the future.

This was a truly collaborative effort. It would not have been possible without countless hours of work from Miguel Nunez and Steve Taylor (Rhode Island Board of Elections); John Marion (Common Cause Rhode Island); Mark Lindeman and John McCarthy (Verified Voting); Wilfred Codrington III and Andrea Cordova (Brennan Center for Justice); Luther Weeks (Connecticut Voters Count); Ron Rivest, Mayuri Sridhar, and Zara Perumal (Massachusetts Institute of Technology); Suzanne Mello-Stark (Rhode Island College), independent volunteers Lynn Garland, Neal McBurnett, Tom Murphy, and many others who made the pilot audits and this report a success.

A host of recent events, including equipment malfunction, cyberthreats, maladministration, and human error, have undermined public confidence in American elections. Unfortunately, these types of occurrences are not likely to disappear. But the good news is that our officials can help, even in the face of constraints on their time and public resources. They can take steps both to decrease the number of incidents and to show that they are willing and able to address the problems as they arise. They can start by conducting RLAs, to assure the public that the *reported* winners of elections are the *actual* winners. Risk-limiting audits are an efficient, effective, and straightforward way to enhance public confidence in our elections that takes into account the realities of election administration. The success of the pilots in Rhode Island can and should serve as a model for what state and local officials across the country can accomplish, and how other individuals and organizations can provide valuable assistance. We hope to make that clear with this report.

Recommendations include:

- Implement a ballot-level comparison risk-limiting audit
- Establish objective criteria for which races will be audited
- Conduct a centralized audit
- Consult local election officials
- Conduct a practice audit
- Use Arlo audit software
- Appoint an ongoing expert advisory council
- Initiate rulemaking
- Develop schedule with milestones
- Endorse vendor recommendations

Part I:
Overview of Risk-Limiting Audits

Evidence-Based Elections and Risk-Limiting Audits: A Brief Introduction

The 2016 U.S. presidential election brought increased media and public interest in long-standing concerns about the accuracy of electronic vote tabulations, throughout the nation, and in Rhode Island specifically (see Risk-Limiting Audits in Rhode Island: The Background). Computer scientists have warned for many years that computerized voting and counting systems are vulnerable to error or malicious subversion, and must be checked using methods that do not rely on the correctness of hardware or software.[1] The U.S. intelligence community and other credible observers have reported on widespread cyberattacks on election systems during the campaign, including the data breach of a state voter registration database.[2] Officials emphasized that there was no evidence that any data had been changed, nor was there evidence that votes had been changed.

Unfortunately, due to poorly designed equipment and procedures, evidence that votes *hadn't* been changed was fragmentary. Tens of millions of Americans voted on systems that provide no verifiable record of their votes. Many others marked and cast their votes on paper ballots, but their states did not check any of these ballots against the official returns. Paper ballots and systematic comparisons of the ballots to official returns are prerequisites for evidence-based elections.[3] A voting system that may produce accurate results, but provides no way to know whether it did, is inadequate. It provides far too many ways for resourceful adversaries to undermine public confidence in election integrity.

The basic strategy for evidence-based elections can be summarized as follows: use paper ballots, protect them, and check them. More specifically:

1. Voters must vote on voter-marked paper ballots – either marked manually or using ballot marking devices, but in either case, with a convenient and accessible means for voters to verify their ballots and, when necessary, to mark replacement ballots before officially casting them. Direct Recording Electronic voting machines that produce "voter-verifiable paper audit trails" provide, at best, an obsolescent stopgap: most voters never check them, and often they are difficult to audit.

1. For an authoritative overview of these concerns see *Securing the Vote: Protecting American Democracy*, The National Academies of Sciences, Engineering, and Medicine, 2018, 5, https://www.nap.edu/read/25120/chapter/1.
2. For instance, see Adam Thorp, "Illinois election officials: 'Very likely' state was target of Russian hackers," *Chicago Sun-Times*, July 13, 2018, https://chicago.suntimes.com/news/illinois-election-officials-very-likely-state-was-target-of-russian-hackers/.
3. Philip B. Stark and David A. Wagner, "Evidence-Based Elections," *IEEE Security and Privacy*, 2012,10, https://www.stat.berkeley.edu/~stark/Preprints/evidenceVote12.pdf.

2. Voted paper ballots must be carefully stored and managed to ensure that no ballots are added, removed, or altered, and procedures should be established to provide strong evidence of proper ballot management. Security experts should review the means adopted to prevent ballot tampering, and compliance audits should be performed to confirm that those procedures are actually followed (e.g. that ballot containers were properly secured).

3. Voted ballots also must be checked in robust post-election vote tabulation audits, in which audit judges manually review a random sample of voted ballots (and possibly additional ballots) and compare them to the reported results – before the results are finalized. To the extent feasible, these audits should be risk-limiting audits (RLAs), which are very likely to correct any election outcome that is wrong due to mistabulation, by means of a full manual count. Both RLAs and recounts should rely on human inspection of the actual voted ballots, not on images or on copied ballots.

A risk-limiting audit provides a large, prespecified minimum chance, if a reported outcome[4] for an audited contest is incorrect (i.e., disagrees with what an accurate full manual count of the ballots would show), that it will be corrected through a full manual count. (Legally, the full manual count might be part of the audit, or it might be a separate recount required because of the audit findings.) The risk limit is the maximum chance that an incorrect contest outcome will not be corrected. For instance, an audit that has at least a 95% chance of correcting an incorrect outcome has a 5% risk limit. A RLA with a small risk limit that does not lead to a full manual count provides strong evidence that the reported outcome is correct (i.e. matches what an accurate full manual count would show).

Risk-limiting audits can be highly efficient: they can be designed to do the amount of work – no more and no less – required to confirm a particular election contest outcome (or multiple outcomes) to a prespecified risk limit. Risk levels for other contests can be measured simultaneously even if they do not achieve the pre-specified risk limit.

More and more states are requiring risk-limiting audits. In November 2017 Colorado conducted the first coordinated statewide RLAs, after a series of pilot audits dating back to 2010. In November 2018, Colorado conducted the first RLAs of statewide contests. Rhode Island has a statutory requirement to conduct RLAs beginning with the 2020 primary. State laws in California and Washington explicitly welcome pilot or voluntary RLAs, and local election officials in other states have conducted pilot audits on their own authority. And in 2017 the Virginia General Assembly amended its audit law, adding a requirement to conduct "risk-limiting" post-election audits annually, effective July 1, 2018.[5]

4. The outcome is the legal and official consequence of an election: for instance, who will take office, who will participate in a runoff election, or whether a referendum will pass.
5. Va. Code Ann. § 24.2-671.1 (2017). These audits do not fit the definition of RLAs used in this paper because they are not allowed to begin until after results are certified and the recount deadline expires.

RLA Methods

Overview

There are three major approaches to risk-limiting audits, each of which has variations and sometimes can be combined with the other approaches. The pilot explored all three of these approaches at a manageable scale in a centralized setting.

1. In **ballot-level comparison**, a random sample of voted ballots is manually interpreted, and each manual interpretation is checked against the machine interpretation of the same ballot.

2. In **ballot polling**, a random sample of voted ballots is manually interpreted, and the resulting manual vote counts are checked against the total machine counts to see if they provide strong statistical evidence that the reported outcome is correct. This method is very similar to exit polling.

3. In **batch comparison**, a random sample of "batches" is selected, and the votes in each batch are counted manually. A batch may consist of all the ballots cast in a precinct, or on a particular voting machine. These counts are compared to the corresponding machine or precinct counts, batch by batch, to measure discrepancies as in ballot polling or ballot-level comparison.

Each one of these approaches starts with generating random numbers and using these random numbers to determine the sample of batches or individual ballots to be examined. Sampled ballots are interpreted by hand and eye and compared with corresponding electronic results. All discrepancies are noted and test statistics are calculated to see whether the audit sample provides provide strong statistical evidence that the reported outcome is correct. If not, additional sample ballots are examined until the statistical evidence is sufficient or a full manual recount is ordered

State Administration of Risk-Limiting Audits

Until 2017, most pilot risk-limiting audits had been conducted for single local jurisdictions – usually counties. In 2017, Colorado became the first state to design and deploy a state-wide risk-limiting audit across all of its individual counties. Scaling up from counties to the state-wide level introduced a number of additional problems for both the theory and practice of risk-limiting audits, including the following challenges:

1. The necessity for development, deployment, documentation and instruction in using robust, enterprise-level software to manage sampling of ballots, entry of vote data for specified contests from sampled ballots, flagging of discrepancies, and calculation of risk levels as specified and coordinated at the state level and conducted in each individual county.

2. Mathematics and software to combine results from different risk-limiting audit methods used in different counties because of limitations of some vote tabulation systems (e.g., some counties had equipment that could imprint ID numbers of centrally counted ballots to facilitate ballot-level comparison methods, while others did not and thus had to use ballot polling methods).

3. Distributed training and supervision of permanent and temporary election officials across 64 counties spanning an area of over 104,000 square miles.

Rhode Island's small geographic area (1,214 square miles) and statewide uniformity of voting systems affords it a singular advantage of being able to choose whether to conduct risk-limiting audits either at one central location or dispersed across 39 individual municipalities or a few geographically distributed sites.

Any of the three major types of risk-limiting audits (ballot-level comparison, ballot polling or batch comparison) could be conducted at a central facility in Providence, so long as that facility has sufficient space to store approximately 1,200 ballot boxes on shelves (organized to facilitate retrieval of ballots) and space to conduct other audit operations (including re-scanning, retabulating and imprinting ballots, dividing ballots in boxes into smaller batches of ballots in folders, retrieval and counting of sampled ballots, and recording marks from selected contests for sampled ballots).

All three major types of risk-limiting audits also could be conducted primarily in geographically distributed locations, up to and including all 39 local municipal jurisdictions, so long as municipal election officials in each location have sufficient space and are willing to take responsibility for doing the audit work during the days following each election, and so long as the state can acquire, deploy, and use software that each municipality can run at their local offices, and that state election officials in Providence can use to manage and centrally coordinate audits across all 39 local municipalities – especially for multi-jurisdiction contests.

Pros and Cons of Each RLA Method

The three different risk-limiting audit methods tried in the pilot each have their own advantages and disadvantages which depend on such factors such as the type of voting equipment used, the number of contests being audited, and the margins of the contests.

① Ballot-Level Comparison

Pros	Cons
This method typically permits RLAs to look at far fewer ballots than the alternatives – often under 100 ballots are needed to attain a 5% risk limit. Even when margins are close the number of ballots that need to be examined to achieve a risk limit is relatively easy to predict and smaller than in the other methods, unless the margin is so close that an entire recount is required. Since the manual interpretation of each ballot is directly compared to its machine interpretation, it also should be possible to identify the cause of any discrepancy. Finding the sources of discrepancies is key for continuously improving audits and election processes. Ballot-level comparison audits also support efficient, informative "opportunistic" auditing of all other contests that appear on the audited ballots but are not being audited to a pre-specified risk limit.	To conduct ballot-level comparison audits, there must be a way to match each ballot to its machine interpretation. Existing precinct-based scanners cannot establish this correspondence, because they do not store either the ballots or the machine interpretations in the order the ballots were cast. The ballots must be rescanned on equipment that keeps the ballots and interpretations (cast vote records) in order, preferably imprinting each ballot sheet with a unique ID that also appears in the corresponding cast vote record. Not all precinct-based scanners meet these two conditions. In that instance, each ballot must be rescanned on equipment that can establish this one-to-one correspondence. This form of audit is known as a transitive RLA.[6] To rescan all ballots expeditiously, some jurisdictions would need to purchase or lease additional systems that can imprint ballots and link the imprinted IDs to the new (rescan) machine interpretations. Also, rescanning all these ballots involves significant additional ballot handling with its associated burden of labor and chain-of-custody issues. The audit needs to be carefully conducted in a transparent manner so that observers can check the entire process, including the summation of the cast vote records to make sure the tallies match.

6. The name refers to the transitive property of equality: if A = B and B = C, then A = C. Here, if the original outcome equals the retabulation outcome, and if the retabulation outcome (according to strong audit evidence) equals what a full manual count would show, then the original outcome matches what a full manual count would show.

② Ballot Polling

Pros	Cons
Ballot polling audits can be performed without rescanning any ballots regardless of the type of voting machines. Relatively few ballots need to be examined (although more than in a ballot-level comparison audit) as long as the margins are not close. Ballot polling can be used when ballots cannot be matched to their machine interpretations.	For close margins (less than 2%) the number of ballots that need to be examined expands dramatically. Even when the number of ballots to audit is not very large, boxes with voted ballots from most or almost all of the precincts may need to be opened. (See Table 1 on p. 54) The required workload is less predictable than in comparison audits, so an outlier sample can require lots of additional auditing even if the machine count was very accurate. This type of audit does not provide any information on the cause of any discrepancies. Ballot polling is not well suited to opportunistic auditing of local contests: without the ability to tell whether a particular ballot was tabulated correctly, small samples are not very informative.

③ Batch Comparison

Pros	Cons
Batch comparison audits are straightforward to administer and easy to understand. The methods used are similar to recounts conducted in some states, so election officials are often familiar with these methods. This method requires little special preparation in most jurisdictions, as ballots are generally stored by batches that can be compared to the initial subtotal for that batch and no additional scanning is needed. Also, a full manual count – which could be required if an RLA fails to find strong evidence for an election outcome – could be administered in much the same way as batch comparison, except that all the batches would be included. For smaller margins, the required counting steadily increases – but less rapidly than with ballot polling. Batch-level manual counts are relatively easy to conduct in parallel at multiple locations. This type of audit can provide information about the accuracy of particular machines and the accuracy of the process of auditing and reporting results. Investigating sources of discrepancies can be time consuming and difficult: the results of the manual audit must be checked to confirm any apparent discrepancy; and all the ballots in the batch must be evaluated to determine which ones may have caused the discrepancy. However, this method identifies many more differences than the other methods and can confirm consistent differences.	Batch comparison audits typically involve examining the largest number of individual ballots. This approach is not well suited to auditing local contests with a small number of batches: it would often require a full hand count or almost a full hand count.

Part 2:
Planning Rhode Island's Risk-Limiting Audit Pilots

Risk-Limiting Audits in Rhode Island: The Background

History of Rhode Island's Voting System

On January 16 and 17, 2019 the Rhode Island Board of Elections conducted three pilot risk-limiting audits with great success. It was the culmination of a two-decade journey toward more stringent verification of Rhode Island's elections.

To understand the context it is necessary to go back to the 1950s, when Rhode Island first used Shoup mechanical voting equipment. Those machines were durable, but provided no auditable paper trail. Because of their durability, the Shoup machines lasted until the 1990s. In 1994, then-State Representative James Langevin led a commission to look for Rhode Island's next voting system.[7] The commission pitted optical scan against direct-recording electronic (DRE) equipment, and ultimately recommended that the state adopt an optical scan voting system.

As the newly-elected Secretary of State, James Langevin purchased a new voting system in 1996, which featured paper ballots and Eagle OpTech ballot tabulators.[8] The purchase of new machines marked a return to the past because the use of paper ballots originated in Rhode Island in the 18th Century.[9] In 2016 the OpTechs were replaced with tabulators from Election Systems & Services (ES&S), as described in **Current Rhode Island Voting System**.

Rhode Island put numerous processes into state statute to accommodate the transition, including a requirement for logic and accuracy testing.[10] While the commission recommended a voting system that would allow "post-election assurance procedures such as retesting equipment and partial manual recount," neither the enabling statute nor rules adopted by the Rhode Island Board of Elections provided for implementing such procedures.[11] Meanwhile, other states were adopting paper ballots, and the majority of them required some type of post-election audit.[12]

7. *The New Ballot Box: A Plan to Bring Rhode Island's Election Process into the 21st Century*, The Commission to Study the Purchase of New Voting Equipment for Rhode Island, June 1994.
8. Tom Mooney, "Head of R.I. Elections Board says state is the last using 'Optech III P' voting machines and they don't meet federal standards," Politifact, March 16, 2013, https://www.politifact.com/rhode-island/statements/2013/mar/16/robert-kando/head-rhode-island-board-elections-says-state-last-/.
9. Suzanne Irene Mello, "A Detailed Forensic Analysis and Recommendations For Rhode Island's Present and Future Voting Systems" (PhD diss., University of Rhode Island, 2011), https://dfcsc.uri.edu/docs/Mello_Dissertation.pdf.
10. 17 R.I. Gen. Laws § 17-19-14 (2016)
11. *The New Ballot Box*, p. 6.
12. "Post-Election Audits," National Conference of State Legislature, last updated January 3, 2019, http://www.ncsl.org/research/elections-and-campaigns/post-election-audits635926066.aspx.

Risk-Limiting Audit Legislation

In the mid-2000's Rhode Island had a series of contentious recounts.[13] In their wake, the ACLU of Rhode Island introduced an omnibus election reform bill in 2009.[14] In 2013, Common Cause Rhode Island added language to the legislation, first drafted by Pam Smith of Verified Voting, to require the state to conduct pilot risk-limiting post-election audits.[15] For several years, the legislation stalled in the General Assembly,

The confluence of two events, both of which occurred in 2016, changed the fate of that legislation. First, there was foreign interference in the presidential contest between Hillary Clinton and Donald Trump. Although intelligence agencies did not find any evidence that Russia altered the vote tabulation, the events brought questions of election security to the forefront.[16]

Second, in Rhode Island a simple mistake caused election administrators to realize the value of post-election auditing. The default answers for ballot questions in the ES&S templates are "accept" or "reject." North Kingstown, Rhode Island had a long-standing preference for using "yes" or "no" as their preferred answers. At the time the policy was to maintain separate files for different ballot styles (mail ballots, precinct-cast ballots, sample ballots, ballots used for logic and accuracy testing). For the precinct-cast ballots the vendor changed the default answer per North Kingstown's request, but did not move the corresponding oval. However, the mark was moved on the ballots produced for logic and accuracy testing. The result was that on election day the DS200 tabulator was looking for the voter's mark in the wrong area.

On election night the unofficial count revealed an unusual result of the referendum: 5 "Yes" votes to 8471 "No" votes. This quickly raised suspicion among the public and election officials. In the days to follow, the Rhode Island Board of Elections ordered the ballot scanners to be reprogrammed and the ballot question recounted. In the end, the certified result – 9492 "Yes" votes to 4569 "No" votes – revealed the gross inaccuracy of the outcome that was initially reported.[17]

Using pilot audit language from the omnibus election administration reform bill, Common Cause Rhode Island drafted standalone RLA legislation in 2017. They secured the support of the Rhode Island Board of Elections, Secretary of State Nellie Gorbea, and the Rhode Island Town and City Clerks Association. Several compromises were made during the legislative process.

13. Talia Buford, "Court won't hear Alves' appeal," Providence Journal, October 17, 2008; Mike McKinney, "Lynch wins one primary," *Providence Journal*, October 23, 2008; Mike McKinney, "Alves' election request awaits," *Providence Journal*, October 9, 2008.
14. H 5326, 2009 Gen. Assemb., Jan. Sess. (Ri. 2009).
15. H 5660, 2013 Gen. Assemb., Jan Sess. (Ri. 2013); S 0421, 2013 Gen. Assemb., Jan Sess. (Ri. 2013).
16. "US report finds no direct foreign interference in 2018 vote," *Associated Press*, December 21, 2018, https://www.apnews.com/cd2618aaeb6040c5b57fb301361c76fd.
17. Donita Naylor, "Recount changes results of North Kingstown septic-loan ballot question from nay to yea," *Providence Journal*, November 16, 2016, https://www.providencejournal.com/news/20161116/recount-changes-results-of-north-kingstown-septic-loan-ballot-question-from-nay-to-yea.

First, it provided for phased implementation, with audits *allowed* to begin in 2018, but *required* beginning in 2020. This change was made to give election officials (who implemented a new voting system in 2016 and electronic pollbooks in 2018) adequate time to develop audit processes.

Second, audits are authorized for the primary elections, but not required. Rhode Island's September primary is among the latest in the United States. An audit that leads to a full hand count could potentially prevent the state from complying with the MOVE Act's requirement that military and overseas ballots be sent no later than 45 days prior to an election.

Finally, language was added to clarify that the audits would happen at the conclusion of any recounts.[18]

In May, 2017, John Marion sought and received advice about the draft legislation from the State Audit Working Group (SAWG) (see Appendix B). The SAWG also encouraged John Marion and the Rhode Island Board of Elections's Director and Deputy Director, Bob Rapoza and Miguel Nunez, to observe the nation's first statewide risk-limiting audit in Colorado in November 2017 and to meet with election officials and others in attendance.

MIT Professor and SAWG member Ron Rivest, and his students provided invaluable support by meeting with election officials to familiarize them with RLAs and different auditing methods.

On October 5, 2017, Governor Gina Raimondo signed H 5704 Sub A and S 413 Sub A into law, making Rhode Island the second state, after Colorado, to require risk-limiting audits. Unfortunately, the legislation did not come with an appropriation, or even a fiscal impact note, from the legislature. Fortuitously, in March 2018 Congress appropriated $380 million in funding for election security to the states via their existing Help America Vote Act (HAVA) accounts.[19]

Common Cause Rhode Island petitioned the Rhode Island State Board of Elections to set aside monies for the development and implementation of the risk-limiting audits.[20] On April 24, 2018 the Board voted to request that $400,000 of the $3 million that Congress appropriated to Rhode Island be allocated for the design and implementation of RLAs over the next five years.

18. The legislation also contained a scrivener's error, requiring audits for "statewide" instead of "state" elections, thus excluding state legislative contests from being audited. Legislation was introduced in 2018 and again in 2019 to correct the mistake.
19. Consolidated Appropriations Act, 2018, Pub. L. No. 115-141 (2018).
20. Letter sent to Rhode Island Board of Elections on March 26, 2018 (On file with author).

Current Structure of Election Administration in Rhode Island

Rhode Island's elections are administered by the Rhode Island Board of Elections, the Secretary of State and 39 local Boards of Canvassers.[21] Rhode Island has 421 precincts for general elections.[22] State statute caps the total number of registered voters at 3000 per precinct.[23] In the 2018 general election Rhode Island had 787,000 registered voters, and saw 381,272 ballots cast.[24] Of those ballots, 26,560 were centrally counted mail ballots. In 2011 Rhode Island amended the state's "emergency mail ballot" statute, making it easier for voters to request and vote a mail ballot in the 20-day period preceding an election. While not true early voting, that provision has led to a drastic increase in the use of mail ballots as de facto early voting.

The Rhode Island Board of Elections is a seven-member board appointed by the governor to staggered nine year terms. They direct a staff of twelve (12) full-time employees, as well as numerous seasonal employees during elections. They have plenary power over all election day administrative responsibilities including maintenance and deployment of voting equipment and ballots to polling places.

The Rhode Island Secretary of State is the state's Chief Election Officer under HAVA. The Secretary is elected to four-year terms. The Elections Division has a full-time staff of four employees. They are responsible for certifying candidates and questions and producing the ballots for Election Day.

Each of Rhode Island's 39 cities and towns has a three-person board of canvassers. Members are appointed on a partisan basis by the city or town council (two seats for the majority party, and one for the minority party). Staffing varies; in larger communities the boards have full-time employees, and in smaller communities the town clerk splits responsibility for election administration with other duties. They are responsible for, among other tasks, recruiting poll workers.

21. Rhode Island is an outlier because it does not have county-level government.
22. The Board of Elections has the ability to administratively reduce the number of precincts for primary elections.
23. 17 R.I. Gen. Laws § 17-11-1 (2012)
24. Ted Nesi, "RI voter turnout rose this year, but not to record level," *WPRI*, November 28, 2018, https://www.wpri.com/politics/ri-voter-turnout-rose-this-year-but-not-to-record-level/1624601098.

Current Rhode Island Voting System

By the early 2000s, Rhode Island's voting system was showing its age. The Optech Eagle scanners were breaking down at an alarming rate. After some controversy, the Rhode Island General Assembly passed a statute in 2015 that made it the Secretary of State's responsibility to purchase voting systems (until then, the Board of Elections had the duty).[25] In July 2016, Secretary of State Nellie Gorbea announced the purchase of the EVS 5.2.0.3 Voting System from Election Systems and Software (ES&S).[26] In addition to the ElectionWare software, the purchase included 590 DS200 digital ballot scanners for precincts and two DS850 high-speed scanners for central counting of mail and provisional ballots. Each precinct is allocated between one to three DS200 tabulators, depending on expected turnout. In 2018 Rhode Island purchased an additional 20 DS200s. (The state owns the DS200 tabulators and stores them in a central warehouse in Providence between elections.)

In addition to the other newly purchased voting equipment and software, Rhode Island continues to use ES&S's AutoMark ballot marking devices for accessibility. The state purchased the AutoMark devices prior to the 2006 elections using the some of its original HAVA funds.[27] The Board deploys one AutoMark per precinct.

The Rhode Island Board of Elections is responsible for all election systems, which come with an eight-year agreement for servicing by the manufacturer (which began on 7/01/2016). As part of the state's contract, ES&S provides an on-site contractor, Joe Vitale, who operates the DS850s.

Participating Cities and Towns in Rhode Island's Pilot RLAs

The Rhode Island Board of Elections choose three communities to participate in the RLA pilots – Bristol, Cranston and Portsmouth, Rhode Island – based on several different factors, including variation in size and election administration staffing.

Bristol, Rhode Island is a town located on the eastern side of Narragansett Bay. The town, which is best known as the home of America's oldest Fourth of July parade, has 22,290 residents and 16,357 registered voters. The Town Clerk, currently Louis Cirillo, is elected.

Cranston, Rhode Island is the state's second largest city. Along with neighboring Warwick, Rhode Island, Cranston hosts the Gaspee Days, which commemorates the 1772 burning of the HMS Gaspee, a British revenue schooner. Cranston has 81,202 residents and 57,380 registered voters. The City Registrar, currently Nicholas Lima, was appointed by the

25. Jennifer Bogdan and Katherine Gregg, "Political Scene: R.I. voting-machine upgrade under new jurisdiction," *Providence Journal*, July 12, 2015, https://www.providencejournal.com/article/20150712/NEWS/150719783/13943.
26. Office of the Rhode Island Secretary of State, "Rhode Islanders welcome state-of-the-art voting systems," press release no. 28126, Jul 21, 2016, https://www.ri.gov/press/view/28126.
27. *Rhode Island State Plan: Help America Vote Act of 2002 (HAVA), Second Revised and Updated Version, Office of the Secretary of State*, 2010, http://www.elections.ri.gov/publications/Election_Publications/Voter_Info/FinalStatePlan2010.pdf.

Portsmouth, Rhode Island is at the northern end of Aquidneck Island. Founded in 1638 by Ann Hutchinson after her banishment from the Massachusetts Bay Colony, the town has 17,389 residents and 14,539 registered voters. The Registrar of Voters, currently Jacqueline Schulz, was appointed by the Board of Canvassers.

Rhode Island RLA Working Group

A group of activists and advocates reached out to the Rhode Island Board of Elections in 2018 with the offer to assist in the design and implementation of RLAs. That group calls itself the Rhode Island RLA Working Group (RIRLA Working Group) and is modeled after a similar effort in Colorado.

Quickly the RIRLA Working Group decided that a series of pilot RLAs were the appropriate first step in implementing the new law. The RIRLA Working Group recommended that the pilots prioritize collecting detailed data on the timing and staff required to carry out three major types of risk-limiting audits to develop RLA cost estimates for the state.

The Rhode Island Board of Elections, including its Director Bob Rapoza, agreed to the pilot, and Deputy Director Miguel Nunez and his staff (particularly Steve Taylor) became active participants. The Rhode Island Board of Elections set January 15-17 as the dates to conduct the pilot RLAs.

To help implement the pilot audits in January 2019, a number of volunteers as well as paid staff from participating organizations served on several sub-groups to plan and carry out the work, including:

- Overall planning, scheduling, and logistics – **Miguel Nunez** (RI Deputy Elections Director), **Steve Taylor** (RI Elections Department), **John Marion** (Common Cause Rhode Island)
- RLA Pilot Audit Design – **Mark Lindeman** (Verified Voting)
- Municipality selection – **Miguel Nunez** (RI Deputy Elections Director), **John Marion** (Common Cause Rhode Island), **Mark Lindeman** (Verified Voting)
- Software development, support, and coordination - **Mark Lindeman** (Verified Voting), **Tom Murphy**, **Ron Rivest** (MIT and Verified Voting), **Mayuri Sridhar** (MIT student), **Zara Perumal** (former MIT student), **Neal McBurnett**, **Suzanne Mello-Stark** (Rhode Island College)
- Timing Measurements – **Lynn Garland**, **Luther Weeks** (Connecticut Voters Count), **John McCarthy** (Verified Voting volunteer), **Mark Lindeman** (Verified Voting)
- Batch Counting RLA Method – **Luther Weeks** (Connecticut Voters Count)
- ES&S Vendor Discussions – **Wilfred Codrington** (Brennan Center), **Lynn Garland**
- RI RLA Group Moderation & Coordination – **John McCarthy** (Verified Voting volunteer)

Other regular contributors to RIRLA Working Group weekly teleconferences and lively email discussions included:

- **Andrea Cordova** (Brennan Center)
- **Ray Lutz** (Citizens Oversight)

We also had key contributions and intermittent participation from:

- **Dwight Shellman** (Colorado Department of State County Coordinator, who has spearheaded statewide risk-limiting audit efforts there since 2016)
- **Jerome Levato** (Election Assistance Commission, who formerly worked with Dwight Shellman to develop Colorado's statewide risk-limiting audits)
- **Brenda Cabrera** (City of Fairfax, Virginia General Registrar, who carried out a pilot RLA in August 2018)
- **Jennifer Morrell** (Democracy Fund and former Elections Director who piloted and implemented risk-limiting audits in Arapahoe County, Colorado)
- **Liz Howard** (Brennan Center and former Deputy Commissioner for the Virginia Department of Elections)
- **Tom Ryan** (Pima County, Arizona computer scientist and election integrity advocate)

Pilot Design

The pilot audits were designed to learn as much as possible about conducting RLAs in Rhode Island, while considering specific constraints created by resources and the state's voting system. Accordingly, the RIRLA Working Group made the following pilot audit choices:

The pilot would experiment with three separate RLA methods. To provide the full range of options for Rhode Island the RIRLA Working Group decided to pilot all three methods of RLAs. Because of Rhode Island's small size and large margins in most statewide contests, it was possible to pilot all three.

The audits would be limited to federal and statewide contests. Statewide and federal contests do not have some of the idiosyncrasies of local contests (e.g. "Vote for Five") that would complicate the audit design. Furthermore, because some local clerks are elected, limiting the audited contests to federal and statewide contests avoided having someone involved in the planning and implementation of an audit of their own election.

The samples would be taken from just three jurisdictions. Because ballots are stored by municipalities, it was crucial to have their cooperation in planning and implementing the audits. The pilots sought to confirm the correct outcome for the statewide and federal contests within the jurisdiction, not statewide. That reinforced that the point of the pilots was not to correct an incorrect outcome, as it would be in an actual RLA. (In a full risk-limiting audit, which would be conducted before the election results were certified, statewide contests would be audited using statewide samples, and it would not matter who "won" a particular municipality.)

The sample size would be predetermined. A full risk-limiting audit calls for the ballot sample size to be expanded until the risk limit is attained. For the pilots, however, we decided in advance that ballot sample sizes would not be expanded regardless of the results of the audit. This allowed for the RIRLA Working Group to better predict the time needed to complete the pilots.

We chose Bristol, Rhode Island for the ballot-level comparison method. This method required all voted ballots for the race or question being audited to be retabulated and imprinted. Bristol voters cast approximately 9,000 ballots, a number that was small enough to make retabulation and imprinting manageable, but large enough to teach participants the logistics of retabulation and imprinting. (Bristol's small number of cast mail ballots were excluded for the purposes of simplifying the audit design.)[28] We wanted the sampling design to: 1) meet stringent risk limits for most or all contests audited; 2) allow variation in the number of contests audited per ballot (so as to make time-based comparisons); and 3) be completed in approximately two hours. *Notably, for the ballot-level comparison method, we:*

28. There were 67 provisional and manual-count ballots in Bristol, about 0.7% of all ballots. These ballots could not be incorporated in the retabulation without some danger of compromising voter privacy. An official risk-limiting audit would have to take account of all voted ballots, either by auditing them or by making worst-case assumptions about any ballots excluded from the audit. (Here, even worst-case assumptions would be unlikely to affect the audit at all, because the fraction of ballots excluded was so small.) For simplicity – bearing in mind, again, that we were verifying municipal "outcomes" with no statewide consequence – we decided to treat the retabulation results as complete, thereby excluding these ballots from the pilot entirely.

- *Decided on a nested two-part sample, using a total of 100 ballots*, where Question 2 (see Appendix P-R) would be audited on all 100 ballots and the remaining federal and statewide contests would be audited on the last 50 ballots. We made this choice because Bristol's 11.9% diluted margin for Question 2 and 18.4% diluted margin for the governor's race meant that a sample of:
  - 64 ballots or fewer was likely to attain a 5% risk limit for state Question 2;
  - 41 ballots or fewer was likely to attain a 5% risk limit for the governor's contest; and
  - A smaller sample was likely to attain a 5% risk limit in the eight other contests.
- *Retabulated the ballots the week prior to the public portion of the pilot.* While we had considered completing the retabulation during the public portion of the pilot, conducting it before the audit gave us an opportunity to adapt to any unexpected events stemming from the retabulation results (e.g. unanticipated idiosyncrasies in the format of the data output). Instead, we presented a video that documented the retabulation process.

We chose Portsmouth, Rhode Island for the ballot polling method. Portsmouth voters cast almost 8,000 ballots. This was a large enough number to ensure that the audit could be conducted using a relatively small proportion of all ballots. Yet it was small enough to limit the amount of work both to divide the ballots into batches and determine the number of ballots per batch (see Part III). The audit could have treated each precinct's in-person ballots as a batch, and it could have relied on the Election Certificates submitted by pollworkers on election night for the number of ballots contained in each batch. (All mail ballots from Portsmouth would be treated as one batch.) However, we were reluctant to work with batches that could contain in excess of 1,500 ballots apiece and might be stored in multiple containers. For the pilot, we divided most precincts into smaller batches of varying sizes, to see how batch size affected the time required to retrieve ballots included in the sample. We also obtained independent counts of the total ballots in each batch rather than rely upon the precinct-based scanners and the electronic pollbooks (as the Election Certificates do). For simplicity's sake, we decided to audit only one contest using the ballot-polling method. We also fixed the ballot sample size at 200 ballots. Ultimately, we chose to audit the governor's race because the contest was fairly high on the ballot and was somewhat competitive (but not so competitive that 200 ballots would be unreasonably small in the jurisdiction). The simulation study showed that if Portsmouth's reported 22.2% margin for Gina Raimondo was roughly accurate, the audit sample had approximately an 84% chance of attaining a 10% risk limit.

We chose Cranston, Rhode Island for the batch comparison method. Specifically, the audit tested the in-person voted ballots from two precincts: 0704 and 0718. Precinct 0704 had about 230 in-person ballots, and 0718 had just over 600 in-person ballots.[29] Selecting two precincts with a relatively small number of ballots allowed participants and observers to compare two counting methods, the sort-and-stack and the hashmark. The contests for Senate, House of Representatives, and Governor were audited using the batch comparison method.

29. Mail ballots were excluded from this part of the pilot because retrieving mail ballots from just these two precincts would have been laborious. If Rhode Island chose to use batch comparison for statewide audits, it still could use ballot-level comparison for the mail ballots (as mentioned earlier), or it could treat the mail ballots from each municipality as a batch, which is how they are stored. The latter approach is most likely for a full manual count.

Audit Software

The Rhode Island risk-limiting audit pilots used the auditing software tool named Audit Conductor.[30] The software performed three principal functions: it identified and generated the pull lists for the randomly-selected ballots (or batches of ballots), reported the current state of the audits, and computed the risk levels.

The software tool is used to speed up the process of conducting the RLA, but is not a necessary component. Risk-limiting audits can be replicated by anyone, even without software, as long as they have the right information, including:[31]

- The random seed (see Part III for explanation);
- The cast vote record (CVR) file used in the audit, if any;
- The pre-audit reported election outcomes; and
- A record of the ballot interpretations from the audit.[32]

Development of the software tool started under the supervision of Suzanne Mello-Stark as a project to implement common risk-limiting methods (ballot polling and ballot-level comparison) in code. It was generalized, under the leadership of Tom Murphy, to be a simple, flexible, easy-to-use tool that could integrate existing risk-limiting tools.[33] Development was done publicly on GitHub, and the collaborators' main interactions were online and via conference calls. Additional code to process and format data, not part of Audit Conductor, was written by Mark Lindeman.

In the development of Audit Conductor three primary factors were considered; flexibility, simplicity and ease-of-use:

Flexibility

Audit Conductor was built with flexibility as a top concern. Given that a goal of the RLA was to compare several methods for conducting audits, software flexibility was especially important. In particular, we needed to have the capability to add methods as needed. To do this, we used Python as an implementation language because it has become a "lingua franca" for RLA audit code. By choosing the language that developers frequently use to write audit code, we were able to integrate tools from several "best-in-class" codebases into our own.

30. For audit software tool, see "Audit-Conductor," Election Audit Ware, GitHub, https://github.com/ElectionAuditWare/audit-conductor.
31. See details at Public RLA Oversight Protocol: http://bcn.boulder.co.us/~neal/elections/PublicRLAOversightProtocol.pdf.
32. Note that, for purposes of transparency and software-independence, ballot interpretations were recorded both on paper and in the audit software.
33. These tools included RIWAVE and BCTool (implementations of auditing statistical methods), and the rivest-sampler package to get a reproducible random sample.

Simplicity

Audit Conductor was also designed to be as simple as possible while fulfilling its requirements; namely generating pull lists, reporting on the current state of the audits, and computing the risk levels. The software's simplicity had two main benefits: it made it readable and it allowed us to delegate the more complicated statistical work to experts.

Because the Audit Conductor's source code is readable, i.e. others can understand it easily, the program can be audited for bugs. Having the code reviewed by outside observers (which, in the case of an open-source project like Audit Conductor, can be virtually any software developer) gives more confidence.

To build a tool that uses various sampling and audit methods, it is important that a team with limited resources be able to delegate specialized work to experts. Instead of reinventing the wheel – and spending time verifying that "the wheel" had been precisely reinvented – we used, in many cases, an expert-written, "off-the-shelf" tool. We could then focus our efforts on developing and testing the code unique to Audit Conductor.

Ease-of-use

The user interface was designed to be not only simple, but also intuitive and unambiguous for those conducting the audit. We strived to incorporate visual "checks" for each action taken by a user, to catch mistakes while the action was in-progress. For example, after clicking a radio button, the user would observe that the full selection is highlighted in a different color, which decreases the risk of inadvertently making the wrong selection. In addition, after entering selections on a particular ballot, users are presented with a confirmation screen to verify their selections.

Future Work

Audit Conductor satisfied the needs of the Rhode Island RLA pilot, but given the limited resources and the short timeline, it is not currently robust enough to use in an actual RLA. For example, it needs the ability to import the native ES&S CVR format or simultaneous data entry by multiple audit boards. In addition, for future use Audit Conductor can use improvements to its reporting functions, test suite, documentation, and ease of installation. In particular, cross-boundary tests written by statistical experts would be quite useful. A small bug surfaced during the audit,[34] and though it was quickly corrected, it would have been caught by these types of integration tests.

34. Specifically, one software module expected a CSV file to have its first row be a header, while another expected there to be no header. This caused mismatches in ballot comparison, where indexes were "off by one." Because all entered data was logged, the software team was able to easily re-run the code after fixing the error (by simply adding 1 to the index to account for the header row) and obtain the correct results.

Risk-Limiting Audit Logistical Preparation

The Rhode Island Board of Elections (RIBOE) is required by statute to implement risk-limiting audits beginning with the April 2020 primary. For the January 2019 pilots it was important to determine what physical assets and human capital the RIBOE must deploy. That includes where the audits are conducted and who does the work of conducting the audits.

Location Decision

The RIBOE has a 10,000 sq. ft. warehouse located in the basement of its main office in Providence, Rhode Island. The warehouse is currently used to store some of the equipment, including the DS200s and DS850s. It has several secure spaces that are used for processing mail ballots during elections. Ballots are stored locally by the state's 39 cities and towns, but all are within a 60-minute drive of Providence, except New Shoreham (Block Island).

The RIBOE warehouse was chosen as the site for the pilots because of its central location, size, security, and flexible floor plan.

Floor Plan

Part of the pilot audit planning included creating a floor plan (see Appendix D) for the various processes involved. The audits took place in two sections of the warehouse: on the main floor, where approximately 2500 square feet were utilized, and in a secure mail ballot processing room, where approximately 1150 square feet were used.

The main floor was used largely for two functions. First, this is where the more than 60 observers present for the pilot audits were seated during the introductory remarks, the dice roll to create the random seed, the manual examination of votes in the ballot-level comparison and ballot-polling audits (when they wished to watch), and the concluding panel. To facilitate observing the manual examination of ballots, the RIBOE set up two large screens and an audio amplification system. One screen displayed a projection of the voted ballot that was interpreted by the RIBOE staff and was confirmed or corrected by the pair of election judges. The other screen showed the user interface for the audit software tool as other RIBOE staff entered the vote.

The mail ballot processing room was used for the entire batch comparison audit as well as ballot retrieval for the ballot-level comparison and ballot polling audits. It also served as the secure storage location for the ballots throughout the two days. The processing room was set up with 8 tables each with 5 chairs for the teams of temporary employees recruited, trained, and paid by the RIBOE to conduct portions of the three pilots occurring in that area.

Expenses

The RIBOE had three sources of human capital for the pilot RLAs. First were the members of the Audit Work Group as described above. A second was the full-time staff of the RIBOE including Miguel Nunez, Steve Taylor, Jennifer Regan, and Manuel Hernandez. Each performed a variety of tasks during the preparation and execution of the audits. The final group were 18 temporary employees recruiting from a pool of workers normally employed by the RIBOE for mail ballot processing. Those employees were paid $100 per day for two days.

In addition to the human capital, the RIBOE had to purchase or rent the following equipment and services:

Item	Cost
Red & Blue ink cartridges for the DS850 *(we used the blue cartridge)*	$14.95/per
20 colored 10-sided dice	$25.90
PA system *(we upgraded our portable sound system)*	$1474.48
Document Camera	$199.00
One counting scale (*Mark Lindeman also loaned two additional scales)*	$295.00
6 combination squares (instead of rulers)	$7.96/per
Several different types of ballot storage boxes	$24.00
Videographer	$3900.00
Rental of Chairs and table skirts *(for lunch and dinner for those present)*	$938.00
Food and drink	$1341.12

In total, the two-day pilot RLAs cost the RIBOE $12,705.06. Those costs do not include staff and volunteer time, or assets already owned by the RIBOE such as projectors, screens, etc. Going forward the bulk of the cost for RLAs in Rhode Island will be staff time and the cost of any temporary employees needed.

Part III:
Rhode Island's RLA Pilot Experience & Results

Random Sampling and Ballot Manifests

RLAs crucially depend on valid random samples of ballot sheets[35] (or batches). In most cases, including the Rhode Island pilot, these samples are Simple Random Samples: every ballot is equally likely to be selected. The random sampling method used should be observably fair – not subject to manipulation or even inadvertently biased toward including some ballots rather than others – and not predictable before the sample is selected.

In the typical RLA random sampling method, observers roll a ten-sided die twenty times, creating a string of numbers known as a random seed. That string is typically entered into a software tool. The software tool uses a pseudorandom number generator, with the seed, to generate a sequence of random numbers. Then the tool maps those random numbers to a list of the stored ballots known as a ballot manifest in order to select the ballots (or batches) to be audited. To draw a sampled ballot, one needs to know how many ballots there are, and exactly where they are stored. A ballot manifest serves this purpose: it accounts for every ballot and says where to find each one. When carefully designed, this approach provides assurance that the sample could not have been predetermined or known in advance, before the seed was created – but also allows people to verify that the sample is correctly derived from the seed. Ideally, the ballot manifest should be prepared without relying on the voting system itself to correctly report how many ballot sheets are in each batch.

35. Long ballots often are divided among two or more pieces of paper, or sheets. All jurisdictions in the pilot used single-sheet ballots, so most parts of this report use "ballots" and "ballot sheets" interchangeably. However, this distinction becomes important when planning for future audits that include multiple-sheet ballots.

Audit Design Specifics

Each type of RLA method piloted required a specific design tailored to Rhode Island-specific factors. For detailed protocols see Appendix E. This section explains the key elements in the design for each method.

1. Ballot-Level Comparison

The basic steps in the ballot-level comparison audit were as follows:

- Retabulate the ballots, imprinting them with unique sequential ID numbers. (This step was done the week before the public pilot began.)
- Divide the Bristol ballots into batches and prepare a ballot manifest accordingly.
- In a public ceremony, use dice to generate a random seed; use this seed entered into the Audit Conductor software to select a random sample of 100 ballots.
- Retrieve the ballots in the sample, using the imprinted IDs.
- Interpret selected contests on the ballots in the sample and enter into Audit Conductor.
- Examine the results produced by the Audit Conductor software and investigate any discrepancies.

Retabulation and Batching

The retabulation of Bristol ballots was conducted on January 8, eight days before the public pilot began. Mark Lindeman observed the retabulation and participated in discussions as it was conducted; John Marion also observed most of the retabulation. A timekeeper captured timing data for each precinct; the timing results are discussed later in the report. The basic workflow was as follows, proceeding serially as in an assembly line:[36]

1. Open ballot containers and manually orient ballots face up and top up.
2. Divide ballots into batches, using a counting scale to estimate the number of ballots per batch as one source of data for the ballot manifest.
3. Retabulate each batch of ballots on the DS850 scanner, imprinting ballots with a serial ID number.
4. Reconcile the scanner count of the number of ballots with the scale count; place the batch in a folder, assigning a batch ID; complete the ballot manifest for the batch.
5. Store and seal the ballots in a new container with the batch ID.

Some details deserve further discussion.

Step 1. Orienting the ballots "right-side-up" was not strictly necessary, but it seemed likely to help staffers retrieve ballots by imprinted ID during the public pilot, because it ensured that most IDs would be in the same corner of the ballot. Staff were available for this task, and it was not a bottleneck. (Generally three election workers performed this step.)

36. During the retabulation, one batch was scanned out of order, before the previous precinct was complete. We decided to delete the batch's retabulation data and rescan it after completing the previous precinct, so the imprinted ID numbers used in the audit would be in consistent order.

Step 2. Two counting scales were tested in the pilot: a Scalemart CS-20 scale with 6-pound capacity and 0.0002-pound reporting precision, and a Tree (LW Measurements) LCT-16 scale with 16-pound capacity and 0.0005-pound precision. A stack of 200 (later 300) ballots was used to calibrate each scale, and both scales' weights and counts were recorded. The counting scales were then used to estimate batches of about 200 ballots apiece. (After some experimentation with different sizes, we decided that this size worked well for retabulation.)

Step 3. Joe Vitale of Election Systems & Services performed the retabulation itself. The DS850 was configured not to distinguish and "outstack" ballots containing overvotes and/or write-ins, so all ballots remained in their original order except in case of error. Vitale placed each batch of ballots in a mechanical "jogger" to minimize small differences in orientation, then scanned them. The imprinter printed (in blue ink)[37] a ten-digit serial ID number at the lower left corner. When ballots misfed and were outstacked, Vitale reoriented them and rescanned them at the end of the batch. From time to time, the scanner jammed and Vitale had to interrupt the scanning to clear the jam.

Step 4. The ballot manifest was sequentially prepared by Steve Taylor at this step, in consultation with staff at other steps. After retabulating each batch, three ballot counts were available: a scanner count and two scale counts. We also knew the first and last imprinted ID in each batch, which implied a fourth count (last ID minus first ID plus one). Any differences between this implied count and the scanner count were expected to be attributable to rescanned ballots. Indeed, each such difference coincided with the number of rescanned ballots. We considered the scanner counts to be definitive.

After each precinct was retabulated, we compared the sum of the batch counts to the counts reported on the Election Certificates (except for mail ballots) and to the original tabulation counts excluding provisional and manual-count ballots. All these counts matched, except that three ballots had been manually added to the results after the initial counts. Thus, we had high confidence in the batch counts and in the total ballot count, 9,021 voted ballots.

Each batch was put in a folder and each folder was assigned an ID that incorporated its precinct number, its box letter, and its serial position within the box. (This arrangement allows box letters to be reused, but because only ten boxes were needed, they were uniquely labeled A through J.) For instance, batch 0208-H-4 was a batch from precinct 0208, stored in box H, in the fourth folder.

Step 5. We experimented with several kinds of ballot boxes to store the batches: the metal containers presently used to store ballots; the plastic tote bins provided with the DS200 precinct-count scanners; generic plastic tote bins that were somewhat smaller than the DS200 bins; and cardboard boxes. The containers were evaluated on ease of retrieving specified batches, ease of moving, sealability, and ease of opening and closing. In Bristol, just one box per precinct was needed. The election officials at this station added folders as they were completed, then sealed the boxes with numbered seals and set them aside. These officials consulted with Steve Taylor to ensure that every batch ended up in the expected box.

37. In experiments, blue seemed easier to distinguish and read than either black or red.

Generating the Random Seed and Ballot Sample

The random seed used to select the ballot sample was generated by observers at the public audit, using a variant of the procedure used in Colorado and in many RLA pilots. Slips of paper bearing observers' names were placed in one hat; twenty ten-sided dice of different colors were placed in another hat. Observers took turns drawing name slips from the first hat. The observers whose names were drawn then took turns drawing and rolling a die, until 20 names had been drawn. The last three observers to roll dice rolled their dice simultaneously, to obviate any concern that the last person to roll could maliciously influence the audit result based on prior knowledge of the first 19 digits.

The 20-digit random seed was entered into the Audit Conductor software. The software then generated a simple random sample of 100 ballots from among all the Bristol ballots included in the audit. The ballots were identified by ballot identifiers (IDs) and also by their imprinted ID numbers. Each ballot ID consisted of a batch ID plus a sequential location within the batch, counting from the first ballot scanned. For instance, ballot 0203-C-1-29 would be the 29th ballot from the beginning of batch 0203-C-1. As the pilot design specified, the first 50 ballots in this sample (in random order) were designated as the "single-contest sample": only Question 2 would be audited. The remaining ballots were designated as the "ten-contest sample": all statewide and federal contests would be audited.

Retrieving the Ballots in the Sample

This process was relatively straightforward. All the voted ballots were divided among six stations, with a team of two election judges at each station. Each team received a software-generated pull sheet that listed, in sorted order, the ballots to retrieve by ballot ID and the actual sequentially imprinted ID. (Scanning reverses the order of the ballots: the first-scanned ballots end up on the bottom of the stack. The teams bore this in mind when searching for each imprinted ID.) Each ballot pulled was clipped together with a cover sheet that listed its imprinted ID number, to facilitate sorting. A place-holder piece of paper was put into the stack for each ballot pulled. Board staff then combined the ballots retrieved by each team, making sure that first the single-contest sample, followed by the ten-contest sample, was complete and that the ballots were in the correct order.

Interpreting the Ballots in the Sample

Three staff members and two election judges participated in interpreting the ballots. This process used the Audit Conductor software, which ran on a laptop computer attached to a projector, so all observers could watch the data entry process. For each ballot, the first staff member checked both the cover sheet and the imprinted ID against the prompt displayed by the software. This official read off the last four digits of the ID, then placed the ballot on a document projector so all observers could see the marks on the ballot. The two election judges read their interpretations of the votes, and the second staff member entered them into the software. At the same time, the third staff member entered the interpretations on a manual tally sheet, one row per ballot, to provide an independent record of the results.

Election judges were provided with an illustrated set of guidelines for interpreting possible votes.[38] Then the first staff member handed the ballot to the election judges, who reviewed the ballot itself while the second staff member read off the software's summary screen of the interpretations as entered. If the election judges agreed, the second official instructed the software to save the interpretations. (If not, the second official could change one or more interpretations.) Then the ballot was set aside, and everyone proceeded to the next ballot.

Examining the Results

The Audit Conductor software was designed to display summary results immediately after all 100 ballots were interpreted. Due to the minor software bug mentioned above, some calculations had to be rerun.

2. Ballot Polling

The basic steps in the ballot polling audit were similar to the ballot-level comparison audit:

- Divide the Portsmouth ballots into batches and prepare a ballot manifest accordingly. (Again, this step was done the week before the public pilot began.)
- Using the same random seed as for the ballot-level comparison audit, using Audit Conductor to select a random sample of 200 ballots.
- Retrieve the ballots in the sample, using one of four methods (see below).
- Interpret one contest (for governor) on the ballots in the sample and enter into Audit Conductor.
- Examine the results.

Batching the Ballots

We decided to rebatch the Portsmouth ballots for the ballot-polling audit the day after the Bristol retabulation" – January 9, one week before the public pilot. We also decided to use the DS850 as one source of per-batch ballot counts, to be compared with scale counts as well as the original reports. For purposes of the pilot, we believed that obtaining scanner counts would provide valuable additional information without unduly increasing the overall preparation time. (In a true RLA, this step should not be necessary provided that per-batch ballot counts that do not rely on the voting system are available. Also, in practice, it would make little sense to feed all the ballots through the scanner without retabulating and imprinting them for ballot-level comparison.) Thus, the workflow was similar to the retabulation – but somewhat faster on average because there was no need to save scanner data for each batch.

38. Rhode Island does not currently have an adjudication guide, nor regulations, for ballots that are manually tallied. For purposes of the audit, an adjudication guide similar to that used by the City of Denver, Colorado was produced. However, at no point during the audit was it consulted because there were no disagreements between the election judges.

We varied the batch size, by dividing the precincts into varying numbers of roughly equal batches, to learn how retrieval time was affected. Having found that the Tree and CS-20 scales consistently reported similar weights, we used just the (higher-capacity) Tree scale in the ballot polling audit, and used a stack of 300 voted ballots from Portsmouth to calibrate the scale. Not unexpectedly, the resulting estimated counts were closer on average to the scanner counts, but still fluctuated. The scanner counts for each precinct reconciled with the Election Certificates and original tabulation results, indicating a total of 7,966 voted ballots excluding provisional and manual-count ballots.

Selecting the Sample

For simplicity, the same public seed used to generate via the Audit Conductor software, the ballot-level comparison sample was used for ballot polling.[39] The ballot-polling sample consisted of 200 ballots in all, divided into four subsamples corresponding with four different retrieval methods. As in the ballot-level comparison audit, each ballot in the sample had a ballot ID that indicated its batch and its sequential location within the batch, counting from the top. As described below, the four retrieval methods used these ballot IDs somewhat differently.

Ballot-Polling Retrieval

The operational details of this pilot were quite complicated, because four retrieval methods were tested. In all four methods, whenever a ballot was retrieved for the sample, it was replaced by a placeholder sheet and attached to a cover sheet that identified it. Here is an overview of the process:

Scale method: First, 64 ballots were retrieved using one of three counting scales (one CS-20 scale and two Tree scales as described above). The precincts with the smallest batches were assigned to the CS-20 because of its smaller capacity; the remaining precincts were divided roughly equally. Each scale was calibrated against a stack of 300 voted Portsmouth ballots.[40] The staff at each station received a software-generated pull sheet that listed the ballots to retrieve, by batch and sequential location within the batch, counting from the top. Ballots in the first 10 or the last 10 of each batch were to be retrieved by counting, because this seemed easier for so few ballots compared to using a scale. Other ballots were to be retrieved by adding ballots to the scale until the desired count had been attained.[41] Although we knew that these counts could be off by a few ballots in either direction, minor innocent errors should not bias the sample in favor of any particular outcome or selection. (However, the possible extent and effect of retrieval errors has not been systematically studied.)

39. Internally, the Audit Conductor software generated 300 random numbers; it used the first 200 of these for the ballot polling sample, and the last 100 for ballot-level comparison.
40. As discussed later, a possible enhancement would be to recalibrate the scale for the reported number of ballots in each batch.
41. The audit teams were shown how to preserve the original order of the ballots by flipping ballots onto the scale, with the topmost ballot face down on the scale.

