BRENNAN CENTER FOR JUSTICE

VOTING SYSTEM FAILURES: A DATABASE SOLUTION

Lawrence Norden

ABOUT THE BRENNAN CENTER FOR JUSTICE

The Brennan Center for Justice at New York University School of Law is a non-partisan public policy and law institute that focuses on fundamental issues of democracy and justice. Our work ranges from voting rights to campaign finance reform, from racial justice in criminal law to presidential power in the fight against terrorism. A singular institution – part think tank, part public interest law firm, part advocacy group – the Brennan Center combines scholarship, legislative and legal advocacy, and communication to win meaningful, measurable change in the public sector.

ABOUT THE BRENNAN CENTER'S VOTING RIGHTS AND ELECTIONS PROJECT

The Brennan Center promotes policies that protect rights, equal electoral access, and increased political participation on the national, state and local levels. The Voting Rights and Elections Project works to expend the franchise, to make it as simple as possible for every eligible American to vote, and to ensure that every vote cast is accurately recorded and counted. The Center's staff provides top-flight legal and policy assistance on a broad range of election administration issues, including voter registration systems, voting technology, voter identification, statewide voter registration list maintenance, and provisional ballots.

The Help America Vote Act in 2002 required states to replace antiquated voting machines with new electronic voting systems, but jurisdictions had little guidance on how to evaluate new voting technology. The Center convened four panels of experts, who conducted the first comprehensive analyses of electronic voting systems. The research proceeded over a period of nearly two years and culminated in two path-breaking reports: *The Machinery of Democracy: Protecting Elections in an Electronic World*, which focused on voting system security, and *The Machinery of Democracy: Voting System Security, Accessibility, Usability, and Cost*. In the years since the Brennan Center published these two reports, the Brennan Center has helped election officials and jurisdictions ensure that their electronic voting systems are as secure and reliable as possible.

ABOUT THE AUTHOR

Lawrence Norden is Senior Counsel in the Brennan Center's Democracy Program and director of the Brennan Center's Voting Technology Project. He has authored several nationally recognized reports and articles related to voting rights, voting systems and election administration. In April 2009, Mr. Norden completed his duties as Chair of the Ohio Secretary of State's bipartisan Election Summit and Conference, authoring a report that recommended several changes to Ohio's election administration practices and laws; the report was endorsed by most of the State's voting rights groups, as well as the bipartisan Ohio Association of Election Officials. Mr. Norden was the Keynote Speaker at the Sixth Annual Votobit International Conference on Electronic Voting (Buenos Aires, 2008), and the 2009 Electronic Voting Technology Workshop/Workshop on Trustworthy Elections (Montreal, 2009). In June 2009, he received the Usability Professional Association's *Usability In Civic Life Award* for his "pioneering work to improve elections." Mr. Norden is the lead author of the book *The Machinery of Democracy: Protecting Elections in an Electronic World* (Academy Chicago Press) and a contributor to the *Encyclopedia of American Civil Liberties* (Routledge 2007).

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Failed voting machines, frustrated voters and lost votes: these have been a constant in news reports following every recent major election cycle. That should not be surprising. The voting systems[1] used in the United States today are complicated machines; each runs on tens of thousands of lines of software code. As with automobiles and airplanes, automatic garage door openers and lawnmowers, occasional malfunctions are inevitable – even after rigorous product testing.

When it comes to system failures, however, voting machines *are different* from automobiles and airplanes, and other products, in at least one important respect: for the vast majority of voting systems in use today, (1) manufacturers are not required to report malfunctions to any government agency, and (2) there is no agency that either investigates such alleged failures or alerts election officials and the general public to possible problems (let alone requires voting system manufacturers to fix such problems).

As this report demonstrates, the consequence of this lack of oversight is predictable. Voting systems fail in a particular county in one election, and then again later, under similar circumstances, but in a different locale. These repeated failures disenfranchise voters and damage public confidence in the electoral system.

The Brennan Center reviewed hundreds of reports of problems with voting systems in the last eight years, and closely studied fourteen of them. Our study shows that election officials and the public are often completely reliant on the private companies that sell and service this voting equipment and related service contracts to voluntarily keep them aware of potential problems with those systems. As one election official we interviewed noted, "vendors are in the business of selling machines, and often don't have an incentive" to inform present and future customers of certain problems with their systems.[2]

The core thesis of this report is simple: we need a new and better regulatory structure to ensure that voting system defects are caught early, officials in affected jurisdictions are notified immediately, and action is taken to make certain that they will be corrected for *all* such systems, wherever they are used in the United States.

Based on our review of regulatory schemes in other industries, we are convinced that the focal point for this new regulatory system must be a clearinghouse – a national database, accessible by election officials and others, that identifies voting system malfunctions that are reported by voting system vendors or election officials. If this database is going to have any real benefit, voting system vendors must be *required* to report all known malfunctions and election officials must have full access to the database.

The Election Assistance Commission (EAC), the relatively new federal agency charged with the task of creating a testing program for new voting system has, within its limited federal mandate, made great strides in the last two years increasing quality control for some of the country's newest voting systems. However, to fully address the problem of underreported and unaddressed voting system problems, the EAC or other federal agency should be given statutory authority and resources to fully implement the kind of database recommended in this report. Such a database would make our electoral system stronger. It would be easier for election officials and others to ensure that their equipment is as user-friendly and accurate as possible. It would also make voting machine vendors more accountable to public officials and taxpayers, incentivizing manufacturers to enhance internal controls. Given the billions of dollars spent by federal and local governments to purchase and maintain new voting equipment over the last several years, this is no small thing.

CORE FINDINGS

Three fundamental findings result from our study of past reported problems, review of current law and contracts for the use and regulation of voting systems, and interviews with election officials:

1. **There is no central location where most election officials can find comprehensive information about problems discovered with their systems before each election.**

    • State and local election officials we interviewed tell us that they must rely almost exclusively on the voting system vendors for information about malfunctions, defects, vulnerabilities and other problems that the vendors have discovered, or that have occurred with their voting systems in other states.