Next the ballots from the precincts were divided into roughly equal numbers of ballots and assigned to one of six stations. Again, staff at each station received pull sheets directing them which ballots to retrieve.

Counting method: Only eight ballots were retrieved by this method. (One team realized that it could retrieve ballots near the bottom of a stack by counting up from the bottom – a shortcut that could be formally supported if this method is used in future audits.)

Ruler method: A total of 64 ballots were retrieved by this method. Each team was provided a combination square: an adjustable "T" (or "L") with a millimeter scale. As with the counting method, ballots near the top or bottom of a batch were to be retrieved by counting. The remaining ballots were to be retrieved by setting the combination square to the appropriate measurement in millimeters (listed on the pull sheet), scraping the combination square across the top of the batch to cut (split) the batch, and then taking the top ballot below the cut point. As with the scale method, the ruler method may introduce small biases into the ballot sampling process.[42] Further research and experimentation is needed to understand the nature and consequences of such biases, and to suggest procedures for mitigating the effects of such (probably small) biases on the audit results.

k-cut method: A total of 64 ballots were retrieved by this method. The pull sheets told each team to retrieve a particular number of ballots from each specified batch. For each retrieval, teams were instructed to cut the designated batch six times, each time placing the ballots previously on top underneath. For each cut, the teams used an online random number generator to produce an integer between 1 and 99, and then attempted to cut the batch at approximately that percentage from the top. (For instance, if the number was 32, they would try to cut about one third of the way down, but a bit less.) After completing this process of six successive cuts, the ballot on top became the ballot in the sample.[43] Experimental and simulation results indicate that the k-cut method can generate approximately uniform samples, perhaps with far fewer than six cuts.[44]

Interpreting the Ballots in the Sample and Examining the Results

Ballot interpretation proceeded in essentially the same way as in the ballot-level comparison audit except that just one contest – for governor – was audited on all 200 ballots. Again, the summary results were displayed immediately after the interpretation step was finished. Because ballot polling audits do not allow the audit interpretation of each ballot to be compared to the machine interpretation, the audit could not produce specific discrepancies to investigate.

42. The ruler method may be more susceptible to sampling bias than the scale method, because the ballot retrieved may depend on how hard the audit judge presses the combination square downward. Also, we know less about possible variability in ballot *thickness* than about the observed variability in ballot *weight*.
43. This method was tested last because, unlike the other methods, it alters the order of ballots.
44. Mayuri Sridhar and Ronald L. Rivest, "k-Cut: A Simple Approximately-Uniform Method for Sampling Ballots in Post-Election Audits," *Cornell University*, November 21, 2018, https://arxiv.org/abs/1811.08811 (explores the method, justifies the choice of k=6 cuts, and suggests possible mitigations for any deviations from uniformity).

3. Batch Comparison

The batch comparison pilot tested variants of two common methods for manually counting ballots.

The *Sort-and-Stack Method* involves first sorting ballots into stacks for a contest by vote (or as "no valid vote") and then counting each stack to determine the results.

The *Hashmarking Method* involves reviewing one ballot at a time while making hashmarks for each vote (or for "no valid vote") in one or more contests, and then totaling the hashmarks for each selection.

The pilot implementations ensured that judges double-checked all vote interpretations and counts, that observers could verify all the work. These implementations prioritized accuracy: hasty methods that produce wrong results ultimately squander resources and confidence.

The sort-and-stack method employed two teams of two judges. Each team was given approximately one-half the ballots for the assigned polling place. First, the ballots were all oriented in the same direction, same side up. For each of the three contests counted: the two judges on each team sorted the ballots into stacks for each candidate (or no-vote). Then both judges reviewed that ballots were correctly stacked for each candidate in each race. Then both judges counted each stack. When counts did not match, stacks were recounted until the counters agreed.

The hashmarking method employed three teams of four judges each, later augmented by two more teams of four. They counted a polling place with about three times as many ballots as in the sort-and-stack method. First the ballots were all oriented in the same direction, same side up, separating out write-ins. The teams jointly counted the ballots into piles of 25, plus a pile of remaining ballots for both regular and write-in ballots. The ballots were then separated into stacks of 50 ballots plus extras. For each stack of 50 a team of four were given two preformatted hashmark sheets to record hashmarks for all candidates and no-votes in all contests. One judge read each vote on each ballot, while another official observed and checked the reader, and two officials made hashmarks on the two sheets (see Appendix E). At the end of each stack, the hashmarks on the two sheets were compared, and the contest totals were compared to the number of ballots in the stack. When discrepancies were found, the teams either recounted the batch with new hashmark sheets or counted the ballots for each candidate in question until they were satisfied that the result was correct.

The results for each sorting and stacking team, and for each of the hashmarking batches, were copied from input into a spreadsheet by a team of two, one doing data entry and the other checking the data entry. They were then compared to the tabulations and any discrepancies were investigated.

Rhode Island Pilot Timing Data

The RIRLA Working Group collected timing data during the pilot to compare the efficiency of the different approaches and the resources required to conduct each. Prior to the pilot, the Working Group developed forms to capture this data. (Copies of the timing forms are included in the Appendix.) After receiving a brief overview and training of the process, volunteers (election staff, computer scientists, students, etc.) helped collect the data by timing the various audit steps and recording it in the forms. The data collection process would have benefited from more clarity in the instructions and additional time to train the timers. Overall, however, the exercise went well and produced data that should be useful for Rhode Island as the state decides how to implement its audit law.

Below is a summary of the results, the data gathered in timing each phase. The state should consider the data, while understanding that they are specific to the pilot. Caution is warranted in generalizing them to future audits, particularly those that use substantially different procedures.

General

Rolling dice & recording random seed (used to determine the random samples):

- Rolling 20 ten-sided dice and recording the numbers took **14 minutes**.

① Ballot-Level Comparison Audit

Rescanning & batching ballots subject to audit:

- Rescanning and batching the ballots took **approximately four hours**, which included some delays needed to discuss the process. The team processed **approximately 3,240 ballots/hour** (this excluded extended delays, but included minor ones, e.g. paper jams).

Median time to retrieve each selected ballot (by ballot type/location):

- All ballots: 45 seconds
- Ballots from a new box: 61 seconds
- Ballots from a new folder: 48 seconds
- Ballots in same folder and box: 31 seconds

Comparing each audited ballot to the initial result:

- The average time to evaluate one contest per ballot was **25 seconds**.
- The average time to evaluate ten contests per ballot was **62 seconds**.

② Ballot-Polling Audit

Dividing ballots into batches & preparing ballot manifests:

- It took **approximately one hour and 40 minutes** to separate ballots into batches and prepare the manifests, an average rate of **4,770 ballots/hour**. (This included the time needed to rescan the ballots and to count the number of ballots per batch.)

Average time to retrieve and evaluate each selected ballot for each method used:

- The pilot collected data using two timing measurements: the overall time for each counting method and the time for each ballot individually. The overall time included discussion and time taken to "rework" the process. Due to a significant learning curve, the first few ballots typically took longer than the average.

	Average based on overall time	*Median based on individually-timed ballots*
• Scale method:	78 seconds	35 seconds
• Ruler Sample method:	78 seconds	75 seconds
• K-cut method with k=6:	104 seconds	86 seconds
• Manual count method:	230 seconds	104 seconds

As expected, the two timing measurements yielded different results. In general, however, they confirmed the relative speed of the different methods. Much of the difference between the mean and median can be attributed to "startup costs" (e.g. initial training and confusion). It also took into account the time spent opening ballot containers and, if necessary, retrieving them. Data were not collected for time required to position ballot containers at the audit retrieval stations because it was both rather brief and not expected to scale up to larger audits with different physical arrangements. (See the section "Considerations for Future Audits in Rhode Island" for further discussion about ballot container management.)

Notably, the batches in the pilot were relatively small. (The largest Portsmouth batch contained just 341 ballots.) By dividing the ballots into smaller batches, we were able to reduce the burden on the ballot retrieval teams and facilitate very careful ballot accounting (as the Election Certificate figures were checked against both scale counts and independent scanner counts). In a full-scale ballot-polling audit, a batch might consist of all the ballots cast at a precinct – perhaps in excess of 2,000 ballots. One should therefore exercise caution when using the data from this pilot to generalize what an audit conducted with substantially larger batches might yield (especially if conducted without pre-batching the ballots).

Comparing each audited ballot to the initial result:

- The average time to evaluate one contest per ballot was **25 seconds**.
- The average time to evaluate ten contests per ballot was **62 seconds**.

③ Batch Comparison Audit

Organizing ballots for audit (orienting & batching):

- Hashmark method: 6 seconds/ballot[45]

Interpreting and counting ballots:[46]

- Hashmark method: 7.2 seconds/ballot
- Sort-and-stack: 7 seconds/ballot per contest

45. The time varied substantially across groups, due to some start-up and training issues. The minimum average observed was 6 seconds per ballot; we believe that after training, other groups would achieve this rate.
46. The numbers for evaluating each method are not directly comparable. Sort-and-stack involved two persons orienting the ballots, sorting them by selection for **one contest** and then counting the stacks. The hashmarking involved two persons for orienting and batching the ballots and then teams of 4 for tallying **all the audited contests**.

Pilot Results

This section contains both the formal quantitative results of the pilot and a description of some of its immediate qualitative results.

① Ballot-Level Comparison

Ballot Retrieval

Retrieving the sample of ballots for this method was fairly simple because it relied on the imprinted IDs. With 100 ballots divided across six teams, retrieval was completed quickly. However, a procedural error was detected and corrected during this stage. A retrieval team discovered that it had two pairs of cover/placeholder sheets that did not correspond to any of the ballots on its pull sheet. Within a few minutes, we determined that the discrepancy stemmed from an error when the ballot manifest was created, and that the ballots indeed belonged in the audit sample.[47]

Ballot Interpretation

Overall, it took approximately one hour and 15 minutes to audit a total of 550 vote opportunities (50 x 1 + 50 x 10). It took less than twice the time to audit ten contests on a ballot as it did to audit just a single contest on a ballot.

Note that there was a discrepancy among the 550 vote opportunities. One of the ballots that had been adjudicated in the audit as "Approve" was listed in the Cast Vote Record as "Reject." The ballot (and its scanner image) clearly shows a vote for "Reject." The error is most likely due to the audit team having inadvertently interpreted the vote for Question 1 instead of for Question 2 (a relatively easy mistake to make given the positioning of the questions on the ballot). Pilot observers failed to take notice of the error. This type of error can be reduced in a full-scale audit by having outside observers to monitor the audit team.

Despite this error, which resulted in a two-vote overstatement (the worst possible outcome in auditing a ballot), the measured risk for this and all other federal and statewide contests was, for the most part, well under 1% (or 0.01). Specifically, the risk was approximately 0.54% for the U.S. Senate race; 0.34% for U.S. Representative (District 1) race; 0.28% for Question 2; just above 0.01% for Secretary of State; and under 0.01% for the remaining contests. Thus, auditing just 50 or (for the U.S. Senate contest) 100 ballots produced very strong evidence that all the outcomes in Bristol would be confirmed by a full manual ballot count.

47. Specifically, we found that one batch's precinct was entered in the ballot manifest as 0025 instead of 0205. The random sample included two ballots from this batch, which did not appear on any pull sheet because "precinct 0025" was not assigned to any team. Ideally, the audit software would have detected this impossible precinct value at the start of the audit, or would have detected that some sample ballots did not appear on any pull sheet.

② Ballot Polling

Ballot Retrieval

As described earlier, the pilot used four different methods of ballot retrieval for the ballot-polling audit. Retrieval teams received training on each method at their stations immediately prior to this step of the audit. While conducting the training shortly before retrieval was useful for the pilot schedule and allowed observers to watch, it also curtailed the time available to teach the methods. This contributed to some confusion and minor errors during the actual retrieval, which were documented. The errors were minor and addressed as they arose. They did not threaten the integrity of the pilot.

Ordering Mistakes

Three of the methods require the ballots to remain in order (the k-cut method does not), but preserving the original order of the ballots was confusing. Because ballots neither bear numbers nor are oriented the same, teams should handle them carefully to preserve the original order. In reality, as long as there is assurance that the ballot is selected without the selection team seeing its contents, a mistake in the ballot order should not materially affect the audit results, but would make it harder for observers to confirm that the audit was performed correctly.

We observed various mistakes that altered ballot order, many of which could have been averted simply by placing a sticky note on the front of the topmost ballot. Systematic training on how to handle the ballots to preserve order is important. Presumably, it would be easier in an actual audit, where one would not have to learn four retrieval methods, but one.

The retrieved ballots posed a different kind of order problem. Teams were instructed to keep the samples for each method separate and in the same order as listed in the pull lists. However, the instructions were poorly communicated, and the ballot order was inconsistent. Ultimately, the 200 ballots had to be separated and sorted manually using the ballot IDs on the cover sheets. This process took several election officials about 20 minutes.

Scale Method

The scale method appears to have been the fastest one employed during the pilot. Presumably, it would have taken longer if the batches were larger (and higher-capacity scales would have been required). The teams also found the method straightforward and intuitive (and seemed to enjoy the adding and removing of ballots until the correct number had been selected).

Counting Method

On average, the counting method took appreciably longer than the other methods, even with the relatively small batches used in the pilot. (However, some teams eventually realized

that, when retrieving a ballot near the bottom of a batch, they could save some time by counting from the bottom of the batch up.) Municipalities that use the counting method should consider adding pull sheet information that facilitates retrieval in this manner, and take into account the potential for confusion in their training.[48]

Ruler Method

The ruler method was faster than the counting but slower than the scale method. The initial retrievals took considerably longer than the successive ones, which could be attributed to the teams learning to use the combination squares (the "rulers"). While some teams adjusted quickly, others struggled to set their devices to the correct measurement. The difficulty was compounded by poor lighting and a lack of familiarity with both metric system scales and the rulers themselves. Most of these problems could be mitigated through training and better preparation, and by obtaining rulers with a better contrast.

The method does have some shortcomings that are difficult to overcome. First, it imprecise. Using an average figure to convert ballot number to millimeters both made it unlikely that the team would retrieve the "right" ballot and it increased the likelihood of including some ballots in the sample over others. This creates the possibility of bias. Also, it was time-consuming and awkward to use the ruler to select ballots towards the bottom of the pile. Further, it became more difficult to scrape the ruler across the top of the batch (to select a ballot) as the batch size and weight increased. For large batches, one might select a ballot by sticking a sharp object (e.g. a nail or flathead screwdriver) at the base of the ruler where the scrape would occur. (And even this would be difficult to execute if 1,000 ballots were stacked above the ruler.)

k-cut Method

The k-cut method proceeded at about the same rate as the ruler method, but it may be easier to use for large (but physically manageable)[49] batches. It can also be conducted without special equipment. And, as previously noted, it may be possible to obtain approximately uniform samples with fewer than six cuts, which could speed up the process considerably.

While some teams liked using this method, others found it difficult or uncomfortable to make the estimates it requires (e.g. in a stack, which ballot was 37% of the way down). However, this concern might be allayed with training that clearly explains the rationale for repeated cuts.

48. For instance, ballot number 572 in a batch of 703 ballots could be annotated on the pull sheet as "132 from the bottom."
49. What "physically manageable" means depend on the size of the ballots and whether there is one person making the cuts, or two people working as a team from different sides of the table. With two people, a stack of 1500 ballots may be manageable.

Ballot Interpretation

It took approximately 90 minutes to audit the 200 ballots for the governor's contest. The audited sample contained 99 votes for Gina Raimondo, the reported winner; 69 votes for Allan Fung, the reported runner-up; 23 votes for other candidates; and 9 undervotes. The sample margin, 15.7% of valid votes [(99 - 69) / (99 + 69 + 23)], was somewhat smaller than Portsmouth's reported margin of 22.2%. The measured risk for this audit is 10.2%. If it had enforced a 10% risk limit, the audit would have had to continue (although probably not for very long).

③ Batch Comparison

Both methods, hashmark and sort-and-stack, were designed to be self-correcting. In a few batches the two hashmarkers' counts did not match, in those cases, the teams had to recount those batches. Likewise, a sort-and-stack team had to redo the process for one contest because, while re-checking the stacks, they realized that they had mixed up stacks between candidates.

Both methods produced results that matched the original results exactly, proving that the methods, officials, and supervision were all effective. Had they not matched, depending on the level of differences, the data entered would have been rechecked and, if necessary, the counting repeated until the manual count results were accurate. Note that accurate manual count results can differ from scanner counts due to non-standard voter marks.

50. A 2x2 chi-square test shows no statistically significant difference between the two leaders' audit vote counts and their reported total (Portsmouth) vote counts ($p = 0.37$). Thus, the difference in margins between audit and reported totals is well within the range of expected sampling variability.

Lessons from the Pilot

Here we briefly consider some lessons from the pilot that are worth considering in future pilots and audits. Some of these could apply to any audit; others are method-specific.

General Lessons

Think hard about how to combine transparency and efficiency. Some election officials conducting RLA pilots have decided to avoid advance publicity and to invite few or no outside observers, so they could focus on learning and experimenting without the distraction of explaining the work (and any complications or mistakes) to an audience. The Rhode Island pilot took a very different approach, inviting and welcoming dozens of outside observers, and experimenting with unfamiliar methods knowing that some were bound to work better than others. This approach offers real rewards: it brought considerable public attention to the Board of Elections' efforts and helped local election officials and other observers understand the logistics of post-election audits. But it also has real costs, both tangible and intangible. We did decide to complete some processes, such as the retabulation, prior to the public event so that the workers could be narrowly focused on the task. At the same time, we wanted observers to be fully apprised of these processes. (A short video documented the retabulation.)

One tangible cost of having observers was the time spent setting up the space for observation, including projectors to display the ballots and the audit software, as well as extensive seating. This paid staff time was well spent: observers appreciated being able to watch the ballot interpretation process without having to crowd around the officials – and simply having a comfortable place to sit – and this arrangement also was more comfortable for the officials.

We chose to train the ballot retrieval teams in the various methods during the event, with observers present. In retrospect, it likely would have been better to train the teams in a calmer environment where they could master the methods without the pressure of having many unfamiliar people watch. The team members did not complain, but surely they faced an uncomfortable situation. Also, the trainers (including Board staff) had to balance answering observers' questions with being available to help the retrieval teams.

It would have been helpful – and would be very important in an official RLA – to have written explanations of the various procedures. The more information that can be provided to observers in advance, the easier it is to manage their questions during the procedures themselves.

Don't skimp on staff. As with any election procedure, adequate staffing can make the difference between a manageable task and a morale-crushing slog. This need posed a hard choice for the pilot. The Board of Elections actively considered involving volunteers -- potentially including members of local Boards of Canvassers -- in the pilot processes. In retrospect, this could have been valuable because the local boards may play a larger role

in future audits. However, the pilot involved complex staffing needs that could change throughout the day, and the Board wanted to ensure that no portion of the pilot would be slowed or impacted by lack of staffing. Therefore, it opted to rely more on bringing back paid election seasonal staff, instead of relying on volunteers. This choice worked well in that the seasonal staff did excellent work. In retrospect, many members of local Boards of Canvassers attended as observers, and could have been incorporated in the pilot. That said, feedback from the Boards of Canvassers indicates they appreciated being able to observe all three pilots.

Test the workflow and ergonomics. At several points in the pilot, we either adapted our arrangements based on immediate experience, or endured the (minor) costs of our failure to experiment in advance.

During the retabulation the workflow (see page 24) was rearranged when a more efficient order was discovered. This led to the creation of the batch tracking sheet that was incorporated into the process.

Lighting conditions provide an example of enduring rather than adapting. For most purposes, the basement warehouse space would be considered well lit. However, for the fine detail work of retrieving and examining ballots, the ambient light was sometimes inadequate to avoid real strain. If we had experimented with these processes in the spaces used in the pilot, we probably would have brought in task lighting to ease the burden on workers.

What we learned about containers. As mentioned before, the pilot tested four kinds of containers to store voted ballots after dividing them into batches: the metal containers currently used to store voted ballots, and three alternatives. The containers were qualitatively assessed based on the following criteria:

- Ease of access to individual folders
- Ease of moving
- Sealability
- Ease of opening and closing

All these containers performed reasonably well. The DS200 ballot bins, which were designed to hold large numbers of ballots, were deemed somewhat unwieldy because of their size and weight. The generic plastic bins were more manageable than the DS200 bins and were easy to seal (using two plastic wire seals) and to open and close. When they were reasonably full, they allowed the ballot folders to stand up, making it easier to retrieve individual folders. (This advantage did not matter much in the pilot because most batches were represented in the ballot samples.) The metal and cardboard ballot containers held fewer ballots than the plastic bins -- which also simplified retrieving individual folders and limited the maximum weight of these containers. The cardboard containers were lighter than the metal containers, and sealed well, but the flaps made them difficult to open and close. Board staff felt that, on balance, the existing metal containers were most practical for their purposes.

Plan ahead for software acquisition, development and testing. Robust fully featured software for all the planned auditing methods was not available leading up to the audit, so as described above, we devoted considerable effort to developing new software which met the needs of the pilot. The landscape of auditing tools is rapidly changing, and advanced planning remains essential, both for pilots and for the more rigorous software and logistical requirements of actual audits.

Method-Specific Lessons

Retabulation: batch size and management matter. The ballot-level comparison audit, as noted earlier, required ballots to be rescanned using the DS850s. Through trial and error it was determined that batches of approximately 200 ballots worked best. Batches of 300 created appreciably more work when a misfeed occurred; batches of 100 were so small as to be inefficient. Also, because of the frequency of misfeeds, it is important to wait until after the entire batch has been scanned to enter the numbers into the ballot manifest. We found it helpful to create a tracking sheet placed on top of each batch. These tracking sheets were used to record timing and count information – and to ensure that the batches stayed in precinct order.

Retrieval using the ruler method: Some teams found that the combination squares used during the pilot worked best when the ballot stacks were placed at the edge of the table. Also, the combination squares used in the pilot were acceptable, but squares with high-contrast (e.g., white-on-black) rulers would be preferable.

Retrieval using the scale method: During the retabulation, we found that the scales consistently undercounted, most likely because the ballots used to calibrate the scanners were test ballots that were slightly heavier on average than the voted ballots. We also observed that the average ballot weight varied slightly but appreciably from batch to batch, generally falling within about 0.5% of the overall average. We believe that most of this variability occurs when the ballot stock is manufactured; storage conditions also can affect ballot weight. Because of this variability, scale counts can vary by plus-or-minus one for every 200 (or so) ballots, and possibly more.

With this in mind, a protocol enhancement worth considering for the scale method would be to recalibrate the counting scale for each batch based on the number of ballots in the batch, as reported in the ballot manifest. This recalibration simply entails placing the entire batch on the scale,[51] entering the number of ballots, and hitting one more key to enter it as a count, which should take only a few seconds per batch. Recalibration compensates for differences in ballot weight from batch to batch.

51. At this point, audit judges can compare the scale's count of ballots in the batch against the figure in the ballot manifest. These generally should be similar within a fraction of a percentage point.

Comparison with the "Principles and Best Practices"

An *ad hoc* group consisting of former election officials, election security advocates, and scholars with expertise in relevant fields developed a set of guidelines for designing and implementing high-quality post-election audits. These guidelines were published in 2018 as the *Principles and Best Practices for Post-Election Tabulation Audits ("Principles and Best Practices")*, an update to a similarly-named document published in 2008. Comparing the pilot audit design and conduct to the nine general principles described in the *Principles and Best Practices* not only provides some basis for gauging its success, it also offers critical insight into how the audit can be improved.

Overall the pilot's conformity with the *Principles and Best Practices* was very good. However, because this was a pilot project that covered a relatively small number of ballots from just a few local jurisdictions, it was impracticable to comply fully with some of the principles.The points below not only explain when this was the case, but they also note where the Rhode Island audit law contemplates conduct that is different from what was feasible during the pilot.

Examination of Voter-Verifiable Paper Ballots: The pilot adhered to this principle. Paper ballots marked by hand or by AutoMARK were used throughout the pilot, and the voter ballot marks (i.e. not barcodes) were the basis for tabulation. Rhode Island will continue to use voter-verifiable paper ballots.

Transparency: With the exception of the ballot re-scan, and publication of the data to be audited, the pilot was open to the general public, and adhered to best practices of observability. It permitted those in attendance to view the ballot retrieval and adjudication from a short distance. (This was adhered to despite the crowding that occurred at certain points during the pilot.) The room setup included two large screens to make it easier to view critical audit steps such as the dice roll to create the random seed and the ballot adjudication. The ballot-level comparison results could have been presented in a more accessible format or some manner that would have made it easy for the general public to understand them without detailed explanation. While the pilot result data were not published, this could have been done, and state law requires the publication of future audit results within two days of the Board's acceptance of them. (R.I. Gen. Laws § 17-19-37.4.)

Separation of Responsibilities: State election officials at the Board had complete discretion over the conduct of the pilot, which technically violates this principle. However, the pilot was designed and conducted in partnership with outside groups and individuals who possess expertise in election administration, election security, and post-election audits (though without input from the general public). According to state law, the Board, which is responsible for tabulating state election returns (R.I. Gen. Laws § 17-19-37), has the authority to develop audit regulations and policies, including those related to selecting the contests and number of units to be audited. (R.I. Gen. Laws § 17-19-37.4.) Those regulations

52. The document is available at https://electionaudits.org/principles.

and policies should be developed after taking into account input from the public and other election officials and stakeholders (e.g. the Office of the Secretary of State, Boards of Canvassers, etc.). They should also provide for segregation of duties, as well as recusals when individuals conducting the audit have close ties to, or are themselves, candidates for office.

Ballot Protection: Rhode Island law provides for sufficient ballot protection from the time of the vote through their delivery and storage at the Board. (R.I. Gen. Laws § 17-19-19, 33, 35 & 39.1.) While the pilot did not include an observation of the post-election chain-of-custody process, there was some inquiry into details of ballot storage during pilot development. The ballot containers were sealed at the beginning of the audit; Board staff was present during the retabulation of the ballots; a thorough ballot reconciliation was conducted as ballots were rebatched (the reconciliation reports should be part of the record); and the ballots were returned and the containers re-sealed at the conclusion. In addition, ballot anonymity was preserved. In general, the chain-of-custody procedures appeared sound, and the pilot adhered to this principle.

Comprehensiveness: Provisional and "manual count" ballots were disregarded for the purposes of the pilot. Otherwise, all voted ballots from the three participating jurisdictions were subject to being audited. Also for the purposes of the pilot, audited contests were predetermined, prioritizing federal and statewide contests.

Appropriate Statistical Design: The statistical design was appropriate for the audit. Each method was designed to use as few ballots as possible to provide evidence that the reported outcomes were correct, while still offering people a meaningful opportunity to participate, observe, and learn in the experiments. With regard to the design, there are two notable points. First, the "reported outcome" did not apply to the statewide results but the results in the jurisdiction being audited. This was circumscribed appropriately to account for the samples being used. Second, for the ballot polling audit, the measured risk was 10.22%, which was slightly above the aspirational 10% limit. However, the pilot was designed to audit a predetermined number of ballots. If this had been a full RLA that enforced a 10% risk limit, the audit would have continued in accordance with state law (which calls for an escalation in ballot counting until the audit results show "strong statistical evidence" that the outcome was reported correctly). (R.I. Gen. Laws § 17-19-37.4.)

Responsiveness to Particular Circumstances: The pilot limited the number of ballots to be audited and, by design, did not contemplate or provide for additional auditing. The law provides the Board of Election broad authority, including to draft regulations that provide for targeted sample auditing of ballots, precincts, or offices in the event that officials suspect voting irregularities or circumstances otherwise warrant increased scrutiny.

Binding on Official Outcomes: The pilot audit was conducted in January 2019, two months after the 2018 election results were certified. Therefore, it was not feasible for the pilot to meet this goal (nor was it contemplated that it would). According to state law, however, election officials must "audit [the] tabulation of the unofficial final results," including recount results, prior to certification by the Board. (R.I. Gen. Laws § 17-19-37.4.) The law

contemplates that the results of future audits will be binding on the official outcome. Future audits will be designed to adhere to this principle.

Investigating Discrepancies and Promoting Continuous Improvement: The pilot methods worked well for addressing the anomalies that were observed during the pilot. As explained above, the one outright discrepancy found (in the ballot-level comparison) demonstrably was caused by an error during the audit itself. However, the same procedures could have quickly isolated errors in the original machine count regardless of their cause(s).

Part IV:
Considerations for Future Audits in Rhode Island

Rhode Island Audit Scenarios

Rhode Island must begin preparing to audit two elections in 2020: the April presidential preference primary ("primary")[53] and the general election in November. Below is an examination of the potential RLA methods[54] and related procedural options that Rhode Island may adopt. The state's decision among the alternatives will influence the scope of the audit (i.e. how many contests are audited and how thoroughly), the time and resources that will be required, and the level of transparency and public observability.

Assumptions & Considerations for All RLA Methods

Voter Turnout. In 2016, approximately 184,000 people voted in Rhode Island's primary election and 464,000 in its general election. Approximately 41,000 of the general election ballots were cast by mail. In 2020, we should expect about 500,000 people to cast their ballots in person for the general election and, according to the state's projection, about 40,000 to vote by mail.[55] For the purposes of this analysis, we focus on the general election. Given that fewer ballots are cast in the primary, it will serve as a "trial run" for conducting the General Election RLA in November.[56]

Contests. The state's RLA statute does not specify what contests must be audited. However, the National Academies of Science, Engineering, and Medicine consensus report recommends that RLAs "should be conducted for all federal and state election contests, and for local contests where feasible."[57] Accordingly, our analysis assumes that, at a minimum, federal and statewide contests will be subject to audit. However, the reader should note that there will be no statewide offices on the 2020 ballot, but there may be statewide measures.

53. Notably, Rhode Island will hold a primary election in April 2020, and a primary contest for state offices later in 2020. Here, the word "primary" refers to the former, which, under the RLA law, must be audited.
54. It is possible for the state to adopt a "hybrid" RLA, with precincts and jurisdictions employing different audit methods (which could potentially reduce the number of ballots to be audited or provide officials with more information). However, these hybrid approaches will not be discussed here.
55. Board of Elections estimates.
56. For the Presidential Preference Primary the Board of Elections must decide whether to audit based on the margin of victory or the allocation of delegates. No prior RLA has been conducted on allocation of delegates.
57. *Securing the Vote: Protecting American Democracy,* 9.

Risk Limits. Nor does the state's RLA statute establish a risk limit to which the races must be audited. The analyses below show estimated number of ballots to be sampled and estimated work loads for both 5% and 10% risk limits for all three methods.

Contest Margins. In past Rhode Island general elections, the outcomes of federal contests have resulted in moderately large vote margins. In 2016, for example, the Democratic nominee for president won the state's vote by 15.5 percentage points. David Cicilline, currently a representative, won his first election in the 1st congressional district by about six percentage points in 2010, and his margins of victory have increased since.

There have been similarly large margins for most recent statewide measures. In 2014, Question 3 (on whether to hold a constitutional convention) was rejected by approximately 10.2 points. That was the closest margin for a statewide measure since 2010. However, some statewide offices have had narrower margins. For example, the 2010 governor's race was decided by about 2.5 points.

For the purposes of this analysis, we assume vote margins of 15, 10, 5, and 2 percent, realizing that they will vary from contest to contest.

Audit Location(s). Rhode Island's Board of Elections needs to choose not only one of three alternative RLA methodologies, but also whether to conduct its 2020 risk-limiting audits in a central location or dispersed among a few or all of the 39 individual municipalities that are responsible for carrying out in-person voting in their individual precincts. Any of the three major RLA methods (ballot-level comparison, ballot polling, or batch comparison) could be carried out centrally because all but one of the 39 municipalities lie within an hour's drive of Providence. The ballot-level comparison method would most likely need to be carried out in a central location because all ballots from precincts would need to be transported to Providence and rescanned, tabulated and imprinted for a transitive ballot-level comparison audit. But either the ballot polling method or the batch comparison method could be dispersed over all 39 different municipalities or consolidated into a smaller number of distributed locations.

In general, one principal advantage of conducting risk-limiting audits at a single geographic location is that it is much easier to manage a centralized audit. As we saw during the pilot audits event in January, when problems arise, a knowledgeable person can be available relatively quickly in person to help solve them. It also is much easier for managers to notice when something is going wrong in some part of the overall process and deal with it quickly. Software only needs to run at one location, and software would not need to be supported in up to 39 different locations with quite different levels of computer expertise.

It should also be noted that the Board of Elections may be required to conduct a full retabulation of all the ballots to conduct a recount in a close statewide contest, which also would require transporting them to the Board of Elections warehouse and storing them

there temporarily.[58] Although this has not occurred since Rhode Island adopted the use of hand-marked paper ballots and optical scanners, it could happen in any year that statewide elections take place. Doing regular risk-limiting audits centrally following each election would provide both capacity and experience that could make conducting full tabulation recounts less traumatic for Board and local staff as well as the general public.

Carrying out an audit in geographically dispersed locations has several advantages, including parallel operations and less impact on the central warehouse facility. But it also has a number of disadvantages, including the following:

- Proper training and management of the auditing staff in all 39 municipalities would be required. This management includes recruiting the auditors, training them, and running the audit. The documentation and training would have to be sufficient to make sure that the procedures were uniform across jurisdictions -- e.g., how to organize ballot boxes for easy retrieval, how to find sampled ballots, and how to enter data from sampled ballots into audit software.

- Each municipality would have to have a secure space for ballot storage and for the examination of the ballots, including sufficient space for observers.

- If municipalities consolidate to a smaller number of locations for the audit, they might have to find larger spaces, track which ballots came from where, and deal with other logistical issues.

- There would have to be coordination between all the municipalities to know how many ballots to audit in each municipality, to capture and analyze the results, and to determine when and how to escalate the audit if needed. Some of this could be accomplished through software, but the software would have to be set up in all audit locations (up to 39 municipalities) as well as at the central site, and all those software components would need to be coordinated from a central site.

- During the audit there would need to be help available via telephone and possibly even individual staff dispatched to help address problems that can arise in remote offices.

The Board of Elections will need to carefully weigh the issues, constraints, advantages and disadvantages of centralization versus decentralization as well as of the three different RLA methods. The Board needs to decide these questions as soon as practicable so rules and regulations can be drafted and another pilot audit can be conducted to test software and procedures for whatever method is chosen well in advance of 2020.

Items to freeze and publish before rolling of dice and sample selection. It is essential that certain materials be frozen prior to the beginning of the process for selecting the ballots to

58. The recount procedure is detailed in the *Board's Guide to Election Recounts*, available at http://www.elections.state.ri.us/documents/Guide_to_Recounts.pdf.

be audited. For all three methods, the ballot manifest should be frozen and published for public inspection prior to the rolling of the dice. For ballot-level comparison audits the cast vote records should similarly be frozen and published prior to the dice roll. Similarly, for ballot polling and batch comparison the precinct totals and subtotals should be frozen and published prior to the dice roll.

Alternative Risk-Limiting Audit Methods

The following sections discuss Rhode Island-specific implementation issues for each of the three major RLA methods, followed by a summary comparison of the estimated number of ballots that might have to be examined manually for each method given different contest margins and risk limits, along with estimated workloads and additional costs that would be required for each different alternative.

1. Alternative 1: Ballot-Level Comparison Method

Retabulation. Given Rhode Island's current voting system, a ballot-level comparison transitive audit would require retabulating and imprinting ballots from all precincts to obtain cast vote records matched to individual ballots. The ballots would also be tallied to verify whether the outcomes initially announced are consistent with the results of retabulation.

Mail ballots, which are an increasing portion of all ballots cast in Rhode Island (see above), can be imprinted during their initial tally. Proceeding in this manner for mail ballots would add a minimal amount of time to the staff work. (It would also permit officials to audit mail ballots through the ballot-level comparison method even if other methods are used to audit in-person ballots.)

In the days leading up to the pilot, the ballots were retabulated on an ES&S DS850 scanner. They were scanned at an effective rate of about 4,000/hour.[59] At this rate, assuming that an approximate 400,000 ballots will be cast in person for the 2020 general election, the state could expect to complete the retabulation in perhaps 170 to 190 scanner-hours, depending on the prevalence of two-sheet ballots. It is difficult to estimate the labor costs associated with transporting ballots to a central location and re-organizing them as part of the retabulation. However, these costs could be minimized by giving careful consideration to how ballots are initially organized and stored to facilitate more efficient ballot retrieval. And transportation from each precinct is already required for the DS200s.

Currently, the Board of Elections has just two DS850 scanners.[60] To complete the retabulation in a timely manner, there are several possible choices, including the following:

- Extend the time for retabulating the ballots. Using existing equipment the Board of Elections may be able to scan and imprint all ballots in a statewide race in a little over a week's time running running 12 hours per day. Either by starting the retabulation earlier, or by beginning the adjudication of ballots later, or both, the Board of Elections could retabulate all the ballots without acquiring additional equipment.

59. The DS850 is rated at up to 300 pages/minute, so the scanning could potentially proceed at a faster rate than it did during the pilot. However, the DS850 tends to jam frequently and has to be tended to with the utmost care. Also most of the scanner operator's time was not spent actually scanning the ballots, but handling them before and after the scan. Note that the scanner throughput of 4,000 sheets/hour is faster than the timing reported under "Rhode Island Pilot Timing Data" above, which includes tasks before scanning started and after scanning concluded.
60. Using the two available DS850 scanners and working from 7:00 am to 11:00 pm in shifts, each machine would process 64,000 per day (16 hours * 4,000 per hour), so 750,000 ballot sheets could be scanned in about 11.7 machine days, or 6 calendar days.

- Lease additional DS450 or DS850 scanners. Notably, during the pilot at least six election officials performed tasks necessary for retabulation, including opening, orienting, and batching ballots, creating the ballot manifest, and tasks related to ballot storage. These officials had considerable slack time, which could be used for scanning. We have heard that although DS450 scanners are not as fast as DS850s, they may not jam as frequently, so their throughput may be comparable.

- Consider using commercial scanners. Using a slower commercial scanner might increase the scanner-hours needed for retabulation by perhaps 25-50%.[61] Commercial scanners have imaging and imprinting capabilities. However, they do not have the capacity to perform tabulations to verify the results initially announced. To perform this step, the Board would have to acquire retabulation software from a private vendor or an open-source system.

- Issue an RFP for a short-term contract to retabulate and imprint an estimated 750,000 ballot sheets for the 2020 general election. (Potential bidders could include ES&S, Clear Ballot, and possibly other vendors who have capable hardware, software, and personnel.) If done, this should occur under strict supervision and management by Rhode Island Board of Elections staff, subject to public notice and observation, at its new facility in Providence.

Retabulation and imprinting demand a considerable amount of up-front work. However, it is an essential step for conducting a transitive ballot-level comparison audit, which is the most efficient and effective of the three RLA methods for races with close margins. It can also help isolate the cause(s) of any discrepancies. It also can support auditing of multiple contests – including "opportunistic auditing" of contests for which no risk limit is set – with minimal added work.

Ballot Samples. One can expect that auditing a contest with a 5-point margin to a 5% risk limit (with some tolerance for minor discrepancies) would require sampling just 150 ballots, assuming few discrepancies. The sampling plan in the table below can be adjusted to account for unofficial margins of the various contests, which would allow multiple contests to be audited. Depending on the number of statewide measures, it is likely that all statewide measures could be audited on 200 ballots and performed within three hours and 30 minutes (not including break time). We suggest increasing the minimum sample size of ballots statewide to provide good coverage of both U.S. House contests. Although we have not systematically studied down-ticket contests, it should be feasible to conduct opportunistic auditing of local contests on these ballots.

Ballot Retrieval & Audit Interpretation. During the pilot, it took an average of 68 seconds to retrieve the first ballot in a new ballot box (already positioned next to the table). While teams retrieved several ballots from each box during the pilot, in a live audit, it would be more common to retrieve just one ballot per box. Additional time would be required to retrieve and replace each box of ballots.

61. For example, the Fujitsu fi-6800, rated at 130 pages/minute, would operate at about half the speed of a DS850 scanner. In the pilot, however, the DS850 was operating less than one-third of the time due to tasks and delays unrelated to the scanner. The Fujitsu fi-6800 scanner costs about $19,000 and has an imprinter installed.

During the pilot, entering audit interpretations for one contest proceeded at about 140 ballots/hour (25 seconds/ballot). Entering audit interpretations for multiple contests was more efficient. It took just under 60 ballots/hour (62 seconds/ballot) to audit ten separate contests on a ballot in which the voter could make one selection among the choices. Nevertheless, it would be hard to sustain these rates of entry over long periods of time. When auditing lots of ballots, it would be helpful to allow multiple teams to simultaneously enter audit interpretations. Doing so can make observation more challenging, so this sort of parallelization should be discussed with interested parties.

See Table 2B for more details on estimated times and costs for different methods.

② Alternative 2: Ballot Polling

Ballot polling audits can be conducted for multiple contests at once, including all statewide and federal contests. Unlike the ballot-level comparison method, ballot polling audits do not require ballots to be retabulated. This method is ill-suited for opportunistic auditing of local contests using the statewide sample, because it is unlikely to provide useful information given the small sizes of most statewide samples. Therefore, specific local contests would need to be audited separately, if at all.

Ballot Samples. The size of the ballot sample needed to complete a ballot-polling audit increases rapidly for narrow-margin contests (< 2%), and is unpredictable even when the reported results are accurate. Officials should therefore be conservative in planning for and setting an initial sample size, aiming for one that provides a large chance of attaining the risk limit without additional auditing (assuming that the reported results are accurate). Not only will a larger ballot sample reduce the likelihood of having to retrieve and audit additional ballots, it will also provide stronger evidence about the accuracy of the audited contests. The optimal sample size will depend on the reported margins and the relative ease of auditing additional ballots.

Local vs. Central Location(s). Ballot-polling audits can be conducted locally or centrally (and the results of audits performed either way can be combined). By conducting audits locally, officials avoid the need to transport ballots, store them in a central location, and them return them to local storage. Performing audits locally may also expedite audits by allowing many teams to work at the same time. It would have mixed effects on observability, requiring more observers, but also allowing observers to stay closer to home. Conducting audits centrally may simplify necessary training and make it more efficient to manage and communicate during the process. Central management would eliminate the need to combine ballot manifests and audit results from around the state, and to perform additional auditing in several locations. Central audits may also be more conducive to observation of the entire audit by election officials and members of the public.

Ballot Counting & Retrieval and Audit Interpretation. Officials can use Election Certificates and other precinct records to create the ballot manifests for the ballot polling method. (Ballot manifests can be prepared centrally or locally, and by several election officials working in parallel.) In preparing ballot manifests, officials ensure the accuracy of ballot counts. Among the approaches tested thus far, the fastest method of getting an accurate ballot count is to use counting scales. Once calibrated, a counting scale can check

the number of ballots in a batch in well under one minute. However, using a scale for the ballot count can produce results that vary from a true count, perhaps by a fraction of a percentage point per batch. Any large discrepancies between reported counts and scale counts should be investigated and resolved.

During the pilot, the counting-scale retrieval method took a median 40 seconds/ballot, not accounting for retrieval of the boxes. Calibrating the scale to the number of ballots in each batch would have added a few more seconds per batch. This suggests that the overall retrieval rate per team would be approximately 105 seconds/ballot (or about 35/team/hour), which is similar to the estimate for retrieving imprinted ballots for the ballot-level comparison method. The rate would improve considerably for larger samples because it takes less than a minute to retrieve an additional ballot from an open box. In general, it should be possible to complete the ballot retrieval in a single work day. Note that this analysis may also apply to other retrieval methods. (For example, the k-cut method of retrieval could take more or less time depending on the number of cuts.)

If the three federal contests in 2020 were the only ones audited, one could expect to enter a full interpretation for 110 ballots/hour. If there were seven statewide questions, as there were in both 2012 and 2016, the process might slow to around 55-60 ballots/hour (which is similar to the rate for entering interpretations for the ten contests during the ballot-level comparison).

Carrying out a ballot-polling audit in a number of distributed locations could be challenging to manage. More training would probably be required to make sure that staff at each location are following the same procedures in terms of selecting sample ballots, marking their locations in their respective ballot boxes, entering votes from sampled contests into the audit software, and so on.

③ Alternative 3: Batch Comparison

Of the three RLA methods, the batch comparison approach requires sampling the greatest number of ballots. For purposes of simplicity, we assume the batch comparison method is used in an unusually close statewide contest, and the number of in-person ballots exceeds 1000 on average coming from more than 100 sampled precincts around the state. (Mail ballots could be audited using the ballot-level comparison method, and the results incorporated with the results from the batch comparison method to yield overall risk limits.) Gauging from the pilot, auditing a close statewide contest using sort-and-stack method should require an estimated 7 seconds/ballot using two-person teams for each race, plus an estimated 7 seconds/per ballot for orienting the ballots before counting the races. Using the more conservative pilot estimate, the batch comparison method (or full manual count) could audit about 510 ballots/team-hour. Auditing 100,000 ballots for one contest would take approximately 195 team-hours. Of course this can be performed by several teams auditing ballots simultaneously. The pilot results also indicate that the hashmark method could audit multiple contests on a subsample of the ballots at approximately 4 seconds/contest (and that there may be efficiencies gained as the number of contests being audited is increased).

Storage Considerations for Batch Comparison Audits. One attractive feature of a batch comparison audit is that sample batches could be selected (either precincts or machines) at the beginning of the audit and then ballot boxes for those batches could be transported to and stored temporarily at the Board of Elections warehouse for the audit. The total number of boxes for sampled batches would be considerably less than the grand total of 1,200 boxes that would need to be at the Board of Elections for a centralized audit using either ballot-level comparison or ballot polling methods.

Treating each DS200 as a separate batch would provide smaller batches to audit and thus fewer ballots to count.[62] Using scanners rather than precincts as the audit unit could reduce the batch comparison workload by close to 30% for margins from 2% to 5%. Basically, the number of batches in the sample would be roughly the same whether the batches were based on scanners or precincts, and the number of ballots in each scanner batch size is less than or equal to the number of ballots in the entire precinct. For instance, the 2014 margin for governor was about 4.5 points. To audit a similar contest by batch comparison, at a 10% risk limit, might entail counting about 63,000 votes at the precinct level, or 44,000 votes at the scanner level, at 2016 turnout levels.

62. Board of Elections staff have said that they fear in precincts that have more than one DS200, many election workers would not be able to be sure to put ballots from separate machines in separate boxes. However, other states, such as Maryland, have successfully been able to keep ballots from different machines separated in different boxes.

Audit Sample Sizes for Different Methods and Contest Margins

Table 1 presents estimates of the number of ballots one would need to audit in an election using each of the three major types of RLA methods. It shows the estimated number of ballots needed at four different margins, assuming that the reported counts are generally accurate. For batch comparison, the ballot estimates are based on data from the 2016 Rhode Island general election. (The number of batches depends only on the proportional margin.) The actual number could vary in other jurisdictions or other election years. These estimates use a 10% risk limit; to reach a 5% risk limit generally would require auditing about 30-40% more ballots.

For sake of simplicity, the estimates also assume a contest that requires voters to select between one of two candidates, and that there were no invalid votes cast. They also assume ballots consist of just a single sheet of paper. For audits with two-sheet ballots, one might need to double the number of sheets sampled.

As we mentioned earlier, ballot polling results are substantially less predictable than comparison results: additional sampling may be needed even when the original count is generally accurate. Here we present four possible ballot polling sample sizes for each margin. The smallest sample size has a 50% chance of attaining the risk limit, thus completing the audit, if the original count is accurate. Auditors might prefer to start with this relatively small sample size if it is not very difficult to expand the sample if necessary. Larger ballot polling samples have a larger chance of completion; the largest sample sizes shown here provide a 95% chance of completion.

Table 1: Estimated Number of Required Ballots to be Sampled and Audited, 10% Risk Limit ***(by Auditing Method and Contest Margin)***

		Margin of Contest Decision			
	Auditing Method	**15%**	**10%**	**5%**	**2%**
①	ballot-level comparison	42	62	124	310
②	ballot polling, 50% chance to complete*	150	330	1,310	8,200
②	ballot polling, 75% chance to complete	260	590	2,330	14,500
②	ballot polling, 90% chance to complete	440	980	3,850	24,100
②	ballot polling, 95% chance to complete	580	1,310	5,100	32,300
③	batch comparison	21,300 *17 batches*	31,000 *25 batches*	57,300 *48 batches*	125,700 *117 batches*

** sample size needed for an estimated 50% chance of attaining the risk limit in the first round*

Technical Notes for Table 1

The total number of voted ballots does not impact the number of ballots that need to be audited for Ballot Comparison or Ballot Polling Methods. For Batch Comparison, we used the number of ballots (464,144) and batches (3007) from the 2016 Presidential election.

Ballot-level Comparison: The estimates allowing for one one-vote overstatement (o1 = 1). See Lindeman and Stark, Gentle Introduction p. 4 (Equation 1).

Ballot Polling: These estimates are derived from simulation studies of the BRAVO method, assuming that every ballot bears a vote for one of the two candidates. (The BRAVO method is similar to the method described in Gentle Introduction, setting the tolerance t to 0, except for Steps 6 and 7. The criterion for stopping the audit, for a 10% risk limit, is T > 10 instead of T > 9.9, and there is no rule for whether and when to perform a full manual count.) Each estimate is based on 100,000 simulated audits. See Lindeman and Stark, Gentle Introduction pp. 3-4.

Ballot polling is less predictable than the comparison methods: even if the original count is highly accurate, an unlucky sample may not provide strong evidence for the reported outcome. A larger sample provides a greater chance of meeting the risk limit and complete the audit in just one round, without having to audit additional ballots. In Table 1, for instance, the "50 percent chance to complete" row shows sample sizes that give a 50 percent chance to complete the audit in one round. The table shows that to increase that chance to 95 percent generally requires auditing about four times as many ballots. Audit planners should take this tradeoff into account when setting the initial sample size.

Batch comparison: The number of batches to draw is based on section 3 in Stark (2009).[63] A convenient approximation for a 10% risk limit is 2 + 2.3 / m, where m is the proportional margin. The estimate for number of votes audited comes from 2016 Rhode Island general election data. We treat each precinct's in-person votes as a batch and each municipality's absentee votes as a batch, and assume that the probability of selecting any batch is proportional to the number of cast votes it contains.

63. Philip B. Stark, "Efficient post-election audits of multiple contests: 2009 California tests," refereed paper presented at the 2009 Conference on Empirical Legal Studies, preprint available at http://ssrn.com/abstract=1443314.

Risk-Limiting Audit Costs by Method and Contest Margin

Table 1 provides a summary comparison of the number of ballots that would need to be audited for different RLA methods and contest margins. The next series of three tables (below) estimate costs for major steps that each RLA method requires, and how those costs vary with differing contest margins.

In order to help election officials, policy makers, and the general public explore and understand costs associated with different types of risk-limiting audits, we used data from the Rhode Island pilot audits and other sources to create an interactive tool based on three related spreadsheets. **Tables 2A**, **2B** and **2C** contain illustrative snapshots of the three spreadsheets from the inter-active tool. We are providing an initial Excel implementation of the interactive tool to the Rhode Island Board of Elections. This version includes data and assumptions that are specific to current Rhode Island elections.

Table 2A contains user-settable parameters and set-up costs to prepare paper records for auditing that do not vary with different contest margins. At the top of **Table 2A**, users of the interactive tool can set three parameters: the average labor cost in dollars per hour, the total number of ballots expected to be cast for the election, and the average number of sheets per ballot. For this snapshot table, we have chosen:

- $20 per hour is the average labor cost per hour;
- 500,000 is the estimated total number of regular ballots that will be voted in precincts on election day in November 2020 (i.e., not counting mail ballots and provisionals that will be processed centrally in any case); and
- 1.5 is the estimated average number of sheets per ballot across all Rhode Island municipalities in November, 2020 (some jurisdictions within the state may require more than one sheet to accommodate all the contests and candidates for the 2020 election in that jurisdiction.[64]

The next set of rows in **Table 2A** show set-up costs that are common to all three types of risk-limiting audits (e.g., organizing shelving and labeling ballot containers).

The bottom three sets of rows in **Table 2A** show set-up costs that are specific to each RLA method – e.g., creating different types of ballot manifests for each method. For each activity shown in a particular row, there are columns whose cells contain the type of unit for that activity (e.g., ballot boxes or individual ballot sheets), the total number of such units, and the estimated number of person hours required to do that activity for each individual unit. Other columns to the right for person hours and cost are calculated from "# of units" and "pers hrs per unit".

64. The numbers in these spreadsheets also assume that we are auditing 3 contests to a risk limit of 10%. In the future these numbers also could be incorporated as additional over-all parameters that could be set by users of the interactive tool.

Table 2A: Estimated Setup Costs for Three Different Methods Conducted Centrally

Labor Cost $ Per Hour =	**$20**	(This number applies throughout the tables and can be adjusted.)
Number of In-Person Ballots =	**500,000**	(The number of absentee ballots has little effect on audit costs in Rhode Island for 2020.)
Average Sheets Per Ballot =	**1.50**	(This affects scan time, sample size, and adjudication time.)
		[in the future, we might also allow users to specify risk limit and/or number of contests]

Steps & Sub-Steps

Steps in Common for All Three Audit Methods	Unit Type	# of Units	Pers hrs per unit	Person hours	Cost	Addl Est	Estimate Source & Notes
Organize shelving for 1,200 ballot boxes	box	1,200				$7,200	staff: $6/ballot box, 2 days for entire state
Transport ballot boxes to Providence	box	1,200		42	$840		staff: 3 people, 2 days, 7 hrs per day
Verify, sort, label and shelve all ballot boxes *(See steps by individual method below)*							
Generate random seeds and pull sheets				0.93	$19		RI pilot timing-4 people for 14 minutes
Subtotal (used in Total Costs Table)				**57**	**$8,339**		

① Ballot -Level Comparison Method	Unit Type	# of Units	Pers hrs per unit	Person hours	Cost	Addl Est	Estimate Source & Notes
Rescan & create batches and manifest	sheet	750,000	0.0020	1,500	$30,000		Jan pilot* - may require diff labor pay rate?
Set up A/V and display				0			staff: TBD but not significant
Subtotal (used in Total Costs Table)				**1,500**	**$30,000**		

② Ballot Polling Method	Unit Type	# of Units	Pers hrs per unit	Person hours	Cost	Addl Est	Estimate Source & Notes
Create manifest	ballot box	1,200	0.02	20	$400		use certificate ballot counts for each precinct
Set up A/V and display				0			staff: TBD but not significant
Subtotal (used in Total Costs Table)				**20**	**$400**		

③ Batch Comparison Method	Unit Type	# of Units	Pers hrs per unit	Person hours	Cost	Addl Est	Estimate Source & Notes
create batch manifest (per individual DS200)	DS200	559	0.01	6	$112		use certificate ballot counts for each precinct**
Subtotal (used in Total Costs Table)				**6**	**$112**		doesn't vary with margin

Table 2A Notes

* Row 17: From the pilot, 6 staff members can process about 3,000 ballots/hour = 500 ballots/person-hour or 0.002 person-hr/ballot (F17). It may be feasible to use fewer staff members.

** Row 24: Number of scanners from spreadsheet with DS200s per 2000 voters. Time per unit to create manifest is assumed same as for ballot polling.

Table 2B: Estimated Execution Costs by Method and Contest Margins (10% Risk Limit & 3 Contests)

			Different Contest Margins												
			10%			5%			2%			1%			
Steps & Sub-steps	Unit	Pers Hr/ Unit	# of Units*	Pers Hr	Cost @Labor $/ Hr***	# of Units*	Pers Hr	Cost @Labor $/ Hr***	# of Units*	Pers Hr	Cost @Labor $/ Hr***	# of Units**	Pers Hr	Cost @Labor $/ Hr***	Estimate Source & Notes
① Ballot-Level Comparison Risk-Limiting Audit Method															
Handle boxes	box	0.20	93	19	$372	186	37	$744	465	93	$1,860	930	186	$3,720	E6: see note
Pull sample	sheet	0.034	93	3	$63	186	6	$125	465	16	$313	930	31	$627	E7: see note
Adjudicate	ballot	0.01	62	1	$14	124	1	$28	310	3	$69	620	7	$138	E8: see note
Subtotal				**22**	**$448**		**45**	**$897**		**112**	**$2,242**		**224**	**$4,484**	
② Ballot Polling Risk-Limiting Audit Method															
Handle boxes	box	0.20	990	198	$3,960	1,200	240	$4,800	1,200	240	$4,800	1,200	240	$4,800	see row 12 note
Pull sample	sheet	0.035	495	17	$347	1,965	69	$1,376	12,300	431	$8,610	49,200	1,722	$34,440	see row 13 note
Adjudicate	ballot	0.01	330	4	$73	1,310	14	$291	8,200	91	$1,820	32,800	364	$7,282	same times as for ballot comparison
Subtotal				**219**	**$4,380**		**323**	**$6,466**		**762**	**$15,230**		**2,326**	**$46,522**	
Handle boxes	box	0.20	1,200	240	$4,800	1,200	240	$4,800	1,200	240	$4,800	1,200	240	$4,800	
Pull sample	sheet	0.035	885	31	$620	3,495	122	$2,447	21,750	761	$15,225	87,150	3,050	$61,005	
Adjudicate	ballot	0.01	590	7	$131	2,330	26	$517	14,500	161	$3,219	58,100	645	$12,898	
Subtotal				**278**	**$5,550**		**388**	**$7,764**		**1,162**	**$23,244**		**3,935**	**$78,703**	
Handle boxes	box	0.20	1,200	240	$4,800	1,200	240	$4,800	1,200	240	$4,800	1,200	240	$4,800	
pull sample	sheet	0.035	1,470	51	$1,029	5,775	202	$4,043	36,150	1,265	$25,305	144,000	5,040	$100,800	
Adjudicate	ballot	0.01	980	11	$218	3,850	43	$855	24,100	268	$5,350	96,000	1,066	$21,312	
Subtotal				**302**	**$6,047**		**485**	**$9,697**		**1,773**	**$35,455**		**6,346**	**$126,912**	
③ Batch Comparison Risk-Limiting Audit Method (for 3 contests)															
Handle boxes	batch	0.24	25	6	$120	48	12	$230	117	28	$562	232	56	$1,114	see row 27 note
Batch sheets	sheet	0.003	31,000	102	$2,046	57,300	189	$3,782	125,700	415	$8,296	211,600	698	$13,966	see row 28 note
Count/record	ballot	0.013	31,000	388	$7,750	57,300	716	$14,325	125,700	1,571	$31,425	211,600	2,645	$52,900	see row 29 note
Subtotal				**496**	**$9,916**		**917**	**$18,337**		**2,014**	**$40,283**		**3,399**	**$67,979**	

50% chance to complete

75% chance to complete

90% chance to complete

Table 2B Notes
* For each margin, the number of units required is from Exhibit 1 of the RI report.
** For margins of 1% Mark Lindeman provided the required number of units.
*** The labor costs are entered as a parameter on the Setup Cost Spreadsheet.

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Table 2B Notes (cont.)
E6: For retrieving and replacing boxes, Miguel Nunez estimates using a small pallet with ten boxes, 20 minutes to retrieve per pallet, 10 mins to return, 2 mins to retrieve per box and 1 minute to return (20 + 10 + 2*10 + 1*10) = 60 minutes per pallet or 6 minutes (0.1 hours) per box to retrieve and return. **2 staff, so 0.2 person hrs/box** (not physically necessary). Box count for 1% is conservative.
E7: Jan pilot 61 seconds median to pull sheet from a new box. 2 persons working so 2.02 minutes (0.0337 hours) per sheet
E8: For three contests, based on Jan pilot avg time to evaluate one contest: 25 seconds, ten contests, 62 seconds, three contests: 40 seconds (.0111 hours). (It takes a few seconds to handle ballots on which no audited contests appear, but the # of ballots is more relevant than the # of sheets.)
Row 12: Assume 2 boxes per retrieved sheet with maximum 1,200.
Row 13: From pilot, using scale method: 1.05 minutes for all new box. For 2 persons working, 1.05 * 2 / 60 = 0.035 person hours per ballot.
Row 27: Each batch will have multiple boxes stored near each other. Assume that collecting all the boxes for a batch takes 1.2 times the amount of time to collect one box (set in row 6).
Row 28: Use of sheet is conservative: depending on contests, additional sheets may be set aside without batching. Pilot timings include start-up issues; the timing here is the fastest observed, 0.10 min * 2 persons/60 = 0.003 person hours per unit.
Row 29: Pilot. .17 min was medium observed amount for evaluation and tallying; with 4 persons, 0.17 * 4 / 60

The spreadsheet table in **Table 2B** shows the costs of retrieving and evaluating sampled ballots. Once again, rows show different types of activities for each method under the heading for that method, while columns show type of unit, number of units, and person-hours per unit.

At the right side of **Table 2B**, there are four sets of three cells each: number of units, calculated person hours and cost; each set corresponds to a different contest margin (10%, 5%, 2%, 1%).

Table 2B shows that the closer the margin for an audited contest, the more units (boxes and ballot sheets) need to be handled and counted. The number of units to be audited is determined primarily by the contest margin, rather than the total number of votes cast for a particular contest being audited.

In **Table 2B**, note that the ballot-polling RLA method activities (handle boxes, pull sample, and adjudicate) are grouped into three vertical sets of different “chances to complete” – 50%, 75%, and 90%. For example, **Table 2B** shows that to attain a 10% risk limit using the ballot-polling method for a contest where the winning margin was only 1%, there would be a 75% chance of completing the audit in the first round by examining 87,150 ballot sheets from 58,100 ballots.

Unlike ballot-level comparison and batch comparison methods, the sample size needed to attain a specified risk limit in the first round of auditing (assuming only minor discrepancies) is quite variable for a ballot polling audit. For instance, if by chance the randomly chosen sample includes many more ballots with the loser selected than appear on average in all the ballots, many more ballots would require examination than would be required on average. So instead of giving a single “# of units” (as shown for the other two RLA methods), the spreadsheet shows three different sets of “# of units” that need to be in the sample in order to achieve a certain percentage probability of completing the audit with that size sample (and assuming that no discrepancies are found).

Table 2C: Combined Total Costs

	Different Contest Margins								
	10%		5%		2%		1%		
RLA Methods	Person Hours	Cost	Person Hours	Cost	Person Hours	Cost	Person Hours	Cost	
① Ballot -Level Comparison Method									
Set up in common	57	$8,339	57	$8,339	57	$8,339	57	$8,339	From Setup Table
Set up for method	1,500	$30,000	1,500	$30,000	1,500	$30,000	1,500	$30,000	
Execution	22	$448	45	$897	112	$2,242	224	$4,484	From Execution Table
Total	**1,579**	**$38,787**	**1,602**	**$39,235**	**1,669**	**$40,581**	**1,781**	**$42,823**	
② Ballot Polling Method									
Set up in common	57	$8,339	57	$8,339	57	$8,339	57	$8,339	From Setup Table
Set up for method	20	$400	20	$400	29	$400	20	$400	
Execution	219	$4,380	323	$6,466	762	$15,230	2,326	$46,522	From Execution Table
Total	**296**	**$13,118**	**400**	**$15,205**	**838**	**$23,969**	**2,403**	**55,260**	
Set up in common	57	$8,339	57	$8,339	57	$8,339	57	$8,339	From Setup Table
Set up for method	20	$400	20	$400	20	$400	20	$400	
Execution	278	$5,550	388	$7,764	1,162	$23,244	3,935	$78,703	From Execution Table
Total	**354**	**$14,289**	**465**	**$16,502**	**1,239**	**$31,983**	**4,012**	**$87,442**	
Set up in common	57	$8,339	57	$8,339	57	$8,339	57	$8,339	From Setup Table
Set up for method	20	$400	20	$400	20	$400	20	$400	
Execution	302	$6,047	485	$9,697	1,773	$35,455	6,346	$126,912	From Execution Table
Total	**379**	**$14,785**	**562**	**$18,436**	**1,850**	**$44,194**	**6,423**	**$135,651**	
③ Batch Comparison Method									
Set up in common	57	$8,339	57	$8,339	57	$8,339	57	$8,339	From Setup Table
Set up for method	6	$112	6	$112	6	$112	6	$112	
Execution	496	$9,916	917	$18,337	2,014	$40,283	3,399	$67,979	From Execution Table
Total	**558**	**$18,366**	**979**	**$26,788**	**2,077**	**$48,733**	**3,461**	**$76,430**	

50% chance to complete

75% chance to complete

90% chance to complete

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The spreadsheet/table in **Table 2C** brings together sub-totals from the setup and execution tables (**Tables 2A** and **2B**) and summarizes for each method the common set-up costs, method-specific set-up costs, and execution costs, along with totals for each. The sub-totals and totals are grouped and broken down by method as well as for different contest margins, as in **Table 2B**.

One of the main take-away messages from the summary table in **Table 2C** is that total costs for ballot-comparison audits increase only slightly with smaller contest margins, while the costs for the other two methods increase dramatically as margins decrease. Moreover, it can become very expensive to complete an audit using the ballot-polling method when contest margins are small.

Summary of Policy Choices for the Rhode Island Board of Elections[65]

When considering what recommendations to make to Rhode Island, the working group asked itself five questions:

1. *Which of the three methods – ballot-level comparison, ballot polling, or batch comparison – should Rhode Island adopt?*
2. *If ballot polling, which retrieval method – count, scale, ruler or k-cut – should the state use?*
3. *Should the audits be conducted centrally or should they be distributed?*
4. *What software should be used?*
5. *What timelines would make Rhode Island best situated to conduct its first official risk-limiting audit in April 2020?*

Recommendations

Based on our experience and data from Rhode Island's very informative January pilot risk-limiting audits, analysis of data from those pilot audits and other sources, and discussions with Rhode Island Board of Elections staff, the members of the RIRLA Working Group offer the following recommendations:

① Implement a ballot-level comparison risk-limiting audit.

While there are a variety of reasons to support a ballot-level comparison risk-limiting audit, four are worth highlighting:

1. Ballot-level comparison audits enable officials to trace discrepancies to the individual ballot. In the event that something goes wrong, this audit method can provide more information about the performance of the voting system than either the ballot polling or batch comparison approach. Such information is key for the continuous improvement of the election and auditing processes.

2. Ballot-level comparison audits are particularly attractive in Rhode Island because the work required for performing any recount could also be used for the audit. By Rhode Island law, candidates have a right to a recount in close margin contests,[66] and the recount simply consists of refeeding all of the ballots into the optical scanners. So far, the state has yet to conduct a refeed for a statewide contest. However, by adopting ballot-level comparison audits, which requires a rescan of all ballots, Rhode Island would be prepared for the eventual statewide recount scenario.

65. The consensus recommendations in this section reflect the opinions of the following members of the Rhode Island RLA Working Group (in alphabetical order): Wilfred Codrington, Lynn Garland, Mark Lindeman, John Marion, John McCarthy, Ron Rivest, and Luther Weeks. Board of Elections staff members Miguel Nunez and Steve Taylor participated actively in Rhode Island RLA Working Group discussions but they did not feel it would be appropriate for them to join in making recommendations because the Board of Elections staff may be asked to make their own independent recommendations.
66. http://webserver.rilin.state.ri.us/Statutes/TITLE17/17-19/17-19-37.1.HTM. In races where there are fewer than 20,000 votes a recount occurs when the margin is less than 2% or 200 votes, whichever is less. In races between 20,001 and 100,000 votes a recount occurs when the margin is less than 1% or 500 votes, whichever is less. In races where there are 100,001 or more votes a recount occurs when the margin is less than 0.5% or 1,500 votes, whichever is less.

3. Ballot-level comparison audits enable opportunistic audits to easily gain some confidence in the outcomes of all the contests.This method is easiest to extend to both statewide and non-statewide contests. As the pilot demonstrated, conducting a ballot-level comparison risk-limiting audit of a large number of statewide contests (ten in the pilot) need not take much longer than auditing just one contest, depending on the margins in the contests. Risk-limiting audits of smaller contests can readily be added as well. Moreover, additional contests can be opportunistically audited on some or all of the ballots in the audit sample, thus easily gaining additional evidence about the accuracy of the vote counts. Extending the other audit methods to multiple contests typically is far more laborious and/or less effective.

4. The ballot-level comparison method has the most predictable workload and cost. To be clear, because of the rescanning requirement, the ballot-level comparison method would have relatively large upfront costs (at least using the state's current voting systems). Those costs are fairly predictable, however, because they are largely determined by the number of hours required to conduct the rescan, which one can conservatively estimate before the election based on expected voter turnout. (Costs are minimal after the rescan unless the audit escalates). The workload for the ballot-level comparison audit is dependent on voter turnout, a relatively stable figure. However, the workload for the alternatives is unpredictable because it depends much more on the contest margin, which varies by contest and election year. For instance, as Table 1 shows, the difference in workload between a 10-point margin and a 2-point margin (at a 10% risk limit) is almost 100,000 hand-counted ballots if batch comparison is used, but only about 250 ballots if ballot-level comparison is used.

We believe it is feasible to implement statewide ballot-level comparison in the 2020 election cycle. That said, ballot-level comparison is not an all-or-nothing proposition. For the presidential preference primary or the general election, the Board of Elections might choose to retabulate part of the state's ballots, and audit these ballots using ballot-level comparison, using ballot polling or batch comparison for the remaining ballots. (The results from these two "strata" could be combined to produce the overall audit result.) With careful planning, the audit can be designed so that if the retabulation goes faster or slower than expected, the audit can adapt accordingly. The Board then can adjust its audit plan for November 2020. Even if the Board decides that it is premature to retabulate all ballots after the presidential primary or general election, it can use retabulation and ballot-level comparison to implement risk-limiting audits in selected non-statewide contests, while using one of the other methods for the presidential and other statewide contests.

If the Board decides not to use retabulation and ballot-level comparison statewide, the Working Group has no firm consensus on which alternative method is preferable. However, we caution that as shown in table 1, ballot polling can become unwieldy when a target contest has a small margin.

Establish objective criteria for which races will be audited.

In April 2020 the Board will have to audit the Presidential Preference Primary contests. The Board has significant discretion to determine which contests to as part of the November 2020 election. The Working Group recommends the Board audit the presidential contest

and establish by regulation objective criteria and a transparent process for determining additional contests to be audited.

Conduct a centralized audit.

Although there are some advantages to having local election officials conduct the audit in a decentralized manner (and it may be a good approach in future years), Rhode Island's first official risk-limiting audits should be conducted centrally. Centralization facilitates the training, communications, and management required for a successful audit.

Both centralized and decentralized audits have benefits from the observability standpoint. However, conducting ballot-level comparison audits centrally has the added advantage of permitting election integrity advocates and the public to watch the entire process. Spreading the audits among more locations (up to all 39 of Rhode Island's cities and towns would make it less likely that trained observers would always be present at each location.

Consult local election officials.

Before making any final decisions, particularly ones that may have a great impact on local election officials (e.g. requiring them to carry out a decentralized risk-limiting audit), the Board of Elections should consult those local officials and seek their input. Local election officials may perceive the additional work as an unfunded mandate. (Notably, a centralized audit may be the best approach for enlisting participation, as local election officials who are willing and able could opt to participate in the RLA – much as Michigan successfully recruited municipal election officials to participate in its countywide RLA pilots of June 2019.)

Conduct a practice audit.

The Board of Elections should conduct another (semi-private) pilot audit in the fall of 2019. This is particularly important given the likelihood that Rhode Island will use a different (or at least substantially revised) software tool. A second pilot would be even more warranted should the Board choose to employ methods not tested during the January 2019 pilots (such as using a hybrid method or conducting an audit in a decentralized manner).

Use Arlo audit software.

Although the Audit Conductor software was adequate for the January pilot, the Board of Elections should use the Arlo software from Voting Works.[67] This open-source software was originally developed to support Colorado's statewide risk-limiting audits. The Arlo software supports parallel input of data from multiple audit adjudicator boards simultaneously in centralized or distributed audit locations. By becoming a paying customer, Rhode Island can help determine future software enhancements (including those scheduled for the coming months) and would get documentation and assistance from paid professionals (who have provided support to Colorado state and local election officials.

67. https://voting.works/rla/.

Appoint an ongoing expert advisory council.

Beginning in 2020 the Rhode Island Board of Elections will have to conduct the audits themselves. We believe that this will require the assistance of experts from inside and outside of the state. The Board should appoint a council of experts to advise them in this process. It might look to the example of Colorado, which has engaged a group of local election officials, auditing experts, and others, to help develop and review audit protocols, rules and regulations, and software, among other things.

Initiate rulemaking.

The Board of Elections must initiate rulemaking as soon as practicable. Rulemaking is necessary for the Board to make key policy choices, which include:

- Establishing ballot interpretation rules;
- Determining contests subject to audit;
- Setting risk limits;
- Adjusting the election calendar
- Harmonizing audits processes with recounts/refeeds requirements Clarifying public notice requirements and rules governing access and observation (as required by Rhode Island's RLA statute); and
- Specifying qualifications for serving as an election judge.

Develop schedule with milestones.

The Rhode Island Board of Elections needs to develop and publish the major milestones they must meet to implement risk-limiting audits. Those milestones include choosing an audit method, conducting additional pilots, and completing the regulatory process, and should account for the period between July 2019 through the general election in November 2020.

Endorse vendor recommendations.

The Rhode Island Risk-limiting Audits Working Group plans to make recommendations to the election machine vendor (as summarized in Appendix A), and urges the Rhode Island Board of Elections to send its own letter to the vendor making similar recommendations.

✓ Part V:
Conclusion

The Rhode Island risk-limiting audit pilots exceeded expectations. They provided an opportunity for election administrators to gain hands-on experience with RLAs. They gave theoreticians an opportunity to test new methods. They gave advocates another data point to point to when arguing that RLAs are possible for any voting system.

As the first known effort to test all three types of RLAs simultaneously, and to provide comprehensive timing and cost measurements, we believe these pilots provide valuable insights for administrators, theoreticians and advocates alike. While we endeavored to test many different methods, there is much more to learn and we look forward to future pilots in Rhode Island and elsewhere.

We hope this report will be a useful tool for the Rhode Island Board of Elections as it drives toward implementing RLAs beginning in April 2020. We thank their staff who have worked with us over the past seven months to plan, implement, measure and now describe the pilot risk-limiting audits.

Glossary

Audit judges
Officials participating in performing the audit.

Ballot manifest
A catalog prepared by election officials listing all the physical paper ballots and their locations in sequence.

Ballot sheets
A single piece of paper that forms part of a paper ballot. Paper ballots may contain multiple sheets.

Batch ID
A unique ID associated with a batch of ballots, used for labeling the batch and for identifying the batch in the ballot manifest.

Common Data Format (CDF)
A format specification designed to allow a kind of data, such as Cast Vote Records, to be interoperably transferred between systems (for instance, from election management systems to audit software).

Compliance audits
Audits that evaluate the compliance with laws, procedures, or standards. E.g. evaluating the security of ballot storage or the conduct of officials on election day.

Counting scale
A scale that can estimate counts of objects (such as ballots) based on the objects' piece weight.

Direct Recording Electronic (DRE)
A vote-capture device that allows electronic presentation of a ballot, electronic selection of valid contest options, and electronic storage of contest selections as individual records. It also provides a summary of these contest selections.

Election certificates
Documents submitted by pollworkers that report the counts of cast and voided ballots, and of voters, in each precinct.

Hashmarking
A method of counting votes where for each vote counted one person reads the vote, and one or more people make tally marks is sets of five marks for each candidate or yes/no vote.

Help America Vote Act (HAVA)
A U.S. Congressional Act in 2002 which provided funds and guidance to states in acquiring new voting equipment.

Jogger
A mechanical device that vibrates vigorously to reduce misalignment among ballot sheets or other pieces of paper.

Logic and accuracy testing
Equipment and system readiness tests whose purpose is to detect malfunctioning devices and improper election-specific setup before the equipment or systems are used in an election. Election officials conduct L&A tests prior to the start of an election as part of the process of setting up the system and the devices for an election according to jurisdiction practices and conforming to any state laws.

MOVE Act
The Military and Overseas Voter Empowerment Act of 2009, federal legislation to facilitate voting by military and overseas voters.

Opportunistic auditing
Auditing of additional contests on selected ballots beyond the contests for which risk limits have been specified.

Optical scan
Voting system that counts votes marked in contest option positions on the surface of a paper ballot.

Outstack
During ballot scanning, to direct some ballots into a separate bin, apart from the main stack of scanned ballots.

Overvote
Occurs when the number of selections made by a voter in a contest is more than the maximum number allowed.

Precinct
Election administration division corresponding to a geographic area that is the basis for determining which contests the voters legally residing in that area are eligible to vote on.

Presidential preference primary
Primary election in which voters choose the delegates to the presidential nominating conventions allotted to their states by the national party committees.

Provisional ballot
A failsafe ballot provided to a voter whose eligibility for a regular ballot cannot be immediately determined. The ballot may be counted or further processed depending on state law.

Pseudorandom number generator
Software algorithm that, given an initial seed value, generates a sequence of numbers that approximate the properties of random numbers (for instance, the next pseudorandom number cannot be predicted from any previous numbers in the sequence) but can be reproduced if one knows the seed. If the initial seed is a random seed, the sequence can be used as a random sample.

Random seed
A randomly generated number that provides the initial seed (input) to a pseudorandom number generator.

Risk-limiting audits (RLAs)
Procedure for checking a sample of ballots (or voter verifiable records) that is guaranteed to have a large, pre-specified chance of correcting the reported outcome if the reported outcome is wrong (that is, if a full hand count would reveal an outcome different from the reported outcome).

Serial ID number
A number imprinted on each ballot sheet during scanning that allows the sheet to be identified and associated with the corresponding Cast Vote Record. The DS850 used in the pilot imprinted nine-digit IDs, the first of which was 237000001.

Simple random samples
Random samples in which every item (such as a ballot sheet) has an equal and independent probability of being selected.

Sort-and-stack method
A method of counting votes where ballots are sorted into stacks by selections in contests and then the number of ballots in a stack are counted to determine the number of votes for a candidate or yes/no.

Transitive RLA
An RLA in which the ballots are retabulated, obtaining a Cast Vote Record for each ballot sheet, and the audit uses these new Cast Vote Records instead of data from the original tabulation. If the retabulation reports the same outcome(s) as the original tabulation, an RLA of the retabulation can confirm the original outcome(s).

Voting system

Equipment (including hardware, firmware, and software), materials, and documentation used to define elections and ballot styles, configure voting equipment, identify and validate voting equipment configurations, perform logic and accuracy tests, activate ballots, capture votes, count votes, reconcile ballots needing special treatment, generate reports, transmit election data, archive election data, and audit elections.

Write-in

A type of contest option that allows a voter to specify a candidate, usually not already listed as a contest option. Depending on election jurisdiction rules, in some cases only previously approved names will be considered as valid write-in contest selections.

Appendices

Appendix A: Recommendations to the Vendor

Develop a mechanism to imprint a unique, pseudorandom number on each ballot immediately upon scanning and to store this number in the corresponding cast vote record (CVR).

Ballot-level comparison RLAs typically involve examining the fewest number of ballots, but they require individual cast ballots to be linked with a one-to-one association to each individual corresponding cast vote record (CVR). This linkage can be achieved by imprinting a unique pseudorandom number on the physical ballot and including this number in that ballot's CVR. In Rhode Island, most voters cast their ballots in-person using a DS200 scanner which currently lacks this capability. Therefore, conducting a ballot-level comparison audit requires officials to re-scan the ballots and imprint each one during the second scan. (For the pilot, we used the DS850 central scanner for the second scan, which has imprinting capability. In this case, the numbers did not have to be random because the ballots were no longer associated with individual voters.) Rescanning and imprinting adds time and cost to the audit, and the additional step creates more room for mishandling and error.

The vendor should add this functionality to in-precinct voting equipment, so that unique, pseudorandom numbers will be generated for and imprinted on each ballot after the scan. It is important that the pseudorandom number is added only after the ballot is scanned and accepted by the machine. (This prevents a number from being imprinted on a ballot that is invalid and returned to a voter only to be re-imprinted with a different number.) It is likewise essential that the pseudorandom numbers be generated in a manner that ensures voter anonymity; they must be completely dissociated from individual voters, and ensure that no one can match the voter's identity to the voter's cast ballot.

Mike Goetz, Vice President of Product Management at ES&S, said that the company explored the possibility of retrofitting the current model of the DS200 to add this functionality, but that those machines do not have sufficient physical space to add imprinting hardware. However, he said that the company was looking into adding this capability to the next generation DS200 model, which is currently under development.

Simplify and standardize the process for election officials to export the necessary data to support audits.

The pilot audits required considerable vendor support to export the voting data and to ensure its usability. While the Board and the Rhode Island RLA Working Group appreciated the vendor's willingness to provide assistance, such information to support audits should be readily available for exporting CVRs and other information from the Election Management System (EMS) without special assistance, especially as more and more jurisdictions conduct audits as standard practice.

Rhode Island election officials (and any agents or consultants who assist with audit design, planning, and implementation) must be able to retrieve essential data in a usable format more readily. We recommend that the vendor adopt the NIST-VVSG interoperable Common Data Format (CDF) standard for CVRs to provide a uniform export for audits. (See Appendix O for the format used in Rhode Island.)

Continue to support Automark ballot-marking device systems.

The Automark system created ballots that were easy to incorporate in the Rhode Island pilot audit. Because of their similar size and appearance to hand-marked ballots, the Automark ballots presented little risk of jeopardizing ballot secrecy. (Notably, ballot security is both a general requirement for election administration and an essential component of ballot protection, a best practice for risk-limiting audits.) To ensure the best results for Rhode Island and the many other states that employ the Automark system, ES&S should continue to support the Automark even as the company makes system upgrades and other improvements.

Provide election officials with voting machines' criteria for counting a mark within an oval as a vote.

The vendor should make any voting machine criteria (including the percentage of oval that needs to be marked to be counted) available to election officials so they can be considered in analyzing discrepancies between Cast Vote Records and audit interpretations. The vendor should also provide any available tuning parameters that can be adjusted for recognizing valid votes.

Make improvements to the sensitivity of the DS850.

During retabulation the DS850 repeatedly outstacked a significant number of ballots requiring them to be re-fed. The DS850 also jammed fairly frequently. We have heard that other jurisdictions that use DS850's have experienced similar problems. Further improvements to the DS850 that will allow them to outstack fewer ballots and have fewer jams will increase the efficiency of transitive audits. Until improvements are made ES&S should provide additional training and staffing to jurisdictions using DS850s for risk-limiting audits for free or at a discounted rate.

Appendix B:
State Audit Working Group

The State Audit Working Group (SAWG) is an informal group of election integrity advocates, statisticians, computer scientists, election officials, and citizens who discuss and promote different kinds of election audits to increase election security and ensure the correctness of election outcomes. The SAWG was founded in early 2008 by Mark Halvorson from Citizens for Election Integrity Minnesota, Luther Weeks from Connecticut Voters Count, and John McCarthy and Pam Smith from Verified Voting, following the first Post Election Audit Summit meeting in October, 2007 in Minneapolis, Minnesota.

The SAWG has held a weekly meeting (sometimes bi-weekly) via teleconference, since early 2008. Weekly calls typically have anywhere from six to fifteen participants, and a larger number of participants communicate via an active email list. that currently includes some 60 individuals. Luther Weeks from Connecticut Voters Count took over convening the weekly calls from Mark Halvorson in 2013. SAWG has offered post election audit advice to states including Colorado, which was the first state to implement a statewide RLA.

Appendix C:
H 5704 Sub A

2017 -- H 5704 SUBSTITUTE A

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LC001568/SUB A
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STATE OF RHODE ISLAND

IN GENERAL ASSEMBLY

JANUARY SESSION, A.D. 2017

AN ACT

RELATING TO ELECTIONS --POST-ELECTION AUDITS

Introduced By: Representatives Ajello, Regunberg, Chippendale, Craven, and Tanzi

Date Introduced: March 01, 2017

Referred To: House Judiciary

It is enacted by the General Assembly as follows:

SECTION 1. Chapter 17-19 of the General Laws entitled "Conduct of Election and Voting Equipment, and Supplies" is hereby amended by adding thereto the following section:

17-19-37.4. Post-election audits.

(a) The general assembly hereby finds, determines, and declares that auditing of election results is necessary to ensure effective election administration and public confidence in the election results. Further, risk-limiting audits provide a more effective manner of conducting audits than traditional audit methods in that risk-limiting audit methods typically require only limited resources for election contests with wide margins of victory while investing greater resources in close contests.

(b) Commencing in 2018 the board in conjunction with local boards is authorized to conduct risk-limiting audits after all statewide primary, general and special elections in accordance with the requirements of this section. Commencing in 2020 the state board in conjunction with local boards must conduct risk-limiting audits after the presidential preference primary, and general elections in accordance with requirements in this section.

(c) The audit program shall be conducted as follows:

(1) The state board shall determine what local, statewide and federal contests are subject to a risk-limiting audit;

(2) The state board shall provide notice pursuant of chapter 46 of title 42 of the time and place of the random selection of the audit units to be manually tallied and of the times and places

of the audits;

(3) The state board shall make available to the public a report of the vote tabulating device results for the contest, including the results for each audit unit in the contest, prior to the random selection of audit units to be manually tallied and prior to the commencement of the audit;

(4) The state board in conjunction with the local boards shall conduct the audit upon tabulation of the unofficial final results as provided in §§17-19-36 and 17-19-37; and

(5) The state board in conjunction with the local boards shall conduct the audit in public view by manually interpreting the ballots according to rules established by the state board in accordance with chapter 45 of title 42.

(d) If a risk-limiting audit of a contest leads to a full manual tally of the ballots cast using the voting system, the vote counts according to that manual tally shall replace the vote counts reported pursuant to §§17-19-36 and 17-19-3 7 for the purpose of determining the official contest results pursuant to §§17-22-5.2 and 17-22-6.

(e) For purposes of this section, the following terms have the following meanings:

(1) "Audit unit" means a precinct, a set of ballots, or a single ballot. A precinct, a set of ballots, or a single ballot may be used as an audit unit for purposes of this section only if all of the following conditions are satisfied:

(i) The relevant vote tabulating device is able to produce a report of the votes cast in the precinct, set of ballots, or single ballot.

(ii) Each ballot is assigned to not more than one audit unit.

(2) "Contest" means an election for an office or for a measure.

(3) "Risk-limiting audit" means a manual tally employing a statistical method that ensures a large, predetermined minimum chance of requiring a full manual tally whenever a full manual tally would show an electoral outcome that differs from the outcome reported by the vote tabulating system for the audited contest. A risk-limiting audit shall begin with a hand tally of the votes in one or more audit units and shall continue to hand tally votes in additional audit units until there is strong statistical evidence that the electoral outcome is correct. In the event that counting additional audit units does not provide strong statistical evidence that the electoral outcome is correct, the audit shall continue until there has been a full manual tally to determine the correct electoral outcome of the audited contest.

(4) "Unofficial final results" means election results tabulated pursuant §§17-19-36 and 17-19-37.

(f) The results of any audits conducted under this section shall be published on the

website of the state board within forty-eight (48) hours of being accepted by the state board. If the audit involved a manual tally of one or more entire precincts, then the names and numbers of all precincts audited and a comparison of the vote tabulator results with the hand counts for each precinct shall be published with the audit results on the website.

(g) Any audit required under this section shall not commence for any election subject to a recount pursuant to §§17-19-37.1, 17-19-37.2, and 17-19-37.3 until the conclusion of said recount.

(h) The state board shall promulgate rules, regulations, and procedures in accordance with chapter 45 of title 42 necessary to implement this section.

SECTION 2. This act shall take effect upon passage.

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LC001568/SUB A
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EXPLANATION

BY THE LEGISLATIVE COUNCIL

OF

A N A C T

RELATING TO ELECTIONS --POST-ELECTION AUDITS

***

This act would authorize the board of elections to establish a post-election risk-limiting audit program to improve the accuracy of election results.

This act would take effect upon passage.

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LC001568/SUB A
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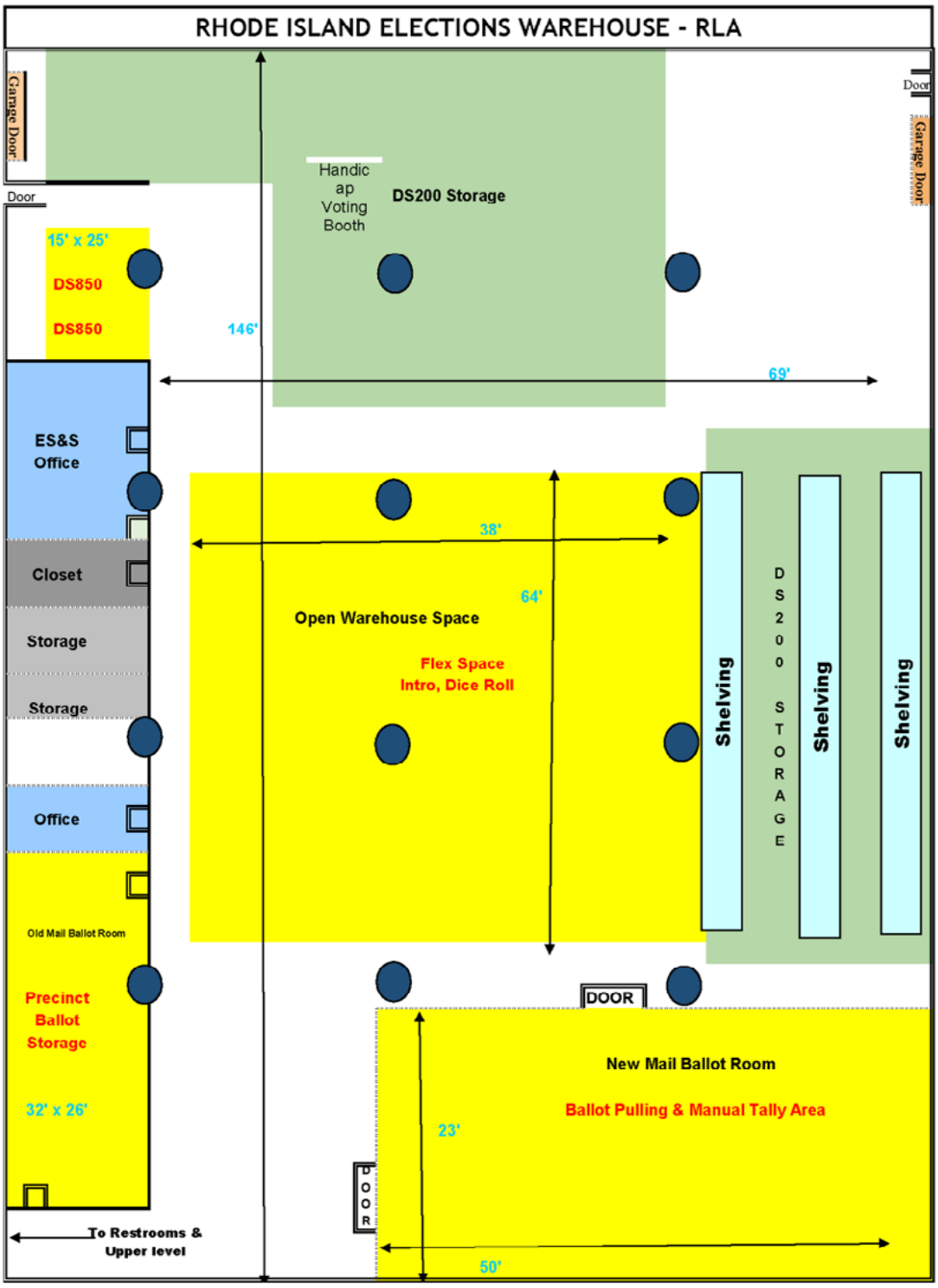
Appendix D:
Pilot Audit Floor Plan



Appendix E:
Detailed Protocol Describing Each Phase of Pilot

Available at:
https://drive.google.com/file/d/1S65PJqht7EhdnqHujkx4IEjX1e_7u7M6/view?usp=sharing

Appendix F:
Ballot Hashmarking Sheet

Stack Number: ☐ **Ballots In Stack:** (count) ☐ **Batch:** ☐

☐ Write-ins ☐ Recount Number: ☐

		Up to 5 hashmarks per cell, e.g. 𝍸										Total
		5	10	15	20	25	30	35	40	45	50	Counts
Senator in Congress											**Total For Contest:**	
Whitehouse	DEM											
Flanders	REP											
NO VOTE												
Represenative in Congress											**Total For Contest:**	
Cicilline	DEM											
Donovan	REP											
NO VOTE												
Governor											**Total For Contest:**	
Raimondo	DEM											
Gilbert	MOD											
Fung	REP											
Armstrong	COM											
Munoz	IND											
Trillo	IND											
NO VOTE												

Appendix G:
Example of Ballot Manifest

	A	B	C	D	E	F	G	H
1	Municipality	Precinct Number	Box Letter	Folder Number	Batch ID	# of Sheets	First Imprinted ID	Last Imprinted ID
2	Bristol	201	A	1	0201 A 1	297	237000001	237000297
3	Bristol	201	A	2	0201-A-2	100	237000298	237000397
4	Bristol	201	A	3	0201-A-3	99	237000398	237000496
5	Bristol	201	A	4	0201-A-4	99	237000497	237000595
6	Bristol	201	A	5	0201-A-5	99	237000596	237000695
7	Bristol	201	A	6	0201-A-6	99	237000696	237000794
8	Bristol	201	A	7	0201-A-7	54	237000795	237000848
9	Bristol	202	B	1	0202-B-1	198	237000849	237001047
10	Bristol	202	B	2	0202-B-2	199	237001048	237001247

Appendix H:
Tracking Sheet

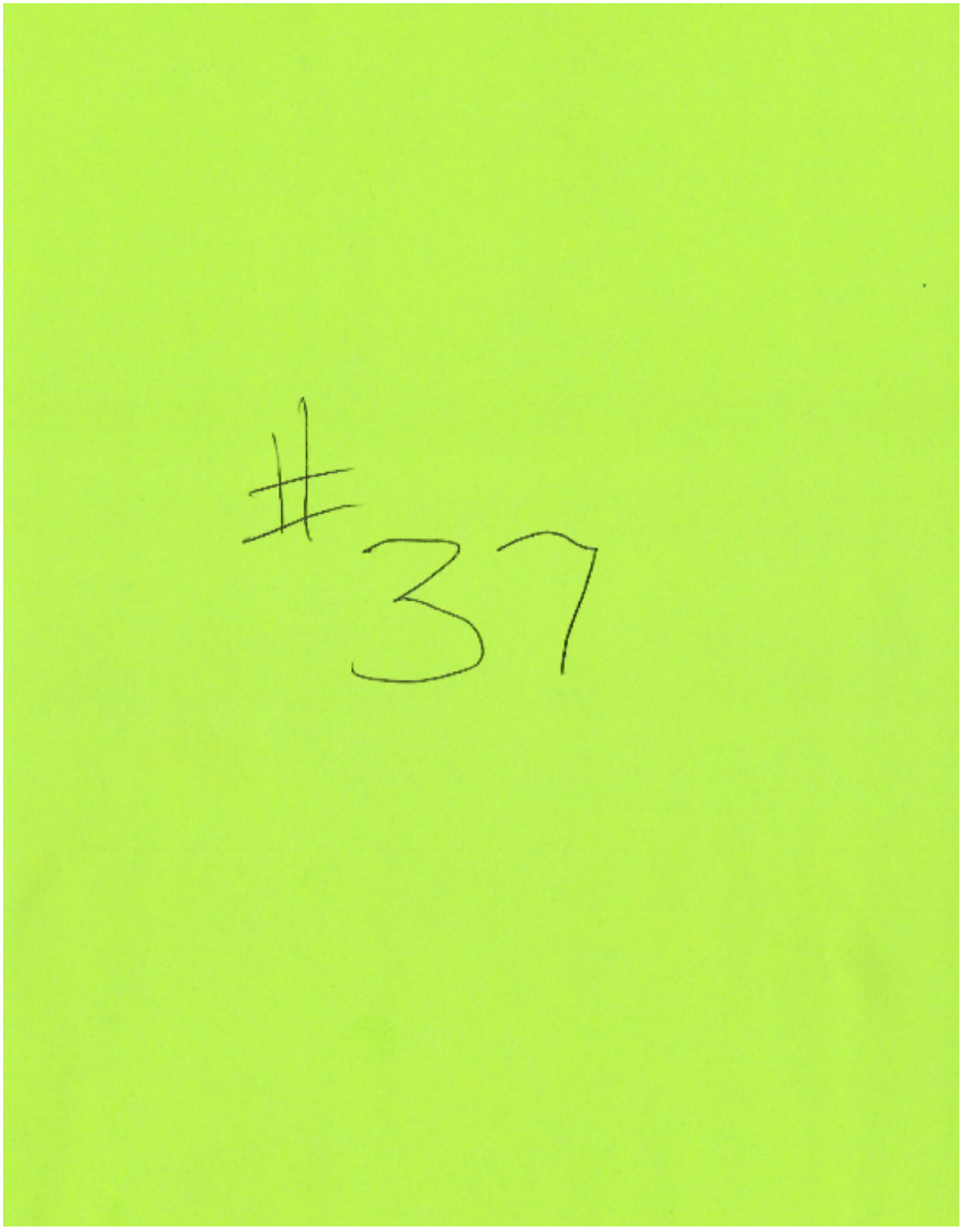
Precinct ID	
Box Letter	
Folder Number	
Number of Ballots	
Beginning ID Number	
Ending ID Number	

Prepared by _____ _____

Precinct ID	
Box Letter	
Folder Number	
Number of Ballots	
Beginning ID Number	
Ending ID Number	

Prepared by _____ _____

Appendix I:
Placeholder Sheet



Appendix J:
Cover Sheet

Logic ID	
Precinct ID	
Box Letter	
Folder #	
Ballot #	

Logic ID	
Precinct ID	
Box Letter	
Folder #	
Ballot #	

Appendix K:
Pull Sheet

Portsmouth team 1 [2703]

Counting sample
batch 2703-C-3, #143
batch 2703-C-4, #207

Ruler sample
2703-C-1, #196
*** #7 from end ***
2703-C-2, #120 (19 mm)
2703-C-3, # 9 (count)
--AND-- #127 (20 mm)
--AND-- #168 (26 mm)
2703-C-4, # 55 (9 mm)
--AND-- #163 (26 mm)
2703-D-1, # 34 (5 mm)
--AND-- # 84 (13 mm)
--AND-- #111 (17 mm)

k-cut sample
batch 2703-C-1, # 42
batch 2703-C-2, # 44
--AND-- #128
--AND-- #182
*** 3 ballots ***
batch 2703-C-3, # 43
--AND-- #195
*** 2 ballots ***
batch 2703-C-4, #103
--AND-- #104
*** 2 ballots ***
batch 2703-D-1, # 41

Appendix L:
Timing Data Collection Forms

Available at:
Ballot-level comparison and ballot polling -
https://drive.google.com/open?id=1SrG6iGbIGF4OrIfyoPbJRtUu0TyOSDQj

Batch comparison -
https://drive.google.com/open?id=1GpWziE4fLgNjDvT5-a6Q0-YnvGNwDYER

Appendix M: Collected Timing Data

BALLOT RETRIVAL TIME PER BALLOT FOR BALLOT POLLING

COUNTING	
all data	
sample size (n	5
avg	2:07
median	1:44
min	0:51
max	3:21
all new box (Y)	
sample size (n	2
avg	1:33
median	1:33
all New Folder Y	
sample size (n	4
avg	1:49
median	1:44
Ballot in same folder & box	
sample size (n	1
avg	3:18
median	3:18

K-CUT	
all data	
sample size (	48
avg	1:32
median	1:26
min	0:39
max	5:01
all new box (Y)	
sample size (	4
avg	1:22
median	1:23
all New Folder Y	
sample size (	21
avg	1:44
median	1:32
Ballot in same folder and box	
sample size (	27
avg	1:22
median	1:23

RULER	
all data	
sample size (	47
avg	1:20
median	1:15
min	0:13
max	3:38
all new box (Y)	
sample size (	4
avg	1:10
median	1:04
all New Folder Y	
sample size (	17
avg	1:17
median	1:10
Ballot in same folder and box	
sample size (	31
avg	1:19
median	1:15

SCALE	
all data	
sample size (r	57
avg	0:41
median	0:35
min	0:05
max	2:08
all new box (Y)	
sample size (r	7
avg	0:55
median	1:05
all New Folder Y	
sample size (r	25
avg	0:51
median	0:48
Ballot in same folder and box	
sample size (r	32
avg	0:34
median	0:32

(Based on timing of individual ballot retrieval in minutes)

COUNTING	3:50

K-CUT	1:44

RULER	1:18

SCALE	1:18

(Based on overall timing at table 1 by Tony adams)

BALLOT RETRIEVAL	
all data	
sample size (n	79
avg	0:51
median	0:45
min	0:10
max	4:15
all New box Y	
sample size (n	10
avg	1:07
median	1:01
all new folder (Y)	
sample size (n	39
avg	0:57
median	0:48
Ballot in same folder & box	
sample size (n	22
avg	0:35
median	0:31

BALLOT COMPARISON AUDIT TIMES

Average Time per ballot to evaluate one contest:	0.42 minutes per ballot
Average Time per ballot to evaluate ten contests:	0.98 minutes per ballot

BATCH COMPARISON AUDIT TIMES

Batch Comparison Set-up time per ballot in minutes (Orienting and batching ballots, Steps 0 - 4) with 4 persons per team

sample size	3
avg	0.27
median	0.34
min	0.10
max	0.38

Batch Comparison Tally Evaluation time per ballot in minutes with 4 persons per team (Steps

sample size (n)	12
avg	0:17
median	0:12
min	0:11
max	0:53

Summary for Sort and Stack timing with 2 persons per team

Sort & Stack times min:sec	Sort & Stack times in sec	# of Ballots	Time per Ballot in seconds
18:59	**1139**	127	9
17:35	**1055**	127	8
17:17	1037	127	8
12:18	**738**	110	7
9:34	**574**	110	5
9:50	**590**	110	5
14:19	859	300	3
			46
Average			7
Median			7

Appendix N: Principles and Best Practices for Post-Election Tabulation Audits

Available at:
https://www.verifiedvoting.org/wp-content/uploads/2019/01/Audit-Principles-Best-Practices-2018.pdf#page=7

Appendix O:
CVR Data Format Used in Rhode Island

Available at:
https://drive.google.com/file/d/1qMNSbB3tSrLIMe1GBxUWldJHBZ9uWeC1/view?usp=sharing

Appendix P: Rhode Island Sample Ballot - Portsmouth

Mail Voter

State of Rhode Island Official Ballot
General Election
November 6, 2018
Portsmouth

Precinct 2701
Congressional District 1
Senate District 11
Representative District 69

Senator in Congress
Six Year Term
Vote for 1

- Sheldon Whitehouse — DEMOCRAT
- Robert G. Flanders, Jr. — REPUBLICAN
- Write-in

Representative in Congress
District 1
Two Year Term
Vote for 1

- David N. Cicilline — DEMOCRAT
- Patrick J. Donovan — REPUBLICAN
- Write-in

Governor
Four Year Term
Vote for 1

- Gina M. Raimondo — DEMOCRAT
- William H. Gilbert — MODERATE
- Allan W. Fung — REPUBLICAN
- Anne Armstrong — Compassion
- Luis Daniel Munoz — Independent
- Joseph A. Trillo — Independent
- Write-in

Lieutenant Governor
Four Year Term
Vote for 1

- Daniel J. McKee — DEMOCRAT
- Joel J. Hellmann — MODERATE
- Paul E. Pence — REPUBLICAN
- Jonathan J. Riccitelli — Independent
- Ross K. McCurdy — Independent
- Write-in

Secretary of State
Four Year Term
Vote for 1

- Nellie M. Gorbea — DEMOCRAT
- Pat V. Cortellessa — REPUBLICAN
- Write-in

Attorney General
Four Year Term
Vote for 1

- Peter F. Neronha — DEMOCRAT
- Alan Gordon — Compassion
- Write-in

General Treasurer
Four Year Term
Vote for 1

- Seth Magaziner — DEMOCRAT
- Michael G. Riley — REPUBLICAN
- Write-in

Senator in General Assembly
District 11
Two Year Term
Vote for 1

- James Arthur Seveney — DEMOCRAT
- Stephanie L. Calise — REPUBLICAN
- Write-in

Representative in General Assembly
District 69
Two Year Term
Vote for 1

- Susan R. Donovan — DEMOCRAT
- Douglas W. Gablinske — Independent
- Write-in

School Committee
Four Year Term
Vote for any 4

- Catherine H. Holtman — DEMOCRAT
- Allen J. Shers — REPUBLICAN
- Thomas Richard Vadney — REPUBLICAN
- John Amos Schlesinger — REPUBLICAN
- Frederick W. Faerber, III — Independent
- Write-in
- Write-in
- Write-in
- Write-in

Town Council
Two Year Term
Vote for any 7

- Linda L. Ujifusa — DEMOCRAT
- Paul Francis Kesson — REPUBLICAN
- Kevin M. Aguiar — DEMOCRAT
- Jeffrey L. Richard — REPUBLICAN
- J. Mark Ryan — DEMOCRAT
- Keith E. Hamilton — REPUBLICAN
- Andrew V. Kelly — DEMOCRAT
- Lawrence J. Fitzmorris — REPUBLICAN
- Raymond Douglas Davis — DEMOCRAT
- Debra Cardoza — REPUBLICAN
- Leonard Barry Katzman — DEMOCRAT
- Elizabeth A. Pedro — REPUBLICAN
- Daniela T. Abbott — DEMOCRAT
- David M. Gleason — Independent
- Peter D. Roberts — Independent
- Write-in
- Write-in
- Write-in
- Write-in
- Write-in
- Write-in
- Write-in

State Questions On Back

State Questions

QUESTIONS 1 - 3
(Chapter 047 - Public Laws 2018)

Shall the action of the General Assembly, by an act passed at the January 2018 session, authorizing the issuance of bonds, refunding bonds, and/or temporary notes of the State of Rhode Island for the capital projects and in the amount with respect to each such project listed below (Questions 1-3) be approved, and the issuance of bonds, refunding bonds, and/or temporary notes authorized in accordance with the provisions of said act?

1. RHODE ISLAND SCHOOL BUILDINGS - $250,000,000

To provide state assistance to cities and towns for the construction of new public schools and renovation of existing public schools.

- Approve
- Reject

2. HIGHER EDUCATION FACILITIES - $70,000,000

For higher education facilities, to be allocated as follows:

(a) University of Rhode Island Narragansett Bay Campus - $45,000,000

(b) Rhode Island College School of Education and Human Development - $25,000,000

- Approve
- Reject

3. GREEN ECONOMY AND CLEAN WATER - $47,300,000

For environmental and recreational purposes, to be allocated as follows:

(a) Coastal Resiliency and Public Access Projects - $5,000,000

(b) Capital for Clean Water and Drinking Water - $7,900,000

(c) Wastewater Treatment Facility Resilience Improvements - $5,000,000

(d) Dam Safety - $4,400,000

(e) Dredging - Downtown Providence Rivers - $7,000,000

(f) State Bikeway Development Program - $5,000,000

(g) Brownfield Remediation and Economic Development - $4,000,000

(h) Local Recreation Projects - $5,000,000

(i) Access to Farmland - $2,000,000

(j) Local Open Space - $2,000,000

- Approve
- Reject

SAMPLE

Appendix P: Rhode Island Sample Ballot - Bristol

Mail Voter

State of Rhode Island Official Ballot
General Election
November 6, 2018
Bristol

Precinct 0201
Congressional District 1
Senate District 10
Representative District 68

Senator in Congress
Six Year Term
Vote for 1

- Sheldon Whitehouse (DEMOCRAT)
- Robert G. Flanders, Jr. (REPUBLICAN)
- Write-in

Representative in Congress
District 1
Two Year Term
Vote for 1

- David N. Cicilline (DEMOCRAT)
- Patrick J. Donovan (REPUBLICAN)
- Write-in

Governor
Four Year Term
Vote for 1

- Gina M. Raimondo (DEMOCRAT)
- William H. Gilbert (MODERATE)
- Allan W. Fung (REPUBLICAN)
- Anne Armstrong (Compassion)
- Luis Daniel Munoz (Independent)
- Joseph A. Trillo (Independent)
- Write-in

Lieutenant Governor
Four Year Term
Vote for 1

- Daniel J. McKee (DEMOCRAT)
- Joel J. Hellmann (MODERATE)
- Paul E. Pence (REPUBLICAN)
- Jonathan J. Riccitelli (Independent)
- Ross K. McCurdy (Independent)
- Write-in

Secretary of State
Four Year Term
Vote for 1

- Nellie M. Gorbea (DEMOCRAT)
- Pat V. Cortellessa (REPUBLICAN)
- Write-in

Attorney General
Four Year Term
Vote for 1

- Peter F. Neronha (DEMOCRAT)
- Alan Gordon (Compassion)
- Write-in

General Treasurer
Four Year Term
Vote for 1

- Seth Magaziner (DEMOCRAT)
- Michael G. Riley (REPUBLICAN)
- Write-in

Senator in General Assembly
District 10
Two Year Term
Vote for 1

- Walter S. Felag, Jr. (DEMOCRAT)
- Write-in

Representative in General Assembly
District 68
Two Year Term
Vote for 1

- Laufton Ascencao (DEMOCRAT)
- William James Hunt, Jr. (Libertarian)
- Write-in

Town Administrator
Two Year Term
Vote for 1

- Steven Contente (Independent)
- Write-in

Town Clerk
Two Year Term
Vote for 1

- Melissa Cordeiro (DEMOCRAT)
- Louis P. Cirillo (REPUBLICAN)
- Write-in

Town Council
Two Year Term
Vote for any 5

- Nathan T. Calouro (DEMOCRAT)
- Thomas M. Carroll (REPUBLICAN)
- Aaron J. Ley (DEMOCRAT)
- William L. Sousa Grapentine (REPUBLICAN)
- Carolyn P. Medina (DEMOCRAT)
- Patrick M. McCarthy (REPUBLICAN)
- Timothy Edward Sweeney (DEMOCRAT)
- Mary A. Parella (REPUBLICAN)
- Ethan M. Tucker (DEMOCRAT)
- Antonio A. Teixeira (Independent)
- Write-in
- Write-in
- Write-in
- Write-in
- Write-in

Non-Partisan Regional School Committee
Four Year Term
Vote for any 3

- Andrew Benn
- Carly Reich
- William M. O'Dell
- Robert D. Hancock
- Patrick Usher, Jr.
- Victor G. Cabral, Jr.
- Diane B. Campbell
- Paul Silva
- Sheila O. Ellsworth
- Write-in
- Write-in
- Write-in

State Questions On Back

State Questions

QUESTIONS 1 - 3
(Chapter 047 - Public Laws 2018)

Shall the action of the General Assembly, by an act passed at the January 2018 session, authorizing the issuance of bonds, refunding bonds, and/or temporary notes of the State of Rhode Island for the capital projects and in the amount with respect to each such project listed below (Questions 1-3) be approved, and the issuance of bonds, refunding bonds, and/or temporary notes authorized in accordance with the provisions of said act?

1. RHODE ISLAND SCHOOL BUILDINGS - $250,000,000

To provide state assistance to cities and towns for the construction of new public schools and renovation of existing public schools.