    • A change in election administrators can sometimes mean a loss of knowledge about all of the potential problems with a voting system as well as procedural safeguards necessary to prevent those problems.

    • There are approximately 4,600 separate jurisdictions across the United States that administer elections.[3]

2. **Vendors are frequently under no legal obligation to notify election officials or the public about problems with their systems.**

    • While purchase or service contracts sometimes bind election officials to inform vendors of malfunctions, vendors are not always similarly obligated to inform officials of problems reported to them.

    • Voting system vendors are under no legal obligation to notify any federal agency of problems they discover with the vast majority of their systems in use in the United States today, despite the fact that hundreds of millions of federal dollars have been spent to purchase such equipment.

3. **The same failures occur with the same machines, in one jurisdiction or another, election after election.**

    • Most of the election officials we interviewed in connection with our review of reported problems claimed to have had no prior warning of the issues we discuss. By contrast, in most cases, the vendors were (or should have been) aware of the problems – often because the same problem had been reported to them earlier by another election official.

    • Frequently, these malfunctions – and their consequence, disenfranchisement – could have been avoided had election officials and/or public advocates known about earlier problems and had an opportunity to fix them.

CENTRAL RECOMMENDATION: CREATION OF A NATIONAL DATABASE FOR VOTING SYSTEM PROBLEMS

Given the nature and importance of voting systems to our democracy, we need a new regulatory structure to ensure that voting system defects are caught early, disclosed immediately, and corrected quickly and comprehensively. Accordingly, this new regulatory system must center around a mandatory national clearinghouse, administered by a federal agency empowered to investigate violations and enforce the law.

Based upon our interviews with election officials and regulatory experts, and our review of analogous regulatory structures in other important industries, we conclude that the clearinghouse must include four key elements to work effectively:

1.   A Publicly Available, Searchable Centralized Database

Election officials, in particular, would benefit from a publicly available, searchable online database that includes official (i.e., election official-reported or vendor-reported) and unofficial (i.e., voter-reported) data regarding voting system failures, and vulnerabilities, and other reported problems and establishes criteria for the database's contents and organization.

2.   Vendor Reporting Requirements

Vendors must be required to notify the appropriate government agency of any known and suspected voting system failures and vulnerabilities, and other reported problems, including customer (i.e., election official) complaints, warranty claims, legal actions and/or actions taken by the vendor to satisfy a warranty or investigate a reported problem.

3.   A Federal Agency with Investigatory Powers

The best way to ensure that vendors address potential problems in a timely manner is to empower the appropriate government agency to investigate all voting system failures and vulnerabilities listed on the database, grant the agency subpoena power to facilitate its investigations, and require vendors to, among other things, maintain records that may help the agency determine whether there are indeed voting system failures or vulnerabilities, and whether the vendor has taken appropriate action to address the failures or vulnerabilities.

4.   Enforcement Mechanisms

The appropriate government agency must have the power to levy civil penalties on vendors who fail to meet the reporting requirement or to remedy failures or vulnerabilities with their voting systems.

We detail these recommendations more fully on pages 27 - 38 of this report.

ADDITIONAL RECOMMENDATIONS

While a national clearinghouse along the lines we suggest in this report is ultimately the best way to ensure that problems with machines are publicized and corrected throughout the country, there are important interim steps that county and state governments, in particular, can begin taking immediately to increase the chances that election officials are notified of problems with their voting systems and can avoid some of the kinds of problems detailed in this report:

1. **Negotiate Better Contracts with Vendors**

    Provisions in many voting machine contracts make it much more difficult for election officials and the public to get detailed information about system problems reported in other parts of the country, or to hold vendors responsible for problems when something goes wrong. To increase voting system reliability and maximize vendor motivation to minimize the risk of such problems, counties and states should begin demanding certain key contract terms. Pages 39 - 40 of this report discusses these more fully.

    This recommendation is particularly relevant to jurisdictions using Premier voting systems. ES&S recently purchased Premier, and pursuant to the proposed Final Judgment for the antitrust action brought by the Department of Justice in March 2010, customers using Premier equipment will have the option of choosing between ES&S and Dominion for future service of those machines.[4] This will provide them with an opportunity to negotiate new contracts.

2. **Implement Stronger State Regulation**

    The legislature in at least one state, California, has passed legislation requiring vendors selling systems within its borders to notify the Secretary of State and all local election officials using its systems of any "defect, fault or failure" within 30 days of discovery.[5] As of the writing of this report, the legislation is currently awaiting a decision by the governor, who had vetoed an earlier version in 2009. In 2005, North Carolina passed a similar bill into law.[6] The California model presents the best legislative attempt we have seen, to date, to address the problems we discuss in this report. We hope more states will adopt this model.

3. **Create a Voluntary Database**

    The appropriate federal agency should create a searchable database to which election officials, vendors, and voters could voluntarily report problems. Absent action by the federal government, a non-governmental organization (like the National Association of Secretaries of State) or even a state government could create such a database.

    There would be no way to force vendors to report to this database, or to provide election officials with whistleblower protections for making voluntary reports – two important suggestions for the mandatory clearinghouse detailed in this report – but it could still serve as a useful interim resource for election officials.

4. **Pressure Vendors to Voluntarily Post Information on Their Own Sites This Year**

One drawback of the three previous recommendations is that they probably cannot be implemented in time for this fall's election. In contrast, vendors could create their own databases relatively quickly, significantly reducing the risk of embarrassing problems. Ideally, vendors would create a central, easily accessible and searchable site where election officials could review all previously issued product advisories, software patches and workarounds, election official complaints, warranty claims, and lawsuits about their systems (together with the result of any vendor investigation, explanations, and actions taken to address these complaints).

County and state officials can and should demand this voluntary action from vendors now, in time to make a difference for November's election.

I.   INTRODUCTION

Since 2002, the Federal and State governments have invested billions of dollars in new voting equipment, transforming the way our nation conducts elections and tallies votes. This has had many positive effects. We have replaced many outdated and unreliable systems. Most political scientists agree that the new equipment has dramatically reduced the kinds of voter errors common in Palm Beach County in 2000,[7] and, advances in technology have made it possible for many disabled voters to vote privately and independently for the first time in their lives.

> "I ADAMANTLY SUPPORT THE RECOMMENDATION OF THE CREATION OF A NATIONAL, SEARCHABLE DATABASE THAT ELECTION OFFICIALS COULD USE AS REFERENCE TO VOTING SYSTEMS."
>
> JANE PLATTEN, DIRECTOR OF THE CUYAHOGA COUNTY BOARD OF ELECTIONS, OHIO'S LARGEST ELECTION JURISDICTION

But the change has also given an even greater role in our elections to the private companies that manufacture voting machines. The new voting systems run on tens of thousands of lines of proprietary software code. Voting machine vendors create these systems, program, and maintain them. More than ever, election officials and the public must rely on private companies to ensure that citizens' votes are recorded as they were intended to be cast, and that they are counted correctly.

This report details the consequences of lack of regulation and oversight of the voting machine industry. Voting machine manufacturers – unlike many other kinds of manufacturers selling products in the United States – are not required to report malfunctions of most of their systems to any government agency. Nor is there a government agency that either investigates mechanical failures or alerts election officials and the public to possible problems for most systems (let alone requiring voting system manufacturers to fix such problems).

While there has been an increase in government oversight of voting systems in the very recent past – and in particular for new systems introduced since 2009 – we conclude that the current process for publicizing and addressing voting system defects nationally is inadequate.

The Brennan Center closely studied 14 reports of voting system problems during the last few years. In most of these cases, the reported problems resulted in the temporary or permanent miscount or loss of votes. The numbers range from a few dozen to tens of thousands, but in all cases better oversight and reporting requirements could have prevented the problems from occurring at all.

The report that follows is broken into three main sections: first, we describe the law and regulatory structure as it currently exists for addressing voting system failures; second, we document the need to fix this regulatory scheme by providing selected examples of its current failures; and finally, we offer suggestions for changes to the law and regulatory structure that would redress the system's current flaws, based largely on models that have proven successful with other commercial products.

II.   THE CURRENT PROCESS FOR PUBLICIZING AND ADDRESSING VOTING SYSTEM DEFECTS

The Help America Vote Act of 2002 (HAVA) resulted in the replacement of voting systems across the country. It also created new standards for the certification and use of these systems. It established the EAC as an independent agency of the federal government and charged it with the task of creating a testing program for the new voting systems and holding hearings and functioning as a clearinghouse for election administration information, among other things.[8] Section 202 of HAVA states in relevant part that "[t]he Commission shall serve as a national clearinghouse and resource for the compilation of information and review of procedures with respect to the administration of Federal elections . . . ."[9]

Some argue this clearinghouse function should include reporting on the performance of voting equipment purchased with funds granted by HAVA.[10] The EAC has not publicly embraced this interpretation for systems it has not certified, and there is no question that its power to oversee voting system manufacturers has been severely limited by federal statute and resources provided to it.

In spite of this, as discussed below, the EAC has recently taken several positive steps to make information about voting system problems more readily available to election officials and the general public. While admirable and important, we believe these steps fall short – both in scope and timeliness – of what is necessary to avoid the kinds of recurring problems detailed in this report. This belief is in no way meant to disparage recent efforts made by the EAC to ensure that problems with its certified systems are tracked and corrected. To the contrary, as discussed more thoroughly in Section IV (*A Better Way to Track and Address Voting System Problems*), current federal law does not allow the EAC or any other federal agency to take many of the steps we recommend to reduce voting system errors. Nor is the EAC or any other federal agency currently provided with funding necessary to take all of the steps we recommend. The EAC's budget in Fiscal Year 2010 was $17,959,000, minus a $3,250,000 pass through to the National Institute of Standards and Technology for a total of just $14,709,000.[11]

> "A MEANINGFUL AND USEFUL CLEARINGHOUSE FUNCTION IS PARTICULARLY APPROPRIATE AS A FEDERAL RESPONSIBILITY. IT IS MUCH MORE EFFECTIVE FOR A SINGLE FEDERAL AGENCY TO HAVE PRIMARY RESPONSIBILITY FOR IDENTIFYING VOTING SYSTEM PROBLEMS AND TO RECOMMEND REMEDIAL ACTION."
>
> DOUGLAS KELLNER, CO-CHAIR OF THE NEW YORK STATE BOARD OF ELECTIONS

The EAC is in the midst of drafting of a new clearinghouse policy,[12] which will be subject to public comment and approval by the EAC's commissioners. Jeannie Layson, Director of EAC Communications and Congressional Affairs, has recommended a pilot program limited in scope and duration to allow the EAC to determine resources needed to operate the new clearinghouse.[13] The Brennan Center has asked the EAC to comment on the extent of its powers and obligations under the clearinghouse provisions of HAVA. The EAC has declined to state whether its new clearinghouse policy will require more reporting on the performance of voting equipment purchased with HAVA funds pending final adoption of that policy.[14] However, in the past, the EAC has taken the position that it does not have the authority or resources to track and resolve problems associated with voting systems it has not certified[15] – which, as discussed below, represents nearly all of the voting systems in use in the United States today.