- Approve
- Reject

2. HIGHER EDUCATION FACILITIES - $70,000,000

For higher education facilities, to be allocated as follows:

(a) University of Rhode Island Narragansett Bay Campus - $45,000,000

(b) Rhode Island College School of Education and Human Development - $25,000,000

- Approve
- Reject

3. GREEN ECONOMY AND CLEAN WATER - $47,300,000

For environmental and recreational purposes, to be allocated as follows:

(a) Coastal Resiliency and Public Access Projects - $5,000,000

(b) Capital for Clean Water and Drinking Water - $7,900,000

(c) Wastewater Treatment Facility Resilience Improvements - $5,000,000

(d) Dam Safety - $4,400,000

(e) Dredging - Downtown Providence Rivers - $7,000,000

(f) State Bikeway Development Program - $5,000,000

(g) Brownfield Remediation and Economic Development - $4,000,000

(h) Local Recreation Projects - $5,000,000

(i) Access to Farmland - $2,000,000

(j) Local Open Space - $2,000,000

- Approve
- Reject

SAMPLE

Appendix P: Rhode Island Sample Ballot - Cranston

Mail Voter

State of Rhode Island Official Ballot
General Election
November 6, 2018
Cranston

Precinct 0704
Congressional District 2
Senate District 28
Representative District 14
Cranston Ward 2

Senator in Congress
Six Year Term
Vote for 1

- Sheldon Whitehouse — DEMOCRAT
- Robert G. Flanders, Jr. — REPUBLICAN
- Write-in

Representative in Congress
District 2
Two Year Term
Vote for 1

- James R. Langevin — DEMOCRAT
- Salvatore G. Caiozzo — REPUBLICAN
- Write-in

Governor
Four Year Term
Vote for 1

- Gina M. Raimondo — DEMOCRAT
- William H. Gilbert — MODERATE
- Allan W. Fung — REPUBLICAN
- Anne Armstrong — Compassion
- Luis Daniel Munoz — Independent
- Joseph A. Trillo — Independent
- Write-in

Lieutenant Governor
Four Year Term
Vote for 1

- Daniel J. McKee — DEMOCRAT
- Joel J. Hellmann — MODERATE
- Paul E. Pence — REPUBLICAN
- Jonathan J. Riccitelli — Independent
- Ross K. McCurdy — Independent
- Write-in

Secretary of State
Four Year Term
Vote for 1

- Nellie M. Gorbea — DEMOCRAT
- Pat V. Cortellessa — REPUBLICAN
- Write-in

Attorney General
Four Year Term
Vote for 1

- Peter F. Neronha — DEMOCRAT
- Alan Gordon — Compassion
- Write-in

General Treasurer
Four Year Term
Vote for 1

- Seth Magaziner — DEMOCRAT
- Michael G. Riley — REPUBLICAN
- Write-in

Senator in General Assembly District 28
Two Year Term
Vote for 1

- Joshua Miller — DEMOCRAT
- Write-in

Representative in General Assembly District 14
Two Year Term
Vote for 1

- Charlene Lima — DEMOCRAT
- Write-in

Council - City Wide
Two Year Term
Vote for any 3

- Steven A. Stycos — DEMOCRAT
- Michael J. Farina — REPUBLICAN
- Gail D. Harvey — DEMOCRAT
- Kenneth J. Hopkins — REPUBLICAN
- Sarah K. Lee — DEMOCRAT
- Amy L. Ricci — REPUBLICAN
- Write-in
- Write-in
- Write-in

Council Ward 2
Two Year Term
Vote for 1

- Paul J. McAuley — DEMOCRAT
- Write-in

Non-Partisan School Committee - City Wide
Two Year Term
Vote for 1

- Michael Anthony Traficante
- Write-in

Non-Partisan School Committee Ward 2
Two Year Term
Vote for 1

- Stephanie Giangrande Culhane
- Write-in

State and Local Questions On Back

State Questions

QUESTIONS 1 - 3
(Chapter 047 - Public Laws 2018)

Shall the action of the General Assembly, by an act passed at the January 2018 session, authorizing the issuance of bonds, refunding bonds, and/or temporary notes of the State of Rhode Island for the capital projects and in the amount with respect to each such project listed below (Questions 1-3) be approved, and the issuance of bonds, refunding bonds, and/or temporary notes authorized in accordance with the provisions of said act?

1. RHODE ISLAND SCHOOL BUILDINGS - $250,000,000

To provide state assistance to cities and towns for the construction of new public schools and renovation of existing public schools.

- Approve
- Reject

2. HIGHER EDUCATION FACILITIES - $70,000,000

For higher education facilities, to be allocated as follows:

(a) University of Rhode Island Narragansett Bay Campus - $45,000,000

(b) Rhode Island College School of Education and Human Development - $25,000,000

- Approve
- Reject

3. GREEN ECONOMY AND CLEAN WATER - $47,300,000

For environmental and recreational purposes, to be allocated as follows:

(a) Coastal Resiliency and Public Access Projects - $5,000,000

(b) Capital for Clean Water and Drinking Water - $7,900,000

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(d) Dam Safety - $4,400,000

(e) Dredging - Downtown Providence Rivers - $7,000,000

(f) State Bikeway Development Program - $5,000,000

(g) Brownfield Remediation and Economic Development - $4,000,000

(h) Local Recreation Projects - $5,000,000

(i) Access to Farmland - $2,000,000

(j) Local Open Space - $2,000,000

- Approve
- Reject

Local Question

4. PLAYGROUNDS AND ATHLETIC FIELDS $2,000,000 BONDS AND NOTES
(Ordinance of the City Council adopted June 25, 2018)

Shall Two Million Dollars ($2,000,000) debt of the City be incurred for the purpose of financing the acquisition, construction, improvement, renovation, repair, alteration and equipping of playgrounds and athletic fields in the City under Rhode Island General Laws § 45-12-2 and an order of the City Council that became effective on June 25, 2018?

- Approve
- Reject

Cranston

SAMPLE
SAMPLE

Common Cause Rhode Island

verifiedvoting

BRENNAN CENTER FOR JUSTICE

President Michael Waldman on Recent Police Killings and Civil Unrest

READ THE STATEMENT

ANALYSIS

A Smart and Effective Way to Safeguard Elections

Risk-limiting audits are an efficient way to protect against tampering with the vote.

Alexandru Nika/Shutterstock

Christopher Deluzio | July 25, 2018

Lest anyone have any doubt that the nation's election infrastructure is under attack, all one has to do is read Special Counsel Robert Mueller's **July 13 indictment of 12 Russian intelligence officers.** Among other things, the Russians conspired "to hack into protected computers of persons and entities charged with the administration of the 2016 U.S. elections in order to access those computers and steal voter data and other information stored on those computers." In one unidentified state, information about 500,000 voters was stolen, and county election administration websites in Georgia, Iowa, and Florida were probed "to identify vulnerabilities."

At least according to the indictment, all the Russians did in 2016 was penetrate and steal. But it hardly takes a leap of imagination to believe that some malefactor in the near future will try to alter election outcomes.

In the wake of the Russian revelations, many are asking the quite reasonable question: How do we protect the integrity of our elections? How can we be sure the right candidate actually won?

The good news is that there is already a simple way to confirm whether voting machines are recording and tallying votes correctly. It is known as a ***risk-limiting audit***. It is one of the **critical measures** necessary to secure elections and a **key component** of a broader cybersecurity defense. In a promising sign for election security, the City of Fairfax in Virginia is going to test a risk-limiting audit next week — an endeavor with the potential to serve as a model for the entire Commonwealth of Virginia and, hopefully, the country.

In straightforward terms, a risk-limiting audit is an easy and efficient method for verifying that vote tallies are accurate. By hand counting a statistically meaningful sample of the votes cast, the risk-limiting audit can determine whether the original vote tally was correct. These audits can be conducted publicly and can provide voters with confidence that a counting error or malicious attack did not change the outcome.

Statistical principles determine the size of the sample — but, in plain terms, more ballots are counted in a close race, while a race with a larger margin would require fewer ballots to be counted. If testing of the sample is consistent with the original vote total, it is almost certain that the initially declared winner won the race. If, on the other hand, the sample has substantial discrepancies with the original tally, the **audit continues** until there is "sufficiently strong statistical evidence that the apparent outcome is right, or until all the ballots have been manually counted."

To show how risk-limiting audits might work in the real world, **two statisticians** laid out how such a check would have worked in the 2016 presidential election. First, there would be an audit of the states Donald Trump won. Overall, about 700,000 ballots would be counted in the 29 states Trump carried, or about 0.5 percent of the votes cast. But the number of ballots counted in each state would vary depending on Trump's margin of victory. In Missouri, where Trump won by 19 percentage points, only ten ballots would need to be counted to have high confidence in the results. In Texas, where Trump's margin was nine percentage points, about 700 ballots would need to be counted.

Importantly, risk-limiting audits are an improvement on traditional audits — used by **29 states and the District of Columbia** — which require a set number (or percentage) of ballots to be counted, often irrespective of the margin of victory. Because risk-limiting audits take into account both the margin of victory and the total number of votes cast and use principles of statistics, these audits can provide a high level of confidence in the results while generally requiring fewer ballots to be hand counted than what is already required in many states using traditional audits.

Risk-limiting audits are considered the **"gold standard"** of post-election audits. **Political scientists**, **statisticians**, and **election-security experts** have all lauded the benefits of post-election, risk-limiting audits.

And an increasing number of jurisdictions are embracing them. Last year, Colorado completed the nation's first **statewide risk-limiting audit**. And **Rhode Island** recently enacted a law mandating risk-limiting audits for all statewide primary, general, and special elections. Marion County, Indiana, conducted a test risk-limiting audit in May. And jurisdictions in Virginia (which last year enacted **a law** embracing risk-limiting audits), California, and elsewhere are also planning test audits this year and after the November 2018 election.

Brenda Cabrera, the City of Fairfax's General Registrar and Director of Elections, has been a driving force behind the test audit taking place in Fairfax next week, which will bring together election security experts and election officials from around the state. Cabrera is optimistic about the trial, saying, "Our pilot should not only lay the

groundwork for future risk-limiting audits but also serve as an example to jurisdictions across Virginia and the country about how crucial post-election audits are to securing the vote."

Yet, as important as risk-limiting audits are in ensuring the integrity of vote counts, they can work only if the voting method leaves a paper trail. The prerequisite for a risk-limiting audit is an individual paper ballot. Unfortunately, **13 states** still use electronic machines that leave no voter-verifiable paper record. What no doubt seemed like a forward-thinking voting technology in the 20th century is utterly unsuited to meet the threats of the 21st. It is imperative that these electronic machines are replaced by a voting method that produces a paper trail. And in states where auditable paper trails are already available, risk-limiting audits should be mandatory after every election. This efficient, cost-effective check will give voters the confidence they deserve that their ballots were counted properly.

(Image: Alexandru Nika/Shutterstock)

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Defending Elections

Federal Funding Needs for State Election Security

Christopher R. Deluzio, Policy Director, University of Pittsburgh Institute for Cyber Law, Policy, and Security
Liz Howard, Counsel, Brennan Center for Justice
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Rachael Dean Wilson, Head of External Affairs, Alliance for Securing Democracy

PUBLISHED JULY 18, 2019

Introduction

State and local election officials are on the front lines of a cyberwar with sophisticated nation-state rivals and other malevolent actors. As Robert Brehm, co–executive director of the New York State Board of Elections, recently put it, "It is not reasonable" to expect each of these state and local election offices to independently "defend against hostile nation-state actors."[1] State and local election systems have already been breached. In 2016 Russian hackers penetrated computer networks in two counties in the swing state of Florida, using information they had gleaned from a software vendor.[2] That same software vendor may have opened a gap for hackers to alter the voter rolls in North Carolina, another swing state, on the eve of the election.[3] Episodes like these undermine faith in our democratic system, and steps must be taken to prevent them from occurring again.

Critically, in 2018 Congress provided $380 million in Help America Vote Act (HAVA) grant funds to help states bolster their election security. Grant recipient states had to submit a grant narrative—a list of specific election security projects (and estimated costs) that the state planned to fund with grant money—and provide a 5 percent state match within two years. Based on information that the states submitted to the Elections Assistance Commission (EAC) as part of the grant process, recipients are using the vast majority of this money to strengthen election cybersecurity, purchase new voting equipment, and improve postelection audits — all pressing needs around which there is broad bipartisan consensus.[4] The EAC has estimated that 85 percent of the money Congress has provided will be spent ahead of the 2020 election.[5]

Unfortunately, given the myriad security challenges

faced by these states, the $380 million is not enough to address the needs of state and local offices; many have substantial election security needs that likely will not be met absent additional federal support.

This paper examines six key states (Alabama, Arizona, Illinois, Louisiana, Oklahoma, and Pennsylvania) that represent different regions of the country, varied population sizes, and the full range of election security needs. It investigates how they have allocated their share of the 2018 federal election security grants and documents their needs for additional election security funding. States' use of HAVA funds is tailored to their specific requirements and reflects the nature of the state and local governments that oversee elections. Likewise, their unfunded election security needs vary according to state-specific circumstances. While the authors have limited their review to a sampling of six states, it is clear that the other 44 states and the District of Columbia have similar unfunded needs.[6]

State Spotlights

Alabama

In the wake of unsuccessful cyberattacks against the state voter registration database in 2016, Alabama Secretary of State John Merrill stated, "While it is encouraging that our efforts to protect Alabamians' data have proven to be successful, we must remain vigilant and prepared for the constantly evolving threats to our voting systems and the integrity of those processes. We will utilize every resource available to ensure we are protecting the data of all Alabamians."[7]

As part of these ongoing efforts, Secretary Merrill has welcomed public and private election security partners, such as the U.S. Department of Homeland Security (DHS), into Alabama, taking advantage of a wide range of free resources available to further improve Alabama's election security risk posture.[8] These partnerships are critical to many states that are, in Merrill's words, "not rich when it comes to resources that are available for discretionary purposes or specifically [election security]."[9]

While these partners can help identify vulnerabilities, best practices, and important support functions, they do not fund the personnel, training, and security measures necessary to secure vulnerabilities in Alabama's election system. For these reasons, Secretary Merrill supports federal block grants for funding specific election security projects in the states and believes such grants "would be very helpful" to Alabamians.[10]

Allocation of 2018 Federal Election Security Funds

Federal grant: $6,160,383
State match: $308,020

Total: $6,468,413

Alabama has designated the entirety of its federal election security grant and state matching funds toward the following four projects:[11]

- **Voter registration database upgrades and maintenance.** With "more voters registered and more ballots being cast than ever before,"[12] the state is devoting $3 million to improve the voter registration database and its security features through upgrades, such as two-factor authentication (2FA), to ensure that voter data is secure and reliable.

- **Computer equipment replacement and upgrades.** The state is providing new computers and related equipment to each of the five primary election officials in all 67 counties at an estimated cost of $300,000. Alabama officials expect to complete this project by September 30, 2019.[13] One of the many cybersecurity challenges faced in Alabama and several other states is related to the security practices of the users of a shared system, such as a statewide voter registration database. By providing computer equipment directly to local officials, the state can ensure that users across the state are implementing basic cybersecurity measures, including antivirus software installation.

- **Postelection audits.** The state designated $800,000 for postelection audits. This process is an essential election security bookend to the critical election measure already in place, paper ballots. While many of the audit-related costs will be incurred at the local level, the state plans to assume or reimburse all costs associated with implementing robust postelection audits, as local election officials simply don't have the funds to underwrite this project.[14] The state is currently working with election security experts to determine the best options for Alabama, and the first pilots are expected to be scheduled in calendar year 2019.[15]

- **Addressing cyber vulnerabilities.** The state designated $2.3 million for various cybersecurity

enhancements, improvements, and fixes. Working with a variety of partners, the state plans to "investigate, implement, and identify new technologies" to help reduce or eliminate cyber vulnerabilities. As an example, the state previously fixed an official state elections website vulnerability that had been publicly identified by a private cybersecurity firm.[16]

Additional Unfunded Security Needs

Alabama election officials identified two unfunded election security projects: legacy voting equipment replacement and development of a "cyber navigator program."[17],[18]

Legacy voting equipment replacement. Alabama election officials in every county except Montgomery use legacy voting systems that are more than a decade old, including AutoMARK voting systems, used in 66 counties, and M100s (precinct count optical scanners), used in seven counties.[19]

These aging voting systems are a security risk and less reliable than voting equipment available today. Older systems are generally "more likely to fail and are increasingly difficult to maintain."[20] Specifically, as neither the AutoMARK nor the M100 is currently manufactured, finding replacement parts will be increasingly difficult over time.[21] This problem exacerbates the system-specific security concerns that have been reported to the EAC or by Verified Voting, such as inconsistent vote tallying and reboot times of 15 to 20 minutes.[22] Moreover, these systems simply lack important security features expected of voting machines today, such as hardware access deterrents for ports.[23]

State and local election officials would consider using additional election security funding to replace these legacy systems.[24] Bullock County Court of Probate Judge James Tatum, the local chief election official, explained, "Our [AutoMARKs] are old and becoming very difficult to maintain . . . I would like to have the most secure equipment, cyber training, and election security [tools], but we simply can't afford it."

Judge Tatum further explained that although "Secretary Merrill is a champion of rural counties," they often must do without the tools and resources available in wealthy counties. "While Huntsville and Birmingham can afford these [replacement] costs, when you're talking about rural counties, we simply can't afford these costs no matter how much they would improve our election security. For example, we would be responsible for paying for training. Of course, we have to compensate our poll workers for their time when they come to training. We can't afford it. Rural counties are all in need of some additional resources."

Development of a "cyber navigator program." Election officials would like a state program that provides election security and cybersecurity professional services to local election officials.[25]

Illinois recently developed such a system, where cyber navigators with responsibility for geographic zones will work across the state with local election officials to train relevant personnel and lead risk assessments and evaluations, among other things. They will fill a role akin in many ways to that of a chief information security officer for counties. Their assessment and evaluation efforts will help officials identify vulnerabilities and determine where additional resources may be needed to shore up cyber defenses. The program's other principal components are infrastructure improvement and information sharing.[26]

Without a state resource for cyber assistance, local election officials, such as those in Bullock County who do not have dedicated IT staff, may be at greater risk of a successful cyberattack. Local election officials consider the state a trusted partner and know personnel are available to address all voting equipment technical questions.[27] However, without a cyber navigator–type of program, local election officials may not have sufficient resources to appropriately respond to identified cyber threats to local systems or equipment, such as those risks shared by the Elections Infrastructure Information Sharing and Analysis Center (EI-ISAC).

Arizona

After obtaining stolen log-in credentials of a local election official, cybercriminals attempted to gain access to Arizona's voter registration database in 2016.[28] Subsequently, state election officials initiated the procurement process for a new, more secure database. They also established private and public partnerships to help identify system vulnerabilities and appropriate steps to mitigate them.

For several reasons, including the decentralized nature of Arizona's election administration system, state election officials believe that supporting local election officials' election and cybersecurity improvement projects is a critical component of their efforts to improve election security across the state.[29] While the 2018 grant provides necessary funding for foundational election security projects, some of which will directly benefit local officials, it is simply not enough to also pay for projects that would provide or subsidize cyber services and more secure voting equipment to local election officials.[30]

Allocation of 2018 Federal Election Security Funds

Federal grant: $7,463,675
State match: $373,184

Total: $7,836,859

Arizona has designated the entirety of its federal elec-

tion security grant and state matching funds toward the following projects:[31]

- **Voter registration database replacement.** The former Arizona secretary of state, Michele Reagan, explained the importance of this project, stating, "When our online database was created, cybersecurity was an afterthought. Now, faced with international threats, we must have a system that implements strong protections and the highest level of security capabilities to protect voter data."[32] While the total cost of replacing the aging database is estimated at $7 million to $10 million, the state has devoted approximately $2.8 million to the project.[33]

- **Cybersecurity.** The state designated the remaining grant funds, approximately $5 million, to various cybersecurity projects, including:

  - **Security assessment.** The state partnered with a private vendor to conduct an assessment of the "current IT infrastructure, focusing on critical election systems." The state expected this assessment to "provide a framework for future spending." The vendor's public report was released in late 2018.

  - **Information sharing.** The state is partnering with local election officials to create stable communication channels and build a culture of support between the state and local election officials through routine meetings with interactive cybersecurity discussion topics and curated agendas.

  - **Cybersecurity subgrants to local election officials.** Working in conjunction with local election officials, the state plans to distribute a portion of its federal grant directly to counties to fund mutually agreed-on cyber projects.

Additional Unfunded Security Needs

Election officials in Arizona noted they do not currently have funds they need to expand cybersecurity assistance to local election officials or replace legacy voting systems.[34]

Greater cybersecurity assistance to local election officials. Assisting local election officials with the cybersecurity challenges they face is an important priority for Secretary of State Katie Hobbs.[35] The secretary of state's chief information officer, Bill Maaske, stated that if Congress provides additional election security funding for the states, then he would support using those funds to implement a state cyber navigator program, which, as described below, would coordinate cybersecurity resources, information, and trainings for and with local election officials.[36]

Such a state program could provide essential services to local election officials, some of whom lack dedicated IT staff and may be at a greater risk of successful cyberattack. Without a cyber navigator–type of program, these local election officials may not have sufficient resources to appropriately respond to identified cyber threats to local systems or equipment, such as those shared by EI-ISAC.

Legacy voting system replacement. Arizona's legacy voting systems represent a security and availability risk for three main reasons. First, "older systems are more likely to fail and are increasingly difficult to maintain."[37] Aging voting systems often use outdated hardware, and many of them, including the AccuVote TSX and AVC Edge systems used in multiple Arizona counties, are no longer manufactured.[38],[39],[40] This can make finding replacement parts difficult, if not impossible. Second, aging systems also frequently rely on outdated software, like Windows XP and 2000, which may not receive regular security patches and are therefore more vulnerable to the latest methods of cyberattack. Third, "older systems are less likely to have the kind of security features we expect of voting machines today."[41]

State election officials estimate the cost to replace the legacy voting equipment in use across the state, including the direct recording electronic (DRE) machines, to be $40 million.[42] While relatively wealthy and urban counties, like Maricopa County, may be able to fund the purchase of new voting equipment without financial support from the state, Arizona's more rural counties will likely struggle to find sufficient local resources.[43],[44] Considering this, if Congress allocates additional state election security funding, then state election officials can prioritize assisting counties with new voting system procurement costs.[45]

Illinois

Former special counsel Robert Mueller's report on Russian election interference included a troubling finding about Illinois: Russian operatives "compromised the computer network of the Illinois State Board of Elections . . . [,] then gained access to a database containing information on millions of registered Illinois voters, and extracted data related to thousands of U.S. voters before the malicious activity was identified."[46] Although there is no single panacea to address such threats, the state is devoting a substantial portion of its federal election security funds to a cyber navigator program, which should help identify and address cybersecurity vulnerabilities like those the Russians exploited in 2016.

Allocation of 2018 Federal Election Security Funds

Federal grant: $13,232,290
State match: $661,615

Total: $13,893,905

Illinois is using all of its federal election security funds to improve its cybersecurity. The hallmark of that effort is the state's cyber navigator program; the state plans to devote at least half of its federal grant toward this program.

Cyber navigators with responsibility for geographic zones across the state will work with local election officials to train relevant personnel and to lead risk assessments and evaluations, among other things. They will fill a role akin in many ways to that of a chief information security officer for counties. Their assessment and evaluation efforts will help officials identify vulnerabilities and determine where additional resources may be needed to shore up cyber defenses. The program's other principal components are infrastructure improvement, through the Illinois Century Network Expansion, and information sharing, through the Cybersecurity Information Sharing Program.[47]

Additional Unfunded Security Needs

Election officials noted two unfunded election security projects: adoption of countermeasures for security vulnerabilities identified through risk and vulnerability assessments, and legacy voting system replacement.[48]

The cyber navigator program will help Illinois officials identify potential vulnerabilities in election systems and concrete actions to correct those weaknesses. However, as Noah Praetz, the former elections director of Cook County, explained, counties will likely need additional funds to correct any issues that arise during assessments: "The cyber navigators will be a great resource for counties and will go a long way toward helping officials across Illinois improve their cybersecurity. But we'll likely need continued funding support to address any vulnerabilities that the Navigators identify and to carry the cyber navigator program forward after its first few years."[49]

More immediately, Matt Dietrich of the State Board of Elections explained that Illinois needs significant additional funding to undertake a statewide replacement of its aging voting systems. He estimated the likely cost to be $175 million. "Many of our local jurisdictions used the [original] HAVA grants to modernize their outdated voting systems. But those systems are now 15 years old and in need of replacement."[50] As explained above, such aging systems were not designed to withstand today's threats and can be more prone to equipment and software issues that could affect performance during voting.

Louisiana

As one of only three states that continue to use paperless voting machines statewide, Louisiana lacks one of the most critical election security measure available today: voter-verifiable paper backups of every vote. Despite warnings by Department of Homeland Security (DHS) officials, cybersecurity experts, and the former Louisiana secretary of state, these paperless machines will likely be used in the upcoming 2019 general election for governor, attorney general, four other statewide elected positions, and all 144 members of the Louisiana Legislature.[51,52]

The ongoing effort by state election officials to replace the paperless voting machines in order to make election results verifiable has faced many setbacks, including bid protests, administration changes, and state budget woes.[53] Most recently, the process to purchase new, paper-based voting machines failed in October 2018 after a bid protest was filed. With this process stalled, state election officials plan to spend $2 million to rent reliable voting equipment for early voting for the 2019 election.[54] Although Secretary of State Kyle Ardoin wants to get new voting machines "as soon as possible to continue to keep Louisiana at the forefront of election integrity and security," the timeline for replacing the voting machines is somewhat unclear.[55]

Allocation of 2018 Federal Election Security Funds

Federal grant: $5,889,487
State match: $294,474

Total: $6,183,961

Given the pressing need to replace the state's paperless voting machines, Louisiana officials have allocated the entirety of the state's federal election security grant toward the purchase of new voting systems. However, those funds are insufficient to cover the cost of replacing paperless machines statewide. The original contract awarded for new voting equipment, since rescinded, was $95 million.[56] Although state officials believe that the ultimate contract price for new voting machines will be lower, federal grant funds may cover less than 10 percent of total costs associated with obtaining and deploying a new, paper-based voting machine fleet across the state.[57,58]

Additional Unfunded Security Needs

Louisiana has set aside all of its federal money to pay for much-needed new voting machines with paper backups. Even with this funding, **it still faces a multimillion dollar gap to replace its voting machines**. In addition, it has other security needs that have gone unaddressed,

including:

- **Post-election audits.** If paper-based voting systems are deployed across the state, then the essential election security bookend to the use of paper ballots – robust postelection audits to ensure that the ballots were counted as cast – can be implemented.

- **Addressing identified cyber vulnerabilities.** Cyber vulnerabilities are identified on an ongoing basis by the secretary of state's information technology department.[59] They also may be identified periodically through independent Risk and Vulnerability Assessments available from DHS. Resources may be required to address cyber vulnerabilities discovered during these processes.

Oklahoma

Although Oklahoma deployed a new statewide fleet of voting equipment in 2012, the state still faces many difficult election security decisions. Recent financial constraints have severely limited officials' discretionary spending as Oklahoma slowly recovers from one of the most debilitating financial crises in the state's history. Eight months into the past fiscal year, Oklahoma was forced to reduce state agency budgets, resulting in a $50,000 cut in funding to the Oklahoma State Board of Elections.[60] The year ended in June 2019 with a $167 million projected shortfall, and this was considered an improvement. One state official noted, "Last year [FY 2018], our shortfall was around $800 million. I believe the year before was about $1.3 billion, so we're improving."[61]

Allocation of 2018 Federal Election Security Funds

Federal grant: $5,196,017
State match: $259,801

Total: $5,455,818

As of July 2018, Oklahoma planned to devote the entirety of its federal grant funds to the following four critical election security projects:[62]

- **Voter registration database upgrades and security enhancements.** The current custom-built state voter registration database relies on architecture designed in 2005 that can be installed only on Windows PCs. Oklahoma plans to spend $1.65 million on the most critical security and system updates and upgrades.

- **Cybersecurity and physical security improvements.** Working with state and federal partners, election officials have identified multiple discrete projects, such as the relocation of their servers to a secure server bunker, implementation of two-factor authentication for access to the state Virtual Private Network (VPN), and remote antivirus protection management. The aggregate estimated cost of these projects is $1 million.

- **Training.** The state estimates that developing and providing training for local election officials on the new equipment described above and additional cybersecurity trainings will cost approximately $300,000.

- **New election system equipment.** The state plans to use $2.5 million to purchase electronic poll books, which officials say can enhance election security through built-in security features, such as automated notifications in the event of unusual activity, e.g., the addition or deletion of a high number of voter records, by one or more users.[63] The state also plans to purchase document scanners to reduce the need to store hard copies of documents that contain personal private information and to protect against theft and loss of information through accidents and disasters.[64]

Additional Unfunded Security Needs

According to State Election Board Secretary Paul Ziriax, Oklahoma Cyber Command and the Department of Homeland Security (DHS) may recommend new election security projects that should be given higher priority than those currently planned.[65] These partner agencies routinely provide services that identify cyber vulnerabilities and significant system risks and have been working with the Election Board to explore options "to optimize the board's physical and cybersecurity and plan for potential election emergency situations."[66]

If this process leads to recommendations of new election security measures, then Oklahoma would likely revise the current grant narrative to include them, Ziriax stated.[67] If officials designate federal funding for these new projects, then they must reduce the amount of federal funds currently designated for one or more of the projects described above. Depending on the costs associated with the new projects, officials may be forced to delay, partially defund, or abandon currently planned election security projects.

Regardless of the outcome of these assessments, Oklahoma has several additional election security needs, some of which have already been identified by election officials, that are not currently designated for federal funding, including:

- **Robust postelection audits.** Oklahoma is one of only 10 states with no postelection audit process.[68] Robust postelection audits ensure that the ballots were counted as cast and are an essential election security bookend to the state's use of paper ballots for all elections.

- **Voting equipment hardware and software updates.** Although Oklahoma's fleet of paper-based voting equipment is relatively new compared with that of several other states, it is already at the approximate "halfway mark of its life span," and state officials "anticipate that the system may require hardware and/or software updates."[69] If such updates become necessary for proper voting system fleet maintenance, then officials plan to revise the grant narrative and use federal funds for this project.[70]

- **Virtual Private Network (VPN) upgrades.** Oklahoma election officials are exploring options to upgrade the VPN provided by the Oklahoma State Regents for Higher Education to enhance security and protection of the state voter registration database.[71] This database houses the personal identifying information of more than 2.1 million registered voters in Oklahoma.[72]

Pennsylvania

Pennsylvania's election security challenges are substantial: As recently as the 2018 midterm elections, more than 80 percent of Pennsylvania voters were registered in jurisdictions still using paperless voting systems.[73] Yet Pennsylvania officials have taken steps to move away from these vulnerable machines. Those efforts include the Pennsylvania Department of State directing counties to have paper-based systems in place by 2020.[74]

Allocation of 2018 Federal Election Security Funds

Federal grant: $13,476,156
State match: $673,808

Total: $14,149,964

Given the pressing need to replace the state's paperless voting machines, Pennsylvania officials have allocated the entirety of the state's federal election security grant to the purchase of new voting systems. The state is sharing these funds with counties in the form of a partial reimbursement once they have selected new voting systems, with each county receiving a share proportionate to its number of registered voters. According to the Department of State, the counties have made great strides toward accomplishing the state's goal of having new paper-based machines in place across Pennsylvania by 2020, and acting Secretary of the Commonwealth Kathy Boockvar expressed confidence in the state's ability to meet that timeline.[75]

Unfortunately, those funds (approximately $14 million with the state match added) are insufficient to cover the cost of replacing paperless machines statewide. The Pennsylvana Department of State estimates that federal funds will cover only 10 to 12 percent of the statewide bill to replace existing machines (approximately $150 million).[76] In Lehigh County, for example, Tim Benyo, the county's chief clerk for elections and registration, stated that federal funds will cover only a small portion of the county's planned spending to procure a new paper-based voting system: roughly $350,000 of the $3.5 million that the county had budgeted for upgrades.[77] Zane Swanger, Mifflin County's director of elections and voter registration, similarly said that federal funds will cover only $41,000 of a likely $250,000–$300,000 total bill for the predominantly rural county's purchase of a new voting system.[78]

Additional Unfunded Security Needs

Setting aside the **ongoing funding gap for new voting systems with paper backups**, the urgent need to replace the state's legacy voting machines has deprived Pennsylvania of the ability to direct federal funds toward other critical election security needs. Examples include:

- **Voter registration system.** The state is embarking on a procurement process to replace its aging statewide voter registration system, which is into its second decade of use. Pennsylvania's state officials "have regularly maintained and updated its operating system," but as Benyo explained, "The system is really outdated, and it has gotten Band-Aid after Band-Aid and requires a lot of money to keep it working properly."[79],[80] Department of State leadership stated that although they remain confident in the security of the current system thanks to multilayered security protections in place, the "voter registration system replacement is absolutely about security," as well as improving its performance and efficiency.[81] Not only is the current system expensive to maintain, but officials often confront performance costs when weighing security enhancements to the system.

- **Cybersecurity assessments.** County officials also expressed interest in regular, robust county cybersecurity assessments, which can be critical to identifying vulnerabilities and shoring up cyber defenses.

Although DHS has put Pennsylvania through its Risk and Vulnerability Assessment process and the Pennsylvania National Guard has been offering some cybersecurity assessment services to counties, counties tend to lack dedicated funding for regular, periodic assessments. The Department of State mentioned the Center for Internet Security's "Albert" sensors and annual costs, in particular, as something that additional funding could support for counties.[82]

- **Cybersecurity trainings.** There was also interest in cybersecurity training, which can help elections personnel guard against spear-phishing attacks and learn other basics of cybersecurity. Noting that the threat "environment is ever changing," Zane Swanger emphasized the importance of training his staff, poll workers, and others involved in election administration about current security threats and "better election material handling."[83]

Conclusion

In administering our elections, states face security challenges of unprecedented magnitude. They are, in many cases, ill equipped to defend themselves against the sophisticated, well-resourced intelligence agencies of foreign governments. States should not be expected to defend against such attacks alone. Our federal government should work to provide the states with the resources they need to harden their infrastructure against cybersecurity threats. At the very least, each state should develop the ability to verify election results in the case of a breach.

Russia and other malign foreign actors use multiple tools and tactics to interfere in democracies, and cyber threats against election systems are among them. The states included in this study have begun the hard work of upgrading dated infrastructure, setting aside funds for postelection audits, and addressing cyber vulnerabilities. But there is more they can do with additional resources.

Elections are the pillar of American democracy, and, as we saw in 2016 and 2018, foreign governments will continue to target them. States cannot counter these adversaries alone, nor should they have to. But at a time when free and fair elections are increasingly under attack, they can, with additional federal funding, safeguard them.

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EXPERT BRIEF

America's Voting Machines at Risk – An Update

Despite manifold warnings about hacking for the past two years, the country has made remarkably little progress in replacing vulnerable voting machines — and has done even less to ensure that we can recover from a successful cyberattack against them.

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Ensure Every American Can Vote

Voting Reform

The Brennan Center has found that despite manifold warnings about election hacking for the past two years, the country has made remarkably little progress since the 2016 election in replacing antiquated, vulnerable voting machines — and has done even less to ensure that our country can recover from a successful cyberattack against those machines.

In September 2015, the Brennan Center published *America's Voting Machines at Risk,* a comprehensive report about America's outdated voting machines. That analysis detailed how these systems were often unauditable, susceptible to malware, frequently difficult to repair, and more prone to failure.[1]

Since then, the Director of National Intelligence published a report detailing the ways in which Russia interfered in the 2016 election.[2] In recent weeks, top intelligence officials have cautioned that foreign actors — including not just Russia, but also North Korea and Iran — may look to launch cyberattacks on this fall's midterm elections. The Department of Homeland Security, the Election Assistance Commission, and states and counties around the country have taken important steps in the last two years to secure our election infrastructure.[3]

But in two critical areas, the Brennan Center finds, the country has been remarkably slow to act: replacing voting machines most vulnerable to hacking, and mandating post-election audits that would allow the country to detect and recover from successful cyberattacks against those machines.

1. **This year, most states will use computerized voting machines that are at least 10 years old, and which election officials say must be replaced before 2020.**

While the lifespan of any electronic voting machine varies, systems over a decade old are far more likely to need to be replaced, for both security and reliability reasons. As machines age, essential parts like memory cards and touch screens fail. Also, older machines are more likely to use outdated software like Windows 2000. Using obsolete software poses serious security risks: vendors may no longer write security patches for it; jurisdictions cannot replace critical hardware that is failing because it is incompatible with their new, more secure hardware; and the software itself is vulnerable to cyberattacks.[4]

Despite the urgent need to replace antiquated equipment, and the growing calls to do so over the last two years, most outdated systems have not been replaced. In 2016, jurisdictions in 44 states used voting machines that were at least a decade old. Election officials in 31 of those states said they needed to replace that equipment by 2020. [5]

Two years later, little has changed. This year, 41 states will be using systems that are at least a decade old, and officials in 33 say they must replace their machines by 2020. In most cases, elections officials do not yet have adequate funds to do so.[6]

It is critical that these jurisdictions get funding soon, so that they can begin to use them in 2019, rather than deploying them during a presidential election year. "You want to implement new systems in a year when poll workers won't be so busy. Macy's wouldn't roll out new cash registers on Black Friday," Sherry Poland, Director of Elections of Hamilton County, Ohio, told the Brennan Center.[7]

1. **Since 2016, only one state has replaced its paperless electronic voting machines statewide.**

Security experts have long warned about the dangers of continuing to use paperless electronic voting machines. [8] These machines do not produce a paper record that can be reviewed by the voter, and they do not allow election officials and the public to confirm electronic vote totals. Therefore, votes cast on them could be lost or changed without notice. Moreover, if officials discover that voting machine software has been corrupted or data has been lost, it may be impossible to recover the lost votes without a paper record.

While many paperless systems were replaced in the years before the 2016 election, since then, the country has made remarkably little progress — even despite repeated warnings from intelligence officials and security experts that voter verified paper records are a critical backstop against cyberattacks.[9] In 2016, 14 states (Arkansas, Delaware, Georgia, Indiana, Kansas, Kentucky, Louisiana, Mississippi, New Jersey, Pennsylvania, South Carolina, Tennessee, Texas, and Virginia) used paperless electronic machines as the primary polling place equipment in at least some counties and towns. Five of these states used paperless machines statewide.[10]

By 2018 these numbers have barely changed: 13 states will still use paperless voting machines, and 5 will continue to use such systems statewide. Only Virginia decertified and replaced all of its paperless systems.[11] In Pennsylvania, Acting Secretary of State Robert Torres directed that all voting machines purchased in the state must employ "a voter-verifiable paper ballot or paper record of votes cast," but this applies only to new systems.[12] The state has not provided any money to replace its current paperless machines.

1. **Only three states mandate post-election audits to provide a high-level of confidence in the accuracy of the final vote tally.**

Paper records of votes have limited value against a cyberattack if they are not used to check the accuracy of the software-generated total to confirm that the veracity of election results. In the last few years, statisticians, cybersecurity professionals, and election experts have made substantial advances in developing techniques to use post-election audits of voter verified paper records to identify a computer error or fraud that could change the outcome of a contest. The Brennan Center and many other election integrity groups have recommended adoption of such techniques.[13]

Specifically, "risk limiting audits" — a process that employs statistical models to consistently provide a high level of confidence in the accuracy of the final vote tally – are now considered the "gold standard" of post-election audits by experts.[14] Despite this fact, risk limiting audits are required in only three states: Colorado, New Mexico, and Rhode Island.[15]

While 13 state legislatures are currently considering new post-election audit bills, since the 2016 election, only one — Rhode Island — has enacted a new risk limiting audit requirement.[16]

1. **43 states are using machines that are no longer manufactured.**

The problem of maintaining secure and reliable voting machines is particularly challenging in the many jurisdictions that use machines models that are no longer produced. In 2015, using data provided by Verified Voting and information gathered from interviews with voting machine vendors, the Brennan Center estimated that 43 states and the District of Columbia were using machines that are no longer manufactured. **In 2018, that number has not changed**.[17]

A primary challenge of using machines no longer manufactured is finding replacement parts and the technicians who can repair them. These difficulties make systems less reliable and secure. Several election officials have told the Brennan Center they scavenge for spare parts on eBay,[18] and even there, many of the parts are no longer available.

In a recent interview with the Brennan Center, Neal Kelley, registrar of voters for Orange County, California, explained that after years of cannibalizing old machines and hoarding spare parts, he is now forced to take systems out of service when they fail.**[19]** Ohio's Sherry Poland told the Brennan Center she has been forced to replace her voting systems next year because she fears she can "no longer get replacement parts to get us through the next two years."**[20]**

The Solution: Congress Should Provide Grants to Replace Antiquated, Paperless Equipment and Conduct Post Election Audits to Detect Hacking or Error.

National security, legal and election experts agree: Congress must act to protect our elections by providing grants to states to replace equipment and conduct post-election audits. There are currently three bipartisan pieces of legislation being considered on Capitol Hill that would provide funding and support for state election officials. Such measures would not just improve security – they would reaffirm public faith in our elections and our democracy at large.

"*We believe there is a framework to secure our elections ... authorize cost-sharing with states for the replacement of insecure electronic systems with those that produce a voter-verified physical record... [and lay] the groundwork for states to regularly implement risk-limiting audits — procedures that check a small random sample of paper records to quickly and affordably provide high assurance that an election outcome was correct*."

Michael Chertoff and Grover Norquist, Washington Post, February 14, 2018.

"More pernicious would be attempts to hack into voter machines and change the results that they report. In some states, there is no paper backup or audit trail, just electronic digits that record how people voted ... If a cyberattack is done well, there may be no evidence of the attack ... Every voting machine must create a paper copy of each vote recorded, and those paper copies must be kept secured for at least a year."

Richard Clarke, ABC News, Aug. 31, 2016.

"*Congress should ... require in federal elections the use of paper ballots or electronic voting machines that produce voter-verified paper ballots... Before certification of final election results, a random sample of electronic voting system totals should be compared with hand counts of the votes on the corresponding paper ballots to detect hacking or error."*

Bruce Fein, The Washington Times, July 4, 2017.

"*Get back to the elegant simplicity that once defined American elections: plain old paper ballots, hardened cybersecurity protection ... and inexpensive automatic post-election vote audits in randomly selected areas to scan for irregularities.*"

Lt. Colonel Tony Shaffer (Ret.), The Hill, March 17, 2017

[1] Lawrence Norden and Christopher Famighetti, Brennan Ctr. for Justice, America's Voting Machines at Risk (2015), *available at* **https://www.brennancenter.org/publication/americas-voting-machines-risk**.

[2] Director of National Intelligence, Background to "Assessing Russian Activities and Intentions in Recent US Elections": The Analytic Process and Cyber Incident Attribution (Jan. 6, 2017), *available at* **https://www.dni.gov/files/documents/ICA_2017_01.pdf**.

[3] For instance, organizations like the **Election Assistance Commission** and the **Belfer Center** at Harvard University have offered cybersecurity trainings to hundreds of state and local election officials, while the Department of Homeland Security, the EAC, and state and local officials have established a coordinating council to allow them to share threat information and pool security resources.

[4] *See* Alex Hern, *WannaCry attacks prompt Microsoft to release Windows updates for older versions*, The Guardian, June 14, 2017, **https://www.theguardian.com/technology/2017/jun/14/wannacry-attacks-prompt-microsoft-to-release-updates-for-older-windows-versions**.

[5] *See* Wilfred Codrington III & Iris Zhang, *Secure the Vote, Secure Our Democracy*, U.S. News & World Report, Feb. 23, 2018, *available at* **https://www.usnews.com/opinion/thomas-jefferson-street/articles/2018-02-23/congress-must-act-to-upgrade-and-secure-our-voting-machines-before-midterms**. In 2015, the Brennan Center estimated that 44 states were using voting machines at least a decade old. Since 2015, Michigan, Minnesota, Nevada, and Rhode Island have allocated money to replace old voting machines. Hawaii's voting machines have since aged to a decade old. Survey of election officials on file with author.

[6] States such as Delaware and Louisiana are considering replacing their paperless voting systems with updated technology that provides voter-verified paper ballots. Florida Gov. Rick Scott has requested funding to bolster election systems security, and Pennsylvania Gov. Tom Wolf's administration has ordered that any new machines purchased have paper records. *See* Danielle Root et al., Center for American Progress, Election Security in All 50 States (2018), *available at* **https://cdn.americanprogress.org/content/uploads/2018/02/11130702/020118_ElectionSecurity-report1.pdf**.

[7] *See* Telephone interview with Sherry Poland, Dir. of Elections, Hamilton Cnty., Ohio (Feb. 7, 2018).

[8] *See* Lawrence Norden and Christopher Famighetti, Brennan Ctr. for Justice, America's Voting Machines at Risk 13 (2015), *available at* **https://www.brennancenter.org/publication/americas-voting-machines-risk**.

[9] *See* Zaid Jilani, *Amid Election Security Worries, Suddenly Paper Ballots Are Making a Comeback*, The Intercept, Feb. 18, 2018, **https://theintercept.com/2018/02/18/paper-ballots-amidst-election-security-worries-suddenly-paper-ballots-are-making-a-comeback/**.

[10] *See* Danielle Root et al., Center for American Progress, Election Security in All 50 States (2018), *available at* **https://cdn.americanprogress.org/content/uploads/2018/02/11130702/020118_ElectionSecurity-report1.pdf**; *The Verifier –Polling Place Equipment – November 2018*, Verified Voting, **https://www.verifiedvoting.org/verifier/** (last visited Mar. 6, 2018). Delaware, Georgia, Louisiana, New Jersey, and South Carolina use paperless DRE machines statewide.

[11] On Feb. 9th, Pennsylvania's Acting Secretary of State Robert Torres directed that all voting machines purchased in the state must employ "a voter-verifiable paper ballot or paper record of votes cast," but this applies only to new systems. The state has not provided any money to replace its current paperless machines. *See* Pa. Dep't of State, DOS Directive Concerning the Purchase of Electronic Voting Systems (Feb. 9, 2018), *available at* **http://www.dos.pa.gov/VotingElections/OtherServicesEvents/Documents/DOS%20Directive%20Concerning%20Purchase%20of%20Voting%20Systems_02.09.2018.pdf**.

[12] *See* Pa. Dep't of State, DOS Directive Concerning the Purchase of Electronic Voting Systems (Feb. 9, 2018), *available at* **http://www.dos.pa.gov/VotingElections/OtherServicesEvents/Documents/DOS%20Directive%20Concerning%20Purchase%20of%20Voting%20Systems_02.09.2018.pdf**.

[13] *See* Lawrence Norden and Christopher Famighetti, Brennan Ctr. for Justice, America's Voting Machines at Risk 32 (2015), *available at* **https://www.brennancenter.org/publication/americas-voting-machines-risk**; Mark Lindeman & Philip B. Stark, A Gentle Introduction to Risk-Limiting Audits (2012), *available at* **https://www.stat.berkeley.edu/~stark/Preprints/gentle12.pdf**; *Principles and Best Practices for Post-Election Audits*, ElectionAudits.org (Sep. 2008), **http://electionaudits.org/files/bestpracticesfinal_0.pdf**.

[14] *See Post Election Audits*, Verified Voting, *available at* **https://www.eac.gov/assets/1/28/VerifiedVoting-Post-Election-Audits.pdf**; Am. statistical ass'n, statement on risk limiting post-election audits (2010), *available at* **https://www.amstat.org/asa/files/pdfs/POL-Risk-Limiting_Endorsement.pdf**.

[15] *See* Danielle Root et al., Center for American Progress, Election Security in All 50 States (2018), *available at* **https://cdn.americanprogress.org/content/uploads/2018/02/11130702/020118_ElectionSecurity-report1.pdf**.

[16] National Conference of State Legislatures, 2011-2018 Elections Legislation Database, *available at* **http://www.ncsl.org/research/elections-and-campaigns/elections-legislation-database.aspx**.

[17] The Brennan Center confirmed with two major vendors - ES&S and Dominion - that the following models are no longer manufactured: iVotronic, M100, M650, AutoMark (ES&S); AccuVote OS, AccuVote OSX, AccuVote TS, AccuVote TSX, AVC Edge, AVC Advantage, Optech IIIP-Eagle and Optech Insight (Dominion). We used this information to confirm that 9 states are using exclusively discontinued voting machines, 34 states use discontinued voting machines in one or more jurisdictions, and 7 states and the District of Columbia use machines that are all currently manufactured. Since the Brennan Center's 2015 analysis, Michigan and Nevada have upgraded in all jurisdictions to machines that are currently manufactured; the AutoMark machine, used in some jurisdictions in New York, has been discontinued; the Model 650 machine, used in some jurisdictions in Oregon, has been discontinued; and Utah and Rhode Island have upgraded voting equipment in some jurisdictions. *See* Telephone Interview with Kay Stimson, Vice President of Gov't Affairs, Dominion Voting Systems (Feb. 28, 2016); E-mail from Kathy Rogers, Senior Vice President of Gov't Relations, ES&S (Feb. 27, 2018, 11:22 EST) (on file with author); *The Verifier –Polling Place Equipment – November 2018*, Verified Voting, **https://www.verifiedvoting.org/verifier/** (last visited Mar. 6, 2018); Lawrence Norden and Christopher Famighetti, Brennan Ctr. for Justice, America's Voting Machines at Risk 50 (2015), *available at* **https://www.brennancenter.org/publication/americas-voting-machines-risk**.

[18] *See* Lawrence Norden and Christopher Famighetti, Brennan Ctr. for Justice, America's Voting Machines at Risk (2015), *available at* **https://www.brennancenter.org/publication/americas-voting-machines-risk.**

[19] *See* Telephone interview with Neal Kelley, Registrar of Voting, Orange Cnty., Cal. (Feb. 5, 2018).

[20] Telephone interview with Sherry Poland, Dir. of Elections, Hamilton Cnty., Ohio (Feb. 7, 2018).

The views expressed are the author's own and not necessarily those of the Brennan Center for Justice.

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at New York University School of Law

A Procurement Guide for Better Election Cybersecurity

by Christopher Deluzio

Introduction

Election officials across the country are turning their attention to procurement decisions about what equipment or services their jurisdiction might need going forward. Whether it's reviewing existing vendor relationships, considering new vendors for existing services, or even deciding whether to seek vendor support for something altogether new, officials face a bevy of difficult choices. The voting equipment and services jurisdictions purchase from vendors can have a substantial impact on the cybersecurity of elections, making these decisions quite consequential.

Vendors, of course, sell voting equipment — like optical scan systems, ballot-marking devices, and direct-recording electronic (DRE) machines — and the three largest sellers of voting machines account for more than 90 percent of this market.[1] But vendors also provide a range of other services and equipment, including e-pollbooks, election night reporting and tabulation systems, voter registration systems, ballot preparation services, and preelection logic and accuracy testing. As David Stafford, the supervisor of elections in Escambia County, Florida, told us, "The election vendors that we rely on are an integral part of election administration — they're critical."[2]

In the face of growing cyber threats and the sophistication of adversaries, local election officials must deploy best practices in the selection and management of election vendors. To that end, this guide provides election officials and policymakers with steps they can take to ensure better cybersecurity from private election vendors.

Recommendations

We look at seven key areas election officials and policymakers should consider as ways to achieve better vendor cybersecurity. These areas were selected based on the recommendations of election officials and cybersecurity experts we interviewed in the process of developing this guide, as well as our analysis of existing reports on the subject.

1. Source Code Disclosure
2. Robust Security Incident Reporting
3. Patching/Software Updates
4. Security Assessments/Audits
5. Regular Penetration Testing
6. Risk-Limiting Audit Support
7. Foreign Nexus Disclosure

In this guide, we provide language to implement these recommendations through (1) new laws or regulations, as well as (2) requests for proposals (RFPs) or contracts — drawing on examples from states and local jurisdictions across the country.

Of course, election security is a complicated topic involving dozens of considerations. This paper does not present an exhaustive list of vendor-related procurement best practices; rather it offers suggested language that jurisdictions can use (in law or contract) to ensure they are protected in the areas listed above.

Those interested in a more complete list of items they should consider before putting out an RFP or entering into a contract with a private vendor may want to consult a forthcoming procurement guide from the Center for Internet Security. The guide should be released in late spring 2019 and will include specific language election offices can use to increase the likelihood of positive outcomes in security.[3]

1. Source Code Disclosure

Relevant vendor offerings: voting systems, e-pollbooks

WHY IT MATTERS

Requiring vendors to disclose source code used in relevant software provides several key benefits to election officials, including increased transparency and the ability to independently audit and scrutinize code.

In a 2015 report, the Brennan Center advocated for disclosure of source code, highlighting New York's example of requiring vendors to permit the state to hold relevant code in escrow:

- "RFPs should provide jurisdictions with the right to maintain voting software. When New York State issued an RFP for new voting machines, it requested that the vendors permit the state to keep the system's source code in escrow. The state insisted on terms that would allow them to procure services from other vendors if the original vendor went out of business or was unresponsive to the needs of an election agency."[4]

Harvard's Belfer Center made similar recommendations in its February 2018 publication, *The State and Local Election Cybersecurity Playbook:*

- "Election officials should have access to the source code for any critical system to perform internal or third-party reviews. This can be a sensitive subject because of intellectual property concerns, but being able to independently audit vendor-created code allows officials to ensure that the code is secure. It also guarantees that the code does not contain any potentially unwanted networking requests, transfers of sensitive information, or modifications to key algorithms and counting mechanisms."[5]

ILLUSTRATIVE LANGUAGE

> Sample Legislative/Regulatory Language

Some states mandate by statute that vendors disclose source code for voting systems (something required under the U.S. Election Assistance Commission's existing testing and certification regime[6]). For example:

- California: "No later than 10 business days after the Secretary of State certifies or conditionally approves the use of a new or updated voting system, the vendor or county seeking certification or approval of the voting system shall cause an exact copy of the approved source code for each component of the voting system, including complete build and configuration instructions and related documents for compiling the source code into object code, to be transferred directly from

either the United States Election Assistance Commission or the voting system testing agency that evaluated the voting system and is approved by the Secretary of State, and deposited into an approved escrow facility."[7]

- Colorado: (1) A voting system provider under contract to provide a voting system to a political subdivision in this state shall:…(b) Place in escrow with the secretary of state or an independent escrow agent approved by the secretary of state, immediately after the installation of election software, one copy of the state certified election software that was installed in each political subdivision, along with supporting documentation; (c) Place in escrow with the secretary of state any subsequent changes to the escrowed election software or supporting documentation."[8]

- New York: "Prior to the use of any voting machine or system in any election in the state,…the state board of elections and the local board of elections using such voting machine or system shall: 1. Require that the manufacturer and/or vendor of such voting machine, system or equipment shall place into escrow with the state board of elections a complete copy of all programming, source coding and software employed by the voting machine, system or equipment which shall be used exclusively for purposes authorized by this chapter and shall be otherwise confidential.[9]

> Sample RFP/Contract Language

There may be situations where jurisdictions will want the flexibility to consider vendor offerings that provide disclosed source code (or open source offerings) against vendor offerings that do not provide such disclosures, particularly outside the voting systems context. For example, election officials will likely be best positioned to weigh the benefits of disclosure relative to other, competing offerings from vendors. In those situations, election officials would be wise to seek source code disclosure through the procurement process, rather than through legislation.

RFPs might, for instance, express a policy preference for open source systems (San Francisco's approach below) or mandate that vendors disclose relevant source code that is to be kept in escrow (which, as noted above, was New York's tactic). For example:

- San Francisco RFP (2015): "Further, the City has established a policy that gives preference to implementing voting systems designed using open source software. The City formally supports the development and eventual implementation of open source voting systems; thus, any organization or firm that has developed or is developing a voting system based on open source code, or intends to do so, and is moving, or, is preparing to move, its open source system through the certification processes is encouraged to reply to this RFI."[10]

- Volusia County, Florida (RFP 2015): "In the event the Contractor ceases to maintain experienced staff and the resources needed to provide any required software maintenance while under an obligation to provide such maintenance, the County shall be entitled to have, use, and duplicate for its own use, a copy of the source code and any other Software required for a fully operational recovery, along with all documentation for the software products covered by the Contract in order for the County to use the Software in accordance with the terms of the Contract."[11]

2. Robust Security Incident Reporting

Relevant vendor offerings: all

WHY IT MATTERS

There is broad consensus that vendors should face mandatory security incident reporting to relevant election officials. This information is invaluable to those officials, arming them with timely information needed to identify and resolve problems. Incident reporting also gives officials key data about vendor performance, enabling a better assessment of the vendor relative to others during future bidding. Consequently, vendors will be incentivized to bolster their internal cybersecurity.