Separate and apart from its soon-to-be released clearinghouse policy, the EAC has recently adopted a number of important reporting requirements for both voting system manufacturers and testing labs that participate in

its newly established Voting System Testing and Certification Program.[16] Pursuant to the Quality Monitoring Program established in the Voting System Testing and Certification Program Manual (the "VSTCPM") the EAC will post on its website "test reports" for all systems tested for EAC certification, regardless of whether or not they are ultimately certified. These test reports will include a list of "discrepancies" identified during the testing.[17] It will also post information related to site audits that it conducts on manufacturers who participate in its program.[18]

Under the VSTCPM, vendors must report to the EAC "malfunctions" of *EAC certified* systems. The VSTCPM defines "malfunction" as "a failure of a voting system, not caused solely by operator or administrative error, which causes the system to cease operation during a Federal election or otherwise results in data loss."[19] The EAC will also post this information on its website. The EAC recently informed the Brennan Center that it intends to post a map showing all jurisdictions that use EAC certified systems, with links to all vendor reported anomalies for such systems.[20] Finally, of relevance to this report, election officials may voluntarily report "anomalies" for such systems if they result "in some disruption to the election process," provided the election officials provide their name, title, and jurisdiction, among other information.[21]

This new system had two recent important public successes. The first occured on June 25, 2010, when the EAC put out a "Voting System Technical Advisory" (VSTA) for the ES&S Unity 3.2.0.0 system, which has been certified by the EAC. The advisory came two months after Jane Platten, Director of the Cuyahoga County Board of Elections, notified the EAC that during testing of the machines prior to a May primary election, approximately 10 percent of the machines started powering down and then freezing.[22] After extensive consultation with both ES&S and Cuyahoga County, the VSTA was sent to election officials using the same system, advising them what steps to take in the event this freeze or power failure occurred during opening or closing of the polls, or during voting.[23]

On August 23, 2010, the EAC issued a VSTA for the MicroVote EMS 4.0B, noting that the voting panel for the system's Direct Recording Electronic device would not operate with certain flash cards.[24]

While the recent steps by the EAC are unquestionably valuable, there are a number of factors which limit the usefulness of this reporting system. They are discussed in greater detail in Section IV (*A Better Way to Track and Address Voting System Problems*) of this report. A summary of some of the most serious limitations of the current system follows:

- Perhaps most importantly, the EAC only certified its first voting system in February 2009 – meaning that almost none of the machines currently in use in the United States are covered by VSTCPM reporting rules, or any federal reporting requirements, for that matter. Of the approximately 4,600 election jurisdictions in the United States, we are aware of *only a few dozen*[25] *that will use EAC certified equipment in 2010.* In other words, approximately 99 percent of U.S. jurisdictions in 2010 will be using equipment that is not certified by the EAC and therefore not covered by this program.

- As most polling place equipment in use in the United States was purchased after 2002, and because many jurisdictions replacing equipment are likely to continue to use non-EAC certified equipment in the future, we expect it could be decades before even a large majority of jurisdictions in the United States are using EAC certified systems.[26] In fact, only *twelve states* require federal certification for new systems, so – absent changes at the state level – it is not certain that the EAC's program will ever cover most jurisdictions in the United States.[27]

- Mandatory reporting by vendors is required only if the EAC-certified system "malfunctioned" during a federal election. Thus, if a vendor becomes aware of a problem that occurred when there were no federal candidates on the ballot, it is apparently under no obligation to report the problem to the EAC.

- Reporting under this system is limited to vendors and election officials for a very specific type of problem. For instance, it is not clear that manufacturers would have to report potential flaws they discover before they result in actual loss of votes on Election Day, or "merely" because they cause delay and long lines rather than a loss of data.

- Independent investigators and voters with credible reports, no matter how numerous or serious, are not entitled to report problems.

- Even where county election officials voluntarily provide anomaly reports (exposing themselves to potentially unhappy vendors, as discussed on pages 25 - 26), the EAC is not required to provide this information to other users of such systems unless various criteria are met, including verification from "the relevant State's chief election official."[28]

- Some election officials have complained that neither the EAC nor the vendors are required to notify election officials immediately upon learning of a malfunction. Douglas A. Kellner, co-chair of the New York State Board of Elections, in a letter to the EAC praising them for issuing their first Voting System Technical Advisory last June, noted that it came two months after the EAC was first notified of the problem and urged "the EAC to put in place a system that would allow an immediate preliminary notice to be distributed to all jurisdictions using the equipment involved as soon as EAC staff has been able to verify a report."[29]

For these and other reasons, most state and local election officials we interviewed tell us that they must still rely almost exclusively on the voting system vendors for information about malfunctions, defects, vulnerabilities and other problems that the vendors have discovered, or that have occurred with their voting systems in other states. Vendors are frequently under no legal obligation to provide such information. While purchase or service contracts sometimes bind election officials to inform vendors of malfunctions, vendors are not always similarly obligated to inform officials of problems reported to them.[30] As Jane Platten put it, "One of the more frustrating aspects of encountering problems [with voting systems], often while preparing and testing for elections as well as on election day or during tabulation, is that the vendors themselves often know about the problems and never disclose any details whatsoever prior to the moment of crisis."[31]

Of course, vendors do frequently notify election officials of problems when they occur, and often provide software patches or other procedural safeguards to ensure that such problems do not occur in the future. Unfortunately, in at least some instances, vendors have appeared slow to acknowledge such problems.[32]

More to the point, there is no centralized location where election officials can find information about anomalies, malfunctions, usability concerns,[33] and other problems discovered with systems they are currently using before each election. A change in election administrators can sometimes mean a loss of knowledge about all of the potential problems with a voting system as well as procedural safeguards necessary to prevent those problems.[34]

The result, as this report demonstrates, is that all too frequently the same failures in the same voting systems occur in one jurisdiction or another, election after election. Often, these malfunctions – and their consequence, disenfranchisement – would have been avoided had election officials and/or public advocates known about previously encountered problems and had an opportunity to fix them.

III. FAILURES OF THE CURRENT SYSTEM: CASE STUDIES

Press reports from the last several years contain hundreds of reported cases of voting machine malfunctions. A subset of these cases is summarized in Appendix B of this report (available in the online version of this report). News items about voting system troubles tend not to include many details; this makes it hard to identify from these reports the precise cause of a particular malfunction. Whatever the causes of a particular problem, it is fair to assume that their occurrence in one jurisdiction will often eventually be repeated in another unless election officials throughout the country are made aware of both the causes of the problem and how to avoid them.

Of the hundreds of reports of voting system malfunctions and vulnerabilities, we collected and closely studied fourteen. They are summarized below. Most of the election officials we interviewed in connection with these summaries claimed to have had no prior warning of the problems we discuss. By contrast, in most cases, the vendors were (or should have been) aware of the problems – often because the same problem had been reported to them earlier by another election official.

"ONE OF THE MORE FRUSTRATING ASPECTS OF ENCOUNTERING [VOTING MACHINE] PROBLEMS . . . IS THAT THE VENDORS THEMSELVES OFTEN KNOW ABOUT THE PROBLEMS AND NEVER DISCLOSE ANY DETAILS WHATSOEVER PRIOR TO THE MOMENT OF CRISIS."

JANE PLATTEN, CUYAHOGA COUNTY BOARD OF ELECTIONS

1. Butler County, Ohio, March 2008

In March 2008, as they reconciled vote totals from the State primary in their office's Data Department, Ohio officials noticed that several votes were dropped from memory cards even though their final report stated that votes on these memory cards were counted.[35] A subsequent investigation by Ohio election officials determined that at least 1,000 votes were undercounted in nine of Ohio's forty-four counties using Premier touch screen or optical scan voting systems.[36] In an editorial several months later, the *New York Times* noted that Premier (known as Diebold Election Systems prior to rebranding in 2007) had subsequently notified more than thirty states using its systems "to be on the lookout for missing votes."[37]

Less widely reported was the fact that this same problem was apparently discovered in DuPage County, Illinois in 2004. In a county election summary (obtained by the Illinois Ballot Integrity Project and the relevant portions of which are annexed to this report as Appendix C), a technician who serviced the machines noted what appears to be the very same problem:

> *GEMS Upload Failure on York 58* – This memory card had a failed upload transmission on election night that was not detected until the next day when reports were on the precinct, and zero results were found for each race within the precinct. The status of the memory card upload within the GEMS was "successful" but the upload record showed the ballot count to be zero. It is rather discomforting [sic] that this failed transmission was not detected on election night.

The publicity around the problems in Butler County, Ohio in March 2008 may have saved thousands of votes on Election Day the following November. It is impossible to know how many votes were lost before the problem was so widely publicized.

Nor was the mere reporting of the problem to the vendor in 2008 enough to guarantee that the 29 other States using this system that year would have known how to protect themselves from similar problems. As the rest of this case study shows, it was the extreme vigilance of the Butler County Board of Elections and the Ohio Secretary of State that resulted in the full scope of the problem being revealed.

On April 4, 2008, the Butler County Board of Elections sent a letter to Premier and copied the Secretary of State, Jennifer Brunner, notifying Premier of the problem.[38] The Board sent a follow up letter to Premier on April 9, 2008 notifying them of a recurrence of the problem.[39]

On May 16, 2008, in response to Butler County's complaint, Premier issued a report that blamed the problem on antivirus software the county had run on their system as well as human error.[40]

County Election Director Betty McGary reports that on May 23, she wrote to Dave Byrd, President of Premier, calling their report "highly speculative," and rejecting their assumptions. She states that she requested Premier continue to research and diagnose the root source of the discrepancies.[41]

Had Butler County's Board of Elections been less persistent, that might have been the end of the story. Other election officials using this system around the country might not have learned of the problems experienced in Butler County, and almost certainly would not have discovered its true cause.

Fortunately, the Butler County Board asked the Ohio Secretary of State's office to assist it in its own investigation of the problem. On August 6-7, 2008, Butler County election officials and the Ohio Secretary of State conducted a simulation of the vote counting process with Premier observers. They conducted eight of these simulations over two days – in some cases disabling the antivirus software Premier had blamed for the malfunction, in other cases enabling it.[42]

The testing revealed that the machines dropped votes during multiple memory card uploads from individual voting machines onto the county server regardless of whether the antivirus software was enabled.[43]

After the testing, Premier conceded that the apparent root cause for the problem was an error with their server software, which the company determined "contains a logic error" that can sometimes result in dropped votes from a sharing violation when multiple cards from individual machines were uploaded at the same time.[44]

Following its additional investigation, Premier sent a product advisory to all counties using its systems detailing procedures intended to "mitigate and reveal this issue should it occur."[45]

Director McGary supports a mandatory requirement for "voting machine vendors to report all malfunctions and complaints they receive from election officials to a central and searchable database," noting that "such reporting should be mandatory."[46]

2. Humboldt County, California, November 2008

In November 2008, election officials in Humboldt County, California implemented a post-election "Transparency Project," whereby a separate scanner not manufactured by the voting machine vendor electronically counted every paper optical scan ballot during the election. The purpose was to verify the official vote totals and to post ballot images on the internet in order to allow any member of the public to conduct independent recounts.[47]

The Transparency Project turned up a counting error on Humboldt County's voting machines: they failed to count approximately two hundred ballots.[48] According to Humboldt County Clerk Carolyn Crnich, the first batch of absentee ballots scanned into the voting system, known as "deck zero," disappeared from the totals produced by the voting system before officials finished scanning all of the ballots and certified the vote totals.[49] Upon learning of the problem, Crnich contacted the voting system vendor.[50]

WIRED AND COMPUTERWORLD MAGAZINES HAVE REPORTED THAT THE VOTING SYSTEM VENDOR WAS AWARE OF THE "DECK ZERO" PROBLEM FOR YEARS, BUT DID NOT NOTIFY THE ELECTION ASSISTANCE COMMISSION, THE NATIONAL ASSOCIATION OF STATE ELECTION DIRECTORS, OR THE CALIFORNIA SECRETARY OF STATE, CALIFORNIA'S CHIEF ELECTION OFFICIAL.