The National Academies of Sciences, Engineering, and Medicine's recent report, *Securing the Vote*, recommended mandatory vendor reporting of voter-registration-related issues both to customers and key governmental officials:

- "Vendors should be required to report to their customers, the U.S. Department of Homeland Security, the U.S. Election Assistance Commission, and state officials any detected efforts to probe, tamper with, or interfere with voter registration systems."[12]

The U.S. Department of Homeland Security included in its set of "evaluative questions and considerations when selecting vendors" an incident-reporting-related inquiry:

- "What conditions will trigger vendor reporting of cyber incidents to purchasers?"[13]

Others, including the Brennan Center,[14] have similarly called for vendor incident reporting:

- Belfer Center: "In your Service Level Agreements (SLAs), include clauses for vendors to notify you in

the event of a cybersecurity breach of their systems or other unauthorized access immediately after they become aware and to cooperate with any consequential investigation, response, and mitigation."[15]

- Brookings Institution: "Election technology vendors should also be required to promptly report any discovered vulnerabilities to state election officials and the Department of Homeland Security."[16]

- Center for Internet Security: "The following terms should be considered for inclusion in the agreements in order to satisfy the identified information security requirements:…incident management requirements and procedures (especially notification and collaboration during incident remediation)."[17]

- Dwight Shellman, county regulation & support manager, Colorado Department of State: "Incidents that need to be reported can go beyond just a security breach and include hardware failure, unanticipated behavior of software, and behaviors that do not comport to description of software in user documentation. Incident reporting can be required as a condition of procurement, as condition of ultimate contract, or as a regulatory matter."[18]

- Eric Fey (Democratic director of elections, St. Louis County, Missouri): "If vendors aren't required to report security incidents, they won't. That's why it's critical to include this requirement in an RFP."[19]

ILLUSTRATIVE LANGUAGE

> Sample Legislative/Regulatory Language

Mandatory incident reporting should be required of all election vendors in a state. For this reason, states should consider imposing this requirement through legislation. A federal bill from the prior Congress, the Secure Elections Act, provides useful language that mandates reporting within three days of discovery of an incident, while also requiring vendor cooperation with authorities.

Secure Elections Act (S.2261):

- "If an election service provider has reason to believe that an election cybersecurity incident may have occurred, or that an information security incident related to the role of the provider as an election service provider may have occurred, the election service provider shall—(1) notify the relevant election agencies in the most expedient time possible and without unreasonable delay (in no event longer than 3 calendar days after discovery of the possible incident); and (2) cooperate with the election agencies in providing the notifications required under subsections (h)(1) and (i)."

- "The term 'election cybersecurity incident' means any information security incident involving an election system….The term 'incident' has the meaning given the term in section 3552 of title 44, United States Code,"[20] which defines "incident" as "an occurrence that—(A) actually or imminently jeopardizes, without lawful authority, the integrity, confidentiality, or availability of information or an information system; or (B) constitutes a violation or imminent threat of violation of law, security policies, security procedures, or acceptable use policies."[21]

Election rules in Colorado similarly mandate incident reporting and require notification of any voting system malfunction:

- "The voting system provider must submit a software or hardware incident report to the Secretary of State no later than 72 hours after a software incident has occurred."[22]

- "A vendor or designated election official must notify the Secretary of State within 24 hours of a reported or actual malfunction of its voting system. The notice must include a description, date, and the names of those who witnessed the malfunction, as well as the procedures followed before the malfunction, and any error messages displayed. The notice may be verbal, but a written notice must follow." [23]

> Sample RFP/Contract Language

In addition, states may want to consider requiring the state's chief election officials to notify locals when she becomes aware of any security breach that could impact their systems.[24] Officials should memorialize in procurement the mandatory reporting obligation coupled with an obligation to cooperate with the jurisdiction, whether or not the requirement for security incident reporting exists in state law or regulation. Ohio provides a useful example that mandates reporting within 24 hours of a security breach (defined broadly) and cooperation with any subsequent investigation:

Ohio (RFP 2013):

- "In case of an actual security breach that may have compromised SOS Data, including but not limited to loss or theft of devices or media, the Contractor must notify the SOS in writing of the breach within 24 hours of the Contractor becoming aware of the breach, and fully cooperate with the SOS to mitigate the consequences of such a breach. This includes any

use or disclosure of the SOS Data that is inconsistent with the Terms of this Agreement and of which the Contractor becomes aware, including but not limited to, any discovery of a use or disclosure that is not consistent with this Agreement by an employee, agent, or subcontractor of the Contractor. The Contractor must give affected the State full access to the details of the breach and assist each SOS in making any notifications to potentially affected people and organizations that the State deems are necessary or appropriate..." [25]

3. Patching/Software Updates

Relevant vendor offerings: voting systems, e-pollbooks, voter registration databases, election-night reporting services

WHY IT MATTERS

Requiring vendors to provide software updates and patches will ensure that jurisdictions are using the most up-to-date software and that vendors are addressing improvements to software to address known vulnerabilities, weaknesses, bugs, and other issues. In that sense, this requirement reinforces an ongoing commitment to cybersecurity and software performance throughout the lifecycle of a contract — without requiring jurisdictions to foot the bill after initial procurement.

The Belfer Center, for instance, recommends mandatory patching and that officials consider patching practices when scrutinizing vendors:

- "Mandate patching as part of a vendor request for proposal (RFP) contract[] and ensure that the patching is conducted securely and frequently."[26]

- "Evaluate the levels of transparency associated with [vendors'] cybersecurity processes, and to what extent they will collaborate with you on key security risk-mitigation activities, including consequence management after a cyber incident. These would include…patching…."[27]

Similarly, the U.S. Department of Homeland Security recommends that election officials ask vendors to explain "patch management and update process" during the vendor selection phase:

- "What is the vendor's patch management and update process?"[28]

Doug Kellner, a co-chair of the New York State Board of Elections, suggested that jurisdictions retain the ability to seek upgrades and patches, as well as maintenance services, from vendors other than the original vendor:

"Contracts should not prevent counties from adding patching from a different vendor. By just having the option of a different vendor, it dampens the monopoly pricing power. For maintenance of voting machines, the vendor will often be the incumbent, but if the incumbent starts charging excessive pricing, then that invites competition. It's important that contract allows someone other than vendor to perform hardware maintenance on the machines."[29]

Amber McReynolds, former director of elections for Denver, Colorado, recommended that jurisdictions consider a 30-day pre-election "freeze window," where all but non-essential, security related patches and updates would be prohibited across all systems in the leadup to voting.[30]

ILLUSTRATIVE LANGUAGE

> Sample RFP/Contract Language

Several jurisdictions have required mandatory software updates or patches through the procurement process. That approach makes sense given the unique nature of each specific procurement, and election officials we consulted endorsed this approach. Officials may want to include explicit language stating that the vendor shall provide these updates at no cost.

- Chicago (RFP 2017): "If Vendor or its subcontractors or manufacturers develops modifications, improvements, or upgrades to any part of the voting devices during the five-year warranty period, Vendor must provide them to the Board free of charge. Vendor must provide, at no additional cost, all new releases, upgrades and patches of the software during the warranty period. Documentation must be updated and delivered within ten (10) days after the new release or upgrade."[31]

- Jefferson County, Alabama (RFP 2015): "Successful bidder must provide warranty and maintenance coverage at no cost to the County the first year after final acceptance of system. Maintenance for the remainder of the contract term shall include routine maintenance, repairs of hardware/firmware and software malfunctions and provision of all system updates, including any security updates and patches."[32]

- Colorado (Contract 2006): "Contractor will, without charge to the State, correct any defects and make any additions, modifications or adjustments to any of the Deliverables or any update or revision to any software Deliverables as may be necessary to keep the Deliverables in operating order in accordance with specifications at all times in accordance with this Contract and the Statement of Work attached as Exhibit A."[33]

Edgardo Cortes, former Virginia commissioner of elections, noted that purchasing jurisdictions should make clear that "updates or patches should be subject to whatever testing and certification requirements are in place" to ensure that inserting updates or patches does not have unintended consequences on the security or reliability of the election system.[34]

In addition, with respect to voting systems, in particular, officials should be mindful of the U.S. Election Assistance Commission System Certification Process and applicable state laws that might limit when such patches can be implemented before elections.[35]

4. Security Assessments/Audits

Relevant vendor offerings: all

WHY IT MATTERS

Election officials should require vendors to submit to security audits, either by government officials or third parties. Such assessments can provide officials with enhanced scrutiny of a vendor's cybersecurity practices, helping officials ensure vendor compliance with contractual and regulatory requirements.

The Center for Internet Security includes this suggestion — i.e., to subject vendors to outside audits — among its best practices for contracting with election vendors:

- "[A] best practice would be that the contractor is subjected to regular independent audits of security controls, with results available to the government organization. Elections officials may wish to have their own security audits. The contract will need to provide for this and the elections officials will need to set aside funds for the audits."[36]

And the Belfer Center similarly advises officials to retain the power to audit vendors and/or to subject vendors to third-party assessments:

- "State/local contracts with vendors should include provisions requiring vendors to conduct third-party vulnerability assessments of their systems and share the results."[37]

- "State officials should perform audits (and retain the right to do so) of a vendor's security practices and protocols. This activity provides assurance that the vendor's cybersecurity practices are robust and meet state and local security standards…."[38]

ILLUSTRATIVE LANGUAGE

> Sample Legislative/Regulatory Language

Officials could consider implementing this recommendation either by statute or through the procurement process. By way of example, California's election code mandates governmental inspections and testing of voting systems:

- "The elections official of any county or city using a voting system shall inspect the machines or devices at least once every two years to determine their accuracy. Any county or city using leased or rented equipment shall determine if the equipment has been inspected for accuracy within the last two years before using it for any election. The inspection shall be made in accordance with regulations adopted and promulgated by the Secretary of State. The elections official shall certify the results of the inspection to the Secretary of State."[39]

- "The Secretary of State shall conduct random audits of the software installed on direct recording electronic voting systems…to ensure that the installed software is identical to the software that has been approved for use on that voting system. The Secretary of State shall take steps to ensure that the process for conducting random audits does not intentionally cause a direct recording electronic voting system to become more vulnerable to any unauthorized changes to the software that has been approved for its use."[40]

> Sample RFP/Contract Language

Officials looking to implement mandatory assessments/audits through procurement should consider the option to outsource assessments/audits to third parties while retaining the option of government personnel conducting such assessments/audits. Officials should also look to require vendor cooperation. The example below, from Colorado, does not explicitly address the state's ability to outsource to third parties, but officials may want to consider such language (which is suggested as an edit below in brackets).

- Colorado (RFP 2013): "Contractor shall permit the State, the federal government, and governmental agencies [as well as any third-parties acting on behalf of the State, the federal government, and/or governmental agencies] having jurisdiction, in their sole discretion, to monitor all activities conducted by Contractor pursuant to the terms of this Contract using any reasonable procedure, including, but not limited to: internal evaluation procedures, examination of program data, special analyses, on-site checking, formal audit examinations, or any other procedures. All monitoring controlled by the State shall be performed in a manner that shall not unduly interfere with Contractor's performance hereunder."[41]

5. Regular Penetration Testing

Relevant vendor offerings: all

WHY IT MATTERS

Much like assessments of vendors' security practices, penetration testing of vendors should help to identify vulnerabilities before adversaries can exploit them. Here, as well, officials should retain the power to subject vendors to penetration testing by government officials and/or outside third parties.

Dwight Shellman of the Colorado Department of State told us that "it is absolutely essential that vendors consent to penetration testing of voting systems."[42] And Neal Kelley (Orange County, California's registrar of voters) stressed that Orange County has taken advantage of the Department of Homeland Security's vulnerability assessment services and that vendors should be subjected to similar scrutiny: "It doesn't make sense for us as a county to look at our vulnerabilities, then have a vendor's voting system with wide-open doors."[43]

The Brookings Institution has advocated for mandatory penetration testing as part of a broader regulatory regime around vendors:

- "Both federal and state governments must better regulate the commercial industry surrounding elections. Currently, this is a limited and proprietary market that too often leaves states with insufficient power to dictate security standards. In addition to setting standards for secure design, manufacturing, and storage of voting systems, the government must mandate ongoing processes such as routine penetration testing."[44]

The Belfer Center, which considers penetration testing "a critical element in ensuring that vulnerabilities in vendor environments are proactively identified and closed,"[45] advises officials to "[m]andate that vendors permit penetration testing of systems, including voting machines,"[46] through contracting:

- "The RFP should clearly include requirements for the vendor to allow penetration-testing by state officials or third parties of their systems to discover weaknesses. Vendors may resist these provisions, especially if they hold broader state contracts that could be affected if vulnerabilities are discovered. Nonetheless, conducting these tests represents the best way to identify cracks in critical infrastructure before malicious actors do, and should be part of any contract with vendors who work on and maintain these systems."[47]

ILLUSTRATIVE LANGUAGE

Memorializing this recommendation will likely overlap with the above recommendation to mandate assessments/security audits of vendors. Much of the illustrative language for that recommendation will also be useful here.

> Sample Legislative/Regulatory Language

Officials considering a statutory approach may also want to consider the Secure Elections Act, which would institute a "Hack the Election" program to "identify and report election cybersecurity vulnerabilities."[48]

Secure Elections Act (S.2261):

- "In establishing the program required under subsection (a), the Secretary shall—(1) establish a recurring competition for independent technical experts to assess election systems for the purpose of identifying and reporting election cybersecurity vulnerabilities; (2) establish an expeditious process by which independent technical experts can qualify to participate in the competition; (3) establish a schedule of awards (monetary or non-monetary) for reports of previously unidentified election cybersecurity vulnerabilities discovered by independent technical experts during the competition; (4) establish a process for election agencies and election service providers to voluntarily participate in the program by designating specific election systems, periods of time, and circumstances for assessment by independent technical experts; and (5) promptly notify election agencies and election service providers about relevant election cybersecurity vulnerabilities discovered through the competition, and provide technical assistance in remedying the vulnerabilities."[49]

> Sample RFP/Contract Language

Illustrative RFPs include specific mention of "penetration tests" or "hacking vulnerability testing," which should leave little doubt about what is expected of vendors in this regard:

- Colorado (RFP 2013): "Security personnel and administrators will audit systems access, review system and application logs, search for security violations, monitor Internet traffic, perform systems penetration tests, and carry out other security related functions on all systems on a regular basis as permitted by the Chief Information Officer (CIO)."[50]

- Pima County, Arizona (RFP 2014): "The system shall have the capability to permit diagnostic testing of all the major components. Vendor shall include documentation for electronic intrusion and software modification or hacking vulnerability testing."[51]

6. Risk-Limiting Audit Support

Relevant vendor offerings: voting systems, ballot preparation, and design services

WHY IT MATTERS

There is wide consensus that the most secure type of voting employs voting systems that rely on voter-marked, human-readable paper ballots.[52] This paper-based voting must, however, be accompanied by audits of the ballots.

Best practice is to conduct statistically sound, robust post-election audits of voter-marked paper ballots after every election, and experts consider risk-limiting audits to be the "gold standard" of post-election audits.[53] Such audits have the benefit of providing a high likelihood of identifying an error in tabulation of votes affecting the outcome, while providing an efficiency advantage over traditional audits that tend to require officials to sample a fixed percentage or number of ballots, regardless of margin of victory.[54]

For example, the National Academies' recent report, *Securing the Vote,* recommended that states "mandate risk-limiting audits prior to the certification of elections," something that "requires the use of paper ballots."[55] To do so, voting systems must be able to match cast vote records (CVRs) to ballots cast — the CVR is the "[a]rchival record of all votes produced by a single voter" and can "be in electronic, paper, or other form."[56] According to the National Academies' report:

- "States and jurisdictions purchasing election systems should consider in their purchases whether the system has the capacity to match CVRs to physical ballots, as this feature could result in future cost savings when audits are conducted."[57]

This requirement, which will also require either imprinting ballots with a unique identifier corresponding to the CVR or segregating ballots by scanner, will facilitate a potentially cost-effective form of risk-limiting audits called *comparison audits*. An EAC report lauds the potential efficiency gains of comparison audits:

- "The comparison RLA provides efficiency by allowing election officials to compare a ballot to the voting system's CVR and generally allows jurisdictions to audit fewer ballots compared to other audit methods."[58]

ILLUSTRATIVE LANGUAGE

> Sample Legislative/Regulatory Language

Several states already mandate risk-limiting audits by statute, which election officials can consult when looking to mandate such audits. Requiring that the audits occur before certification is important to maximizing the utility and effectiveness of the audits, as is making clear that the results of any full recount would replace any unofficial results.

Colorado

- "(2)(a) Commencing with the 2017 coordinated election and following each primary, general, coordinated, or congressional vacancy election held thereafter, each county shall make use of a risk-limiting audit in accordance with the requirements of this section. Races to be audited shall be selected in accordance with procedures established by the secretary of state, and all contested races are eligible for such selection….

- (4) The secretary of state shall promulgate rules in accordance with article 4 of title 24, C.R.S., as may be necessary to implement and administer the requirements of this section. In connection with the promulgation of the rules, the secretary shall consult recognized statistical experts, equipment vendors, and county clerk and recorders, and shall consider best practices for conducting risk-limiting audits.

- (5) As used in this section: …(b) 'Risk-limiting audit' means an audit protocol that makes use of statistical methods and is designed to limit to acceptable levels the risk of certifying a preliminary election outcome that constitutes an incorrect outcome."[59]

Rhode Island

- "(b) Commencing in 2018, the board, in conjunction with local boards, is authorized to conduct risk-limiting audits after all statewide primary, general, and special elections in accordance with the requirements of this section. Commencing in 2020, the state board, in conjunction with local boards, must conduct risk-limiting audits after the presidential preference primary and general elections in accordance with the requirements in this section….

- (d) If a risk-limiting audit of a contest leads to a full manual tally of the ballots cast using the voting system, the vote counts according to that manual tally shall replace the vote counts reported pursuant to §§ 17-19-36 and 17-19-37 for the purpose of determining the official contest results pursuant to §§ 17-22-5.2 and 17-22-6."[60]

> Sample RFP/Contract Language

Rather than stating detailed requirements about CVRs and imprinting capabilities, which might run into state ballot secrecy issues, officials might consider employing

language to straightforwardly require that voting systems support ballot-level comparison audits:

- "The voting system shall support ballot-level comparison audits of individual paper ballots, consistent with applicable law and regulations."

7. Foreign Nexus Disclosure

Relevant vendor offerings: all

WHY IT MATTERS

Foreign efforts to interfere in American elections, including Russian attacks on the nation's election infrastructure, continue to garner attention. These threats highlight the importance of election officials understanding whether vendors might be presenting avenues of attack for foreign adversaries.

Just this past summer, for example, the FBI notified Maryland officials that a vendor servicing the state's voter registration database, online voter registration system, and election night reporting website, among other things — ByteGrid LLC — had substantial ties to Russia.[61] Specifically, the FBI informed Maryland officials that the vendor's financing source (AltPoint Capital Partners) had as its largest investor Russian oligarch Vladimir Potanin. The vendor had not disclosed this foreign ownership to Maryland officials — a fact that would have been critically important to assessing whether the vendor's cybersecurity was adequate for Maryland.[62]

This example highlights the importance of election officials being aware of any foreign ownership, control, or influence affecting a vendor. According to Eric Fey, the St. Louis County, Missouri, Democratic director of elections, "It's important to require vendors to disclose foreign ownership and entanglement so that the [election official] can make their own cost/benefit analysis."[63] But requiring such disclosure is insufficient if not coupled with a requirement for vendors to disclose promptly any changes that might affect a vendor's foreign entanglements.

ILLUSTRATIVE LANGUAGE

> Sample Legislative/Regulatory Language

There have been several bills pending in Congress seeking to regulate vendors' foreign ties — local election officials could consider the approaches of these bills in drafting language to mandate vendor disclosure of fore ign ties, particularly in the event that Congress does not pass such a measure. Election officials could also incorporate similar language into RFPs if necessary.

For example:
Election Vendor Security Act (H.R. 6435):

- "(1) The vendor shall certify that it is owned and controlled by a citizen, national, or permanent resident of the United States, and that none of its activities are directed, supervised, controlled, subsidized, or financed, and none of its policies are determined by, any foreign principal (as defined in section 1(b) of the Foreign Agents Registration Act of 1938 (22 U.S.C. 611(b)), or by any agent of a foreign principal required to register under such Act.

- (2) The vendor shall disclose to the Chair and the Secretary, and to the chief State election official of any State in which the vendor provides, supports, or maintains any component of an election system, any sourcing outside the United States for parts of the system." [64]

Protect Election Systems from Foreign Control Act (H.R. 6449)

- Defining "qualified voting system vendor" as a vendor who meets several criteria, including:

- "(A) Except as provided in paragraph (2), the person is solely owned and controlled by a citizen or citizens of the United States.

- (B) The person discloses any sourcing outside the United States for any parts of the voting system to the Chair of the Commission, the Secretary of Homeland Security, and the chief State election official of any State in which the vendor provides or seeks to provide goods or services with respect to the voting system.

- (C) The person discloses any material change in its ownership or control to the Chair of the Commission, the Secretary of Homeland Security, and the chief State election official of any State in which the vendor provides goods or services with respect to the voting system."[65]

The bill also permits a waiver of the domestic ownership requirement:

- "The Secretary of Homeland Security may waive the requirement of subparagraph (A) of paragraph (1) with respect to a person who is a United States subsidiary of a parent company which has implemented a foreign ownership, control, or influence mitigation plan that has been approved by the Secretary. Such plan shall ensure that the parent company cannot control, influence, or direct the subsidiary in any manner that would compromise or influence, or give the appearance of compromising or influencing, the independence and integrity of an election."[66]

Additional Suggestions

Our interviews with election officials and other experts produced two more suggestions that jurisdictions may want to consider when entering into new agreements with private vendors. First, suggests Amber McReynolds, former director of elections for Denver, Colorado, "Having a security agreement and communication plan between vendors and election officials for each election," which would detail things like support structure, reporting, and contact requirements.[67] This could also be used to confirm background checks for vendor employees.

Second, Matthew Davis, former chief information officer for Virginia's Department of Elections, suggests conducting baseline testing on all equipment upon receipt and prior to every deployment. These test results can be used to confirm that the equipment received is delivered as ordered. They can also be used for comparison purposes after an election if any concerns are raised during an election.

Conclusion

The combination of aging infrastructure and heightened attention to election security means that there will likely be a large number of purchases of election systems and services around the country, unmatched perhaps since the years following the passage of the Help America Vote Act in 2002. The knowledge election officials and others have gained in that time provides us with a unique opportunity to reset the clock and ensure that private vendors who play a central and critical role in American elections are delivering products and services that will increase the security of those elections.

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POLICY REPORT

BRENNAN CENTER FOR JUSTICE

Preparing for Cyberattacks and Technical Failures

A Guide for Election Officials

By Edgardo Cortés, Gowri Ramachandran, Liz Howard, and Lawrence Norden

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Introduction

America's intelligence agencies have unanimously concluded that the risk of cyberattacks on election infrastructure is clear and present — and likely to grow.[1] While officials have long strengthened election security by creating resiliency plans,[2] the evolving nature of cyber threats makes it critical that they constantly work to improve their preparedness. It is not possible to build an election system that is 100 percent secure against technology failures and cyberattacks, but effective resiliency plans nonetheless ensure that eligible voters are able to exercise their right to vote and have their votes accurately counted. This document seeks to assist officials as they revise and expand their plans to counter cybersecurity risks.

Many state and local election jurisdictions are implementing paper-based voting equipment, risk-limiting audits, and other crucial preventive measures to improve overall election security. In the months remaining before the election, it is at least as important to ensure that adequate preparations are made to enable quick and effective recovery from an attack if prevention efforts are unsuccessful.

While existing plans often focus on how to respond to physical or structural failures, these recommendations spotlight how to prevent and recover from technological errors, failures, and attacks. Advocates and policymakers working to ensure that election offices are prepared to manage technology issues should review these steps and discuss them with local and state election officials.

Prevent and Recover from Electronic Pollbook Failures and Outages

Electronic pollbooks, or e-pollbooks, are laptops or tablets that poll workers use instead of paper lists to look up voters. E-pollbooks expedite the administration process, shorten lines, lower staffing needs, and save money. Most e-pollbooks can communicate with other units in the same location to share real-time voter check-in updates. They may also be able to communicate directly with a local election office or with other locations, such as vote centers, via physical connections or wireless networks.

There are no national standards for e-pollbook operations or security. E-pollbooks present unique challenges because they need to maintain updated information across numerous devices and locations. Additionally, many devices that may be used as e-pollbooks do not have the ability to connect via physical networks and require some type of wireless communication to convey important information. Election officials should consider the following security recommendations when using e-pollbooks:

Limit or eliminate connectivity to wireless networks whenever possible. E-pollbooks used for voter check-in generally do not need wireless connections. Officials who operate precinct-based voting on Election Day should choose e-pollbook options that use hardwired connections to share voter information in real time across units to complete the voter check-in process. This provides the greatest level of security. Bluetooth is not an acceptable alternative to other types of wireless network connectivity; researchers have found security vulnerabilities that risk the spread of malware and allow unauthorized access to data being transmitted between Bluetooth-connected devices.[3]

Implement proper security protocols when wireless connectivity is required. Election officials using vote centers and multiple early-voting locations may require some network connectivity to share voter check-in information across several locations. Additionally, some e-pollbooks may not fully function if their wireless connections are eliminated or disabled. For example, certain e-pollbooks use Apple iPads, which rely solely on wireless connectivity for communication. If wireless networks must be used, officials should implement security protocols, including encrypting communication between e-pollbooks and requiring strong passwords that are changed after every election.

Ensure that systems are properly patched as part of Election Day preparations. E-pollbooks must receive appropriate operating system updates and software patches in advance of every election to protect against known cyber vulnerabilities. To determine what patches are available or recommended, election officials should start by reviewing any guidelines or requirements created by state or local government IT agencies. States and localities may develop their cybersecurity requirements on the basis of the National Institute of Standards and Technology's cybersecurity framework.[4] Adhering to these requirements will ensure that election officials are using best practices for securing election systems, protecting the personally identifiable information (PII) of voters, and preserving the integrity of voter data used on Election Day. Alerts from the Election Infrastructure Information Sharing and Analysis Center (EI-ISAC) can also provide insights about recent vulnerabilities and emergency security patches.

Keep appropriate backup of e-pollbooks in polling places. Paper backups of e-pollbooks are the best resiliency measure in the event of an e-pollbook failure. They allow poll workers to continue confirming voters' eligibility, diminish the potential for long lines, and may minimize the need to issue provisional ballots. While jurisdictions in 41 states and the District of Columbia (DC) use e-pollbooks, our research indicates that only 11 states and DC formally require paper backups on Election Day, although several other states recommend the practice or have counties that voluntarily keep paper backups.[5] Durham County, North Carolina, experienced a significant failure of e-pollbooks in November 2016, when many voters arrived at the polls to find that they had been marked on the e-pollbooks as already having voted or were improperly marked as needing to provide additional identification.[6] Voting was delayed for more than an hour and a half as the county printed paper pollbooks and delivered them.[7] This delay could have been avoided if printed pollbooks had been sent ahead of time with other polling place materials. Preemptively sending paper backup of e-pollbooks to polling places obviates the need for detailed logistics in case of e-pollbook failure.

Jurisdictions should evaluate their e-pollbook recovery procedures to ensure they will be easy for poll workers

to follow and will not introduce new obstacles to voters casting their ballots quickly. As the use of vote centers and other centralized voting locations increases, printing pollbooks may create logistical and administrative challenges. These types of voting locations may need other backup options, such as nonnetworked devices from a different vendor that contain the entire list of registered voters for a jurisdiction, along with the correct ballot style and current status (i.e., voted, absentee, or not voted) for each voter. Another option is to produce a backup list on demand using high-speed printers. This backup procedure, which New Hampshire law calls for, could allow polling places to quickly transition from malfunctioning e-pollbooks to paper backups.

Provide sufficient provisional ballots and materials for two to three hours of peak voting. A key backup measure for Election Day is to supply sufficient provisional ballots and provisional balloting materials. It is preferable to issue regular ballots to eligible voters if the e-pollbook system fails. However, it may not be possible to determine voter eligibility in the event of such a failure, especially if backup paper pollbooks are unavailable or are found to contain errors. Provisional ballots ensure that individuals can cast a ballot while providing election officials time to determine their eligibility. These ballots should be counted once officials determine eligibility, with no further action required of the voter. Having sufficient provisional ballots to account for two to three hours of peak voting activity will allow voting to continue in the event of system failures.[8] For the November 2020 election, this will require enough provisional ballots for at least 35 percent of registered voters.[9] While not enough to deal with an all-day problem, it will provide sufficient time for other measures to be implemented or additional ballots and materials to be delivered. Contingency plans must provide for additional materials to be delivered if the problem cannot be resolved.

Train poll workers to implement pollbook contingencies. Improper or insufficient training of poll workers can lead to voters being turned away, long lines, and ineligible individuals casting ballots. Poll worker instructions for managing provisional ballots must specify how to handle e-pollbook failures appropriately, including when to allow voters to cast a regular ballot and when to issue provisional ballots instead. Whenever voter eligibility can be confirmed in a timely fashion through the use of appropriate backups, regular ballots should be issued. The U.S. Election Assistance Commission (EAC) provides a list of guidelines for poll workers regarding provisional ballots as well as some best practices for poll worker accountability. Provisional ballot forms must clearly indicate the sections that should be filled out by voters, poll workers, and election staff, so each person knows what he or she needs to do. It is also important to provide a clear list of circumstances in which to use provisional ballot envelopes, including on the envelopes themselves. In 2018, Virginia adopted new provisional ballot materials created in coordination with the Center for Civic Design that illustrate these best practices.[10]

More Resources

Center for Internet Security Handbook
www.cisecurity.org/wp-content/uploads/2018/02/CIS-Elections-eBook-15-Feb.pdf

Belfer Center Cybersecurity Playbook
www.belfercenter.org/publication/state-and-local-election-cybersecurity-playbook#voterreg

Pew E-pollbook Database
www.pewtrusts.org/en/research-and-analysis/data-visualizations/2017/a-look-at-how-and-how-many-states-adopt-electronic-poll-books

National Conference of State Legislatures Page on E-pollbooks
www.ncsl.org/research/elections-and-campaigns/electronic-pollbooks.aspx

EAC Standards for Poll Workers
www.eac.gov/research-and-data/provisional-voting

Center for Civic Design on Provisional Ballots
www.civicdesign.org/you-see-a-provisional-ballot-voters-see-their-ballot

Prevent and Recover from Voting Equipment Failures

Even under the best of circumstances, equipment failures occur. For digital or optical-scan voting systems, recovery in case of an equipment failure can be relatively fast; as ballots are already printed, voting can continue while the tabulator issue is resolved. As a Brennan Center report on voting machines notes, jurisdictions that rely on direct-recording electronic (DRE) machines can face more problems in the event of a failure, since "voters may have to wait in long lines while election workers scramble to repair them."[11]

These problems can occur when jurisdictions use ballot-marking devices (BMDs) and ballot-on-demand (BOD) printers as well. In the event of a system failure, these machines will not function until repaired or replaced, and jurisdictions using them will need to print ballots in advance of the election to allow voting to continue. Regardless of the voting system used, election officials should conduct logic and accuracy testing on all voting equipment prior to every election in order to minimize the chance of unforeseen failures on Election Day.

If using paper ballots, print enough ballots for all registered voters. Many election officials using paper ballots decide how many ballots to print on the basis of prior election turnout or the percentage of registered voters expected to vote. This approach can result in ballot shortages and leave jurisdictions unprepared for unexpected voter surges. This happened across the country during the 2018 midterm elections, when turnout reached historic levels, and many experts predict record-breaking turnout in 2020.[12] To prepare, election officials should print enough ballots for all registered voters. Jurisdictions that allow Election Day registration may require an even higher ballot supply.

If using voting systems that do not require preprinted ballots, print enough emergency paper ballots for two to three hours of peak voting activity. Emergency ballots should be provided to voters who are identified as qualified and meeting all the requirements for voting pursuant to state law but who are unable to vote due to a voting machine malfunction. Emergency ballots are different from provisional ballots, which are given to voters whose eligibility is unclear. Emergency ballots should be counted as soon as functional voting equipment becomes available, without any additional scrutiny of voter qualifications, unlike provisional ballots, which may require research on voter eligibility. Printing enough emergency ballots for two to three hours of peak voting activity will allow voting to continue until equipment can be repaired or replaced, or until additional paper ballots can be delivered to a polling place. For the November 2020 election, this will require enough provisional ballots for at least 35 percent of registered voters. Appropriate procedures should be put in place for chain of custody and accounting for preprinted paper ballots.

DRE voting systems directly record, in electronic form, voters' selections in each race or contest on the ballot. An increasing number of states and local jurisdictions have begun replacing antiquated DREs with BMDs as the primary voting option. Others are increasingly using vote centers, which often rely on BOD printers to produce on-site any ballot style and language that might be needed for a particular voter. Because these systems do not need preprinted ballots, election jurisdictions using DREs, BMDs, or BOD-printed ballots as their primary voting option should preprint and distribute emergency paper ballots that can be counted by existing tabulators. There are 16 states that will use DREs as the principal polling place equipment in at least some jurisdictions in 2020.[13] However, at least seven do not mandate that paper ballots be made available in the event of DRE failure.[14]

In vote centers that have a large number of ballot styles, preprinted emergency ballots for at least the precincts closest to that vote center should be stocked. Vote centers can also be stocked with master copies of emergency paper ballots in all necessary styles and languages, along with a photocopier to reproduce them in emergency situations.

Tabulators should be programmed to accept and read both ballots produced by the BMD/BOD printers and preprinted emergency ballots. Preelection testing should verify that the tabulators properly identify and record both types of ballots.

Develop procedures to manage and track malfunctioning equipment or equipment failure. Machines that appear to be malfunctioning or improperly calibrated should be taken out of service and additional voting equipment deployed to the polling place or vote center. Recalibrating DRE touch screens or conducting any other necessary voting equipment repairs should be done in full view of observers. Any reports from voters of machine errors should be tracked and immediately reported to the

central election office. Election offices should review and compare these reports across voting locations to identify trends that could indicate widespread problems, including potential cyberattacks. Training should ensure that poll workers understand the process for counting ballots, including potentially hand-counting ballots, if equipment failure cannot be resolved before voting ends.

Communicate with voters to build trust in the election process. Election officials should preprint signage that will allow poll workers to inform voters of equipment failures in a manner that is consistent across locations and approved by the election office. On Election Day, poll workers should ensure that voters are not directed to use machines that are suspected of producing erroneous records.

Poll workers should also take steps to make sure that voters accurately recorded their selections on their ballots. When using hand-marked paper ballots that are counted without the help of an optical scanner, poll workers should remind voters to check their ballots to prevent overvotes, which occur when voters make more selections than the number allowed. When using DREs with a voter-verifiable paper audit trail (VVPAT) or BMDs, poll workers should clearly explain to voters how their ballots will be cast and remind them to verify that the paper printout matches the selections they made on the machine. For example, when using BMDs that print a ballot that must then be scanned by a separate machine, poll workers should say to voters, after their ballot has been printed and before it is cast: "Don't forget to check the printed ballot carefully. If you see something wrong, you can get a replacement. Then you'll go [over there] to cast it."

Take steps to prevent late polling place openings due to equipment failures. Inoperable voting equipment should not prevent the timely opening of a polling place. Late polling place openings can lead to long lines and voters leaving without an opportunity to cast a ballot.[15] Poll workers should be trained to deal with equipment failures occurring on the morning of Election Day. Voters should be allowed to vote using emergency paper ballots if voting equipment is not operable when the polls open. Poll workers should explain to voters how their ballots will be counted once working voting equipment becomes available.

Plan to assist voters with disabilities if voting machines fail. If accessible voting machines fail and paper ballots are used instead, disabled voters may not be able to vote privately and independently. Jurisdictions with sufficient resources should have backup accessible voting equipment, with all ballot styles available (similar to what would be used at a central voting site for early voting), geographically dispersed so that it can be rapidly delivered to any polling place where accessible equipment has failed. In the longer term, jurisdictions might consider providing each polling place with accessible tablets and printers to be used by voters with disabilities in the event of equipment failure.[16] Poll workers should be appropriately trained on any backup systems used to provide accessibility.

More Resources

Brennan Center Report on Voting Machines at Risk
www.brennancenter.org/analysis/americas-voting-machines-risk-an-update

Brennan Center Voting Equipment Overview
www.brennancenter.org/analysis/overview-voting- equipment

Verified Voting Verifier – Lookup Tool for Polling Place Equipment
www.verifiedvoting.org/verifier

Prevent and Recover from Voter Registration System Failures and Outages

Voter registration systems maintain official lists of registered voters, including all voter information and district assignment information. The statewide systems usually serve additional election-management purposes as well, such as processing absentee ballots. A failure of the registration system on or near Election Day can cause problems producing files for paper pollbooks or e-pollbooks, using voter information lookup tools, or validating provisional ballots immediately after the election.

Establish a 60-day preelection blackout window for all noncritical software updates and patches. These windows increase the likelihood that programming errors, viruses, or other problems will be discovered in a timely manner prior to Election Day. Sixty days provides sufficient time before the close of voter registration or the start of absentee voting to identify whether installed patches or updates have created unintended system issues. Even updates that do not directly impact voter registration databases, such as server patching, networking equipment upgrades, and locality telecommunications system changes, may impact a local election official's ability to access the state voter registration database. Therefore it is critical that these blackout dates be established and communicated with relevant staff to prevent potential issues on or shortly before Election Day. The plan should include a process for emergency updates during the blackout window, indicating who will authorize the emergency update and how it will be tested prior to rollout.

Subject the system periodically to independent vulnerability testing. States can either partner with the Department of Homeland Security or engage outside cybersecurity consultants to test the system for vulnerabilities on a periodic basis. Vulnerability testing should be conducted well in advance of an election, and at least quarterly, to provide sufficient time to resolve any potential vulnerabilities that are discovered. While the specific results of vulnerability testing need not be released so as to maintain system security, officials should be transparent about what entity conducted the testing and what standards it used.

Maintain backup copies of digital records off-line in case online access is limited. In the lead-up to the election, local officials should download an electronic copy of voter information on a daily basis and store it securely, so that they have the most recent information in case the voter registration system becomes unavailable. This can be used to conduct research on provisional ballots after the election.

Provide voters with tools to look up their voter registration status online and conduct outreach to urge voters to use the tool in advance of any registration deadline. Voters can provide crucial information about undesired changes to their registration, including address changes they did not request, which could be an early indicator of a possible breach. Encouraging voters to check before a deadline ensures that problems can be resolved in a timely fashion. It may also reduce pressure on poll workers on Election Day.

Provide voters with tools to look up their polling place information online, and make alternative websites available. In case a voter lookup tool fails, election officials should be prepared to provide links to other polling place lookup tools, such as the Voting Information Project (VIP), an independent entity that provides information to voters using official data. New Jersey successfully used VIP to provide information to voters after Hurricane Sandy made state systems unavailable and necessitated a large number of polling place changes in advance of the 2012 election.[17] Using tools such as VIP for polling place lookups, instead of sites that depend on statewide registration systems, also reduces the load on state servers at busy times in the election season. This requires providing accurate polling place data to the backup site in advance of elections and confirming that the backup site is working correctly.

More Resources

EAC Deep Dive on Election Technology
www.eac.gov/documents/2018/05/01/eavs-deep-dive-election-technology

Pew Project on Upgrading Voter Registration
www.pewtrusts.org/en/projects/election-initiatives/about/upgrading-voter-registration

EAC Checklist for Securing Voter Registration Data
www.eac.gov/documents/2017/10/23/checklist-for-securing-voter-registration-data

Voting Information Project
www.votinginfoproject.org

Prevent and Recover from Election Night Reporting System Failures and Outages

Local and state officials usually post unofficial results on election night. While this information does not reflect the certified results, large differences between unofficial election night results and the final outcome can create questions for voters about the accuracy of the process. Election night reporting sites are prime targets for denial of service (DoS) attacks because the sites' high-use period is known ahead of time, and preventing access to unofficial results can create negative media attention about the electoral process. A hotly contested race can intensify interest in the election results, and a large increase in visitors to a reporting site in a short period can likewise bring down the site.

Establish redundancies. Some states, including Arizona and Virginia, experienced election night reporting failures in the 2014 midterm elections.[18] Addressing the system failures after the election, several of these states established a redundant system that can be made available if the main system fails.[19]

Do not connect election night reporting systems to voting systems or the statewide registration system. Election night reporting systems (ENRs) are attractive targets for cybercriminals and other nations. Bad actors have successfully attacked ENRs around the world, including in Ukraine, Bulgaria, and more recently the United States. By publishing unofficial results through an unconnected system, election officials can minimize the potential that a targeted attack on the reporting system will have any lasting impact. Knox County, Tennessee, experienced a DoS attack linked to foreign IP addresses during its May 1, 2018, primary elections. Although this attack likely served as a distraction from a separate attack on the county's servers, the reporting website itself did not provide an avenue for future disruption. The county's deputy director of IT noted that its reporting system is "not connected to any live databases. . . . It's a repository for being able to report to the public, and we have intentionally kept any primary data extremely isolated."[20]

More Resources

EAC Checklist for Securing Election Night Reporting Systems
www.eac.gov/documents/2017/10/23/checklist-for-securing-election-night-reporting-systems-data- election-administration-security

Communication Strategy

All good contingency plans include a communication plan. At its core, a communication plan is intended to assist election officials in distributing essential information in a timely manner and maintaining public confidence in the election's administration. Communication plans are important in all unexpected situations, from equipment failures to potential cyberattacks to unintentional errors.

Draft, review, and approve a communication plan prior to Election Day. Keeping voters, poll workers, and others informed minimizes the harm that could arise on Election Day in the event of negative developments. The most basic communication plan includes key staff and contacts. A more detailed strategy may include various response options for potential problems as well as longer-term considerations, such as notification requirements in the event personal voter information has been leaked.

Provide a public website for emergency communications. Officials should publicize links where emergency information will be posted on Election Day, possibly including official social media accounts used by state and local election officials. These can serve as official sources where voters, candidates, media, and advocacy organizations can find information regarding extended polling place hours, polling place relocations, and other emergency information. Doing this in advance of an election will make emergency communications easier for election officials.

Be transparent but careful. As the Belfer Center for Science and International Affairs suggests, "Transparent communication builds trust, but in a cyber incident, you will have few facts at hand, especially at the outset. Public comments should demonstrate that you are taking the issue seriously but avoid providing any details that may change as the investigation progresses, so you don't have to correct yourself down the line. Avoid speculation on the perpetrator of the incident."[21]

More Resources

Belfer Center Cybersecurity Playbook
www.belfercenter.org/publication/state-and-local-election-cybersecurity-playbook#voterreg

Endnotes

1 See generally Senate Select Committee on Intelligence, *Russian Active Measures Campaigns and Interference in the 2016 U.S. Election Volume 1*, 2019, https://www.intelligence.senate.gov/sites/default/files/documents/Report_Volume1.pdf; Robert S. Mueller III, *Report on the Investigation into Russian Interference in the 2016 Presidential Election*, U.S. Department of Justice, 2019, https://www.justice.gov/storage/report.pdf; and Olivia Gazis, "Intel Chiefs Warn of Russia-China Alliance as Threats Grow More Complex," CBS News, Jan. 29, 2019, https://www.cbsnews.com/news/intelligence-chiefs-provide-updates-on-worldwide-threats-2019-01-28-live-updates.

2 See, e.g., Wisconsin State Board of Elections, *Report on Election Related Contingency Planning*, 2007, https://elections.wi.gov/sites/default/files/publication/65/election_related_contingency_planning_2007_pdf_19060.pdf; Senate Select Committee on Intelligence, *Russian Targeting of Election Infrastructure During the 2016 Election: Summary of Draft SSCI Recommendations*, 2018, https://www.burr.senate.gov/imo/media/doc/RussRptInstlmt1-%20ElecSec%20Findings%2CRecs2.pdf.

3 See, e.g., Armis, *Protecting the Enterprise from BlueBorne*, 2017, https://go.armis.com/hubfs/BlueBorne%20Technical%20White%20Paper.pdf; Daniele Antonioli, Nils Ole Tippenhauer, and Kasper B. Rasmussen, "The KNOB Is Broken: Exploiting Low Entropy in the Encryption Key Negotiation of Bluetooth BR/EDR" (paper presented at the 28th Usenix Security Symposium, Santa Clara, CA, Aug. 2019), https://www.usenix.org/conference/usenixsecurity19/presentation/antonioli.

4 National Institute of Standards and Technology, "Cybersecurity Framework," accessed Nov. 20, 2019, https://www.nist.gov/cyberframework.

5 In our research, we found written paper backup requirements for e-pollbooks in 11 states and Washington, DC. These 11 states are Connecticut, Georgia, Michigan, Minnesota, New Jersey, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, and South Dakota. Mississippi and West Virginia have laws recommending paper backups. In Nevada and Wyoming, backup paper pollbooks are available in practice everywhere e-pollbooks are used, while in other states, like Colorado, Kansas, and Texas, paper backups are available in many jurisdictions. Arizona and Maryland formally require that either paper or electronic backups be available, while Idaho has indicated that it makes this recommendation. A few other states require or recommend that electronic backups be available. New Hampshire mandates that a sufficient number of high-speed printers be available to produce a backup paper checklist in the event of a system failure but has not yet deployed its e-pollbook solution.

6 Pam Fessler, "Russian Cyberattack Targeted Elections Vendor Tied to Voting Day Disruptions," NPR, Aug. 10, 2018, https://www.npr.org/2017/08/10/542634370/russian-cyberattack-targeted-elections-vendor-tied-to-voting-day-disruptions.

7 Fessler, "Russian Cyberattack Targeted Elections Vendor."

8 Nicholas Weaver, "Election Vulnerability: Voter Registration Systems," *Lawfare*, Feb. 23, 2018, https://www.lawfareblog.com/2018-election-vulnerability-voter-registration-systems.

9 In the typical state, 35 to 45 percent of voters surveyed arrived at their polling place during the peak three hours of voting. Because historically high turnout is expected in the 2020 elections, we multiplied this range by 90 percent, to estimate that emergency supplies to serve 30 to 40 percent of voters would be prudent, or 35 percent in the typical case. See Charles Stewart III, *2016 Survey of the Performance of American Elections: Final Report*, Massachusetts Institute of Technology, 2017, 343, http://www.legendsvote.org/wp-content/uploads/MIT-Charles-Stewart-Voter-Turnout-Study-2016.pdf.

10 Center for Civic Design, "Making Provisional Voting Easier in Virginia," accessed Nov. 20, 2019, https://civicdesign.org/showcase/making-provisional-voting-easier-in-virginia.

11 Lawrence Norden and Christopher Famighetti, *America's Voting Machines At Risk*, Brennan Center for Justice, 2015, 30, https://www.brennancenter.org/sites/default/files/publications/Americas_Voting_Machines_At_Risk.pdf.

12 Henry Olsen, "We Could Have Record Turnout in the 2020 Election. We're Not Ready for It," *Washington Post*, Oct. 10, 2019, https://www.washingtonpost.com/opinions/2019/10/10/we-could-have-record-turnout-election-were-not-ready-it.

13 These 16 states are Arkansas, Indiana, Illinois, Kansas, Kentucky, Louisiana, Mississippi, Nevada, New Jersey, North Carolina, Ohio, Texas, Tennessee, Utah, Wyoming, and West Virginia. Three states that have recently used DREs — Georgia, South Carolina, and Pennsylvania — have committed to replacing them by 2020.

14 We have identified the following states where there are no provisions mandating that paper ballots be made available in the event of DRE failure: Kansas, Nevada, North Carolina, Texas, Utah, West Virginia, and Wyoming. While not required by statute, polling places in some of these states may provide some form of emergency paper ballots when systems go down. For instance, Kansas requires counties to keep an additional supply of ballots to meet any emergency need for such ballots, although machine failure is not specifically listed; Nevada requires each local election official to submit a plan for the use of absentee ballots in case of an emergency; Texas advises its counties to adopt procedures to provide emergency paper ballots in the event of DRE machine failure; Utah allows the provision of emergency paper ballots; and West Virginia counties have contingency plans in the event of machine failure.

15 For example, during New York's June 2018 federal primary election, a voter was reportedly unable to vote because an election worker had not yet activated voting equipment. The voter was not offered an emergency ballot before having to leave the polling place. See Jake Offenhartz, "Voters Reporting Closed Poll Sites and Other Primary Day Confusion," *Gothamist*, June 26, 2018, http://gothamist.com/2018/06/26/voters_primary_confusion_nyc.php.

16 States like Oregon have adopted remote accessible voting by mail without requiring access to the internet to mark the ballot. Jurisdictions may want to consider having such systems available in the polling place in the event of machine failures. See State of Oregon, "Voting Instructions for Voters with a Disability," accessed Nov. 20, 2019, https://sos.oregon.gov/voting/Pages/instructions-disabilities.aspx.

17 Susan K. Urahn, "Collaboration, Technology and the Lessons of Election Day," *Governing: States and Localities*, Jan. 16, 2013, https://www.governing.com/columns/mgmt-insights/col-collaboration-technology-voting-information-accessibility.html.

18 Eyragon Eidam, "Is Your Election Night Reporting System Ready for 2016?" *Government Technology*, Dec. 21, 2015, http://www.govtech.com/state/Is-Your-Election-Night-Reporting-System-Ready-for-2016.html.

19 Eidam, "Is Your Election Night Reporting System Ready?"

20 Sam Levine, "Hackers Tried to Breach a Tennessee County Server on Election Night: Report," *Huffington Post*, May 11, 2018, https://www.huffpost.com/entry/knox-county-election-cyberattack_n_5af5ca21e4b032b10bfa56ee; and Tyler Whetstone, "Knox County Election Night Cyberattack Was Smokescreen for Another Attack," *Knox News*, May 17, 2018, https://www.knoxnews.com/story/news/local/2018/05/17/knox-county-election-cyberattack-smokescreen-another-attack/620921002/.

21 Siobhan Gorman et al., *Election Cyber Incident Communications Coordination Guide*, Belfer Center for Science and International Affairs, 2018, 12, https://www.belfercenter.org/sites/default/files/files/publication/CommunicationsGuide.pdf.

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Election Security Advance Planning Checklist

PUBLISHED DECEMBER 19, 2019

Prevent and Recover from Electronic Pollbook Failures and Outages

☐ **Limit or eliminate connectivity to wireless networks whenever possible.**

☐ **Implement proper security protocols when wireless connectivity is required.**

- Encrypt all communications between e-pollbook units.
- Adopt new and strong passwords after every election.

☐ **Ensure systems are properly patched as part of Election Day preparations.**

- Review and adhere to all guidelines or requirements created by state or local government IT agencies.
- Use the National Institute of Standards and Technology (NIST) cybersecurity framework to develop any additional guidelines.
- Stay up to date on alerts from the Election Infrastructure Information Sharing and Analysis Center (EI-ISAC) about recent vulnerabilities and emergency security patches.

☐ **Keep appropriate backup of e-pollbooks in polling places.**

- Send paper backups of e-pollbooks to polling places with other printed materials.
- If centralized voting locations are used and back-up paper pollbooks are not feasible, arrange for these locations to have nonnetworked alternative devices containing the entire list of registered voters for the jurisdiction.
- Evaluate recovery procedures to ensure they will be easy for poll workers to follow.

☐ **Provide sufficient provisional ballots and materials for two to three hours of peak voting.**

- Allow voters to use regular ballots whenever possible.

- Do not deny or delay providing provisional ballots where eligibility or registration is in doubt due to e-pollbook failure.

☐ **Train poll workers to implement pollbook contingencies.**

- Include instructions for managing provisional ballots in case of e-pollbook failure.
- Make sure that each section of provisional ballot forms clearly instructs voters, poll workers, and election staff on what they need to do.

Prevent and Recover from Voting Equipment Failures

☐ **If using paper ballots, print sufficient ballots for 100 percent of registered voters.**

☐ **If using direct-recording electronic (DRE) machines, ballot-marking devices (BMD), or ballot-on-demand (BOD) printers, print emergency paper ballots for two to three hours of peak voting.**

- Make sure emergency paper ballots are in every polling place and poll workers have been trained to use them.
- Count emergency ballots without any additional scrutiny of voter qualifications.
- If using BMDs or BOD printers, program tabulators to accept and read emergency paper ballots.

☐ **Develop procedures to manage and track equipment failure.**

- Take malfunctioning equipment out of service and deploy additional equipment to polling places when needed.
- Recalibrate DRE touchscreens and make any other necessary voting equipment repairs in full view of observers.
- Establish protocols for poll workers to notify the election office of equipment failures and other issues.
- Train poll workers on the process for counting paper ballots, including potential hand-counting.

☐ **Communicate with voters to build trust in the election process.**

- Preprint signage that informs voters of equipment failures and include instructions with other polling place materials for when to post the signage.
- Remind voters to check their ballots or paper printouts for any errors.
- If equipment is not working during voting, provide information to voters about how their ballot will be counted.

☐ **Take steps to prevent late polling place openings.**

- Train poll workers to deal with equipment failures occurring on Election Day morning.

☐ **Plan to assist voters with disabilities if accessible voting machines fail.**

- Distribute backup accessible voting equipment — with all ballot styles available — to geographically dispersed areas.
- In the longer term, provide each polling place with accessible tablets and printers for voters with disabilities to use in the event of voting equipment failure.

☐ **Conduct a postelection manual audit of paper ballots or an audit trail to verify software totals.**

Prevent and Recover from Voter Registration System Failures and Outages

☐ **Establish a 60-day preelection blackout window for all noncritical software updates and patches.**

- Provide a process for emergency updates during the blackout window that specifies who will authorize them and how they will be tested prior to rollout.

☐ **Subject the system to independent vulnerability testing on a periodic basis.**

- Conduct vulnerability testing well in advance of an election so that there is sufficient time to resolve potential vulnerabilities that are discovered.
- Be transparent about what entity will conduct the testing and what standards it will use.

☐ **Maintain backup copies of digital records offline in case online access is limited.**

- In the weeks before the election, download an electronic copy of voter information daily and store it securely.

☐ **Provide voters with tools to look up their voter registration status online.**

- Conduct outreach and urge voters to use the tool in advance of any registration deadline.

☐ **Provide voters with tools to look up their polling place information online.**

- Be prepared to provide voters with alternative web pages, such as those offered by the Voter Information Project, in case of voter lookup tool failure.
- Provide accurate polling place data to the backup website in advance of the election and confirm that the backup website is working correctly.

Prevent and Recover from Election Night Reporting System Failures and Outages

☐ **Establish a redundant election night reporting system to be used in case of an outage.**

☐ **Do not connect election night reporting systems to voting systems or the statewide registration system.**

Develop a Communication Strategy

☐ **Draft, review, and approve a communication plan prior to Election Day.**

☐ **Include key staff and other contacts in the plan.**

☐ **Prior to Election Day, provide a public website for emergency communications.**

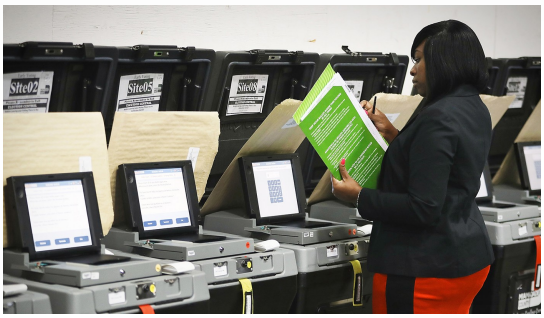
President Michael Waldman on Recent Police Killings and Civil Unrest

READ THE STATEMENT

EXPERT BRIEF

How to Secure Elections for 2020 and Beyond

States urgently need federal funding to prepare for the cyberattacks that are likely to come. The danger to democracy is too great to wait until it's too late.