Crnich states that after examining copies of the county's database, the vendor told her that a programming error in its election management system, the software used to aggregate the votes from all of the county's voting machines, caused the problem.[51]

Wired and *Computerworld* magazines have reported that the voting system vendor was aware of the "deck zero" problem for years, but did not notify the Election Assistance Commission, the National Association of State Election Directors, or the California Secretary of State, California's chief election official.[52] Instead, according to a report issued by California Secretary of State Bowen after the Humboldt County incident came to light, the vendor sent "a vague e-mail to election officials" in California that used the software with the programming problem, recommending a "workaround" procedure without identifying the problem or the potential consequences (i.e., lost votes) of failing to implement the workaround.[53]

The voting system vendor has testified that once it first identified the software problem in October 2004, it "communicated" its findings, and "a simple procedure workaround to mitigate this issue, via email to all California counties then affected."[54] Carolyn Crnich does not dispute that the vendor may have informed her predecessor of the problem. She is certain, however, that her predecessor did not leave any documentation about the problem when she took over, or institute procedures that would have prevented the problem from causing the voting system to lose votes.[55]

Nor did the vendor report the problem to the California Secretary of State's office. As the vendor noted in testimony, at the time there was no "mandate for reporting issues of this nature" to the Secretary of State.[56]

Humboldt County Election Director Crnich has stated that if there were an EAC database with information detailing problems that other counties had experienced using the same voting system used in Humboldt County that she could have accessed before the November 2008 election, she almost certainly would have used it. Such a database would have alerted her to the programming issue with her county's tally server, as well as the workaround. Crnich stated that she believed it was well within the EAC's mandate to provide this kind of information to local election officials and that new officials, who might have little experience with the systems they are charged with using, would particularly benefit from this kind of database.[57]

3. Orange County, Florida, November 2006

In 2007, the Florida Division of Elections listed Orange County as experiencing the highest undervote rates in the state on absentee ballots cast in the 2006 general election for both the U.S. Senate race and the state Governor's race.[58] Alarmed by the exceptionally high rate of undervoted ballots in a major election – nearly 5 percent – the Florida Fair Elections Center's Associate Director contacted the Orange County Elections Administrator, who promised to investigate the issue.[59] According to the Center, Orange County officials responded to the inquiry by stating that their manual inspection of the ballots confirmed that some legitimately cast ballots had not been counted. The Center adds that when they questioned the vendor of the county's OpTech optical scan machines about the problem, the vendor's representative identified the problem as the scanners' failure to read certain types of gel ink used by voters to complete their ballots.[60]

On further investigation, the Center discovered that the same problem seemed to have occurred on similar scanning equipment in March of 2004 in Napa County, California. In that election, optical scanners manufactured by Sequoia failed to count some ballots voted with gel ink.[61] This problem was only discovered during the state's legally-mandated hand count of 1 percent of the ballots cast in the election.[62] Sequoia told *Wired* magazine that the problem was not with the machines themselves, but rather with the county's calibration procedures – the machines were calibrated to read only carbon ink, not dye-based ink found in many gel pens.[63] According to Sequoia, the issue could have been avoided through more thorough pre-election testing.[64]

When the Florida Fair Elections Center delved more deeply into the history of this type of problem, they learned that in the 2000 election, Orange County's optical scan machines failed to count more than 400 votes in the presidential race for no apparent reason.[65] At the time, it was postulated that one possible explanation for the machines' failure to count these ballots was "low carbon content in the ink pens used to mark them."[66] Kitty Garber, Associate Director of the Center, believes that both the vendor and the state were well aware of this before the time she discovered the issue in 2007 – in part because the vendor so quickly identified the source of the problem. For some reason, she states, this was not adequately "communicated to the people actually running the elections" in Orange County in 2004 or 2006.[67]

Bill Cowles, Supervisor of Elections for Orange County noted in an interview with us that the county switched to a different model of ES&S scanner after the 2006 general election.[68] Florida has also implemented a post-election audit law in the intervening years, though a 2008 study by the Brennan Center and others has been critical of that audit as being insufficiently robust to catch many problems.[69]

4. Pulaski County, Arkansas, May 2006

During early voting in the May primary, several voters complained of problems with an ES&S touch screen DRE.[70] According to a local newscast, Pulaski County election officials tested the machine and determined that the machine was not broken; an optical illusion perceived by voters who were over six feet tall caused the problem.[71] Officials determined that the angle at which particularly tall voters viewed the screen caused them to believe that they were voting for the candidate below the one for whom a vote was recorded.[72] This is a significant problem given that more than 15 percent of American males over the age of 20 are six feet tall or taller.[73]

Pulaski County Director of Elections Susan Inman told the *Arkansas Democrat-Gazette* that when she asked ES&S to examine the machine to ensure that there wasn't a problem with the equipment, a company employee told her that they were already aware of optical illusion problems experienced by tall voters.[74]

A review screen that appears before voters finalize their ballots alerted some to the fact that their votes were not recorded as intended. However, several studies have shown that most voters will not notice errors on their final review screens, so there is no way to know how many voters in Pulaski County actually cast their ballots for candidates other than the candidate of their choice.[75] Officials were livid at the thought that ES&S could have known about the problem and failed to warn them.[76] Pulaski County Prosecuting Attorney Larry Jegley launched an investigation into the issue, saying, "I can't understand how in the world a big company like ES&S, with contracts all over the state of Arkansas, would know about a problem like this and fail to fix it."[77]

• • •

5. Florida, November 2006

In 2007, Diebold, Inc. conceded that its optical scan readers had a glitch that caused memory card failures, and told the *Daytona Beach News-Journal* that it would investigate the "J40 connector" that attaches memory cards to its optical scan voting machines.[78] This admission came after complaints about memory card failures from election officials dating as far back as 2000.[79]

According to the *News-Journal*, Volusia County, Florida reported that eleven memory cards in Diebold optical scan machines failed during the November 2006 general election.[80] Premier told the *News-Journal* that the 4.4 percent error rate in Volusia County was "unusual," but an investigation by the paper revealed even higher error rates in other Florida counties using the same equipment.[81] According to public records obtained by the paper, several other Florida counties experienced failure rates that were comparable to or higher than those observed in Volusia County.[82]

The 2006 incidents were not the first time that memory cards in Diebold machines failed in Volusia and other Florida counties. According to the *News-Journal*, a 2004 county report indicates that Volusia had 57 memory card failures, which Diebold stated was "more memory card failures than 'the rest of our customers in Florida combined.'"[83] The paper also reported that Volusia's problems with memory cards dated back to the 2000 general election, when 300 ballots went uncounted when a memory card failed in the middle of ballot scanning.[84] The loss of votes was not discovered until a hand recount began as a result of the close contest.[85] The *News-Journal* noted that "Volusia County's most infamous memory card problem . . . when more than 16,000 negative votes were recorded against Al Gore," had "never been determined." At the time, a county election official wrote an angry e-mail asking the manufacturer to "please explain this so that I have the information to give the auditor instead of standing here looking dumb."[86]

Despite this long history of failures with the same equipment, state election officials said in 2007 that they were previously unaware of the problem.[87]

By 2007, nearly 25,000 Diebold optical scans machines were in use nationwide. The *News-Journal* reported that the manufacturer conducted a survey of its customers to determine the frequency of such failures, but refused to release results from the study, calling it proprietary information.[88] According to the *News-Journal*, officials at the Election Assistance Commission told the paper that they could not compel distribution of this information unless an official government agency requested the action.[89] Many saw this as an argument for the EAC to bolster its clearinghouse function. "[T]he federal agency required by law to act as a clearinghouse on voting system problems – the U.S. Election Assistance Commission – has been slow to develop a place where such information can be shared," the *News-Journal* reported in 2007, "The [election] supervisors are left largely on their own."[90]

• • •

6. Broward County, Florida, November 2004

Two days after Election Day in November 2004, Broward County election officials double-checked election results and discovered that tens of thousands of votes on certain state amendments were not counted. The problem: a "software glitch" in the system used to count the county's absentee ballots.[91] According to the *Palm Beach Post*, the software started counting backward after it logged 32,000 votes in a race.[92] Once officials identified the problem and obtained correct vote totals, the newfound votes contributed to a changed result for a statewide gambling amendment and sparked angry calls for a recount. [93]

THE NEWS-JOURNAL REPORTED THAT DIEBOLD CONDUCTED A SURVEY OF ITS CUSTOMERS TO DETERMINE THE FREQUENCY OF SUCH FAILURES, BUT REFUSED TO RELEASE THE RESULTS, CALLING THEM PROPRIETARY.

Several newspapers reported that ES&S, the voting system vendor, claimed to have noticed the problem in 2002, and said it notified the Secretary of State's office of the issue after that election.[94] It isn't clear from news accounts why Broward County did not adopt procedures to safeguard against this glitch once it was discovered. Broward County officials told the *Palm Beach Post* that the manufacturer claimed its upgrades were rejected by the Secretary of State's office in 2002; the state contested this claim.[95] One reason officials in 2004 may have been unaware of the problem: there was turnover in the offices of chief election officials in both Broward County and the State of Florida between 2002, when the software glitch was originally discovered, and 2004, when the unaddressed problem caused Broward County to miscount the votes.

Regardless of who was to blame for Broward County's failure to address the problem ahead of time, a centralized database could have prevented it, by allowing Broward County officials in 2004 to review reported problems for their systems, including necessary workaround procedures, and avoid the controversy that followed the well-publicized tallying problems.

7. Florida, June 2004

According to the *Miami Herald*, only five months before the 2004 general election, some state officials learned that touch-screen voting machines used in 11 of the state's counties contained a software flaw that would make it impossible to conduct a manual recount of ballot images in close races.[96] Election officials in at least one Florida county knew about the problem as early as 2002, but for whatever reason, the existence of the flaw was not understood by the relevant State election officials for nearly a full year.[97]

Miami-Dade County learned of the problem after an election in May 2003. The division director of the County's technology department found that the electronic event log of voting activity scrambled the serial numbers of voting machines.[98] He wrote a letter to the County elections supervisor on June 6, 2003 stating that "I believe there is a serious 'bug' in the program(s) that generate these reports, making the reports unusable for the purpose that we were considering (audit an election, recount an election and, if necessary, use these reports to certify an election)."[99]

The vendor of the machine assured all parties that the software flaw would not affect the counting of votes. Nevertheless, there was concern that if counties were ordered to produce a record of the votes in a close race for the purpose of conducting a recount, some of the relevant data could be lost.[100]

Press reports indicate that, at least initially, the media attention to the flaw in June 2004 led to a round of finger-pointing among Florida election officials, with the Florida Secretary of State "blasting" Miami-Dade officials for failing to notify her office when they learned of the problem a year earlier, and Miami-Dade officials, arguing that other counties that discovered the same problem should have notified the state, to put more pressure on the vendor to "come up with a so-called work-around to the problem before the mistake was repeated."[101]

Again, a centralized database that listed reports of problems from vendors and election officials would probably have provided election officials in Florida with much earlier notice of the problem.