Joe Raedle/Getty

Lawrence Norden

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Defend Our Elections

Election Security

After months of enduring the "Moscow Mitch" label, Senate Majority Leader Mitch McConnell surprised many observers in September by throwing his support behind a proposal to provide **$250 million in funds** for state election security, something he had assiduously rejected all year. The move was only a partial concession, and **many rightly argue** it is hardly enough.

McConnell still rejects the need for comprehensive security legislation that many **experts** say we need. The proposal he supports would provide far less money than a House appropriations bill **passed** in June, which would not only provide the states with a much more robust $600 million, but also includes measures meant to ensure that all of the money is spent on **election security measures** rather than non-security related items.

The *Washington Post* has **noted** that McConnell's sudden conversion "is likely just the start of what could be a battle royal in Congress" over these differences. Still, the move by McConnell makes it much more likely states will see additional money they can use for election security ahead of November 2020. The House and Senate will need to compromise to pass a budget, and for now, both sides finally seem to agree that states need more resources to ensure that American elections remain free, fair, and secure from cyberattack.

One question we're hearing a lot at the Brennan Center is: even if there is agreement, is it too late to make a difference for 2020? The answer is no.

The Brennan Center has estimated that the national cost for some of the most critical election security measures to be approximately **$2.2 billion** over the next five years. Below I detail each of those items and explain why there is still time for an infusion of cash from Congress to make significant improvements in protecting our election from cyberattacks.

Upgrading voting machines and other critical election infrastructure

Most of the public dialogue around election security centers on securing our voting machines. This is not particularly surprising, as the easiest attack to understand — and in many ways, the most nightmarish — is the insertion of malware onto voting machines that changes election results without detection.

The most critical step we need to take around voting machines is replacing paperless voting machines with systems that have a voter-verified paper backup of every vote. Without that, we do not have an independent record that we can use to make sure we can trust the software totals provided by voting machines. The good news is that we've made **substantial progress** in replacing these machines, nearly halving the number used since 2016. Still, unless more states and counties move to replace them, the Brennan Center estimates that approximately 16 million Americans will vote on paperless systems in 2020.

More broadly, paper backup or not, many voting machines in the United States are so old they pose a **security risk**. At a certain point, older computerized systems are more likely to fail and difficult to maintain. They use outdated hardware and software that are no longer serviced, meaning that some election officials have **to turn to eBay** for replacement parts and cannot patch vulnerabilities when they are discovered. Election officials know these machines should be replaced. In a **survey** last year, local officials in 31 states told the Brennan Center they needed to replace their equipment before the 2020 election, but two-thirds said they did not have the funds to do so.

In addition to voting machines, other critical election infrastructure, like voter registration databases, need to be upgraded for better security. It is worth remembering that while there is no evidence that voting machines were targeted in 2016, voter registration databases **certainly were**, as they have been **in other countries** around the world. We use voter registration databases to determine who can vote and where. An attack on them, such as changing or deleting files, could disenfranchise huge numbers of voters unless states take steps to prevent that. Many statewide voter registration systems in use today were **first built** between 2004 and 2006. These systems were not designed with cybersecurity protections needed to face today's threats against our election infrastructure.

Is it too late to upgrade or replace critical election infrastructure like voting machines and voter registration systems?

Of the critical election security measures we need to take, this is one where the most lead time is probably needed. As a general rule, states and counties don't want to embark on replacing major election infrastructure, much less than a year before a big election (which the November 2020 election certainly will be). Still, it is worth noting that the state of Virginia replaced all of its paperless voting machines **in a matter of months** after discovering they had severe security vulnerabilities.

Local cybersecurity training and staff

The vast and decentralized election system in the United States means our elections are largely run at the local level. While there are certainly security benefits associated with this decentralization, there are also obvious risks.

Foremost among these is the fact that with over **8,000 separate election offices**, there are many potential targets — from local election websites that tell people where and when to vote to election night reporting systems, which aggregate vote totals for the public after the polls close. As Bob Brehm, co-executive director of the New York State Board of Elections, recently put it in an **interview** with the Brennan Center, "it is not reasonable" to expect each of these state and local election offices to independently "defend against hostile nation-state actors." This is particularly true in the case of local election offices that frequently have little or no in-house IT or cybersecurity resources.

The need for cybersecurity expertise (and training for non-expert staff) will continue to be high in 2020. Many states and counties around the country have or are in the process of having the Department of Homeland Security or other security experts conduct cybersecurity scans of their election-related computer systems. But with current resources, not all local jurisdictions will be able to take action to fix or minimize vulnerabilities that are discovered.

Contingency planning

Efforts to prevent attacks in the first place are, of course, critical. But in the months remaining before the election, it is at least equally important that state and local election officials ensure adequate preparations are in place to quickly and effectively recover if prevention efforts are unsuccessful.

Examples of the kinds of attacks we could see include:

- Hacking of election websites that provide information on polling locations, voting times, and registration status
- Cyberattacks on registration systems or electronic poll books (tablets that are used to check in voters and are often connected to the internet during voting) to eliminate people from voter rolls, switch their designated polling places, or incorrectly show that they already voted
- Cyberattacks on election vendors who program voting machines for the purpose of crashing machines during voting or altering vote totals
- Attacks on election night reporting systems to take down these sites or provide incorrect information on election results.

For each of these, there are contingency plans that could mitigate the damage such an attack could do, even if successful.

So, for example, election officials must ensure that there are sufficient emergency paper ballots where electronic machines are used so that machine failures do not lead to long lines or lost votes is a critical step every jurisdiction using such equipment should take. Similarly, they must make sure that there are paper backups of electronic pollbooks in every polling place, so that failure of these tablets does not keep people from voting. Finally, establishing redundant election night reporting sites that could be made available in the event the main site is attacked, and having a good communications plan in place in the event of such an attack, will be critical for election officials to retain credibility in the event they discover a breach of such systems.

Election officials have long been focused on creating contingency plans ahead of Election Day, which are a source of strength as our elections face new security threats. But these steps cost money. Congress and state legislatures must ensure that election officials have enough resources to implement these plans effectively.

Post-election audits

A critical component of election security is known as the "post-election audit," which compares the paper ballots to the electronic totals produced by each voting machine. Nearly 90 percent of Americans will vote on paper-based systems in 2020, and we expect that at least 42 states will have paper records of nearly every vote. But these paper records will be of little security value unless they are used to check and confirm electronic tallies.

Here is where there is the most work to do. Only **24 of these 42 states** require these kind of post-election audits before certification of election results. The remaining 26 states, totaling 243 electoral votes, do not currently require post-election audits of all votes prior to certification.

However, there is nothing stopping most of these remaining states from conducting such audits if they have the resources do so. Many states would like to do more. In fact, a slew of states, including Georgia, Indiana, Michigan, Missouri, New Jersey, Pennsylvania, and Virginia have recently or soon plan to launch pilots of the most robust kind of post-election audit, the risk-limiting audit (RLA). These audits use statistical modeling to detect potential inaccuracies in election outcomes, whether they are the result of accidental or intentional interference. RLAs can provide assurance that the reported winner did, in fact, win.

While such audits would not prevent successful attacks against electronic voting machines, they would provide states with the opportunity to catch such attacks and then use the paper ballots to correct totals to reflect voter's choices. They would also help increase confidence in the integrity of an election that are likely to be challenged on social media, regardless of the outcome.

It's not too late

While the window is closing on the ability of states to make major upgrades like replacing paperless voting machines, there is still time. Just as importantly, there are other measures that states can take in 2020 that are at least as critical to protecting elections. That includes hiring cybersecurity staff that can address problems as they are discovered in 2020; implementing more robust contingency planning so that if attackers are successful in

disrupting our Election Day, people can still vote and have assurance those votes will be counted; and conducting post-election audits to confirm that cyberattacks did not alter election results.

But a complete answer would also include the important caveat that "Is it too late?" is the wrong question. Congress has a bad habit of throwing money at our election infrastructure only when things go off the rails. In the wake of the 2000 election fiasco, Congress passed the 2002 **Help Americans Vote Act**, which provided hundreds of millions of dollars to replace punch card machines and mandate statewide voter registration databases.

Congress didn't invest in our election infrastructure again for another 16 years. Of course, we must do everything we can to secure the 2020 election. But there will be elections after 2020. The threat of cyberattacks will still be with us. We need a consistent and **steady stream of funding** to protect us in 2022, 2024, and beyond.

Featured Work

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April 18, 2020

Lawrence Norden

Edgardo Cortés

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Derek Tisler

Gowri Ramachandran

STATEMENT

Brennan Center Submits Follow-up Comment to Georgia State Board of Elections on Proposed Election Rules

February 17, 2020 Gowri Ramachandran, Derek Tisler

STATEMENT

Brennan Center Submits Comment to Georgia State Board of Elections on Proposed Election Rules

January 13, 2020 Gowri Ramachandran, Derek Tisler

POLICY SOLUTION

Preparing for Cyberattacks and Technical Failures: A Guide for Election Officials

December 19, 2019 Edgardo Cortés, Gowri Ramachandran, Elizabeth Howard, Lawrence Norden

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November 7, 2019

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BRENNAN CENTER FOR JUSTICE

Defending America's Election Infrastructure

Democracy in America is under serious threat. A bipartisan report from the Senate Intelligence Committee concluded that in 2016 all 50 states were likely targeted by Russian operatives seeking access to election infrastructure, at least one major election vendor was successfully breached, and that future attacks should be expected. Indeed, since 2016, we have seen continued cyberattacks against political campaigns tied to both Russia and Iran.

American elections are decentralized, with state and local election officials retaining primary authority for administering them. This means, among other things, that they bear considerable responsibility for defending our infrastructure against concerted attacks from sophisticated nation state actors. Fortunately, election officials take this duty seriously, and the federal government has recently provided some overdue assistance, in the form of minimal funding to improve election security and better coordination with agencies such as the Department of Homeland Security. Many states are in the process of replacing antiquated and paperless voting machines with more secure systems, while others have sought out risk assessments to identify security vulnerabilities in important infrastructure such as registration databases.

Much more can be done, however, to strengthen election security and increase public confidence in elections. Below, we detail our top policy recommendations for doing so.

Conduct Assessments and Testing

Discussions of election security often focus on individual aspects of election systems, such as voting machines or registration databases. While such focus is important, it is also critical to look at the election process as a whole, understand the interaction of election systems and personnel, and assess the vulnerabilities that exist in each facet that could be exploited by malicious actors looking to undermine elections. Below we detail steps the federal government could take to ensure more comprehensive security.

Conduct periodic state and nationwide threat assessments. As cyber threats evolve, it is essential to assess the security of our election infrastructure regularly, to understand where new vulnerabilities may crop up. Congress should provide resources for state and federal agencies to conduct regular threat assessments and help state and local governments implement mitigation strategies to address the identified weaknesses.

Establish a bug bounty program for election systems. Bug bounty programs provide a mechanism for independent security researchers to identify potential vulnerabilities and responsibly report them. This provides a legal method to actively search out vulnerabilities in election systems and financial incentives for appropriately reporting them. Disclosures through a bug bounty program would allow manufacturers the ability to fix the issue before the discovery is made public and allow election officials to appropriately plan mitigation strategies for existing vulnerabilities. Several federal agencies, including the Department of Defense, have established successful bug bounty programs in recent years as part of ongoing efforts to strengthen cyber security. Congress should authorize and provide funding for the Election Assistance Commission (EAC) to certify and monitor a broader range of election systems (explained more below), and create an additional requirement for establishing a bug bounty program for each of these EAC-vetted systems.

Develop a CSF Elections Profile. The National Institute of Standards and Technology (NIST) is responsible for creating and maintaining the Cybersecurity Framework (CSF), a set of standards, guidelines, and practices that help entities manage cybersecurity risks. Along with the CSF, NIST creates implementation profiles that give voluntary guidance on how to adapt these guidelines and practices to particular critical infrastructure sectors. Consistent with the recognition of election systems as critical infrastructure, NIST should prioritize the development of a CSF Elections Profile to provide clear and direct guidance to election officials on how to best secure their systems.

Secure Voting Equipment and Registration Databases

Even though election jurisdictions across the country have made significant progress in updating their election infrastructure since 2016, significant security gaps remain. But steps can be taken to reduce the likelihood of equipment failure, recover more quickly from failures when they do occur, and ensure that every legitimate voter has an opportunity to cast a ballot and have their vote counted. We recommend the following actions be taken to achieve these goals.

Require paper ballots. Paper ballots create a tangible record of a voter's choices that the voter can review, prior to casting the ballot, to ensure it accurately captures their intent. These records can then be used by election officials to discover any errors in the voting tabulation system, and ultimately ensure that total election results were recorded correctly. All voting systems should use paper ballots in order to make effective auditing and confirmation of results feasible.

Ban wireless components. Wireless components that permit connections to WiFi networks, cellular networks, or other devices, via Bluetooth or other protocol, pose an unnecessary risk of malware being implanted in this equipment, unbeknownst to election

administrators. Wireless components should be prohibited in voting systems that record and tabulate votes. Voting system components that do not tabulate votes should limit wireless connectivity only to instances necessary for accessibility.

Implement robust post-election audits. Replacing paperless voting machines is not enough on its own to ensure accurate election results—election officials must use these paper ballots to conduct rigorous and routine post-election audits that are designed to provide a high level of statistical confidence of the correct outcome. We recommend the regular use of risk-limiting audits. Risk-limiting audits provide confidence in election outcomes because they limit the risk that a voting system error or hack significant enough to affect the outcome of an election will go undiscovered. A sample of ballots is examined by hand and compared to the results recorded by the voting system to look for discrepancies. For contests with large reported margins of victory, a smaller sample is required to reduce the risk of error than for contests with small reported margins of victory. Therefore, risk-limiting audits can be performed on a regular basis, unlike costly full hand recounts.

Back up voter registration databases regularly. In the run-up to the 2016 elections, Russian agents sought to access election systems in many states, and successfully breached records in the voter registration database of at least one state. Such attacks on statewide voter registration databases present a serious risk of electoral disruption, as malicious actors could interfere with the ability of voters to cast ballots by deleting them from lists of registered voters, changing their recorded address, or changing party affiliation to keep them from voting in their party's primary. If backup registration lists are available, election officials should be able to quickly reconstruct accurate lists when improper changes are discovered. To ensure that no manipulation of a state registration database prevents legitimate voters from casting a ballot or having their votes counted, backup registration lists should be created regularly on removable media isolated from internet connections, as well as on paper.

Establish election day failsafes. Backup registration lists can allow election officials to reconstruct accurate lists, but that may not ensure eligible voters can cast ballots if the problems are discovered only after Election Day is over. An undetected change to the voter list could incorrectly show that a voter had already cast a ballot, or that she had recently moved. For this reason, election officials should also put in place failsafe measures to ensure that legitimate voters can still cast a ballot that will be counted, such as having sufficient numbers of provisional ballots at every polling place. In addition, states should adopt election day registration procedures that allow voters to register at their polling places if they are unregistered, improperly removed from the lists, or if there are other problems with their registration in the database.

Create a certification program for e-pollbooks. Under the Help America Vote Act (HAVA), the EAC is tasked with developing voluntary voting system guidelines (VVSG) that set standards for voting systems and certifying voting systems that meet these

standards. While participation in the certification program is voluntary under HAVA, many states have formally adopted the VVSG and require all voting systems used in the state to be certified by the EAC. But the VVSG and corresponding certification process is limited to voting systems upon which votes are cast and counted, failing to account for the numerous other systems that are necessary for the broader election process. The EAC's authority should be expanded to certify not just voting systems, but also e-pollbooks, in order to ensure that other components of election infrastructure are more secure, incorporating appropriate access controls, and providing backup and recovery mechanisms. Several proposed bills in Congress—including the Election Security Act, the SAFE Act, and the For the People Act—have recommended adding e-pollbooks to the voting system certification regime.

Regulate Election Vendors

Security measures in response to the attacks on America's elections in 2016 have largely focused on instituting best practices for state and local officials to prevent, detect, and recover from cyberattacks. Yet private vendors, not election officials, build and maintain much of our election infrastructure. These companies are involved at every stage of the election process—creating voter registration databases, programming ballots, providing electronic pollbooks and voting machines, building election night reporting websites, and checking equipment and procedures post-election. Despite this prevalent role, there is almost no federal regulation of private vendors in the election space. A forthcoming Brennan Center report will focus on this problem and propose a series of solutions, including the following:

Create a certification regime for election system vendors. While the EAC runs a federal certification system for voting machines, it does not certify vendors selling voting machine equipment or vendors that provide other election services. There is no federal oversight to ensure that private vendors have properly screened employees who may program voting machines and conduct other sensitive functions, or have engaged in the best supply chain management and cybersecurity practices when manufacturing and replacing their equipment. We need a federal certification program so that election officials and the public can have greater confidence in the companies that provide critical election products and services, and to engage in routine monitoring of such vendors to ensure ongoing compliance. The For the People Act and the SAFE Act have both proposed these kind of programs.

Require vendors to report cyber incidents. Both the public and government officials are often in the dark about security incidents affecting election vendors. This state of affairs can undermine faith in the vote and leave election officials unsure about vendor vulnerabilities. To address these concerns, Congress should require election vendors to report cyber incidents to all relevant election authorities. Recent bills in Congress have

proposed similar mandatory reporting requirements, including the Secure Elections Act and the Election Vendor Security Act.

Centralize Information

While the EAC has taken significant steps in recent years to improve information sharing among election officials when problems with voting systems occur, we believe more can be done to ensure that state and local officials can address system vulnerabilities and prevent the same problems from occurring in multiple jurisdictions. Because of this, we recommend that the federal government take a greater role in monitoring voting system failures and promoting the spread of information across the country.

Create a national database of voting system failures. The establishment of a new, national information hub is needed to ensure that voting system defects are caught early, disclosed immediately, and corrected quickly and comprehensively. Specifically, the nation needs a publicly available, searchable online database that includes data about voting system failures and defects discovered across the country. Such a database could be used to prevent the same system failures from occurring in multiple jurisdictions across many years, and would assist election officials as they look to purchase new voting machines with critical information about system performance.

Provide Long Term Support and Funding

A lack of financial resources presents the most significant obstacle to election security improvements in local jurisdictions. Congress took an important first step in 2018 by allocating $380 million to states for election security activities, and there are promising signs of more funding coming in 2019. But these one-time investments are not enough to address the significant problems facing election systems or provide long-term stability for future election security planning. It is clear there is an ongoing need for federal funding to help protect our election infrastructure from foreign threats. Accordingly, we recommend that Congress take the lead to ensure that all levels of government provide sufficient long-term funding for election security and invest in innovative approaches toward making elections more secure, accessible, and efficient.

Provide robust, consistent funding for election resources. Because the threats to election security evolve over time, effective election security requires an ongoing commitment of resources, as opposed to a one-time expenditure. Companies in the private sector have departments and budgets dedicated to security generally, and often to cybersecurity specifically, precisely for this reason. Congress should provide a steady stream of funding for the periodic replacement of outdated voting systems, upgrading of database and other election infrastructure, and the purchasing of ongoing technical and security support for all these systems. But federal funding alone is not enough—state and

local governments should make election security a budget priority and develop long-term plans to fund regular equipment upgrades, training, and cybersecurity staff to assist local officials.

The Brennan Center has estimated the nationwide five-year cost for several critical election security items to be approximately $2.2 billion. This total includes:

- Providing additional state and local election cybersecurity assistance
- Upgrading or replacing statewide voter registration systems
- Replacing aging and paperless voting machines
- Implementing rigorous post-election audits

Establish an innovation fund. Congress should establish an innovation fund for the purpose of promoting advancements in the security, accessibility, and efficiency of elections. This fund would award grants on a competitive basis to entities for research and development in election modernization. The Election Security Act, which is currently pending before Congress, would provide for such a fund.

Make the "critical infrastructure" designation for election systems permanent. The federal government has provided important election security support to state and local governments through its "critical infrastructure" designation for election systems, adopted by the Department of Homeland Security in January 2017. However, this designation could be withdrawn by the executive branch at any time. Congress should make the critical infrastructure designation permanent though legislation to guarantee states are provided with priority access to tools and resources available from DHS and greater access to information on cyber vulnerabilities.

Adequately fund the EAC. In recent years, despite the increased threat of cyberattacks against our nation's election infrastructure, funding for the Election Assistance Commission -- the federal agency charged with adopting election security guidance and certifying voting systems -- has dropped sharply. The agency's budget in fiscal year 2019 was just $9.2 million, slightly more than half the funding it received in fiscal year 2010. Congress should ensure this agency has the resources, staff and leadership it needs to properly perform its critical election security functions.

The following Brennan Center experts are available for additional consultation:

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Ensuring Safe Elections

Federal Funding Needs for State and Local Governments During the Pandemic

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The coronavirus pandemic has changed voting behavior and poses an extraordinary challenge to state and local officials as they seek to ensure that elections in 2020 are fair, safe, and secure. As national policymakers consider how people should vote in light of the pandemic, elections themselves have already changed. Millions of voters are requesting mail ballots, far more than would have been the case otherwise. Many fewer are updating their registrations at government offices. Instead, they register online or find other ways to sign up. Governments face the unforeseen cost of investing in personal protective equipment (PPE) and sanitation supplies to reduce the risk of illness and even death to their workers and voters.[1] Even if no rules change, the 2020 election will be costly.

Congress has already provided some help. On March 27, President Trump signed into law a $2 trillion economic relief package that included $400 million in grants to help states run their elections during the coronavirus disease 2019 (Covid-19) pandemic. This was an important first step. Unfortunately, we now know this is not enough.[2]

In this document we examine the difference between the March 27 federal investment in the electoral process and what will be needed to ensure safe and healthy elections for 2020. We focus on Georgia, Michigan, Missouri, Ohio, and Pennsylvania. These five states have diverging election administration systems and needs, from the number of elections each will hold this cycle to their requirements for absentee voting. Two common themes stand out.

First, what Congress has provided so far is not enough to run safe and secure elections in 2020. Our review shows that the March 27 grants will likely cover anywhere from less than 10 percent of what Georgia officials need to around 18 percent of what Ohio officials need.

Second, local election jurisdictions bear the heaviest burden of protecting voters and workers during the election. In two of the states we examined, local governments must cover over 90 percent of the costs needed to ensure safe and secure elections this year. In all five states, they will bear the overwhelming share of such expenses.

The measures that we appraise in this document are critical. They come from our discussions with numerous election officials in each of the five states we examined. States need help

- developing the infrastructure necessary to support changed voter behavior (e.g., more voters choosing to register online or to vote by mail);

- protecting voters and election workers during elections (e.g., giving poll workers PPE, allowing curbside voting, cleaning polling places, and ensuring that election staff can work off-site as needed without exposing election offices to cyberattacks); and

- educating the public about changes made to election procedures and polling locations (including notice of changed elections, moved polling sites, and new voting options to reduce density at in-person locations).

This report represents the consensus of an ideologically diverse group of organizations: the Alliance for Securing Democracy, the Brennan Center for Justice, Pitt Cyber, and R Street Institute. From interviews with election officials and the vendors who must supply most of the products and services these officials need, it is clear that additional appropriations are necessary to fulfill the goal of free, fair, and safe elections in 2020. Without funding from the federal government, there is little chance that state and local governments can shoulder the financial burden. Indeed, nearly every state and local government in the country faces severe budget challenges this year.[3]

Without congressional leadership, the risk of repeating the problems experienced in recent primaries will increase dramatically. These problems include an inability to timely process ballot applications, closed polling places, and unnecessary sickness and even death for voters and election workers performing their civic duties.[4] Facing an economic downturn, states may soon tighten their belts further on many services. The federal government has the resources to ensure that state and local governments can run free, fair, and safe elections this fall. We urge them to do so as soon as possible.

How We Arrived at Our Estimates

Our estimates of the expenses state and local jurisdictions will incur come from

- interviews with election officials in each of these five states about the costs they have already incurred;

- interviews with vendors and service providers on the costs of other needed products and services that election officials identified, as well as publicly available information about these costs; and

- projections of voter behavior, based on history as well as changes we have seen in elections that have already been held this year.

In all cases, we have documented the sources and assumptions behind our estimates, which are described and discussed in detail in the methodology section found in the appendix.[5]

Georgia

Total registered voters: 6.9 million active voters[6]
2020 cycle elections: primary (June 9), state/federal/local runoff (August 11), general (November 3), state runoff (December 1), federal runoff (January 5)
Total costs: $110.7–$124.4 million
State costs: $42.4–$49 million
Local costs: $68.3–$75.4 million
Federal grant: $10.8 million[7] (9–10 percent)

In response to ongoing warnings by federal and state health officials, Georgia recently delayed its primary election, originally scheduled for March 24, for the second time. The primary is currently scheduled for June 9.[8]

State election officials have taken a leading role during this unprecedented situation. While Georgia was already a no-excuse state, absentee voting was not heavily used by Georgians in the past; during the 2018 general election, 3 percent of registered voters cast their vote by mail .[9] That is almost certain to change. In response, Secretary of State Brad Raffensperger's office has stressed the importance of mail voting, which relieves crowding on Election Day, for public safety reasons: "With social distancing as one of the most important tools for limiting the spread of coronavirus, providing alternatives to voting in person is crucial."[10]

To alleviate the resource burden on county election officials caused by absentee voting spikes during the primary, state officials have taken on some of the costs and election administration duties that would normally be the responsibility of local officials in the primary. Specifically, the state is paying for the printing, packing, and postage costs to send prepopulated[11] absentee ballot applications to every active voter and absentee ballots to every voter whose application is approved by local officials.[12]

These proactive steps have been well received by local election officials,[13] many of whom are faced with staffing stresses[14] or much worse (a Fulton County elections employee died of Covid-19),[15] and government office closures.[16] However, county officials remain primarily responsible for the majority of increased costs associated with administering elections during a pandemic and its aftermath. These increased costs may be a bigger concern in Georgia than in any other state, because Georgia could hold up to five elections this cycle.[17]

Georgia election officials need additional federal funding now to help cover increased election administration costs related to the coronavirus. Multiple local Georgia officials, who are primarily responsible for these costs, joined others from around the country in stating that federal funding provided by the Coronavirus Aid, Relief, and Economic Security (CARES) Act is "simply not enough" and that additional federal funding is critical as they prepare for the elections ahead.[18]

State costs: $42.4–$49 million

- Printing and mailing absentee ballot applications to all registered voters
- Packing and mailing absentee ballots to all voters approved by local officials
- Purchasing and deploying centralized vote-tabulation machines (high-speed scanners)
- Investing in state election infrastructure

Georgia officials have already made significant investments to increase the adoption rate of absentee voting to help minimize the spread of the coronavirus, promote poll worker and voter safety, and minimize the issues voters could encounter on Election Day due to a potential lack of poll workers causing polling place closures and consolidations. For example, at a cost of $3.1 million, state officials are sending absentee voting applications to every active voter in the state.[19] The state is also paying the $1.88–$2.38 in postage and handling costs per absentee ballot mailed to approved absentee ballot applicants.[20] For the primary election, we estimate the cost of mailing absentee ballots will be $3.1–$3.9 million.[21]

State officials are committed to serving Georgia voters and working in conjunction with local election officials through these unprecedented circumstances.[22] They are planning ahead to ensure that all upcoming elections are safe and secure and that Georgia has a resilient election infrastructure that can withstand attack or major spikes in absentee voting.[23] State officials are prepared to continue their voter outreach and absentee ballot distribution efforts if necessary.[24] Assuming Georgia has five elections this cycle, it is estimated that the absentee ballot application printing and mailing costs will be $15.5 million and the printing, packing, and mailing of absentee ballots will be $16–$22.4 million.[25]

In Georgia, the state is responsible for some infrastructure costs and decisions, including voting equipment selection and procurement. However, state officials have worked closely with local officials over the past two years to make key infrastructure improvements across the state.[26] When making these investment decisions, it was reasonable for election officials to assume that absentee voting turnout would remain relatively stable, as no-excuse absentee voting has been available in Georgia over 10 years.[27] For example, 3 percent of registered voters voted absentee by mail in 2018 and 2016.[28]

Current infrastructure is not sufficient for the needs of election officials who are "bracing for the flood of absentee ballots."[29] Local election officials will need additional machinery and equipment, including absentee ballot tabulation machines, to assist with managing the significant spike in absentee voting. The state has already invested approximately $2.1 million in the equipment necessary for county officials to centrally tabulate a significant percentage of total votes cast.[30] With additional federal funding, additional centralized tabulation equipment, to be distributed to county officials across the state, would be a priority.[31] We estimate the total vote-tabulation equipment costs will be $10.3 million.[32]

Additional infrastructure investments, including an online absentee ballot application tool to increase absentee voting security and election integrity, improved absentee ballot tracking systems, and additional load and vulnerability testing for current online systems (which we expect will experience significant spikes in usage rates) will cost an estimated $640,000–$890,000.[33]

Local costs: $68.3–$75.4 million

While state officials are playing an important role in the current crisis, local election officials retain primary responsibility for the majority of election administration costs and responsibilities. Local officials are preparing for a surge in absentee voting with a populace that has historically voted in person and infrastructure that was geared toward this preference lasting for years to come. For example, in 2016 and 2018, around 95 percent of voters cast their ballots in person.[34] Local election officials we interviewed know these numbers are likely to be much lower in the primary election and believe that Covid-19 will likely continue to impact voting preferences in the general election, even if the virus has been contained.[35] Additional infrastructure investments, described below, will be required to accommodate the expected surge in absentee voting.

Conducting absentee ballot education and outreach: $21.3 million

While the state is mailing important information to all voters in the primary, some county officials may decide to supplement these educational outreach efforts at the local level, as some local officials are doing in Iowa, where state officials have also proactively distributed absentee ballot applications to eligible voters.[36] We estimate that reasonable media outreach would cost $5.1 million for the year and that sending informational mailers to all voters would cost $3.2 million per election.[37]

Processing absentee ballot applications and providing prepaid return postage: $4–$5.4 million

Although the state has assumed responsibility for sending

prepopulated absentee ballot applications to all voters, voters remain responsible for the postage required to return the absentee ballot application to the appropriate local official. However, local election officials we interviewed would support paying these postage costs if they received assistance from the federal government to do so.[38] We estimate that prepaid return postage for applications would cost $1.6–$3 million for the general election and $2.4 million in total for the runoff elections. While not included in our estimates as voters did not receive postage prepaid envelopes to return absentee ballot applications for the primaries, we estimate that the return postage costs would have been approximately $1.1 million.[39]

Local officials are currently tackling the deluge of incoming paper applications.[40] Georgia state officials played an important role in minimizing the time required for local officials to process these applications when it voluntarily centralized absentee ballot application printing and mailing by prepopulating the forms with voters' information and, importantly, including a bar code that local officials can scan to greatly expedite processing times.[41]

However, between office closures, the spread of the coronavirus, and an infrastructure built for the state's traditionally low absentee-by-mail turnout, there may be application processing backlogs across the state. "The courthouse may be closed, but I'm at the office and my staff must keep working," said Deidre Holden, Paulding County supervisor of elections and voting.[42]

Processing and tabulating absentee ballots: $28.5–$34.2 million

Once local election officials approve an absentee ballot application, the state's vendor mails absentee ballot packages to the individual voter. In Georgia, absentee ballot packages will include one privacy sleeve, instructions for voting, the paper ballot, and an (outer) envelope in which to return all required materials.[43] The package will be mailed to the voter in one large envelope.[44]

Currently, as with ballot applications, Georgia voters are responsible for the postage costs to return their absentee ballots.[45] Local officials we interviewed would also support providing absentee voters with postage-prepaid envelopes to return their ballots if they received assistance from the federal government to do so.[46] We estimate that the total postage costs to return absentee ballots in the primary will be approximately $2.3 million but did not include this cost in these estimates even though local officials will be responsible for some postage costs as the U.S. Postal Service (USPS) delivers absentee ballots marked as official election mail even if the envelope does not include sufficient postage and subsequently bills the local official recipient.[47] We estimate that return postage could cost $6.9–$11.6 million for the remainder of the cycle.[48]

Ballot drop boxes, which allow voters to securely and conveniently return their voted absentee ballots without incurring postage costs, are standard in almost all states with a high percentage of mail ballots.[49] On April 15, the State Election Board voted unanimously to allow drop boxes, "an option that [allows voters to avoid] human contact during the coronavirus pandemic."[50] In addition, drop boxes will lead to decreased long-term absentee ballot postage return costs and ensure that voters can return their ballot by the deadline, even if the post office experiences service interruptions or the voter does not receive the ballot in sufficient time to return it via USPS under normal delivery circumstances. Drop boxes have proven exceptionally popular in other several other states, including Colorado, where approximately 75 percent of ballots are returned to drop boxes.[51] With sufficient funding, Georgia election officials we interviewed would consider widespread deployment of ballot drop boxes.[52] Statewide secure ballot drop boxes will cost approximately $3–$4 million to purchase, install, and maintain.[53] For these estimates, we assume that drop boxes will be deployed prior to the general election and the percentage of voters who return their ballot by mail may be much lower in the general election than in the primary. The estimated return postage for absentee ballots costs reflect this assumption.

Once an absentee ballot is received, local officials must sort, process, and verify the voter's signature on the outer envelope. To manage the expected significant spike in incoming mail, local election officials will need equipment to assist with this process. The equipment needs, which will vary based on the size of the locality, may include mail-sorting equipment and automated letter openers. After election officials open outer envelopes on Election Day, ballots are removed from their privacy sleeves and then aggregated and tabulated. While the significant spike in the number of ballots to be counted centrally means that many local officials will need additional centralized absentee ballot tabulators (i.e., high-speed scanners), in Georgia these costs are generally paid by the state. Some counties will also need additional space for secure ballot processing and storage.[54] Statewide, the staffing, facilities, non-tabulation equipment, and software that will likely be needed to process returned absentee ballots will cost approximately $18.6 million for the year, including one-time equipment costs.[55]

Building secure remote, offsite, or additional infrastructure: $1.7 million

Election officials' work must continue despite stay-at-home (SAH) orders, social distancing recommendations, limits on nonessential travel, building closures, and public health concerns. To do so, many local election officials may have staff who need to work at home or in temporary office space for periods of time throughout the election cycle. Working remotely can present significant security risks as malicious actors seek to exploit weaker networks and general disruption in routine.[56] Officials may need additional secure workstations to accommodate processing associated with the spike in absentee voting. We estimate that it will cost local election authorities $1.7 million to purchase secure devices and to implement proper cybersecurity protections.[57]

Ensuring healthy and secure in-person voting options: $12.8 million

State and local officials are committed to offering in-person voting options to voters.[58] Local election officials we interviewed are also committed to protecting their poll workers and their voters on Election Day.[59] Reasonable measures to ensure a healthy and safe polling place in a pandemic include sufficient PPE for poll workers, hand sanitizer, gloves, and other cleaning supplies.[60] These measures also include providing plexiglass sneeze guards for poll workers and thoroughly cleaning all polling locations after use.[61] Statewide, these materials will cost approximately $3.8 million total for all elections this cycle.[62]

In addition, local election officials must be prepared for significant poll worker attrition and voter demand for curbside voting options on Election Day. State officials in Alabama have already announced poll worker pay raises, and if they received assistance from the federal government to do so, local Georgia officials we interviewed would also support poll worker pay raises.[63] The total cost for these measures will be approximately $8.9 million total for all elections this cycle.[64]

Michigan

Registered voters: 7.7 million[65]
2020 cycle elections: municipal (May 5), primary (August 4), general (November 3)
Total costs: $94.9–$103.8 million
State costs: $13.5–$17.6 million
Local costs: $81.4–$86.2 million
Federal grant: $11.2 million[66] (11–12 percent)

Michigan's presidential primary was held on March 10. Less than two weeks later, Governor Gretchen Whitmer issued an SAH order,[67] which was recently extended through May 1, 2020.[68]

Secretary of State Jocelyn Benson acted quickly in the wake of the SAH order to address issues associated with the state's upcoming local elections on May 5.[69] First, the secretary encouraged local communities to delay tax and bond proposals until the August election, unless such a move would cause existing critical funds to expire.[70] Next, she took several steps to promote absentee voting for the local elections, including mailing voters an absentee ballot application with a postage-prepaid envelope.[71]

Over the past year, Michigan officials have upgraded key infrastructure in response to the successful 2018 ballot initiative that authorized no-excuse absentee voting starting in 2019. However, consistent with trends in other states that have made this transition,[72] election officials made infrastructure investments assuming only a modest uptick from prior absentee turnout, which was approximately 14 percent of registered voters in 2018.[73]

These recent improvements are not sufficient to meet election officials' needs associated with the expected massive spike in absentee voting due to Covid-19.[74] As Michigan election officials prepare for a surge in absentee voting in 2020,[75] it needs prompt and significant federal investment to ensure that the state's election infrastructure is sufficiently resilient against pandemics or other disruptions.

Michigan election officials need additional federal funding now to help cover increased election administration costs related to the coronavirus. More than a dozen local Michigan election officials, who will be primarily responsible for these additional costs, joined others from around the country in stating that the federal funding provided in the CARES Act is "simply not enough" and that additional federal funding is critical as they prepare for the elections ahead.[76]

State costs: $13.5–$17.6 million

- Printing and mailing absentee ballot applications to eligible voters
- Providing postage-prepaid envelopes for absentee ballot application return
- Assisting with prepaid postage for voters to return absentee ballots
- Investing in state election infrastructure

State officials quickly identified absentee voting as an important component of safely managing the May local elections.[77] "To help ensure both public health and democratic rights are protected" in jurisdictions that go forward

with these elections, state officials "will mail absent voter ballot applications to all [May 5 election eligible] voters with postage-paid return envelope."[78] In addition, the state will assist counties with providing postage-prepaid envelopes in which to return their absentee ballot.[79]

State officials continue to coordinate with state executive and health officials and are exploring options for launching similar efforts in all subsequent elections this year if necessary,[80] which will cost an estimated $6 million in the primary and $6.9–$10.8 million in the general.[81]

Additional infrastructure investments to make absentee voting easier for eligible voters and more secure, including an online absentee ballot application tool to increase absentee voting security and election integrity, improved absentee ballot tracking systems, and additional load and vulnerability testing for current online systems (which we expect will experience significant spikes in usage rates) will cost an estimated $590,000–$790,000.[82]

Local costs: $81.4–$86.2 million

While state officials play an important role in the current crisis, local election officials retain primary responsibility for administering and paying for Michigan elections. With over 1,600 jurisdictions, elections are highly decentralized and resource needs, and concerns, vary across the state. The uncertainty facing election officials is a significant concern. For many local clerks, this will be the very first cycle with no-excuse absentee voting. And, for all clerks, "this is the very first cycle in a pandemic."[83] What election officials do understand is that mail ballot turnout is likely to be dramatically higher than 14 percent for the upcoming elections; those we interviewed believe that Covid-19 will likely continue to impact voting preferences in the primary and general elections, even if the virus has been contained.[84] Election officials across the state need additional infrastructure and other resources to manage the expected surge in absentee voting.

Conducting absentee ballot education and outreach: $9 million

While the state is mailing important information to all May voters, some local officials may decide to supplement these educational outreach efforts. Separately, local officials will need to continue these educational outreach efforts ahead of the primary and the general election through informational mailers and media outreach. We estimate that sending informational mailers to all voters will cost $3.4 million per election and that reasonable media outreach will cost $2.1 million for the year.[85]

Processing absentee ballot applications

Once an application is received, local officials must sort, open, and process the paper applications. As in Georgia, the processing time in Michigan will vary based on whether the application was prepopulated and included a bar code programmed with the applicant's information. While new to Georgia, local Michigan officials we interviewed have sent prepopulated applications, with a bar code, to voters on the permanent absentee ballot application list for several years.[86]

Even with the increased efficiencies associated with prepopulated absentee ballot applications, "you can't undercount the resource needs associated with the absentee ballot applications," warned Tina Barton, Rochester Hills clerk.[87] In Michigan, where officials conduct signature verification not only on the returned absentee ballot envelopes but also on the absentee ballot applications, and file and store individual paper applications, the additional workload is especially challenging as "there's a lot of work required."[88] Also important, this responsibility comes on top of the local official's other ongoing duties. In Michigan, that list is long.[89]

Processing and tabulating absentee ballots: $45–$49.8 million

Once an absentee ballot application is approved, officials mail an absentee ballot package to individual voters. In Michigan, absentee ballot packages include one privacy (inner) envelope, instructions for voting, the paper ballot, and an (outer) envelope in which to return all required materials, as is standard in the remainder of the states we profile. We estimate that associated printing, packing, and mailing costs would be $7–$11.3 million for the year.[90] Michigan voters are currently responsible for the return postage on voted absentee ballots. However, state officials expect to continue assisting locals with providing postage-prepaid envelopes for returned ballots; these postage costs are included in the state cost section above.

As in Georgia and other states, Michigan municipalities and townships will also want to deploy drop boxes for several reasons, including to reduce their long-term postage costs (accounted for in these estimates) and increasing voter convenience. With sufficient funding, local Michigan election officials we interviewed would consider widespread deployment of ballot drop boxes.[91] Statewide secure ballot drop boxes will cost approximately $1.6–$2.1 million to purchase, install, and maintain.[92]

Absentee ballot processing and tabulation requires multiple steps, and officials will need additional resources to handle the expected spike in incoming mail. As Tina Barton notes, "While I consider our office lucky because we have four high-speed tabulators, I still need a long list of supplies, additional equipment, and other resources, from additional crates for absentee ballot and absentee ballot applications storage, ballot bags, storage space,

envelope openers to election officials who are willing to potentially work overnight to assist with absentee ballot tabulation."[93]

Election officials may also need to review the basic logistics of their absentee processing and tabulating plans due to the current social distancing requirements. "We normally have teams of five people at one six-foot table who process absentee ballots. If I can only have two people at a table, then we'll have to set up an assembly line with multiple tables, so instead of six tables, I'll easily need 20. But if this will give my staff and workers the space they need to stay safe, we'll find a way."[94]

Statewide, the staffing, facilities, equipment, and software that will likely be needed to process and tabulate returned absentee ballots amounts to approximately $36.5 million, including one-time equipment purchase costs.[95]

Building secure remote, offsite, or additional infrastructure: $10 million

Election officials' work must continue despite SAH orders, social distancing recommendations, limits on nonessential travel, building closures, and public health concerns. To do so, many local election officials may have staff who need to work at home or in temporary office space for periods of time throughout the election cycle. Working remotely can present significant security risks as malicious actors seek to exploit weaker networks and general disruption in routine.[96] In addition, officials may need additional secure workstations to accommodate processing associated with the spike in absentee voting. We estimate that it will cost local election authorities $10 million to purchase secure devices and to implement proper cybersecurity protections.[97]

Ensuring healthy and secure in-person voting options: $17.3 million

Local officials "are committed to protecting every voter and every vote" and every poll worker.[98] Although local election authorities are facing poll worker attrition, polling location site issues, and other challenges, local officials we interviewed believe it is critical to offer safe in-person voting options.[99] Reasonable measures to ensure a healthy and safe polling place in a pandemic include sufficient PPE for poll workers, hand sanitizer, gloves, single-use pens, and other cleaning supplies (collectively, "healthy polling location materials," or HPLM).[100] These measures also include providing plexiglass sneeze guards for poll workers and thoroughly cleaning all polling locations after use.[101] In addition to these health and safety needs, local officials support increasing the number of poll workers and their pay as a way to support increased demand for Michigan's limited curbside voting assistance services and mitigate the impacts of attrition due to Covid-19 we have seen in other states, but they say they can only do so with sufficient federal support.[102] Statewide, these materials will cost approximately $17.3 million across all elections this year.

Missouri

Total registered voters: 4.2 million[103]
2020 cycle elections: municipal (June 2), primary (August 4), general (November 3)
Total costs: $59.4–$67 million
State costs: $590,000–$790,000
Local costs: $58.8–$66.2 million
Federal grant: 7.6 million[104] (11–13 percent)

On March 18, Governor Michael L. Parson postponed Missouri's municipal elections, originally scheduled for April 7, until June 2, 2020. "Postponing an election is not easy, but we are all in this together. We are thankful to Secretary [of State Jay] Ashcroft and our 116 election authorities for their leadership, cooperation, and commitment to doing what is best for their communities during this time," Parson said.[105]

Ashcroft requested this postponement after working closely with local election officials who expressed concerns about poll worker attrition, the number of sites no longer willing to serve as polling locations, and voter safety.[106] As some local election officials had petitioned the court for individual county election extensions prior to the executive order, the postponement will ensure that all municipal elections will be held on the same day across the state.

Although Missouri is one of a small number of states that require voters to meet certain qualifications to cast an absentee ballot, voters want the option,[107] and many believe that voters concerned about the coronavirus qualify under current law.[108] With multiple local officials now promoting absentee voting as a safety measure,[109] absentee voting is expected to be much greater than in past elections, such as the November 2018 general election, in which 5 percent of registered voters cast an absentee ballot by mail.[110]

Missouri election officials need additional federal funding now to help cover increased election administration costs related to the coronavirus. Multiple local Missouri election authorities across the state, who will be primarily responsible for these additional costs, joined others from around the country in stating that federal funding provided in the CARES Act is "simply not enough" and that additional federal funding is critical as they prepare for the elections ahead.[111]

State costs: $590,00–$790,000

- Investing in state election infrastructure

State officials have already initiated contingency planning to ensure the safe and secure administration of elections in Missouri and are planning to conduct elections even if the situation is "worse than it is now."[112] In fact, Secretary Ashcroft believes that his "job is to make [Missouri elections] happen and make [Missouri elections] happen safely under whatever circumstances we have." As part of these efforts, state officials are having discussions with local election authorities weekly, "if not more often."

Additional infrastructure investments, including an online absentee ballot application tool[113] to increase absentee voting security and election integrity, improved absentee ballot tracking systems, and additional load and vulnerability testing for current online systems (which we expect are likely to experience significant spikes in usage rates), will cost an estimated $590,000–$790,000.[114]

Local costs: $58.8–$66.2 million

In Missouri, local election authorities will be responsible for the majority of coronavirus-related election administration cost increases. The majority of these costs, as well as administration challenges, stem from an infrastructure that was built for the state's historically low absentee voting turnout. Missouri local officials we interviewed expect that absentee voting turnout will be much higher in the primary election than in the past and believe that Covid-19 will likely continue to impact voting preferences in the general, even if the virus has been contained.[115] Additional infrastructure investments will be required to accommodate the expected surge in absentee voting during the entire election cycle.

Conducting voter education and outreach: $7.3 million

Election officials will need to engage in a variety of forms of voter education and outreach. The state has not committed to conducting such outreach, so local educational efforts will be critical. Voters with questions about absentee voting are already inundating local officials with questions about absentee voting. One employee at the St. Louis County Board of Elections received over 100 voicemails in a single day from voters, and local officials are now implementing a plan to distribute the additional voter response workload across the office.[116] We estimate that reasonable media outreach will cost $1.7 million for the year and that sending informational mailers to all voters will cost $1.9 million per election.[117]

Mailing and processing absentee ballot applications: $8.7–$9.6 million

Since Missouri is not adopting an all vote-by-mail model,[118] all voters who qualify and wish to vote absentee must submit an application for an absentee ballot. If Missouri were to follow other states and mail absentee ballot applications to all voters, printing, postage, envelopes, and other needs associated with distributing these applications would cost approximately $2.4 million for each election. If Missouri election authorities were to provide prepaid postage for absentee application returns,[119] as they currently do for absentee ballot returns, the return postage would be approximately $686,000 for the municipal and primary elections, combined, and an additional $900,000–$1.7 million for the general election.[120]

Mailing, processing, and tabulating absentee ballots: $28.6–$35.2 million

Once an absentee ballot application is approved, officials must prepare a standard absentee ballot package for each individual voter.[121] Sufficient and well-trained staff, or experienced contractors, are essential to ensuring that every approved applicant receives all the necessary materials and the correct ballot.[122] The estimated cost of necessary materials, staffing, postage out, and return postage for all upcoming elections is $9.7–$15.8 million,[123] which includes $338,000 in the municipal election, $812,000 in the primary, and $756,000–$1.2 million in the general for return postage.

As in Georgia and other states, Missouri election authorities will also want to deploy drop boxes for several reasons, including to reduce their return postage costs (accounted for in our cost estimates) and increase voter convenience. Missouri election authorities we interviewed would consider widespread deployment of ballot drop boxes if they received assistance from the federal government to do so.[124] Statewide secure ballot drop boxes will cost approximately $1.6–$2.1 million to purchase, install, and maintain.[125]

Once an absentee ballot is returned, local Missouri officials undertake a multistep process to ensure election integrity and accurate tabulation, similar to the process we see in other states. As in Georgia and all other states we interviewed, while the specific needs will vary by county, local officials will need additional equipment, office or warehouse space, staff, and other resources to manage the surge in incoming absentee ballots and applications.[126] We estimate these costs will be approximately $17.3 million, including one-time equipment purchase costs.[127]

Building secure remote, offsite, or additional infrastructure: $1.2 million

Election officials' work must continue despite SAH orders, social distancing recommendations, limits on nonessential travel, building closures, and public health concerns. To do so, many local election officials may have staff who need to work at home or in temporary office space for periods of time throughout the election cycle. Working remotely can present significant security risks as malicious actors seek to exploit weaker networks and general disruption in routine.[128] In addition, officials may need additional secure workstations to accommodate processing associated with the spike in absentee voting. We estimate that it will cost local election authorities $1.2 million to purchase secure devices and to implement proper cybersecurity protections.[129]

Ensuring healthy and secure in-person voting options: $12.9 million

Although local election authorities are facing poll worker attrition, polling location site issues, and other challenges, those we interviewed believe that it is essential to offer their voters safe in-person voting opportunities.[130] Several have signed a letter that asks Congress to ensure they have the resources to protect all of their voters, votes, and poll workers.[131]

They also agree that reasonable measures include HPLM and support increasing the number of poll workers and their pay as a way to support increased demand for curbside voting and mitigate the impacts of attrition due to Covid-19 that we have seen in other states, but they say they can only do so with sufficient federal support.[132] Statewide, we estimate that the total cost for these measures will be approximately $12.9 million total for all elections this cycle.[133]

Ohio

Total registered voters: 7.8 million[134]
2020 cycle elections: primary (April 28),[135] special (August 4), general (November 3)
Total costs: $70–$82.2 million
State costs: $4.2–$4.4 million
Local costs: $65.8–$77.8 million
Federal grant: $12.8 million[136] (16–18 percent)
State grant: $7 million

Ohio voters and election officials faced exceptionally challenging circumstances in the lead-up to the primary, originally scheduled for March 17. After a brief legal battle, and hours before the polls were slated to open, Dr. Amy Acton, director of the Ohio Department of Health, ordered all polling locations closed[137] to "avoid the imminent threat with a high probability of widespread exposure to Covid-19."[138] Ohio lawmakers subsequently rejected Governor Mike DeWine and Secretary of State Frank LaRose's legislative proposal calling for a new election day with "limited in person voting" and decided to only "extend[] mail voting in the state's primaries until April 28."[139]

As only voters who require assistance or do not have a mailing address were able to vote in person in April, most voters who were planning to vote in person on primary day had to vote absentee by mail.[140] In light of the public health concerns associated with Covid-19, LaRose promoted many common-sense and innovative measures and tools to make absentee voting more secure and to increase its voter adoption rate.[141] For example, he worked with newspapers across the state to print absentee ballot applications, which voters can "cut out of the newspaper, fill[] in and mail[]."[142] As part of these efforts, he announced partnerships with dozens of public and private companies, including the Ohio Grocers Association, the AFL-CIO, and Cox Inc., that are "stepping up" to promote absentee voting.[143]

These are important steps, but there is much more to do as local election officials work to manage the huge spike in absentee voting.[144] In Ohio, as in most states across the country, the costs associated with coronavirus-related changes in voting preferences will primarily be the responsibility of local election officials. And officials believe that Covid-19 will likely continue to impact voting preferences in the general election, even if it has been contained.[145]

LaRose has predicted that the 2020 election will see "the highest turnout in our state's history."[146] Although the state legislature appropriated $7 million for costs associated with extending the primary,[147] Ohio election officials still need additional federal funding to help cover increased election administration costs related to the coronavirus. Several local Ohio election officials, including the president and vice president of the Ohio Association of Election Officials, joined others from around the country in stating that funding provided by the CARES Act is "simply not enough" and that additional federal funding is critical as they prepare for the elections ahead.[148]

State costs: $4.2–$4.4 million

- Printing and mailing voter informational postcards for the primary
- Investing in state election infrastructure

Working closely with local officials, state officials have led a significant election infrastructure investment program over the past year and a half. Many of these elec-

tion security improvements will be critical as Ohio voters are more likely to take advantage of online election services, such as online voter registration, over the coming months.

State officials have recommended various additional infrastructure investments aimed at making absentee voting more secure, cheaper to administer, and easier for eligible voters. For example, LaRose has proposed an online absentee ballot application tool, which would allow for Ohioans to request absentee ballots online, with no paper form involved.[149] We estimate that this tool will cost approximately $360,000–$470,000 to develop and maintain, and additional state-level infrastructure investments, including improved absentee ballot tracking systems and additional load and vulnerability testing on online systems, will cost approximately $210,000–$300,000.[150]

Voter education and outreach efforts will also be critical over the coming months. To ensure that voters are aware of the extended absentee voting period for the primary, state officials are planning to "design, print and mail approximately 7.8 million informational postcards to every registered Ohioan that explains to them how to obtain the form necessary to request an absentee ballot."[151] We estimate the associated costs to be $3.6 million.[152]

Local costs: $65.8–$77.8 million

In Ohio, local election authorities will be responsible for the majority of coronavirus-related election administration cost increases. The majority of these costs, as well as administration challenges, stem from an infrastructure that was built for the state's current absentee-by-mail voting turnout.[153] Ohio local officials we interviewed know the level of absentee voting will be much higher in the primary and believe that Covid-19 will likely continue to impact voting preferences in the general, even if it has been contained.[154] Additional infrastructure investments will be required to accommodate the expected surge in absentee voting during the entire election cycle.

Conducting voter education and outreach: $4.8 million

While the state is mailing important information to all voters before the primary, local election officials are usually responsible for the costs associated with mailings and voter education outreach. They will need to engage in a variety of forms of voter education and outreach for the general at minimum. For the general election, we estimate that reasonable media outreach will cost $1.1 million, and individual voter outreach through information mailers will cost $3.6 million.[155]

Mailing and processing absentee ballot application requests and applications: $6.6–$8.3 million

As Ohio is not adopting an all vote-by-mail model,[156] all voters who qualify and wish to vote absentee must submit an application for an absentee ballot. If local Ohio officials follow other states and mail absentee ballot applications to all voters,[157] printing, postage, return postage, envelopes and other needs associated with distributing these applications will cost approximately $6.6–$8.3 million for the general election.[158]

Although Governor DeWine and Secretary LaRose supported a proposal to provide all voters with postage-prepaid envelopes to return absentee ballot applications, the legislature refused to fund this request. If they received assistance from the federal government to do so, local officials we interviewed would also support providing voters with postage-prepaid envelopes to return absentee ballot applications, and these costs are included in the above total.[159]

Mailing, processing, and tabulating absentee ballots: $40.4–$50.7 million

Once an absentee ballot application is approved, officials must prepare a standard absentee ballot package for each individual voter.[160] Sufficient and well-trained staff, or experienced contractors, are essential to ensuring that every approved applicant receives all the necessary materials and the correct ballot.[161] The estimated cost for necessary materials, staffing, and postage is $5.9 million in the primary election and $6.7–$12.8 million in the general.[162]

In Ohio, voters will receive a postage-prepaid envelope in which to return their ballot for the primary, but local officials are not required to provide postage-prepaid envelopes for absentee ballot return in the general. In fact, under current state law, locals are prohibited from providing postage.[163] However, if they received assistance from the federal government to do so and if another exemption were granted for the general, local election officials we interviewed would support providing postage-prepaid envelopes to voters.[164] For the primary, we estimate that local officials will incur an additional $1.8 million in return postage costs for the April 28 primary and an additional $1–$3.9 million for the general.[165]

As in Georgia and other states, Ohio counties will also want to deploy drop boxes for several reasons, including to reduce their postage costs (accounted for in these estimates) and increase voter convenience. If they received assistance from the federal government to do so, Ohio election authorities we interviewed would consider widespread deployment of ballot drop boxes.[166] Statewide secure ballot drop boxes will cost approximately $4.5–$5.9 million to purchase, install, and maintain.[167]

Once an absentee ballot is returned, local Ohio officials

undertake a multistep process to ensure election integrity and vote-tabulation accuracy. As in other states we interviewed, local officials will need additional equipment, office or warehouse space, staff, and other resources to manage the surge in incoming absentee ballots and applications.[168] We estimate these costs will be approximately $20.5 million, including one-time equipment purchase costs.[169]

Building secure remote, offsite, or additional infrastructure: $1.2 million

Election officials we interviewed in Ohio are considering various options to immediately expand the capacity of their infrastructure in order to continue their vital work as absentee ballot applications and returned ballots continue to pour into their offices.[170] Kim Smith, the deputy director of elections in Defiance County, is considering increasing the number of workstations at her office by 50 percent so temporary staffers can assist with the processing. New workstations cost approximately $2,000, including the licensing fees for the state absentee ballot processing software and equipment costs.[171]

Ensuring healthy and secure in-person voting options: $12.7 million

Several local election officials have joined together to argue that more federal funds are needed to ensure the safety and security of all voters, poll workers, and votes.[172] Although local election authorities are facing poll worker attrition, polling location site issues, and other challenges, those we interviewed are committed to offering in-person voting in subsequent 2020 elections and agree that HPLM are reasonable measures.[173]

Keeping poll workers safe is of particular importance to Defiance County's director of elections, Tonya Wichman, who relies on many friends and family members to serve as poll workers.[174] She explained, "[Poll workers] make my job possible, they make democracy possible, and work from 5:30 in the morning until at least 8:00 at night for not what they deserve but what we can offer them as a paycheck."

For reasons similar to those described by local officials in Michigan and Georgia, local Ohio officials we interviewed would support increasing the number of poll workers and their pay, but they say they can only do so with sufficient federal support.[175] The total cost to locals for these changes is estimated at $12.7 million for the general election.[176]

Pennsylvania

Registered voters: 8.5 million[177]
2020 cycle elections: primary (June 2), general (November 3)
Total costs: $79.1–$90.1 million
State costs: $17.5–$17.9 million
Local costs: $61.6–$72.2 million
Federal grant: $14.2 million[178] (16–18 percent)

On March 25, Pennsylvania Governor Tom Wolf and the state legislature agreed to postpone the state's primary election, which was originally scheduled for April 28, to June 2. In response to local election officials who were "pulling fire alarms all over the place"[179] about the election administration challenges facing their offices, such as government office closures and poll worker attrition, the legislation postponing the election also provided local officials with decision-making authority over several election administration matters, such as the establishment of vote centers and polling location consolidation, in the primary.[180]

In the wake of the postponement, Wolf issued a statewide SAH order through April 30;[181] it has since been extended through May 8.[182] Voter registration and absentee ballot[183] application windows are currently open for the primary, but in the last month, with some local offices still closed and others facing residual staffing effects, furloughs, or other challenges,[184] "that means voters aren't being registered, absentee ballot applications aren't being processed, and other election preparations aren't moving forward."[185] Only with sufficient resources will election officials be able to manage the backlog that is likely being created.[186]

In the past year, Pennsylvania upgraded key infrastructure to accommodate the change in the state law in 2019 to allow no-excuse vote by mail. However, consistent with trends in other states,[187] election officials made infrastructure investments assuming only a modest uptick from prior absentee-by-mail turnout, which was 2 percent of registered voters in 2018.[188] These recent improvements alone are not sufficient to meet election officials' needs, or voters' expectations, associated with the expected massive spike in absentee voting due to Covid-19.[189] Without immediate additional resources, one local official we interviewed expressed concerns that the primary could be a "catastrophe."[190] Given the fundamental shift in voting preferences in 2020 expected by the Pennsylvania officials we interviewed[191] and the likelihood of unprecedented turnout in November, there must be prompt and significant federal investment in the state's election infrastructure to ensure a system that is sufficiently resilient against pandemics or other emergencies.[192]

State costs: $17.5–$17.9 million

- Mailing voter information notices
- Launching voter education efforts
- Investing in state election infrastructure
- Purchasing Covid-19 precinct protection kits
- Implementing accessible ballot-marking tool so that voters with disabilities can utilize mail-in voting

Working closely with local officials, state officials have led a significant election infrastructure investment program over the past year and a half. Many of these election security improvements will be critical to safely and securely administering upcoming elections as Pennsylvania voters are more likely to take advantage of online election services, such as online voter registration, over the coming months.

Most importantly, in September of 2019, the Pennsylvania Department of State deployed a new online absentee ballot application tool, the OABAT. Not only does the OABAT make the absentee voting process more secure through an indirect connection with the state voter registration database, but it also significantly reduces the county staff time required to process applications. A paper absentee ballot application takes approximately 7–10 times longer to process than a paperless application.[193]

However, state officials have much work to do to prepare for elections in a pandemic. First, Pennsylvania officials are planning to invest in substantive voter education and outreach efforts. These efforts are of particular importance in Pennsylvania, given that no-excuse voting by mail was only introduced recently and, historically, only a small percentage of Pennsylvania voters have cast their votes by mail.[194]

These efforts are also important to public — and poll worker — safety on election day.[195] With state and local election officials bracing for polling location consolidations and closures across the commonwealth,[196] those who vote by mail or absentee will decrease in-person Election Day turnout and thereby make it easier to conduct in-person voting in compliance with health officials' social distancing recommendations. Due to limited resources, state officials plan to spend in advance of the primary election approximately $1 million on modest but critical educational outreach efforts and an additional $1.3 million to send informational mailers to every eligible-voter household in the commonwealth.[197] In addition, state officials plan to provide Covid-19 precinct protection kits to the counties at a cost of approximately $1.2 million.[198] For these estimates, we assume that the state will also provide these kits to local election officials in the general election.

Additional outreach will be required before the general election and, with sufficient federal resources, state officials would likely double or triple those efforts.[199] Reasonable media outreach for the general election will cost at least $1.5 million and informational mailers will cost another $1.3 million.[200] State officials will continue to monitor public health conditions in conjunction with health-care experts in the coming months and, if necessary, would consider mailing vote-by-mail applications with postage-prepaid envelopes to voters in the fall at an estimated cost of $8 million.[201] State officials would also need at least $780,000–$1.2 million to obtain absentee ballot tracking software, enhanced voter lookup tools, additional load and vulnerability testing for the state's online voter registration database, and upgrades to its online absentee ballot application.[202] They are also working to implement an accessible remote ballot-marking tool so that voters with disabilities can utilize mail-in voting, which will cost approximately $1.2 million.[203] Given the limited time to develop and deploy these tools and the difficulty of integrating them with existing legacy systems, these costs could be as high as $2.5 million.[204]

Local costs: $61.6–$72.2 million

In Pennsylvania, local election authorities will be responsible for the majority of coronavirus- related election administration cost increases. While they are appreciative of the recent federal financial assistance, multiple local Pennsylvania officials joined others from around the country in stating that it was "simply not enough."[205] The majority of these costs, as well as administration challenges, stem from an infrastructure that was built for the state's historically low absentee-by-mail voting turnout;[206] officials reasonably assumed that the state's move to no-excuse absentee voting would result in a gradual increase in its use, as we have seen in states across the country.[207] Pennsylvania has seen a vast increase in absentee applications — already more than six times those from the previous presidential primary, in 2016.[208] Officials we interviewed know the level of absentee voting will continue to grow in the primary and believe that Covid-19 will likely continue to impact voting preferences in the general, even if it has been contained.[209] Additional infrastructure investments will be required to accommodate the expected surge in absentee voting during the entire election cycle.

Mailing and processing absentee ballot applications

Although the state sent informational postcards to all eligible-voter households with important information about the primary election, including how to apply for an absentee ballot, it is possible that local election officials are printing and mailing absentee-by-mail applications to voters before the primary. However, we are not including estimated costs for doing so in the primary as, due to the availability of the online absentee ballot application tool in Pennsylvania, some localities may decide against mailing out applications to all voters, or decide to only mail paper applications to universes of voters that might not be eligible to use the OABAT.[210]

Mailing, processing, and tabulating absentee ballots: $36.3–$47 million

Once an absentee ballot application is approved, officials must prepare a standard absentee ballot package for each individual voter.[211] Sufficient and well-trained staff, or experienced contractors, are essential to ensuring that every approved applicant receives all the necessary materials and the correct ballot.[212] The estimated cost for necessary materials, staffing, postage out, and return postage is $7.3 million for the primary election and $7.9–$17 million for the general.[213]

As with the other states we profile, localities will also want to deploy drop boxes for several reasons, including to reduce their postage costs (accounted for in these estimates) and increase voter convenience. If they received assistance from the federal government to do so, Pennsylvania officials we interviewed would consider widespread deployment of ballot drop boxes.[214] Statewide secure ballot drop boxes will cost approximately $5.1–$6.6 million to purchase, install, and maintain.[215]

Once an absentee ballot is returned, local officials undertake a multistep process to ensure election integrity and accurate vote tabulation, similar to the process we see in many other states that face similar struggles. In Pennsylvania, as in every state we interviewed, while the specific needs will vary by county, local officials will need additional equipment, office or warehouse space, staff, and other resources to manage the surge in incoming absentee ballots and applications.[216] Statewide, the staffing, facilities, equipment, and software that will likely be needed to process and tabulate returned absentee ballots is approximately $16.1 million, including one-time equipment purchase costs.[217]

Building secure remote, offsite or additional infrastructure: $1.1 million

Election officials' work must continue despite SAH orders, social distancing recommendations, limits on nonessential travel, building closures, and public health concerns. To do so, many local election officials may have staff who need to work at home or in temporary office space for periods of time throughout the election cycle. Working remotely can present significant security risks as malicious actors seek to exploit weaker networks and general disruption in routine.[218] In addition, officials may need additional secure workstations to accommodate processing associated with the spike in absentee voting. We estimate that it will cost local election authorities $11. million to purchase secure devices and to implement proper cybersecurity protections.[219]

Ensuring healthy and secure in-person voting options: $24.2 million

While local officials are authorized to consolidate up to 60 percent of existing polling places in the primary due to the pandemic — or further, if approved by the Department of State[220] — every locality is still required to conduct in-person voting. State and local election officials we interviewed are dedicated to protecting their poll workers and their voters on Election Day and agree that HPLM are reasonable measures.[221] For these estimates, we assume that the state is taking on the costs associated with these materials for both the primary and general elections.

For reasons similar to those of their colleagues in other states, local Pennsylvania officials we interviewed support increasing the number of poll workers and their pay but say they can only do so with sufficient federal support.[222] And Berks, Lehigh, and Philadelphia Counties, which are required to provide language assistance at the polls,[223] may need to contract for remote interpreter services to ensure compliance on Election Day. The state also provides remote interpreter services to improve language access on Election Day.[224] The total cost to locals for these changes is estimated at $24.2 million for both elections.[225]

TABLE 1

Estimated Costs for Georgia

	LOW-END ESTIMATE	HIGH-END ESTIMATE
State total	**$110,741,555**	**$124,430,160**
State costs	$42,403,860	$49,034,290
Local costs	$68,337,695	$75,395,870
Secure online systems		
Online absentee request systems (development and maintenance)	$360,000	$470,000
Ballot-tracking systems and voter notification	$100,000	$200,000
Online voter registration capacity and testing	$150,000	$170,000
Voter lookup tools and vulnerability testing	$30,000	$50,000
Mail ballot distribution		
Mailing absentee applications		
Absentee ballot applications (November)	$3,102,000	$3,102,000
Return postage (November)	$1,569,750	$2,982,525
Absentee ballot applications (other elections)	$12,408,000	$12,408,000
Return postage (other elections)	$2,421,900	$2,421,900
Mailing absentee ballots		
Absentee ballots (November)	$4,540,200	$10,920,630
Return postage (November)	$1,690,500	$6,423,900
Absentee ballots (Other elections)	$11,463,660	$11,463,660
Return postage (Other elections)	$5,216,400	$5,216,400
Drop boxes	$2,128,000	$3,040,000
Drop box maintenance	$912,000	$912,000

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Mail ballot processing and tabulation		
Automated letter openers	$138,000	$138,000
Mail-sorting equipment	$4,600,000	$4,600,000
High-speed scanners	$10,250,000	$10,250,000
Processing and storage facilities	$2,050,000	$2,050,000
Processing staff (all elections)	$11,491,200	$11,491,200
Computers and technology	$326,300	$326,300
In-person voting		
PPE and health (all elections)	$2,256,750	$2,256,750
Plexiglass sneeze guards (one-time expenditure)	$796,500	$796,500
Postelection cleaning services (all elections)	$796,500	$796,500
Single-use pens (all elections)	$0	$0
Poll worker pay increase (all elections)	$5,073,300	$5,073,300
Interpreter services (all elections)	$327,600	$327,600
Expanded curbside voting (all elections)	$3,547,500	$3,547,500
Public education		
Informational mailers to all voters (all elections)	$16,200,000	$16,200,000
Media outreach (all elections)	$5,059,952	$5,059,952
Secure remote working and off-site infrastructure		
Remote-working devices, security protections, and maintenance	$1,735,543	$1,735,543

Note: The cost of return postage during the primary election is not included.

TABLE 2

Estimated Costs for Michigan

	LOW-END ESTIMATE	HIGH-END ESTIMATE
State total	**$94,945,253**	**$103,778,403**
State costs	$13,540,937	$17,595,693
Local costs	$81,404,316	$86,182,710
Secure online systems		
Online absentee request systems (development and maintenance)	$360,000	$470,000
Ballot-tracking systems and voter notification	$50,000	$100,000
Online voter registration capacity and testing	$150,000	$170,000
Voter lookup tools and vulnerability testing	$30,000	$50,000
Mail ballot distribution		
Mailing absentee applications		
Absentee ballot applications (November)	$4,481,580	$4,481,580
Return postage (November)	$1,615,366	$3,069,195
Absentee ballot applications (other elections)	$4,481,580	$4,481,580
Return postage (other elections)	$745,554	$745,554
Mailing absentee ballots		
Absentee ballots (November)	$4,782,639	$9,087,013
Return postage (November)	$839,668	$3,240,595
Absentee ballots (other elections)	$2,207,372	$2,207,372
Return postage (other elections)	$787,189	$787,189
Drop boxes	$1,106,000	$1,580,000
Drop box maintenance	$474,000	$474,000

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Mail ballot processing and tabulation		
Automated letter openers	$293,000	$293,000
Mail-sorting equipment	$5,400,000	$5,400,000
High-speed scanners	$17,350,000	$17,350,000
Processing and storage facilities	$3,470,000	$3,470,000
Processing staff (all elections)	$9,424,800	$9,424,800
Computers and technology	$521,300	$521,300
In-person voting		
PPE and health (all elections)	$1,630,980	$1,630,980
Plexiglass sneeze guards (one-time expenditure)	$1,439,100	$1,439,100
Postelection cleaning services (all elections)	$575,640	$575,640
Single-use pens (all elections)	$5,735,777	$5,735,777
Poll worker pay increase (all elections)	$5,373,750	$5,373,750
Interpreter services (all elections)	$9,450	$9,450
Expanded curbside voting (all elections)	$2,578,500	$2,578,500
Public education		
Informational mailers to all voters (all elections)	$6,882,033	$6,882,033
Media outreach (all elections)	$2,149,533	$2,149,553
Secure remote and off-site infrastructure		
Remote-working devices, security protections, and maintenance	$10,000,442	$10,000,442

TABLE 3

Estimated Costs for Missouri

	LOW-END ESTIMATE	HIGH-END ESTIMATE
State total	**$59,412,659**	**$67,013,321**
State costs	$590,000	$790,000
Local costs	$58,822,659	$66,223,321
Secure online systems		
Online absentee request systems (development and maintenance)	$360,000	$470,000
Ballot-tracking systems and voter notification	$50,000	$100,000
Online voter registration capacity and testing	$150,000	$170,000
Voter lookup tools and vulnerability testing	$30,000	$50,000
Mail ballot distribution		
Mailing absentee applications		
Absentee ballot applications (November)	$2,385,217	$2,385,217
Return postage (November)	$901,578	$1,712,998
Absentee ballot applications (other elections)	$4,770,434	$4,770,434
Return postage (other elections)	$686,276	$686,276
Mailing absentee ballots		
Absentee ballots (November)	$4,439,896	$8,435,803
Return postage (November)	$755,834	$2,872,169
Absentee ballots (other elections)	$3,379,623	$3,379,623
Return postage (other elections)	$1,150,672	$1,150,672
Drop boxes	$1,113,000	$1,590,000
Drop box maintenance	$477,000	$477,000

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Mail ballot processing and tabulation		
Automated letter openers	$102,000	$102,000
Mail-sorting equipment	$2,900,000	$2,900,000
High-speed scanners	$7,250,000	$7,250,000
Processing and storage facilities	$1,450,000	$1,450,000
Processing staff (all elections)	$5,359,200	$5,359,200
Computers and technology	$226,200	$226,200
In-person voting		
PPE and health (all elections)	$1,908,420	$1,908,420
Plexiglass sneeze guards (one-time expenditure)	$1,122,600	$1,122,600
Postelection cleaning services (all elections)	$673,560	$673,560
Single-use pens (all elections)	$3,105,320	$3,105,320
Poll worker pay increase (all elections)	$3,315,400	$3,315,400
Interpreter services (all elections)	$0	$0
Expanded curbside voting (all elections)	$2,806,500	$2,806,500
Public education		
Informational mailers to all voters (all elections)	$5,589,575	$5,589,575
Media outreach (all elections)	$1,745,863	$1,745,863
Secure remote and off-site infrastructure		
Remote-working devices, security protections, and maintenance	$1,208,491	$1,208,491

TABLE 4

Estimated Costs for Ohio

	LOW-END ESTIMATE	HIGH-END ESTIMATE
State total	**$70,001,871**	**$82,166,652**
State costs	$4,201,913	$4,401,913
Local costs	$65,799,959	$77,764,740
Secure online systems		
Online absentee request systems (development and maintenance)	$360,000	$470,000
Ballot-tracking systems and voter notification	$50,000	$100,000
Online voter registration capacity and testing	$130,000	$150,000
Voter lookup tools and vulnerability testing	$30,000	$50,000
Mail ballot distribution		
Mailing absentee applications		
Absentee ballot applications (November)	$4,730,203	$4,730,203
Return postage (November)	$1,888,595	$3,588,330
Absentee ballot applications (other elections)		
Return postage (other elections)		
Mailing absentee ballots		
Absentee ballots (November)	$6,711,603	$12,752,047
Return postage (November)	$1,026,644	$3,901,246
Absentee ballots (other elections)	$5,872,653	$5,872,653
Return postage (other elections)	$1,796,626	$1,796,626
Drop boxes	$3,150,000	$4,500,000
Drop box maintenance	$1,350,000	$1,350,000

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Mail ballot processing and tabulation		
Automated letter openers	$88,000	$88,000
Mail-sorting equipment	$6,400,000	$6,400,000
High-speed scanners	$7,600,000	$7,600,000
Processing and storage facilities	$1,520,000	$1,520,000
Processing staff (all elections)	$4,636,800	$4,636,800
Computers and technology	$280,800	$280,800
In-person voting		
PPE and health (all elections)	$1,513,680	$1,513,680
Plexiglass sneeze guards (one-time expenditure)	$2,671,200	$2,671,200
Postelection cleaning services (all elections)	$534,240	$534,240
Single-use pens (all elections)	$2,103,441	$2,103,441
Poll worker pay increase (all elections)	$3,886,700	$3,886,700
Interpreter services (all elections)	$0	$0
Expanded curbside voting (all elections)	$2,028,500	$2,028,500
Public education		
Informational mailers to all voters (all elections)	$7,263,825	$7,263,825
Media outreach (all elections)	$1,134,401	$1,134,401
Secure remote and off-site infrastructure		
Remote-working devices, security protections, and maintenance	$1,243,960	$1,243,960

Note: Estimates do not include costs associated with absentee applications and in-person voting for the April 28 primary election.

TABLE 5

Estimated Costs for Pennsylvania

	LOW-END ESTIMATE	HIGH-END ESTIMATE
State total	**$79,054,774**	**$90,104,119**
State costs	$17,480,000	$17,870,000
Local costs	$61,574,774	$72,234,119
Secure online systems		
Online absentee request systems (development and maintenance)	$500,000	$750,000
Ballot-tracking systems and voter notification	$100,000	$200,000
Online voter registration capacity and testing	$150,000	$170,000
Voter lookup tools and vulnerability testing	$30,000	$50,000
Mail ballot distribution		
Mailing absentee applications		
Absentee ballot applications (November)	$3,300,000	$3,300,000
Return postage (November)	$4,700,000	$4,700,000
Absentee ballot applications (other elections)		
Return postage (other elections)		
Mailing absentee ballots		
Absentee ballots (November)	$6,802,425	$12,924,608
Return postage (November)	$1,077,201	$4,093,363
Absentee ballots (other elections)	$5,539,118	$5,539,118
Return postage (other elections)	$1,754,298	$1,754,298
Drop boxes	$3,549,000	$5,070,000
Drop box maintenance	$1,521,000	$1,521,000

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Mail ballot processing and tabulation		
Automated letter openers	$64,000	$64,000
Mail-sorting equipment	$5,100,000	$5,100,000
High-speed scanners	$5,900,000	$5,900,000
Processing and storage facilities	$1,180,000	$1,180,000
Processing staff (all elections)	$3,616,200	$3,616,200
Computers and technology	$219,700	$219,700
In-person voting		
PPE and health (all elections)	$2,400,000	$2,400,000
Plexiglass sneeze guards (one-time expenditure)	$2,746,800	$2,746,800
Postelection cleaning services (all elections)	$1,098,720	$1,098,720
Single-use pens (all elections)	$4,444,606	$4,444,606
Poll worker pay increase (all elections)	$6,842,700	$6,842,700
Interpreter services (all elections)	$2,157,750	$2,157,750
Expanded curbside voting (all elections)	$6,865,500	$6,865,500
Public education		
Informational mailers to all voters (all elections)	$2,600,000	$2,600,000
Media outreach (all elections)	$2,500,000	$2,500,000
Secure remote and off-site infrastructure		
Remote-working devices, security protections, and maintenance	$1,095,756	$1,095,756

Note: Total and state costs include implementing a remote ballot marking tool at a cost of $1.2 million.

Appendix: Methodology

Our estimates of the expenses state and local jurisdictions confront come from (1) interviews with election officials in each of these states about the costs they have already incurred; (2) interviews with vendors and service providers about the costs of other needed products and services that election officials identified, as well as publicly available information about these costs; and (3) projections of voter behavior, based on prior history, as well as changes we have already seen in recent elections. Below are the assumptions and sources of our cost estimates.

Securing Online Systems

Costs included: online absentee ballot request systems, ballot-tracking systems, and added capacity, vulnerability testing, and maintenance for all online election systems.

Based on interviews with state election officials, we determined whether each state currently has all of the necessary systems for online absentee ballot requests and ballot tracking. When unable to obtain confirmation from state election officials, we used publicly available information about state systems to make our assumptions.[226] Even where these systems are already in place in some form, additional resources for vulnerability testing will be needed given the importance of these remote tools if in-person interaction becomes difficult or impossible. Existing systems will also need upgrades to meet the increased demand for mail voting, and states will require additional server space and IT support. Cost estimates were based on interviews with election officials and information from technology vendors.

We estimate that secure online absentee ballot request systems will cost each state $300,000–$350,000 to develop and another $60,000–$120,000 to maintain.[227] Of the states that we analyzed in this report, only Pennsylvania has an online absentee ballot request system already.[228] However, Pennsylvania officials plan to spend $500,000–$750,000 on needed upgrades and enhancements to this system before November.[229]

For Georgia and Pennsylvania, we estimate that it will cost $100,000–$200,000 to purchase and improve absentee ballot tracking systems that notify voters when their ballot has cleared each step in the delivery and counting process.[230] Because Michigan, Missouri, and Ohio have more extensive ballot-tracking systems in place already,[231] we estimate that they will each need only $50,000–$100,000 to add additional notification features and prepare these systems for increased use.

Online voter registration (OVR) capacity and vulnerability testing costs generally depend on whether the state's voter registration database is a "top-down" or "bottom-up" system. Georgia, Michigan, Missouri, and Pennsylvania all have "top-down" systems and Ohio has a "bottom-up" system.[232] We estimate that capacity and vulnerability testing will cost $150,000–$170,000 for each "top-down" state and $130,000–$150,000 for each "bottom-up" state.[233]

Finally, we estimate that vulnerability testing for voter lookup tools — including for registration status and polling place location — will cost $30,000–$50,000 for each state.[234]

Mail Ballot Distribution

Costs included: mailing absentee applications and absentee ballots (including materials, envelopes, postage, and staffing) and additional drop boxes for ballot return.

Mailing Absentee Applications We estimated how much it would cost each state to mail an absentee ballot application with prepaid return postage to every voter for each election. For the cost of return postage, we assumed that election officials would pay only for applications actually returned by mail.

Where available, we used 2020 voter registration statistics for each state to determine the number of voters that would receive an absentee application. In Ohio, where we could not find publicly available voter registration numbers for 2020, we used 2018 voter registration numbers from the Election Administration and Voting Survey (EAVS).[235] Because Georgia has already committed to sending absentee applications to all active registered voters for the primary election, we used active registered voters as the baseline for this state rather than total registered voters.

For most states, we assumed that the number of applications returned by mail would be equal to the number of mail ballots cast in each election. We assumed that turnout in each election would be consistent with corresponding elections in 2016. For Georgia, we assumed turnout would be 32 percent in the primary, 10 percent in the primary runoff, 70 percent in the general, 22 percent in the state runoff, and 40 percent in the federal runoff. For Michigan, we assumed turnout would be 20 percent in the primary and 65 percent in the general. For Missouri, we assumed turnout would be 10 percent in the

municipal, 24 percent in the primary, and 67 percent in the general. For Ohio, we assumed turnout would be 42 percent in the primary and 72 percent in the general. For Pennsylvania we assumed turnout would be 38 percent in the primary and 70 percent in the general. We also assumed that mail ballots would make up 75 percent of votes cast in primary, runoff, and local elections, and 50–95 percent of votes cast in the November general election. This range reflects how much uncertainty there is regarding what the public health threat will be this fall.

Based on interviews with election officials, we estimated that the cost of printing and sending out absentee ballot requests ranges from $0.45 to $0.60 per voter.[236] The cost of prepaid return postage was estimated at $0.65 per voter, which includes an estimate of the processing and handling fee charged by USPS.[237] Where states have already committed to certain practices or funds associated with mailing absentee applications or ballots for an upcoming election, we used those available cost estimates. For Pennsylvania, we used an $8 million estimate for mailing applications with return postage that was provided by state officials.[238]

Mailing Absentee Ballots For the cost of mailing absentee ballots, we first set projected baselines for the amount of resources each state would need in an election under "normal" circumstances — that is, with no public health crisis. We determined the number of absentee ballots cast as a percentage of registered voters using 2018 EAVS data and used this to determine the number of absentee ballots that would be cast in 2020 with similar absentee ballot use patterns. For Pennsylvania, which recently adopted no-excuse absentee voting, we used a 10 percent absentee vote rate. We then subtracted this number from the total number of registered voters to determine the supply of additional absentee ballot materials that would be needed to have enough for all voters.[239] These numbers were then multiplied by absentee ballot material costs per voter and reduced by expected turnout, as explained below.

We also set projected baselines for the number of paper ballots that would be printed under normal circumstances. These baselines were set according to the number of ballots that would be printed for absentee voting (using the same methodology as described above for absentee ballot materials) and for in-person voting. To determine the number of ballots that would be printed for in-person voting, we used the number of voters in jurisdictions that use hand-marked paper ballots as their primary voting system[240] and the minimum number of ballots that these jurisdictions must print under state law.[241] We then subtracted this number from the total number of registered voters to determine the supply of additional absentee ballot materials that would be needed to have enough for all voters.[242] These numbers were then multiplied by absentee ballot costs per voter and reduced by expected turnout, as explained below.

We then estimated the costs associated with the measures, equipment, and other accommodations state and local officials will need to best manage the expected significant increase in mail voting due to Covid-19. We conducted interviews with local election officials to obtain estimates for many of the discrete costs we relied on to create these estimates. When necessary and possible, we used averages drawn from multiple election officials.

Based on interviews from election officials and publicly available sources, we estimate the cost of materials for absentee ballots (ballots, envelopes, instructions, etc.) will range from $1.25 to $1.89 per voter.[243] To estimate the additional staffing costs needed to address the spike in absentee voting, we assumed that jurisdictions with fewer than 25,000 voters would need one additional temporary worker ($1,200) and jurisdictions with 25,000 or more voters would need three additional temporary workers ($3,600) for a period of approximately two weeks to assist with assembling absentee ballot packets.

For the cost of mailing absentee ballots, we assumed that turnout for each election would be consistent with recent corresponding elections. For Georgia, we assumed turnout would be 32 percent in the primary, 10 percent in the primary runoff, 70 percent in the general, 22 percent in the state runoff, and 40 percent in the federal runoff. For Michigan, we assumed turnout would be 20 percent in the primary and 65 percent in the general. For Missouri, we assumed turnout would be 10 percent in the municipal, 24 percent in the primary, and 67 percent in the general. For Ohio, we assumed turnout would be 42 percent in the primary and 72 percent in the general. For Pennsylvania we assumed turnout would be 38 percent in the primary and 70 percent in the general.

We also assumed that mail ballots would make up 75 percent of votes cast in primary, runoff, and local elections, and 50–95 percent of votes cast in the November general election. This range reflects how much uncertainty there is regarding what the public health threat will be this fall.

Election officials we interviewed emphasized that postage costs vary based on several variables, including the length of the ballot. For these estimates, we assume that postage costs for sending absentee ballots ranged from $1.15 to $2.38 per voter for each ballot sent, and $0.80 to $1.40 per voter for each ballot returned.[244] When estimating the cost of return postage for the November general election, our lower-range estimates assume that half of voters who vote by mail return their ballot using a drop box. Specifically, we assumed that 50–95 percent of the total number of estimated voters will cast an absentee ballot, but to determine our estimated postage costs for the November, we assumed that only half of this popula-

tion, or as few as 25 percent, will return their ballot by mail.

Ballot Drop Boxes For ballot drop boxes, we estimate that each election jurisdiction will need one drop box for every 15,000 voters.[245] We assume that the county (or jurisdiction) office can operate as one secure drop-off site for each of these jurisdictions at minimal cost, and determined the number of drop boxes that would be needed in addition to the county office to meet the ratio of one drop-off site per 15,000 voters. Drop boxes were estimated at $7,000–$10,000 to purchase and install, plus another $3,000 to maintain. These estimates are taken from costs associated with drop boxes in Washington State, where their use is widespread.[246] While some drop boxes can be found at lower costs, we chose this price point because these drop boxes offer structural protection against physical damage, fires, ballot theft, and tampering.[247]

Mail Ballot Processing and Tabulation

Costs included: automated letter openers, mail-sorting equipment, high-speed scanners, additional processing and storage facilities, and additional processing staff.

Local jurisdictions will need more equipment, space, and staff to handle a substantial increase in absentee ballot use. We determined the estimated cost for each jurisdiction based on the number of voters.[248]

We estimate that automated letter openers will cost $1,000 per unit[249] and that every jurisdiction with more than 5,000 voters will need one. We estimate that mail-sorting equipment will cost $100,000 per jurisdiction and will be needed by every jurisdiction with more than 25,000 voters.[250] We estimate that high-speed scanners will cost $50,000 for every jurisdiction with 5,000 to 25,000 voters and $100,000 for every jurisdiction with more than 25,000 voters.[251] We estimate that expanded facilities will cost $10,000[252] for every jurisdiction with 5,000 to 25,000 voters and $20,000[253] for every jurisdiction with more than 25,000 voters. We estimate that additional processing staff will cost $16,800[254] for every jurisdiction with 5,000 to 25,000 voters and $42,000[255] for every jurisdiction with more than 25,000 voters. Finally, we estimate that additional computers for processing will cost $1,300 for every jurisdiction with 5,000 to 25,000 voters and $3,900 for every jurisdiction with more than 25,000 voters.

Even in jurisdictions that have some of this technology, such as high-speed scanners, in place, election officials will likely need to purchase additional units or units that can handle higher capacity, given that each of these states has had relatively low rates of mail voting in the past.

In-Person Voting

Costs included: PPE for poll workers, cleaning supplies, plexiglass sneeze guards, postelection cleaning services, single-use pens, poll worker pay increases, remote interpreter services, and expanded curbside voting.

We determined cost estimates for a set of polling place cleaning and health supplies recommended by health professionals, and estimated costs for each state based on their numbers of precincts and poll workers in recent elections.[256] Based on interviews with election officials, information from vendors, and publicly available information, we estimate that personal protective equipment (PPE) and cleaning supplies would cost an additional $170 per precinct, that plexiglass sneeze guards would cost an additional $300 per precinct, and that postelection cleaning services would cost an additional $60 per precinct. The cost of PPE and cleaning supplies is set to the amount that Pennsylvania officials will spend per "kit" that includes various PPE supplies and other cleaning products,[257] and the estimated costs of plexiglass sneeze guards[258] and postelection cleaning services[259] were determined from a sample of prices from vendors of these services and equipment as well as guidance from health experts. We estimate the cost of single-use pens for all voters using hand-marked paper ballots to cast their vote at a rate of $0.50 each.[260] This estimate was also determined based on a sample of prices from election supply vendors. We used the estimated number of voters in jurisdictions that use hand-marked paper ballots as the baseline for single-use pen estimates.[261]

For the cost of PPE and cleaning supplies in Pennsylvania, we use a $1.2 million per election estimate that was provided to us by state officials.[262]

We assumed a $100 pay increase for every poll worker in order to help with recruitment. We relied on 2018 EAVS data to determine the estimated number of poll workers in each state.[263] Election officials we interviewed expressed broad agreement that poll workers are currently underpaid, that pay increases would be helpful for recruitment, and that $100 pay increases would reasonably further these efforts.

We also determined the cost of providing language interpretation services by phone to every precinct covered under section 203 of the Voting Rights Act. We estimated that these services would cost $700 per precinct, based on information from vendors. This estimate was determined by looking at a sample of rates from professional interpreter services. [264]

Finally, we estimated costs associated with expanded curbside voting at an additional $500 per polling location, which would cover two additional poll workers and needed materials.[265] This estimate takes into account best practice, which requires a bipartisan team of two poll workers to meet voters outside of polling locations for

curbside voting. While poll worker pay varies considerably from state to state and sometimes even from county to county, $200 per poll worker represents an approximate nationwide average when taking into account desired pay increases.[266]

Public Education

Costs included: informational mailers to all voters and media outreach.

We estimate the costs of sending every registered voter an informational mailer for each election at a rate of $0.45 per voter,[267] and the costs of general media outreach for the election cycle at a rate of $0.14 per voter. The costs were determined from interviews with election officials, as well as comparable outreach efforts, such as for the 2020 census.[268]

For Pennsylvania, we used total cost estimates for informational mailers and media outreach that were provided to us by state officials.[269]

We recognize that voter education and outreach costs used for the purpose of this analysis are conservative estimates.[270] Election procedures are likely to undergo substantial changes over the year due to the evolving and unprecedented public health crisis. Given the low rates of absentee use in these states, many voters will be voting by mail for the first time. We fully support a robust education campaign to ensure that all voters understand how to safely cast their vote in 2020.

Secure Remote and Offsite Infrastructure

Costs included: computers, endpoint protection, multifactor authentication, VPN, and tech maintenance.

These estimates include the costs of setting up and maintaining a virtual private network (VPN) in each election jurisdiction, as well as the cost of providing secure devices with endpoint protection and multifactor authentication to access state election networks.

We estimate that these purchases and upgrades will cost $4,733 for jurisdictions with fewer than 3,500 voters, $8,870 for jurisdictions with 3,500 to 100,000 voters, and $32,040 for jurisdictions with more than 100,000 voters. Costs were determined based on interviews with state cybersecurity staff and technology vendors.[271]

Endnotes

1 There have been several instances of poll workers testing positive for Covid-19 soon after elections. See e.g., John Keilman, "After Chicago poll worker dies from COVID-19 and others test positive, city warns voters they might have been exposed to virus at polling places," *Chicago Tribute*, Apr. 13, https://www.chicagotribune.com/coronavirus/ct-chicago-poll-worker-dies-covid-cornavirus-20200413-rz-55vqpo6jfbxn7e4i6vkj6n2y-story.html; Gary Fineout, "2 Florida primary poll workers test positive for coronavirus," *Politico*, Mar. 26, 2020, https://www.politico.com/states/florida/story/2020/03/26/2-florida-primary-poll-workers-test-positive-for-coronavirus-1269261.

2 Moreover, some states are concerned that they will not be able to access the federal funds because of constraints put on the money. National Association of Secretaries of State, "NASS President Paul Pate & President-elect Maggie Toulouse Oliver Open Letter to Congress and American Voters on COVID-19 Election Preparations," Mar. 25, 2020, https://www.nass.org/node/1824.

3 Stateline Article, " 'We Have No Money': Coronavirus Slams State Taxes," Pew Charitable Trusts, Apr. 2, 2020, https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2020/04/02/we-have-no-money-coronavirus-slams-state-taxes ("Few state economists and budget analysts have calculated the fiscal impact of the pandemic so far, and it's hard at this early stage to say how big the drop off in tax collections will be, said Brian Sigritz, director of state fiscal studies for the National Association of State Budget Officers, a Washington, D.C.-based membership organization. But the early estimates don't look good, he said. 'It looks like the drop-off that states could be facing this time could be more severe than the Great Recession.'").

4 See, e.g., Keilman, "After Chicago poll worker dies from COVID-19 and others test positive, city warns voters they might have been exposed to virus at polling places"; Fineout, "2 Florida primary poll workers test positive for coronavirus."

5 All totals and subtotals listed in state profiles reflect cost estimates in the state estimate chart. Because of rounding, estimates listed in state profiles may not add up to the subtotals listed in state profiles.

6 Georgia Secretary of State, "Active Voters by Race and Gender as of April 1, 2020 (By County with Statewide Totals)," accessed Apr. 16, 2020, https://sos.ga.gov/index.php/Elections/voter_registration_statistics.

7 U.S. Election Assistance Commission, "2020 Cares Act Grants," accessed Apr. 16, 2020, https://www.eac.gov/payments-and-grants/2020-cares-act-grants.

8 Georgia Secretary of State, "Raffensperger Announces Postponement of Primary Election Until June 9," Apr. 9, 2020, https://sos.ga.gov/index.php/elections/raffensperger_announces_postponement_of_primary_election_until_june_9.

9 U.S. Election Assistance Commission, *Election Administration And Voting Survey 2018 Comprehensive Report: A Report to the 116th Congress*, June 2019, 29 and 55, https://www.eac.gov/sites/default/files/eac_assets/1/6/2018_EAVS_Report.pdf; see also Mark Niesse, "Voters mailed absentee ballot request forms for May 19 Georgia primary," *Atlanta Journal Constitution*, Apr. 10, 2020, https://www.ajc.com/news/state--regional-govt--politics/voters-mailed-absentee-ballot-request-forms-for-may-georgia-primary/hc0FkOo85uVCALbWvQUo9L.

10 Georgia Secretary of State, "Raffensperger Takes Unprecedented Steps to Protect Safety and Voter Integrity in Georgia," Mar. 24, 2020, https://sos.ga.gov/index.php/elections/raffensperger_takes_unprecedented_steps_to_protect_safety_and_voter_integrity_in_georgia.

11 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

12 Georgia Secretary of State, "Raffensperger Takes Unprecedented Steps to Protect Safety and Voter Integrity in Georgia"; Niesse, "Voters mailed absentee ballot request forms for May 19 Georgia primary."

13 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

14 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

15 Mark Niesse, "Elections employee dies of COVID-19 ahead of Georgia primary," *Atlanta Journal-Constitution*, Apr. 23, 2020, https://www.ajc.com/news/state--regional-govt--politics/elections-employee-dies-covid-ahead-georgia-primary/tCXDJ2abT6QTqu6r1qEv8L.

16 Camden County, Georgia, Alert Center, "County Office Buildings Temporarily Closed," Mar. 20, 2020, https://www.co.camden.ga.us/AlertCenter.aspx?AID=County-Office-Buildings-Temporarily-Clos-101.

17 Georgia Secretary of State, "2020 State Elections and Voter Registration Calendar," accessed Apr. 13, 2020, https://sos.ga.gov/admin/uploads/2020_Short_Calendar.pdf; Isaac Sabatei, "Election 2020: Inside Georgia's Senate Races," *Atlanta Journal Constitution*, Apr. 9, 2020, https://www.ajc.com/news/state--regional-govt--politics/election-2020-inside-georgia-senate-races/OO1k28vHPPHaNJgIEAznDL (noting "7 Democrats qualified to run" in the Democratic primary for U.S. Senate); Jessica Taylor, "Georgia Senate Special Election Moves From Likely to Lean Republican," *Cook Political Report*, Jan. 31, 2020, https://cookpolitical.com/analysis/senate/georgia-senate/georgia-senate-special-election-moves-likely-lean-republican ("If no candidate receives a majority (which seems all but certain), the top two finishers will advance to a runoff on January 5, 2021.").

18 Georgia election officials have signed a letter in support of additional federal elections funding: Deidre B. Holden (Supervisor of Elections and Registration, Paulding County), Joseph Kirk (Director of Elections, Bartow County). See Brennan Center for Justice, "Election Officials Call for More Election Funding in Next Stimulus Bill," last updated Apr. 16, 2020, https://www.brennancenter.org/our-work/research-reports/election-officials-call-more-election-funding-next-stimulus-bill.

19 Niesse, "Voters mailed absentee ballot request forms for May 19 Georgia primary."

20 Niesse, "Voters mailed absentee ballot request forms for May 19 Georgia primary"; Kevin Rayburn (Deputy Elections Director and Deputy General Counsel, Georgia Secretary of State), Gabriel Sterling (Voting System Implementation Manager, Georgia Secretary of State), Chris Harvey (Elections Director, Georgia Secretary of State), interview with Brennan Center for Justice, Apr. 17, 2020.

21 See attached state estimate chart and methodology section for detailed calculations.

22 Kevin Rayburn (Deputy Elections Director and Deputy General Counsel, Georgia Secretary of State), Gabriel Sterling (Voting System Implementation Manager, Georgia Secretary of State), Chris Harvey (Elections Director, Georgia Secretary of State), interview with Brennan Center for Justice, Apr. 17, 2020.

23 Kevin Rayburn (Deputy Elections Director and Deputy General Counsel, Georgia Secretary of State), Gabriel Sterling (Voting System Implementation Manager, Georgia Secretary of State), Chris Harvey (Elections Director, Georgia Secretary of State), interview with Brennan Center for Justice, Apr. 17, 2020.

24 Kevin Rayburn (Deputy Elections Director and Deputy General Counsel, Georgia Secretary of State), Gabriel Sterling (Voting System Implementation Manager, Georgia Secretary of State), Chris Harvey (Elections Director, Georgia Secretary of State), interview with Brennan Center for Justice, Apr. 17, 2020.

25 See attached state estimate chart and methodology section for detailed calculations.

26 Brad Raffensperger (Georgia Secretary of State), Jordan Fuchs (Deputy Secretary of State, Georgia Secretary of State), Ryan Germany (General Counsel, Georgia Secretary of State), Kevin Hamilton (Deputy Elections Director, Georgia Secretary of State), Kelvin Williams (Elections Coordinator, Gwinnett County), Joseph Kirk (Elections Supervisor, Bartow County), Deb Cox (Supervisor of Elections, Lowndes County), Georgia Election Cybersecurity Roundtable, Georgia Secretary of State, Feb. 19, 2020.

27 2005 Georgia Laws Act 53 (H.B. 244).

28 See U.S. Election Assistance Commission, "2016 EAVS Data Brief: Georgia," accessed Apr. 13, 2020, https://www.eac.gov/sites/default/files/eac_assets/1/6/Georgia_-_EAVS_2016_Data_Brief_-_508.pdf; U.S. Election Assistance Commission, "2018 EAVS Data Brief: Georgia," accessed Apr. 13, 2020, https://www.eac.gov/sites/default/files/eac_assets/1/6/EAVS_2018_Data_Brief_GA.pdf.

29 Mark Niesse, "Georgia elections chief launches effort against mail-in voting fraud," *Atlanta Journal Constitution*, Apr. 6, 2020, https://www.ajc.com/news/state--regional-govt--politics/georgia-elections-chief-launches-effort-against-mail-voting-fraud/uKcFoPbbLnFC0A4nXihaLI.

30 Kevin Rayburn (Deputy Elections Director and Deputy General Counsel, Georgia Secretary of State), Gabriel Sterling (Voting System Implementation Manager, Georgia Secretary of State), Chris Harvey (Elections Director, Georgia Secretary of State), interview with Brennan Center for Justice, Apr. 17, 2020.

31 Kevin Rayburn (Deputy Elections Director and Deputy General Counsel, Georgia Secretary of State), Gabriel Sterling (Voting System Implementation Manager, Georgia Secretary of State), Chris Harvey (Elections Director, Georgia Secretary of State), interview with Brennan Center for Justice, Apr. 17, 2020.

32 See attached state estimate chart and methodology section for detailed calculations.

33 See attached state estimate chart and methodology section for detailed calculations.

34 Around 95 percent of overall turnout was in person. See "2016 EAVS Data Brief: Georgia"; "2018 EAVS Data Brief: Georgia".

35 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

36 Paul Pate (Iowa Secretary of State), "Paul Pate on States Considering Voting Changes Amid Coronavirus Pandemic," interview by Steve Scully, *Washington Journal*, C-SPAN, Apr. 5, 2020, https://www.c-span.org/video/?470912-3/washington-journal-paul-pate-discusses-potential-voting-amid-coronavirus-pandemic.

37 See attached state estimate chart and methodology section for detailed calculations.

38 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

39 Although USPS has agreed to deliver voted absentee ballots to election officials if the voter failed to provide sufficient postage, "the Postal Service didn't answer questions about whether it would deliver absentee request forms without postage." See Mark Niesse, "Mailed ballots in Georgia will be counted, even without a stamp," *Atlanta Journal-Constitution*, Apr. 14, 2020, https://www.ajc.com/news/state--regional-govt--politics/mailed-ballots-georgia-will-counted-even-without-stamp/4P04UcxpZuJ1jZVXgDbixO.

40 Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

41 Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

42 Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020.

43 Mark Niesse, "Georgia absentee ballots changed to remove inner envelope," *Atlanta Journal-Constitution*, Apr. 27, 2020, https://www.ajc.com/news/state--regional-govt--politics/georgia-absentee-ballots-changed-remove-inner-envelope/5VCLguuvNOR2qb4zTctOLK/.

44 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

45 Although voters are asked to pay postage to return their absentee ballot, USPS "mail carriers are told to deliver ballot envelopes labeled as 'official election mail'" even if they don't have sufficient postage. USPS will subsequently bill county officials for the postage costs. See Niesse, "Mailed ballots in Georgia will be counted, even without a stamp."

46 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

47 Niesse, "Mailed ballots in Georgia will be counted, even without a stamp."

48 See attached state estimate chart and methodology section for detailed calculations.

49 Ten states provide ballot drop boxes in some or all counties: Arizona, California, Colorado, Kansas, Montana, Nebraska, New Mexico, Oregon, Utah, and Washington. See National Conference of State Legislatures, "Voting Outside the Polling Place: Absentee, All-Mail and other Voting at Home Options," last updated Apr. 14, 2020, https://www.ncsl.org/research/elections-and-campaigns/absentee-and-early-voting.aspx#provide.

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51 Judd Choate (Director of Elections, Colorado Department of State), interview by Brennan Center for Justice, Mar. 31, 2020; see also Charles Stewart III, *2016 Survey of the Performance of American Elections: Final Report*, Massachusetts Institute of Technology, 2016,

https://dataverse.harvard.edu/file.xhtml?persistentId=doi:10.7910/DVN/Y38VIQ/2NJDL9&version=1.0 (according to 2016 survey data, 73 percent of Colorado voters returned their ballots to some physical location, such as a drop box or local election office; moreover, according to Choate, Colorado has over 400 drop boxes statewide and has dedicated another $125,000 in 2018 Help America Vote Act funds to more boxes).

52 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

53 See attached state estimate chart and methodology section for detailed calculations.

54 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

55 See attached state estimate chart and methodology section for detailed calculations.

56 Cybersecurity and Infrastructure Security Agency, "UK and US Security Agencies Issue Covid-19 Cyber Threat Update," Apr. 8, 2020, https://www.cisa.gov/news/2020/04/08/uk-and-us-security-agencies-issue-covid-19-cyber-threat-update.

57 See attached state estimate chart and methodology section for detailed calculations.

58 See, e.g., Georgia Secretary of State, "Raffensperger Takes Unprecedented Steps to Protect Safety and Voter Integrity in Georgia."

59 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

60 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

61 Alabama Secretary of State, "Congress Appropriates $400 Million to Prepare States for Election Day amid Coronavirus Concerns," Mar. 30, 2020, https://www.sos.alabama.gov/newsroom/congress-appropriates-400-million-prepare-states-election-day-amid-coronavirus-concerns; City of Madison Clerk's Office, "Twelve Things for Voters to Know on Election Day," Apr. 5, 2020, https://www.cityofmadison.com/news/twelve-things-for-voters-to-know-on-election-day.

62 See attached state estimate chart and methodology section for detailed calculations.

63 Janine Eveler (Director of Elections, Cobb County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Deidre Holden (Elections Supervisor, Paulding County, Georgia), interview by Brennan Center for Justice, Apr. 14, 2020; Joseph Kirk (Elections Supervisor, Bartow County, Georgia), interview by Brennan Center for Justice, Apr. 2, 2020.

64 See attached state estimate chart and methodology section for detailed calculations.

65 "Registered Voter Count by County," Michigan Voter Information Center,

Department of State, accessed Apr. 13, 2020, https://mvic.sos.state.mi.us/VoterCount.

66 U.S. Election Assistance Commission, "2020 Cares Act Grants," https://www.eac.gov/payments-and-grants/2020-cares-act-grants.

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68 "Gov. Whitmer extends Michigan's stay-at-home order until May 1," WXYZ, Apr. 13, 2020, https://www.wxyz.com/news/coronavirus/gov-whitmer-extends-stay-at-home-order-until-may-1.

69 Office of Secretary of State Jocelyn Benson, "Secretary of State to mail absent voter ballot applications to all May 5 voters," Mar. 23, 2020, https://www.michigan.gov/sos/0,4670,7-127-93094-522761--,00.html.

70 Gus Burns, "Michigan sending absentee ballot applications to all May 5 election voters because of coronavirus outbreak," *MLive*, Mar. 23, 2020, https://www.mlive.com/public-interest/2020/03/michigan-sending-absentee-ballots-to-all-voters-for-may-5-election-because-of-coronavirus-outbreak.html.

71 Office of Secretary of State Jocelyn Benson, "Secretary of State to mail absent voter ballot applications to all May 5 voters"; see also Gus Burns, "Michigan sending absentee ballot applications to all May 5 election voters because of coronavirus outbreak," *MLive*, Mar. 23, 2020, https://www.mlive.com/public-interest/2020/03/michigan-sending-absentee-ballots-to-all-voters-for-may-5-election-because-of-coronavirus-outbreak.html ("Voting by mail protects public health, is highly accessible, and was clearly mandated by Michiganders when they overwhelmingly voted in 2018 to amend our state constitution and afford everyone this right.").

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73 14 percent of registered voters in Michigan voted by mail in 2018. See U.S. Election Assistance Commission, *Election Administration And Voting Survey 2018 Comprehensive Report: A Report to the 116th Congress*, June 2019, 29 and 55, https://www.eac.gov/sites/default/files/eac_assets/1/6/2018_EAVS_Report.pdf.

74 Ronald Brownstein, "The Most Important 2020 States Already Have Vote by Mail," *Atlantic*, Apr. 11, 2020, https://www.theatlantic.com/politics/archive/2020/04/voting-mail-2020-race-between-biden-and-trump/609799 ("Jocelyn Benson, Michigan's secretary of state and a Democrat, expressed a broad consensus among local officials when she told me, 'We will certainly see people voting by mail more than ever before in our state.'").

75 Tina Barton, (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020; Chris Swope (City Clerk, Lansing, Michigan), interview by Brennan Center for Justice, Apr. 13, 2020.

76 Many Michigan election officials have signed a letter in support of additional federal elections funding, including Michelle L. Anzaldi (Clerk, Pittsfield Charter Township), Erica Armstrong (City Clerk, City of Midland), Tina Barton (City Clerk, Rochester Hills), Judy A. Bigney (Clerk, Algoma Township), Lisa Borgacz (City Clerk, City of Mount Clemens), Cynthia A. Bower (City Clerk, Taylor), Louise D. Burke (Deputy Clerk, Charter Township of York Washtenaw County), Sarah J Bydalek (City Clerk, City of Walker), Jill A. Domingo (City Clerk, City of Albion), Kathy Funk (Clerk, Charter Township of Flint), Mary Gillis (Deputy Clerk, Scio Township), Lisa Kay Hathaway (City Clerk, City of Grosse Pointe Woods), Evan Hope (Clerk, Delhi Township), Cathy Lane (Township Clerk, Charter Township of Grand Blanc), Lisa Lawitzke (Deputy Clerk, Bellevue Township), Richard LeBlanc (City

Clerk, City of Westland), Janice Pockrandt (Deputy City Clerk, Center Line), Sheila Reitz (Clerk, Township of Buchanan, Berrien County), Melanie D. Ryska (City Clerk, Sterling Heights), Lawrence S. Stec (City Clerk, City of Wyandotte), Julia K. Stonestreet (Clerk, Spring Arbor Township), Chris Swope (Clerk, Lansing), Elizabeth Whitt (Township Clerk, Conway Township), Sandy Winans (Clerk, Woodhull Township). See Brennan Center for Justice, "Election Officials Call for More Election Funding in Next Stimulus Bill," last updated Apr. 16, 2020, https://www.brennancenter.org/our-work/research-reports/election-officials-call-more-election-funding-next-stimulus-bill.

77 Office of Secretary of State Jocelyn Benson, "Secretary of State to mail absent voter ballot applications to all May 5 voters."

78 Office of Secretary of State Jocelyn Benson, "Secretary of State to mail absent voter ballot applications to all May 5 voters."

79 Office of Secretary of State Jocelyn Benson, "Secretary of State to mail absent voter ballot applications to all May 5 voters."

80 Jonathan Brater (Director of Elections, Michigan Secretary of State), interview by Brennan Center for Justice, Apr. 17, 2020.

81 See attached state estimate chart and methodology section for detailed calculations.

82 See attached state estimate chart and methodology section for detailed calculations.

83 Chris Swope (City Clerk, Lansing, Michigan), interview by Brennan Center for Justice, Apr. 13, 2020.

84 Tina Barton, (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020; Chris Swope (City Clerk, Lansing, Michigan), interview by Brennan Center for Justice, Apr. 13, 2020.

85 See attached state estimate chart and methodology section for detailed calculations.

86 Chris Swope (City Clerk, Lansing, Michigan), interview by Brennan Center for Justice, Apr. 13, 2020; Tina Barton, (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020.

87 Tina Barton, (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020.

88 Tina Barton, (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020.

89 Tina Barton (City Clerk, Rochester Hills, Michigan), "Interview 5: Handling Absentee Ballot Requests for Increased Voting by Mail," interview by Ben Hovland (Commissioner, U.S. Election Assistance Commission), Apr. 15, 2020, https://www.youtube.com/watch?v=CvbP7K4-VoE&feature=youtu.be ("My current staff isn't going to be able to handle 30,000 absentee ballot applications all coming back at the same time. We're also issuing death certificates, (currently at a higher than usual rate), providing administrative support for city council and boards and commissions, overseeing and managing all city FOIAs (Freedom of Information Act), issuing liquor licenses after reviewing applications, managing local cemeteries, issuing passports, and this year, I'm in charge of the census. . . . [And] in some smaller communities, the local clerks also have municipal or township accounting responsibilities.").

90 See attached state estimate chart and methodology section for detailed calculations.

91 Tina Barton, (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020; Chris Swope (City Clerk, Lansing, Michigan), interview by Brennan Center for Justice, Apr. 13, 2020.

92 See attached state estimate chart and methodology section for detailed calculations.

93 Tina Barton, (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020.

94 Tina Barton, (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020.

95 See attached state estimate chart and methodology section for detailed calculations.

96 Cybersecurity and Infrastructure Security Agency, "UK and US Security Agencies Issue Covid-19 Cyber Threat Update," Apr. 8, 2020, https://www.cisa.gov/news/2020/04/08/uk-and-us-security-agencies-issue-covid-19-cyber-threat-update.

97 See attached state estimate chart and methodology section for detailed calculations.

98 See Brennan Center for Justice, "Election Officials Call for More Election Funding in Next Stimulus Bill," last updated Apr. 16, 2020, https://www.brennancenter.org/our-work/research-reports/election-officials-call-more-election-funding-next-stimulus-bill.

99 Tina Barton, (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020; Chris Swope (City Clerk, Lansing, Michigan), interview by Brennan Center for Justice, Apr. 13, 2020.

100 Tina Barton, (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020; Chris Swope (City Clerk, Lansing, Michigan), interview by Brennan Center for Justice, Apr. 13, 2020.

101 Alabama Secretary of State, "Congress Appropriates $400 Million to Prepare States for Election Day amid Coronavirus Concerns"; City of Madison Clerk's Office, "Twelve Things for Voters to Know on Election Day."

102 Tina Barton, (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020; Chris Swope (City Clerk, Lansing, Michigan), interview by Brennan Center for Justice, Apr. 13, 2020.

103 See Missouri Secretary of State, "Registered Voters in Missouri," accessed Apr. 13, 2020, https://www.sos.mo.gov/elections/registeredvoters/2018.

104 U.S. Election Assistance Commission, "2020 Cares Act Grants," https://www.eac.gov/payments-and-grants/2020-cares-act-grants.

105 Missouri Governor, "Governor Parson Announces April 7 Municipal Elections Postponed Until June 2 in Response to Covid-19," Mar. 18, 2020, https://governor.mo.gov/press-releases/archive/governor-parson-announces-april-7-municipal-elections-postponed-until-june-2.

106 Secretary of State Jay Ashcroft, "This Week in Missouri Politics Coronavirus Update with Secretary of State Jay Ashcroft," interview by Scott Faughn, *Missouri Times*, Mar. 31, 2020, https://www.facebook.com/themissouritimes/videos/290768858576590.

107 Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Brianna Lennon (County Clerk, Boone County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020. Shane Schoeller (County Clerk, Greene County, Missouri), Madison McFarland (Elections Coordinator, Greene County, Missouri), interview by Brennan Center for Justice, Mar. 30, 2020.

108 See, e.g., Jason Hancock, "Will coronavirus outbreak mean more Missourians can cast absentee ballots?," *Kansas City Star*, Mar. 17, 2020, https://www.kansascity.com/news/politics-government/article241275436.html; Missouri State Conference of the National Association for the Advancement of Colored People et al. v. State of Missouri et al., https://www.aclu.org/legal-document/missouri-naacp-v-missouri-complaint-0; see also Mo. Code § 115.294 ("Other provisions of law to the contrary notwithstanding, no absentee ballot shall be rejected for failure of the voter to state on the ballot envelope his reason for voting an absentee ballot.").

109 See, e.g., Kevin Jenkins, "County clerk says 'vote absentee,'" *Daily Journal Online*, Mar. 30, 2020, https://dailyjournalonline.com/news/local/county-clerk-says-vote-absentee/article_7e3b74e2-fbdc-52bc-b610-9e8c2219fb7e.html (St. Francois County); Rudi Keller, "Missouri municipal elections delayed to June 2," *Examiner*, Mar. 18, 2020, https://www.examiner.net/news/20200318/missouri-municipal-elections-delayed-to-june-2 (Boone County).

110 U.S. Election Assistance Commission, *Election Administration*

And Voting Survey 2018 Comprehensive Report: A Report to the 116th Congress, June 2019, 29 and 55, https://www.eac.gov/sites/default/files/eac_assets/1/6/2018_EAVS_Report.pdf.

111 Many Missouri election officials have signed a letter in support of additional federal elections funding, including Kay Brown (Clerk/Election Authority, Christian County), Christina Buie (Clerk, Monroe County), Batina Dodge (Clerk, Scotland County), Lauri Ealom (Director, Kansas City Board of Elections), Eric Fey (Director of Elections, St. Louis County), Jared W. Kutz (Clerk/Election Authority, Perry County), Stephanie Lebron (Clerk, Iron County), Brianna Lennon (Clerk, Boone County), Jackie Morris (Clerk, Sullivan County), Shane Schoeller (Clerk, Greene County), Susette M. Taylor (Clerk, Atchison County; President-Elect, Missouri Association of Counties), and Diane Thompson (Clerk and Election Authority, Johnson County). See Brennan Center for Justice, "Election Officials Call for More Election Funding in Next Stimulus Bill," Mar. 31, 2020, https://www.brennancenter.org/our-work/research-reports/election-officials-call-more-election-funding-next-stimulus-bill.

112 Ashcroft, "This Week in Missouri Politics," interview by Faughn.

113 At least one Missouri county has already developed an online absentee ballot application that enables voters to securely apply for an absentee ballot paperlessly. Brianna Lennon (Clerk, Boone County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020.

114 See attached state estimate chart and methodology section for detailed calculations.

115 Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Brianna Lennon (County Clerk, Boone County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Shane Schoeller (County Clerk, Greene County, Missouri), Madison McFarland (Elections Coordinator, Greene County, Missouri), interview by Brennan Center for Justice, Mar. 30, 2020. The potential impact in Missouri could be greater than in other states because the deadline to request an absentee ballot is two weeks prior to the election (compared to one week in many other states). Voters are now aware of how fast the health environment can change and may opt to request an absentee ballot in higher percentages in Missouri because of the longer period during which circumstances could change drastically.

116 Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 18, 2020.

117 See attached state estimate chart and methodology section for detailed calculations.

118 Ashcroft, "This Week in Missouri Politics," interview by Faughn.

119 Although some counties currently provide voters with postage-prepaid envelopes to return their absentee ballot applications, county budget-makers did not assume that there would be a significant spike in absentee voting, as is expected due to the coronavirus. Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020.

120 See attached state estimate chart and methodology section for detailed calculations.

121 Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Brianna Lennon (County Clerk, Boone County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Shane Schoeller (County Clerk, Greene County, Missouri), Madison McFarland (Elections Coordinator, Greene County, Missouri), interview by Brennan Center for Justice, Mar. 30, 2020; Cameron Gerber, "Missouri elections during the coronavirus pandemic: Q&A with a county clerk," *Missouri Times*, Apr. 9, 2020, https://themissouritimes.com/missouri-elections-during-the-coronavirus-pandemic-qa-with-a-county-clerk.

122 Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Brianna Lennon (County Clerk, Boone County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020. Shane Schoeller (County Clerk, Greene County, Missouri), Madison McFarland (Elections Coordinator, Greene County, Missouri), interview by Brennan Center for Justice, Mar. 30, 2020.

123 Although state law requires local officials to provide return postage for absentee ballots (Mo. Stat. § 115.285), local appropriators did not plan for a significant spike in absentee voting and associated local costs due to the coronavirus. Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Brianna Lennon (County Clerk, Boone County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020. Shane Schoeller (County Clerk, Greene County, Missouri), Madison McFarland (Elections Coordinator, Greene County, Missouri), interview by Brennan Center for Justice, Mar. 30, 2020. As Missouri's absentee turnout is traditionally low, our estimates include the total expected costs and do not subtract what we expect will be the small amount local officials have allocated for return postage. See attached state estimate chart and methodology section for detailed information.

124 Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Brianna Lennon (County Clerk, Boone County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020. Shane Schoeller (County Clerk, Greene County, Missouri), Madison McFarland (Elections Coordinator, Greene County, Missouri), interview by Brennan Center for Justice, Mar. 30, 2020.

125 See attached state estimate chart and methodology section for detailed calculations.

126 Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Brianna Lennon (County Clerk, Boone County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020. Shane Schoeller (County Clerk, Greene County, Missouri), Madison McFarland (Elections Coordinator, Greene County, Missouri), interview by Brennan Center for Justice, Mar. 30, 2020.

127 See attached state estimate chart and methodology section for detailed calculations.

128 Cybersecurity and Infrastructure Security Agency, "UK and US Security Agencies Issue Covid-19 Cyber Threat Update," Apr. 8, 2020, https://www.cisa.gov/news/2020/04/08/uk-and-us-security-agencies-issue-covid-19-cyber-threat-update.

129 See attached state estimate chart and methodology section for detailed calculations.

130 Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Brianna Lennon (County Clerk, Boone County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Shane Schoeller (County Clerk, Greene County, Missouri), Madison McFarland (Elections Coordinator, Greene County, Missouri), interview by Brennan Center for Justice, Mar. 30, 2020.

131 Many Missouri election officials have signed a letter in support of additional federal elections funding, including Kay Brown (Clerk/Election Authority, Christian County), Christina Buie (Clerk, Monroe County), Batina Dodge (Clerk, Scotland County), Lauri Ealom (Director, Kansas City Board of Elections), Eric Fey (Director of Elections, St Louis County), Jared W. Kutz (Clerk/Election Authority, Perry County), Stephanie Lebron (Clerk, Iron County), Brianna Lennon (Clerk, Boone County), Jackie Morris (Clerk, Sullivan County), Shane Schoeller (Clerk, Greene County), Susette M. Taylor (Clerk, Atchison County; President-Elect, Missouri Association of Counties), Diane Thompson (Clerk and Election Authority, Johnson County). See Brennan Center for Justice, "Election Officials Call for More Election Funding in Next Stimulus Bill," Mar. 31, 2020, https://www.brennancenter.org/our-work/research-reports/election-officials-call-more-election-funding-next-stimulus-bill.

132 Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020;

Brianna Lennon (County Clerk, Boone County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020; Shane Schoeller (County Clerk, Greene County, Missouri), Madison McFarland (Elections Coordinator, Greene County, Missouri), interview by Brennan Center for Justice, Mar. 30, 2020.

133 See attached state estimate chart and methodology section for detailed calculations.

134 Ohio Secretary of State, "Larose Announces Latest Early Voting Numbers of the 2020 Primary," Mar. 3, 2020, https://www.ohiosos.gov/media-center/press-releases/2020/2020-03-03.

135 Zach Montallero, "Ohio to run all-mail primary through April 28," *Politico*, Mar. 25, 2020, https://www.politico.com/news/2020/03/25/ohio-vote-by-mail-primary-election-149012 (Ohio lawmakers "have extended mail voting in the state's primaries until April 28").

136 U.S. Election Assistance Commission, "2020 Cares Act Grants," https://www.eac.gov/payments-and-grants/2020-cares-act-grants.

137 Dan Merica, "Ohio governor announces polls will be closed Tuesday over coronavirus," CNN, Mar. 17, 2020, https://www.cnn.com/2020/03/16/politics/ohio-primary/index.html.

138 Veronica Stracqualursi, "Ohio secretary of state: 'It was simply untenable' to tell Ohioans go to the polls amid coronavirus," CNN, Mar. 17, 2020, https://www.cnn.com/2020/03/17/politics/ohio-secretary-of-state-primary-polls-close-cnntv/index.html.

139 Montallero, "Ohio to run all-mail primary through April 28" (Ohio lawmakers "have extended mail voting in the state's primaries until April 28").

140 See 2020 Ohio Laws File 30 (Am. Sub. H.B. 197); see also Gannett Ohio, "Action required: Ohio voters must take the first step to obtain mail-in ballot for primary," *Daily Record*, Apr. 4, 2020, https://www.the-daily-record.com/news/20200404/action-required-ohio-voters-must-take-first-step-to-obtain-mail-in-ballot-for-primary.

141 See, e.g., Ohio Secretary of State, "Larose Announces Latest Early Voting Numbers of the 2020 Primary,"

(LaRose promotes providing voters with postage pre-paid envelopes to return their absentee ballot applications).

142 Josh Sweigart, "Absentee ballot request forms to be printed in local newspapers," *Dayton Daily News*, Apr. 2, 2020, https://www.daytondailynews.com/news/absentee-ballot-request-forms-printed-local-newspapers/Nw8P1F5Fm7pnKADDaHDeoL.

143 Frank LaRose (@FrankLaRose), "Throughout this crisis, Ohio has once again cemented its place as a national leader. We're at our best when we work together, and these organizations have stepped up to make sure Ohioans will have their voice heard," Twitter, Apr. 9, 2020, 5:11 p.m., https://twitter.com/FrankLaRose/status/1248357961682092037?s=20.

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145 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020; Amber Lopez (Deputy Director, Clark County, Ohio), interview by Brennan Center for Justice, Apr. 14, 2020.

146 Bonnie Meibers, "Is your vote safe? Secretary of State says Ohio is 'best prepared' state in nation," *Dayton Daily News*, Jan. 14, 2020, https://www.daytondailynews.com/news/local-govt--politics/your-vote-safe-secretary-state-says-ohio-best-prepared-state-nation/84XTxXZxEd1L5zxcNsIhYI.

147 See 2020 Ohio Laws File 30 (Am. Sub. H.B. 197).

148 Many Ohio election officials have signed a letter in support of additional federal elections funding, including Jason Baker (Director, Clark County Board of Elections), Sally Krisel (Deputy Director, Hamilton County Board of Elections), Amber Lopez (Deputy Director, Clark County Board of Elections), Sherry Poland (Director, Hamilton County Board of Elections), Kimberly Smith (Deputy Elections Director, Defiance County), Tonya Wichman (Elections Director, Defiance County), Michelle L. Wilcox (President, Ohio Association of Election Officials; Director, County Board of Elections, Auglaize County). See Brennan Center for Justice, "Election Officials Call for More Election Funding in Next Stimulus Bill," Mar. 31, 2020, https://www.brennancenter.org/our-work/research-reports/election-officials-call-more-election-funding-next-stimulus-bill.

149 See S.B. 318, 133rd Gen. Assemb., Reg. Sess. (Ohio 2018).

150 See attached state estimate chart and methodology section for detailed calculations.

151 See, e.g., Ohio Secretary of State, "Larose Announces Latest Early Voting Numbers of the 2020 Primary."

152 See attached state estimate chart and methodology section for detailed calculations.

153 In Ohio, 11 percent of registered voters voted by mail in 2018. See U.S. Election Assistance Commission, *Election Administration And Voting Survey 2018 Comprehensive Report: A Report to the 116th Congress*, June 2019, 29 and 55, https://www.eac.gov/sites/default/files/eac_assets/1/6/2018_EAVS_Report.pdf.

154 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020; Amber Lopez (Deputy Director, Clark County, Ohio), interview by Brennan Center for Justice, Apr.14, 2020.

155 See attached state estimate chart and methodology section for detailed calculations.

156 Ohio, "Action required: Ohio voters must take the first step to obtain mail-in ballot for primary".

157 Ohio Rev. Code Ann. § 3501.05 (Westlaw through File 30 of the 133rd General Assembly 2019-2020) ("The secretary of state may mail unsolicited applications for absent voter's ballots to individuals only for a general election and only if the general assembly has made an appropriation for that particular mailing. Under no other circumstance shall a public office, or a public official or employee who is acting in an official capacity, mail unsolicited applications for absent voter's ballots to any individuals.").

158 See attached state estimate chart and methodology section for detailed calculations.

159 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020; Amber Lopez (Deputy Director, Clark County, Ohio), interview by Brennan Center for Justice, Apr. 14, 2020.

160 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020; Amber Lopez (Deputy Director, Clark County, Ohio), interview by Brennan Center for Justice, Apr. 14, 2020.

161 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020; Amber Lopez (Deputy Director, Clark County, Ohio), interview by Brennan Center for Justice, Apr. 14, 2020.

162 See attached state estimate chart and methodology section for detailed calculations.

163 Ohio Rev. Code Ann. § 3509.03 (Westlaw through File 30 of the 133rd General Assembly 2019-2020); Ohio Rev. Code Ann. § 3511.02 (Westlaw through File 30 of the 133rd General Assembly 2019-2020); Ohio Secretary of State, Election Official Manual, 2019, 194, https://www.ohiosos.gov/globalassets/elections/directives/2019/dir2019-11_eom.pdf ("No board is permitted to pre-pay return postage for any type of absentee ballot application.").

164 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020; Amber Lopez (Deputy Director, Clark County, Ohio), interview by Brennan Center for Justice, Apr. 14, 2020.

165 See attached state estimate chart and methodology section

for detailed calculations.

166 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020; Amber Lopez (Deputy Director, Clark County, Ohio), interview by Brennan Center for Justice, Apr. 14, 2020.

167 See attached state estimate chart and methodology section for detailed calculations.

168 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020; Amber Lopez (Deputy Director, Clark County, Ohio), interview by Brennan Center for Justice, Apr. 14, 2020.

169 See attached state estimate chart and methodology section for detailed calculations.

170 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020; Amber Lopez (Deputy Director, Clark County, Ohio), interview by Brennan Center for Justice, Apr. 14, 2020.

171 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), email message to Derek Tisler, Apr. 2, 2020.

172 Many Ohio election officials have signed a letter in support of additional federal elections funding, including Jason Baker (Director, Clark County Board of Elections), Sally Krisel (Deputy Director, Hamilton County Board of Elections), Amber Lopez (Deputy Director, Clark County Board of Elections), Sherry Poland (Director, Hamilton County Board of Elections), Kim Smith (Deputy Elections Director, Defiance County), Lisa Welch (Director, Holmes County Board of Elections), Tonya Wichman (Elections Director, Defiance County), Michelle L. Wilcox (President, Ohio Association of Election Officials; Director, County Board of Elections, Auglaize County). See Brennan Center for Justice, "Election Officials Call for More Election Funding in Next Stimulus Bill," last updated Apr. 21, 2020, https://www.brennancenter.org/our-work/research-reports/election-officials-call-more-election-funding-next-stimulus-bill.

173 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020; Amber Lopez (Deputy Director, Clark County, Ohio), interview by Brennan Center for Justice, Apr. 14, 2020.

174 Tonya Wichman (Director, Defiance County Board of Elections, Ohio), letter emailed to Dr. Amy Acton (Director of Health, Ohio Department of Health), Mar. 27, 2020 (forwarded to Liz Howard on Mar. 17, 2020), (noting Defiance County poll workers include "my father with a heart condition, my mother with respiratory issues, my aunt/godmother with health issues, my boss from my part time job I work on the side with heart issues, my son who [has to take] a vacation day from his job to help me before he [goes] home to his wife and one year old son, our choir accompanist from my church, three of my former teachers from school, a high school student I work with at the local dairy bar, two former teammates of my college daughter, friends from outside of work and an entire group of people that I truly consider to be friends not just people who work at the polls. These people make my job possible, they make democracy possible and work from 5:30 am in the morning until at least 8:00 at night for not what they deserve but what we can offer them as a paycheck.").

175 Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020; Amber Lopez (Deputy Director, Clark County, Ohio), interview by Brennan Center for Justice, Apr. 14, 2020.

176 See attached state estimate chart and methodology section for detailed calculations.

177 Pennsylvania Department of State, "Voter registration statistics by county," last updated on Mar. 14, 2020, https://www.dos.pa.gov/VotingElections/OtherServicesEvents/VotingElectionStatistics/Pages/VotingElectionStatistics.aspx.

178 U.S. Election Assistance Commission, "2020 Cares Act Grants," https://www.eac.gov/payments-and-grants/2020-cares-act-grants.

179 Jonathan Lai, "Pennsylvania elections officials are pleading with the state to move the primary: 'We're pulling fire alarms all over the place,'" Philadelphia Inquirer, Mar. 17, 2020, https://www.inquirer.com/health/coronavirus/postpone-pa-primary-election-coronavirus-20200317.html.

180 2020 Pa. Legis. Serv. Act 2020-12 (S.B. 422).

181 Pennsylvania Governor Tom Wolf, "Order for Individuals of the Commonwealth to Stay at Home," Apr. 1, 2020, https://www.governor.pa.gov/wp-content/uploads/2020/04/20200401-GOV-Statewide-Stay-at-Home-Order.pdf; see also Office of Governor Tom Wolf, "Gov. Wolf, Sec. of Health: Pennsylvania on Statewide Stay-at-Home Order Beginning at 8 PM Tonight," Apr. 1, 2020, https://www.governor.pa.gov/newsroom/gov-wolf-sec-of-health-pennsylvania-on-statewide-stay-at-home-order-beginning-at-8-pm-tonight-most-prudent-option-to-stop-the-spread.

182 Ron Southwick, "Gov. Tom Wolf extends Pa. stay-at-home order to May 8 but plans to ease some restrictions," *Penn Live*, Apr. 20, 2020, https://www.pennlive.com/coronavirus/2020/04/update-on-coronavirus-in-pa-watch-gov-tom-wolf-and-secretary-of-health-live.html.

183 Pennsylvania uses two distinct types of mail voting: absentee ballots and mail-in ballots. Voters with a qualified excuse may use absentee ballots, while voters without a qualifying excuse use mail-in ballots. This report uses the term "absentee ballot" to refer to both types of ballots.

184 Lai, "Pennsylvania elections officials are pleading with the state to move the primary"; Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020; Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020.

185 Lai, "Pennsylvania elections officials are pleading with the state to move the primary."

186 Jonathan Lai (Journalist, *Philadelphia Inquirer*), "Something I'm watching: More than 1/3 of Philly absentee ballot applications have not yet been processed. 23,888 processed. 12,909 pending. Elections staff might have to work the weekend to keep processing ballots, executive director Joe Lynch said at meeting today," Twitter, Apr. 15, 2020, 12:31 p.m., https://twitter.com/Elaijuh/status/1250461783392956417.

187 See, e.g., Katie Galioto, "1.1 million Illinois voters have cast ballots so far, surpassing 2014 early vote counts," *Chicago Tribune*, Nov. 5, 2018, https://www.chicagotribune.com/politics/elections/ct-met-illinois-early-voting-20181018-story.html ("There was a slight increase in the rate of people voting early in 2014 compared with 2010. This could be a product of the state's efforts to make voting more convenient. . . . The state also introduced 'no-excuse' mail voting in 2010 to give residents the chance to vote from the comfort of their own home without specifying a reason for being absent from the polls.").

188 U.S. Election Assistance Commission, *Election Administration And Voting Survey 2018 Comprehensive Report: A Report to the 116th Congress*, June 2019, 29, https://www.eac.gov/sites/default/files/eac_assets/1/6/2018_EAVS_Report.pdf.

189 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology,, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020; Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020; Jeff Greenburg (Director of Elections, Mercer County, Pennsylvania), interview by Brennan Center for Justice, Apr. 2, 2020.

190 Jeff Greenburg (Director of Elections, Mercer County,

Pennsylvania), interview by Brennan Center for Justice, Apr. 2, 2020.

191 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020; Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020; Jeff Greenburg (Director of Election Security and Technology, Mercer County, Pennsylvania), interview by Brennan Center for Justice, Apr. 2, 2020.

192 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020.

193 Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020.

194 Jonathan Lai and Julia Terruso, "Voting by mail is a safe option during coronavirus. Here's what you need to know about absentee ballots in Pennsylvania and New Jersey," *Philadelphia Inquirer*, updated Apr. 1, 2020, https://www.inquirer.com/politics/election/coronavirus-vote-by-mail-absentee-ballots-pennsylvania-new-jersey-20200401.html ("most voters have never [cast an absentee by mail ballot]").

195 Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020; Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020; Jeff Greenburg (Director of Elections, Mercer County, Pennsylvania), interview by Brennan Center for Justice, Apr. 2, 2020.

196 See 2020 Pa. Legis. Serv. Act 2020-12 (S.B. 422) (authorizing polling location consolidation during the primary); Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020; Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020; Jeff Greenburg (Director of Elections, Mercer County, Pennsylvania), interview by Brennan Center for Justice, Apr. 2, 2020.

197 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020 (noting that voter education and outreach are an important priority, and that if they received assistance from the federal government to do so, they would supplement these voter education and outreach efforts).

198 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020.

199 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020.

200 See attached state estimate chart and methodology section for detailed calculations.

201 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 23, 2020.

202 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10,2020.

203 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020.

204 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020.

205 Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020; Jeff Greenburg (Director of Elections, Mercer County, Pennsylvania), interview by Brennan Center for Justice, Apr. 2, 2020; see also Brennan Center for Justice, "Election Officials Call for More Election Funding in Next Stimulus Bill," last updated Apr. 21, 2020, https://www.brennancenter.org/our-work/research-reports/election-officials-call-more-election-funding-next-stimulus-bill.

206 Absentee by mail turnout accounted for just 2 percent of overall turnout in Pennsylvania in 2018. See U.S. Election Assistance Commission, *Election Administration and Voting Survey 2018 Comprehensive Report: A Report to the 116th Congress*, June 2019, 29 and 55, https://www.eac.gov/sites/default/files/eac_assets/1/6/2018_EAVS_Report.pdf.

207 See, e.g., Katie Galioto, "1.1 million Illinois voters have cast ballots so far, surpassing 2014 early vote counts," *Chicago Tribune*, Nov. 5, 2018, https://www.chicagotribune.com/politics/elections/ct-met-illinois-early-voting-20181018-story.html ("There was a slight increase in the rate of people voting early in 2014 compared with 2010. This could be a product of the state's efforts to make voting more convenient. . . . The state also introduced 'no-excuse' mail voting in 2010 to give residents the chance to vote from the comfort of their own home without specifying a reason for being absent from the polls.").

208 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020 (supplemental information provided April 24, 2020).

209 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020; Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020; Jeff Greenburg (Director of Elections, Mercer County, Pennsylvania), interview by Brennan Center for Justice, Apr. 2, 2020. Some Pennsylvania local officials have even pushed for the June primary to be conducted entirely by mail. Emily Previti, "Counties home to more than a third of Pennsylvania voters calling for mail-only primary," *PA Post*, Apr. 17, 2020, https://papost.org/2020/04/17/counties-home-to-more-than-a-third-of-pennsylvania-voters-calling-for-mail-only-primary.

210 See attached state estimate chart and methodology section. Because Pennsylvania has an online absentee ballot request system, low-end estimates assume that only voters without a PennDOT ID return their applications by mail. High-end estimates assume that all voters return their applications by mail. Low-end estimates provided by Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020.

211 Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020; Jeff Greenburg (Director of Elections, Mercer County, Pennsylvania), interview by Brennan Center for Justice, Apr. 2, 2020.

212 Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020; Jeff Greenburg (Director of Elections, Mercer County, Pennsylvania), interview by Brennan Center for Justice, Apr. 2, 2020.

213 See attached state estimate chart and methodology section for detailed calculations.

214 Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020; Jeff Greenburg (Director of Elections, Mercer County, Pennsylvania), interview by Brennan Center for Justice, Apr. 2, 2020.

215 See attached state estimate chart and methodology section for detailed calculations.

216 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10,2020; Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020; Jeff Greenburg (Director of Elections, Mercer County, Pennsylvania), interview by Brennan Center for Justice, Apr. 2, 2020.

217 See attached state estimate chart and methodology section for detailed calculations.

218 Cybersecurity and Infrastructure Security Agency, "UK and US Security Agencies Issue Covid-19 Cyber Threat Update," Apr. 8, 2020, https://www.cisa.gov/news/2020/04/08/uk-and-us-security-agencies-issue-covid-19-cyber-threat-update.

219 See attached state estimate chart and methodology section for detailed calculations.

220 2020 Pa. Legis. Serv. Act 2020-12 (S.B. 422).

221 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020; Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020.

222 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020; Nick Custodio (Deputy Commissioner, Office of Philadelphia City Commissioner Lisa Deeley, Chairwoman), interview by Brennan Center for Justice, Apr. 3, 2020.

223 U.S. Department of Justice, "About Language Minority Voting Rights," accessed Apr. 17, 2020, https://www.justice.gov/crt/about-language-minority-voting-rights.

224 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020.

225 See attached state estimate chart and methodology section for detailed calculations.

226 For an overview of which states have online absentee ballot request systems, see "Preparing for an Election Under Pandemic Conditions," Brennan Center for Justice, last updated Apr. 23, 2020, https://www.brennancenter.org/our-work/research-reports/preparing-election-under-pandemic-conditions. For more information on available methods for requesting absentee ballots in each state analyzed in this report, see Georgia Secretary of State, "Absentee Voting in Georgia," accessed Apr. 22, 2020, https://sos.ga.gov/index.php/Elections/absentee_voting_in_georgia; Michigan Secretary of State, "Absentee Voting," accessed Apr. 22, 2020, https://www.michigan.gov/sos/0,4670,7-127-1633_8716_8728-21037--,00.html; Missouri Secretary of State, "Absentee Voting," accessed Apr. 22, 2020, https://www.sos.mo.gov/elections/goVoteMissouri/howtovote#absentee; Ohio Secretary of State, "Absentee Voting," accessed Apr. 22, 2020, https://www.ohiosos.gov/elections/voters/absentee-voting; Pennsylvania Voter Services, "Ballot Request Application," accessed Apr. 22, 2020, https://www.pavoterservices.pa.gov/OnlineAbsenteeApplication/#/OnlineAbsenteeBegin. For an overview of which states have online systems for tracking absentee ballots, see National Conference of State Legislatures, "Voting Outside the Polling Place: Absentee, All-Mail and other Voting at Home Options," last updated Apr. 14, 2020, https://www.ncsl.org/research/elections-and-campaigns/absentee-and-early-voting.aspx#systems.

227 Dave Leichtman (Director, Program Strategy, Defending Democracy at Microsoft), interview by Brennan Center for Justice, Apr. 15, 2020; Matt Davis (former Chief Information Officer, Virginia Department of Elections), interview by Brennan Center for justice, Mar. 27, 2020. Our estimates assume that higher costs may be faced by states to develop and implement these tools given the short time frame before the general election and the anticipated high use of these systems.

228 Pennsylvania Voter Services, "Ballot Request Application," https://www.pavoterservices.pa.gov/OnlineAbsenteeApplication/#/OnlineAbsenteeBegin.

229 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020.

230 Matt Davis (former Chief Information Officer, Virginia Department of Elections), interview by Brennan Center for Justice, Mar. 27, 2020.

231 See "Voting Outside the Polling Place: Absentee, All-Mail and other Voting at Home Options" (absentee ballot tracking systems are mandated by state law in Michigan and Missouri); Ohio Secretary of State, "Track Your Ballot," accessed Apr. 23, 2020, https://www.ohiosos.gov/elections/voters/toolkit/ballot-tracking/.

232 U.S. Election Assistance Commission, "Statewide Voter Registration Systems," Aug. 31, 2017, https://www.eac.gov/statewide-voter-registration-systems.

233 Matt Davis (former Chief Information Officer, Virginia Department of Elections), interview by Brennan Center for Justice, Mar. 27, 2020.

234 Matt Davis (former Chief Information Officer, Virginia Department of Elections), interview by Brennan Center for Justice, Mar. 27, 2020.

235 U.S. Election Assistance Commission, *Election Administration And Voting Survey 2018 Comprehensive Report: A Report to the 116th Congress*, June 2019, 55, https://www.eac.gov/sites/default/files/eac_assets/1/6/2018_EAVS_Report.pdf.

236 The State of Georgia is spending $480,000 to print absentee ballot requests and $2.6 million to mail absentee ballots to 6.9 million active voters. Niesse, "Voters mailed absentee ballot request forms for May 19 Georgia primary"; Kevin Rayburn (Deputy Elections Director and Deputy General Counsel, Georgia Secretary of State), Gabriel Sterling (Voting System Implementation Manager, Georgia Secretary of State), Chris Harvey (Elections Director, Georgia Secretary of State), interview with Brennan Center for Justice, Apr. 17, 2020. Green County, Missouri, estimates that it will cost $0.56 per voter to print and mail absentee applications. Shane Schoeller (County Clerk, Greene County, Missouri), interview by Brennan

Center for Justice, Mar. 30, 2020. Defiance County, Ohio, estimates that it will cost $0.50 per voter to print and mail absentee applications. Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020.

237 Eric Fey (Democratic Director of Elections, St. Louis County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020.

238 Kathy Boockvar (Pennsylvania Secretary of State), Jonathan Marks (Deputy Secretary of Elections, Pennsylvania Department of State), Michael Moser (Director of Election Security and Technology, Pennsylvania Department of State), interview by Brennan Center for Justice, Apr. 10, 2020.

239 Using this methodology, we determined the following baselines for absentee ballot materials and postage: 6,559,909 (Michigan); 3,923,862 (Missouri); 7,129,470 (Ohio); 7,694,291 (Pennsylvania). For Georgia, we used the full number of active registered voters (6.9 million), so that total estimated costs would be consistent with estimates publicly released by the state.

240 Verified Voting, "The Verifier – Polling Place Equipment – November 2020," https://www.verifiedvoting.org/verifier.

241 Mich. Admin. Code R 168.774 (Michigan); V.A.M.S. 115.247 (Missouri); Directive 2016-22, Election Official Manual 4-14, https://www.sos.state.oh.us/globalassets/elections/directives/2016/dir2016-22_eom-ch_04.pdf (Ohio); 2019 Pa. Laws 77 (Pennsylvania).

242 Using this methodology, we determined the following baselines for absentee ballot materials and postage: 1,559,341 (Michigan); 1,007,141 (Missouri); 3,653,556 (Ohio); 1,846,807 (Pennsylvania). These numbers represent the additional ballots that would be needed for a total supply equal to 120 percent of registered voters, to account for ballot spoilage and the need to allocate resources between mail and in-person voting.

243 Rochester Hills, Michigan, spends $0.30 per voter for ballots and $0.85 per voter on envelopes. Tina Barton (City Clerk, Rochester Hills, Michigan), interview by Brennan Center for Justice, Mar. 27, 2020. Greene County, Missouri, spends $1.50 per voter on envelopes and $0.10 per voter to print absentee ballot instructions. Shane Schoeller (County Clerk, Greene County, Missouri), interview by Brennan Center for Justice, Mar. 30, 2020. Defiance County, Ohio, spends $1.70 per voter to outsource ballot printing and absentee packet assembly. Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020.

244 The State of Georgia is spending $1.88–$2.38 per absentee ballot sent in postage and handling costs, and officials estimate that return postage could cost up to $1.40 per ballot. Niesse, "Voters mailed absentee ballot request forms for May 19 Georgia primary"; Kevin Rayburn (Deputy Elections Director and Deputy General Counsel, Georgia Secretary of State), Gabriel Sterling (Voting System Implementation Manager, Georgia Secretary of State), Chris Harvey (Elections Director, Georgia Secretary of State), interview with Brennan Center for Justice, Apr. 17, 2020. Boone County, Missouri, spends about $1.15 per ballot in return postage. Brianna Lennon (County Clerk, Boone County, Missouri), interview by Brennan Center for Justice, Apr. 13, 2020. Defiance County, Ohio, estimates that each ballot sent costs $1.20 in postage. Kimberly Smith (Deputy Director, Defiance County Board of Elections, Ohio), interview by Brennan Center for Justice, Mar. 29, 2020.

245 The Cybersecurity and Infrastructure Security Agency (CISA) Elections Infrastructure Government Coordinating Council and Sector Coordinating Council's Joint COVID Working Group recommends that jurisdictions have one drop box for every 15,000–20,000 registered voters. Cybersecurity and Infrastructure Security Agency, "Ballot Drop Box," https://www.cisa.gov/sites/default/files/publications/ballot_drop-box_final-508.pdf. The State of Washington, where drop boxes are widely used, requires one drop box per 15,000 registered voters. Washington Secretary of State, *Ballot Drop Boxes in All Communities*, May 19, 2017, https://www.sos.wa.gov/_assets/elections/auditorsctp/17-01%20ballot%20drop%20boxes%20in%20all%20communities.pdf.

246 Washington State Association **of** Counties et al. v. State of Washington, https://wsac.org/wp-content/uploads/2019/12/WSAC-et-al-v-State-of-Washington.pdf.

247 See, e.g., Melissa Santos, "These ballot boxes keep your vote safe from fire, rain and rampaging SUVs," *Crosscut*, Oct. 17, 2019, https://crosscut.com/2019/10/these-ballot-boxes-keep-your-vote-safe-fire-rain-and-rampaging-suvs.

248 2018 EAVS data was used to determine the number of voters in each county for Georgia, Missouri, Ohio, and Pennsylvania. In Michigan, where elections are administered at the city and township level, we used data from the Michigan Department of State. Michigan Department of State, Bureau of Elections, *2020 Biennial Precinct Report*, https://www.michigan.gov/documents/sos/Biennial_Precinct_Report_for_2020_683154_7.pdf.

249 Automated letter openers sold by Pitney Bowes range from $400 to $2700. State of Ohio Procurement, *State of Ohio Equipment Catalog*, Sept. 9, 2015, https://procure.ohio.gov/pricelist/800051revpricelist.pdf; Pitney Bowes, *State of New Jersey Catalog*, updated Jan. 15, 2014, https://www.pb.com/docs/us/pdf/microsite/state-and-local-government-solutions/new-jersey/nj-2014-price-book.pdf.

250 The cost of mail-sorting equipment varies considerably depending on the capacity and speed needed. For example, when Hawaii switched to a vote-by-mail system, counties spent between $50,000 and $250,000 on mail-sorting equipment. Hawaii Office of Elections, "Implementing Elections by Mail," Nov. 6, 2019, https://elections.hawaii.gov/wp-content/uploads/Report-to-Legislature-20191104.pdf.

251 State of Ohio Procurement, *Election Systems & Software Price Sheet*, https://procure.ohio.gov/pdf/OT902619_MAC113_ESSPriceSheet.pdf (costs of high-speed scanners range from $44,925 to $108,270); Aquene Freechild and Hamdi Soysal, *Cost of Counting the Vote: The Price of Upgrading Voting Systems in 43 U.S. Counties*, Public Citizen, May 31, 2018, https://www.citizen.org/wp-content/uploads/voting_equipment_pricing_mini-report_05_31_18_final-1.pdf (counties in survey paid from $49,950 to $53,000 for an ES&S DS450 high-speed scanner and $94,503 to $111,500 for an ES&S DS850 high-speed scanner).

252 An estimated rental cost of $5,000 per month for two months.

253 An estimated rental cost of $10,000 per month for two months.

254 10 additional workers for 14 days at $15 per hour.

255 25 additional workers for 14 days at $15 per hour.

256 We used EAVS 2018 data for the number of precincts and poll workers.

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REPORT

Estimated Costs of Covid-19 Election Resiliency Measures

Jason Redmond/AFP/Getty

SUMMARY: Proper planning can ensure that the pandemic does not prevent a free and fair election. To be effective, funding is urgently needed.

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UPDATE 4/18/2020: *On March 19, the Brennan Center published a preliminary estimate of the cost of adapting the country's voting systems and practices to ensure that the coronavirus pandemic wouldn't interfere with safe and secure election in November. Our estimate: approximately $2 billion. Importantly, this estimate did not include*

the cost of ensuring the safety and security of the many other statewide and local elections that will occur throughout 2020.

Since our March estimate, new guidance from health professionals has led election officials to take extra actions to ensure the health of their workers and voters, including providing protective gear — such as gloves and masks — to all poll workers and offering curbside voting. Most election offices also have had additional IT costs associated with ensuring that staff can perform critical functions remotely and securely.

Given the costs associated with protecting state and local elections with the new recommended health protections and technology costs, as well as for safely running dozens of additional elections this year, states and localities will need many more resources in 2020 than our preliminary estimate for the November election.

Accordingly, the Brennan Center recommends that Congress make available at least $4 billion to ensure all elections between now and November are free, fair, safe, and secure.

There is no question that the Covid-19 pandemic presents a difficult and, in many ways, unprecedented challenge to America's elections. The Brennan Center has offered a **detailed plan** to ensure that the pandemic does not prevent a free and fair election. Implementing that plan must begin now. Below, we provide a preliminary cost estimate to implement all aspects of our plan, which could cost up to $2 billion nationwide.[1] Of course, the Brennan Center plan is not an exhaustive list, and states will have additional needs to ensure all of their citizens can vote with confidence during this pandemic.

Ensuring vote-by-mail option is available to all voters

Total estimated cost: $982 million–$1.4 billion

The following costs should be considered when increasing the option of mail voting to all voters across the country:

Ballot printing. Increasing the number of voters using vote by mail will require printing a larger number of ballots, absentee envelopes, and other materials. Jurisdictions should print enough ballots and ballot envelopes for 120 percent of registered voters to ensure sufficient ballots for all voters even if there are surges in voter registration close to the election and voters who change their minds and decide to vote in person instead of casting their ballot by mail. ***Estimated cost: $54 million–$89 million***

- Based on cost estimates provided by three ballot printing vendors, we estimate that the cost to print a ballot ranges from 21.4 cents per ballot to 35 cents per ballot. We multiplied these costs by 254 million registered voters, 120 percent of the registered voters in the United States, to obtain our estimate.

Postage costs. The costs of both sending and receiving ballots should be covered by the U.S. Postal Service (USPS). ***Estimated cost: $413 million–$593 million***

- We estimate the cost of mailing voters their ballots (including additional materials, such as return envelopes, instructions, and other informational materials) will cost $1.15–$2.00 per registered voter, or $243,455,000–$423,400,000 in total. This estimate is derived from interviews with election officials and

ballot printing vendors (estimates varied widely, from $0.65 in Virginia to over $2.00 in California). In addition, voters will need to return their ballots. The cost per ballot will be less because additional materials will not be included in the return. Using an average of 80 cents per ballot for voters to return ballots, we estimate an additional $170 million to provide voters with prepaid postage for voters to return their ballots.

Drop boxes for absentee ballots and appropriate security. Jurisdictions should offer secure drop boxes in accessible locations for voters to drop off ballots directly. Drop boxes must be equipped with adequate security measures, such as cameras. ***Estimated cost: $82 million–$117 million for purchase and installation (excluding current infrastructure in vote-by-mail states) and $35 million–$47 million for operation and maintenance (excluding current infrastructure)***

- We know that at least four states — California, Colorado, Oregon, and Washington — already have drop boxes in place statewide. **Washington State** requires at least one ballot box per 15,000 registered voters. In Pierce County, Washington, ballot boxes provided by the company Laserfab **cost** between $7,000 and $10,000 to purchase and install. Snohomish County, Washington, which uses the same ballot boxes, estimates an annual ongoing operating and maintenance **cost** of approximately $3,000 per ballot box in a typical nonpresidential election year and $4,000 per ballot box in a presidential election year. Accounting for the four states that already have ballot boxes in place statewide, we estimate that 11,666 ballot boxes would be needed nationwide (~175 million registered voters/15,000 registered voters). To arrive at our cost estimate, we multiplied these various ballot box costs by 11,666 ballot boxes.

Secure electronic absentee ballot request technology. Voters must be allowed to request absentee ballots in person or through the mail, and states should offer additional methods to request ballots online or by phone. These costs must also include an increased use of online ballot delivery for uniformed and overseas citizens absentee (UOCAVA) voters. ***Estimated cost: $16.7 million (excluding current infrastructure)***

- Costs of obtaining or developing a secure electronic absentee ballot application tool vary widely, but we estimate an average of $325,000 per state, if the state currently has online voter registration (39 states and DC have **OVR**). For the purpose of estimating an online absentee ballot application tool cost, we assume that all states have OVR, since we account for the cost of implementing OVR in a different section of this document. We know that at least two states, Virginia and Pennsylvania, already have this tool and that in three states, Colorado, Oregon and Washington, voters do not need to apply to receive an absentee ballot. Therefore, we multiplied $325,000 by 46 (45 states and DC) to obtain a total cost estimate of $7 million to implement secure online absentee ballot tools nationwide.
- We estimate a cost of $100,000 per state per year to provide a secure, online blank ballot delivery service, which allows voters to mark their absentee ballot on a computer before printing it. This assures accessibility for voters with disabilities. We estimate that at least 25 percent of states already offer a service like this. We multiplied $100,000 by 37 states to obtain a cost estimate of $3,700,000 for this service.
- We estimate the total cost for secure electronic absentee ballot request technology/tool + annual cost for electronic vote-by-mail technology to be $2,300,000 + $3,700,000, or $6 million total.

Ballot tracking. Ballot tracking software should be used to provide confidence that ballots are reaching the appropriate destination in a timely manner. Jurisdictions should also set up a texting service for ballot tracking information, which will provide voters with reminders, confirmations of receipt, and confirmations of acceptance. ***Estimated cost: $4.2 million (excluding current infrastructure)***

- We estimate that at least 25 percent of states already have basic ballot tracking software. We estimate that this software will cost $50,000 per state. (38 states x $50,000 = $1,900,000). We are providing a

separate estimate for the text delivery service, which only a handful of states currently utilize: $50,000 per state. This estimate includes setting up the platform plus costs of messages. (45 states x $50,000 = $2,250,000)

Improvements to absentee ballot processing. To manage the increase in absentee ballots, some jurisdictions will need to purchase resources that include signature verification technology, high-volume mail processing and sorting equipment, and high-speed ballot scanners. ***Estimated cost: $120 million–$240 million***

- Approximately 15 percent of local jurisdictions in the country have more than 25,000 voters (15 percent of 8,000 jurisdictions is 1,200 jurisdictions). High-speed scanners for tabulating absentee ballots cost in the range of $50,000 to $100,000 per unit. This gives a range of $60,000,000 to $120,000,000 for high-speed tabulators nationwide. The cost for high-speed automated mail sorting equipment is assumed to be in a similar range and also would only be needed in jurisdictions with more than 25,000 voters. This gives a range of $60,000,000 to $120,000,000 for high speed mail processing equipment nationwide.

Additional facilities. Jurisdictions will require substantially more space for ballot processing and storage.***Estimated cost: $92 million***

- A surge in absentee ballots will require jurisdictions to set up an additional location for ballot processing. Most local election offices are not large enough to handle these needs and will likely need to obtain commercial space. For this estimate, we assume lease of a commercial space for 60 days to cover pre- and postelection processing work. For 85 percent of locals that have fewer than 25,000 voters (6,800 locals), we estimate rental costs of $5,000 per month for a total of $10,000. For the 15 percent of jurisdictions that are larger (1,200 locals), we estimate $10,000 per month for a total of $20,000. This gives us an estimated cost of $92,000,000.

Additional staffing to support absentee ballot processing. Staff will be needed for processing ballots and duplicating ballots onto the stock required for tabulation. ***Estimated cost: $164.6 million***

- Assumptions include that additional seasonal staff will be needed to process absentee ballots before, during, and after Election Day for a total of 14 days. Hourly rate is assumed to be at least $15 per hour for eight hours of work per day. This would be $1,680 per additional worker. For jurisdictions under 25,000 voters, we assume 10 additional staff for a total of 68,000 seasonal workers. For jurisdictions larger than 25,000 voters, we assume 25 additional staff for a total of 30,000 seasonal workers. This would require $164,640,000 in additional staffing support nationwide.

Maintaining in-person voting

Total estimated cost: $271.4 million

Providing everyone with the option to vote by mail will not replace all in person voting by November. The handful of states that have all-mail elections took many years to get there. As we saw in the Iowa caucus, putting too much strain on an entirely new system is sure to result in breakdowns and failures. Furthermore, there are millions of Americans who will not be able to cast a private and independent vote by mail: people without Internet and mail access, those who need language assistance to vote, and people with disabilities who rely on voting machines to

cast their ballots among them. There is **evidence** that the absence of in-person voting options could **disproportionately** and negatively impact Black, Latino, and young voters. We must maintain the safety-valve of in person voting, but in a way that reduces density and ensures health. To do so, the following costs must be incurred:

Polling facilities that meet public health standards. Poll workers will need additional resources to clean and sanitize all facilities, machines, and resources. Polling places that use hand-marked paper ballots may wish to give voters single-use pens. Jurisdictions may also incur costs due to the need to change polling locations close to Election Day if public health requires, or to acquire access to backup polling locations. ***Estimated cost: $29.2 million (funding for all states, even though some states may already be paying for some of this cost)***

- Cleaning supplies would cost an estimated $20 per precinct. A sample of three states with no-excuse absentee voting (Illinois, North Carolina, and Ohio) had an average of one precinct for every 1,454 registered voters. Cleaning supplies would therefore cost $0.013 per registered voter. Providing a single-use ballot-marking pen to every voter would cost about $0.50 per registered voter, if every registered voter voted in person. This will be a much lower cost if vote by mail increases. Estimate is based off of pens for 25 percent of registered voters. While this still may be high considering the number of voters using absentee ballots and voting machines, the estimate will help to cover additional facility costs.

Increased poll worker support. Jurisdictions must hire poll workers beyond the normal amount to overcome day-of absences. Poll worker pay may need to increase to provide an incentive for serving in-person voting. ***Estimated cost: $140 million (funding for pay raises for current level of poll workers in each state, and full payment for additional poll workers in each state)***

- A sample of three states with no excuse absentee voting (Illinois, North Carolina, and Ohio) had an average of one poll worker for every 208 registered voters, or about 1 million poll workers nationally. Increasing poll worker hiring by 20 percent as well as providing a raise, bringing pay from about $100 to $200 a day, would cost $100 million in raises for current levels of staffing and $40 million for the additional 20 million workers.

Professional interpreters. Jurisdictions will need to offer language assistance by phone in case bilingual poll workers are absent or unavailable. ***Estimated cost: $43 million (funding for interpretive services for all counties covered under Section 203)***

- This estimate would cover interpreter services at a cost of $700 per day for each precinct located in a county covered under Section 203 of the Voting Rights Act. Notably, this estimate only covers interpreter services on Election Day, not during early voting periods.

Increased provisional materials. Jurisdictions should prepare for a surge in provisional voting due to delays in the processing of voter registration applications. ***Estimated cost: $21 million (funding for all provisional envelope printing, even though states and locals are already covering some of this cost)***

- Supplying enough provisional envelopes for 25 percent of registered voters at a cost of $0.40 per envelope would cost $21 million nationally.

Voter wait time tools. States and counties that use vote centers for in-person voting should develop online voter wait time tools to reduce lines and crowding. ***Estimated cost: $1.2 million (funding for all states that allow vote centers)***

- A mobile app that tracks wait times for one Texas county took 50 hours to develop in 2014. Our total estimate assumes average rates of mobile app development at $16 per hour and assumes that the time of

development increases with the size of the jurisdiction.

Expanded early voting. Jurisdictions should expand early voting options to reduce lines and administrative stress on Election Day. This will increase all of the costs of in-person voting considered above. ***Estimated cost: $37 million (funding for states that don't already have early in-person voting)***

- In 2010, Maryland counties spent **$2.6 million** to conduct early voting for a one-week period prior to the election, according to a legislative fiscal analysis. This represented $0.74 per registered voter. Adjusted for inflation, this would be $3.1 million in 2020, or $0.89 per registered voter. For a two-week period of early voting, this would then be $1.77 per registered voter. Excluding the all-mail states, there are 20.7 million voters in states that do not have early in-person voting. Expanding early voting to these voters would therefore cost an estimated $36.6 million. More money may be needed to expand early voting periods in states that offer in-person early voting for less than two weeks.

Developing and bolstering online registration

Total estimated cost: $85.9 million

In the months and weeks before every presidential election, millions of Americans update their voter registration information or register to vote for the first time. Covid-19 could severely disrupt this process, making it difficult for Americans to submit timely registration applications elections officials to process those applications. The outbreak will certainly reduce access to government offices that provide voter registration services.

States should adopt and bolster online voter registration systems (**and they should consider implementing same-day registration**, the costs of which will likely not be significant). Bolstering online registration will include the following costs:

Implementation of online registration for states where not used already. Thirty-nine states and DC have either fully implemented online voter registration or are in the process of doing so. The other states should do so before November. ***Estimated cost: $3.7 million***

- A 2014 survey of states by the Pew Charitable Trusts found that 11 of 13 states that had implemented online voter registration spent an average of $240,000 in initial startup costs. Two outliers reported $0 (Kansas) and $1.8 million (California). Since one of the remaining jurisdictions to implement online voter registration is a very high population state (Texas), an increased estimate for costs in Texas of $1 million is appropriate. $3.4 million was then adjusted for inflation to $3.7 million.

  Note: some states may not be able or willing to move to online registration systems in time for the November election. These states will need to invest in public campaigns, voter outreach, education, and mailings to ensure voter registration is fully up to date. We do not believe the cost of these measures will be significantly less than our estimates for adoption of online registration.

Capacity and vulnerability testing. Online voter registration systems should be tested and their capacity bolstered to ensure that they can handle surges in web traffic. ***Estimated cost: $82.2 million***

- A 2017 U.S. Election Assistance Commission (EAC) survey found that 15 states have either "bottom-up" or "hybrid" voter registration databases. For these states, added testing will be required, as individual counties that maintain their own online voter registration systems will need to conduct capacity and vulnerability testing of those systems. We estimate that capacity testing will cost approximately $25,000–$60,000 per jurisdiction and vulnerability testing will cost approximately $80,000–$100,000 per jurisdiction. Six states with bottom-up systems have 421 counties total for a total of 421 county and 6 state systems. County level systems are on the high end ($100,000) for vulnerability testing but midrange ($40,000) for load testing. Nine states have hybrid systems. In Texas, 39 counties operate their own system. Using this as a predictor of the average number of individual systems, we estimate 109 county and 9 state systems across those nine states, which also are on the high end ($100,000) for vulnerability testing but midrange ($40,000) for load testing. Thirty-four states operate top-down systems (North Dakota does not have registration) and DC is added for 35, each of which is on the high end for load testing ($60,000) and vulnerability testing ($100,000), adding up to $82.2 million

Public education

Total estimated cost: $252.1 million

Fear and confusion around a pandemic create a fertile environment for fear, disinformation, and efforts to manipulate the electoral process for improper purposes and partisan gain. State officials, advocates, and citizens should take steps to reassure citizens that voting will be safe and to guard against the use of Covid-19 to suppress voters or otherwise manipulate the election. The following costs should be considered:

Public education campaigns. Jurisdictions must inform voters of all changes to voting rules and all options available to register and vote. This must include advertising in non-English languages. ***Estimated cost: $250 million***

- Only five states have essentially moved to an all or primarily vote-by-mail system. The rest, plus DC, will need to launch public education campaigns that include mailers, television, radio, social, and other media, all in multiple languages. The 2020 Census similarly involves significant changes that the public must learn about, such as an online option and multilanguage advertising needs. For the 2020 Census, California is spending about $2.52 per person who was counted in the 2010 Census, while New York City is spending about $0.50 per person. Houston and Harris County in Texas are jointly spending $4 million dollars, or about $0.88 per person. Similar levels of spending per voting-age member of the population — about 77 percent of the total population — would result in costs of between $129 million and $643 million. Our estimate for voter education about options during the Covid-19 pandemic is on the lower end of this range, even though these levels are over and above spending undertaken by the Census Bureau and independent organizations to ensure an accurate count.

Strengthened voter resources. Jurisdictions must provide accessible and easily used tools for voters to look up polling locations and registration status in order to proactively counter misinformation or malicious attacks to government systems. ***Estimated cost: $2.1 million***

- Capacity testing on these websites should cost approximately $40,000 per state plus DC and Puerto Rico.

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Endnotes

1. Our estimates are conservative because they do not include cost estimates for Puerto Rico. We did not include Puerto Rico in our estimates because we relied on data from the most recent Election Administration and Voting Survey, which Puerto Rico did not participate in, as it did not conduct a federal election in 2018. Congress should of course provide funding for Puerto Rico to implement Covid-19 plans.