• • •

8. Alameda and San Diego Counties, California, March 2004

According to the *San Diego Union-Tribune*, on the morning of the March 2 primary election, more than 700 Diebold precinct control modules that activate the cards used to call up ballots on touch screen machines displayed the wrong start-up screen.[102] With no way to load ballots onto the voting machines, hundreds of polling sites had to delay opening their doors, some by as much as three hours.[103] Some voters told the *Union Tribune* that they had to leave before getting the opportunity to cast a ballot.[104]

Shortly after the primary, a Diebold spokesman acknowledged that the start up screen on precinct control modules could fail in the event of a problem with the unit's power supply, calling the glitch "a possibility […] but it was an improbability."[105] A report released by the company six weeks later revealed that the problem was caused by faulty power switches that failed to fully turn off the units when placed in the 'off' position, causing power to drain from the machines before election day.[106]

The Secretary of State's Voting Systems and Procedures Panel called a hearing in late April to examine the problems experienced during the primary. At the hearing, former Diebold technician James Dunn testified that the problems with batteries losing power were evident before the machines were shipped to San Diego and Alameda counties.[107]

The technician, whose job was to assemble voting machines, load their software, and pack them for shipment, testified that battery problems could lead to incidents like those seen on primary day:

> We had a significant amount of problems with the batteries. In fact, one of the things we were told – one of the last things we were to check was before they packed up, was that they were supposed to have 60 to 70 percent battery load in them due to the problem of the batteries discharging once they reached anywhere from 20 to 15 percent charge rate, they would then dump the settings, sometimes dump the software load, and then on initial startup, would being up a standard Windows CE screen and not the Diebold screen … [This occurred] [f]requently. All the time.[108]

Calling the disaster in San Diego and Alameda counties "predictable" and the problem "fully known," Mr. Dunn testified that he notified supervisors of the problem and was told that the company knew that machines encountered this problem once the batteries discharged to a certain point, and that their solution was simply to ensure that the machines were shipped with a sufficient charge.[109]

At the hearing, an attorney for Diebold contested the accuracy of Mr. Dunn's testimony in vague terms, but of the battery problems on Election Day, company president Robert Urosevich said, "We were caught. I apologize for that."[110]

• • •

9. Bernalillo County, New Mexico, November 2002

Ten days after Election Day in 2002, Bernalillo County Commissioners discovered that their electronic voting system reported approximately 36,000 votes even though nearly 48,000 voters had signed in at the polls. As reported in the *Albuquerque Tribune*, the vice president and regional manager of the voting system vendor stated that the individual touch-screen machines recorded the votes correctly, but the "software program used to [aggregate] all the votes," did not have the capacity to handle the totals and was "overwhelmed by the data."[111] The result was that nearly 12,000 votes were missing from the totals produced by the voting system.

In fact, the very same problem occurred weeks earlier in Clark County, Nevada and was fixed for future elections.[112] Unfortunately, according to the *Albuquerque Tribune*, the technician in charge of Bernalillo County's problems was not told of the Clark County problems, and was not provided with the patch.[113]

James Noel, who served as counsel to one of the candidates on the ballot that day, discovered the problem several days after the election.[114] According to Mr. Noel, as he reviewed the unofficial results, he noticed undervote rates of 20 to 25 percent for the early voting period for statewide and federal offices. This was higher than the undervote rate in down-ticket races, not something that one would typically expect. He estimated that thousands of votes might not have been counted.[115]

Mr. Noel stated that he brought this anomaly to the attention of the County Clerk, and that despite this fact, she recommended final certification of the results several days later.[116] Mr. Noel objected to certification, pointing out the unusually high undervote rate in statewide and federal races, and the board voted to delay certification pending investigation by the County Clerk.[117] When told of the problem, the vendor re-ran the results "using the software patch this time," and issued a new report that included the missing ballots.[118]

Denise Lamb, who currently serves as Chief Deputy Clerk for Elections in Sante Fe County, New Mexico, believes that a central database that detailed malfunctions for each system, as well as workarounds or software patches supplied by the vendors, could have prevented the problems that Bernalillo County encountered with its tally server in 2002, and certainly would have allowed the County to understand quickly the potential source of the malfunction once it occurred. She noted that, "vendors are in the business of selling machines, and often don't have an incentive" to inform present and future customers of problems with their systems.[119]

• • •

10. Wake County, North Carolina, November 2002

According to *Wired News*, ES&S discovered a glitch in the firmware of its touchscreen voting machines used during early voting in the 2002 general election in Jackson County, North Carolina.[120] The glitch "made the ES&S machines falsely sense that their memories were full," a company spokeswoman told the magazine.[121] The potential result of this error was that memory cards associated with the machines would not record votes that had been cast. Fortunately, the problem was fixable.[122]

DENISE LAMB, WHO CURRENTLY SERVES AS CHIEF DEPUTY CLERK FOR ELECTIONS IN SANTE FE COUNTY, NEW MEXICO, NOTED THAT, "VENDORS ARE IN THE BUSINESS OF SELLING MACHINES, AND OFTEN DON'T HAVE AN INCENTIVE" TO INFORM PRESENT AND FUTURE CUSTOMERS OF PROBLEMS WITH THEIR SYSTEMS.

Election officials in neighboring Wake County later found this same glitch "by chance" during their own early voting period that year.[123] Election officials told *Wired* that at the time, early voters would fill out paper applications which contained tracking numbers. Each application had a tracking number, and before the early voters cast their votes on the touch-screen machines, poll-workers typed the number into the machines. At some point, election officials compared the number of votes on the machines to the applications, and found that the two figures did not match.[124] As the Brennan Center and other organizations have documented, even today many election jurisdictions do not always follow such reconciliation practices.[125]

According to Cherie Poucher, Director of the Wake County Board of Elections, upon learning of the discrepancy, she immediately contacted ES&S. She says that at that point, she was told that Jackson County had experienced a similar problem. Poucher stated this was the first time she had been informed of this problem.[126]

Ms. Poucher stated that in all, six touch-screen voting machines used in Wake County had lost 436 ballots as a result of the problem. Because the county had paper applications and a numerical code associated with the lost votes, they were able to contact voters whose votes had been lost, and provide them with the opportunity to revote. Many did so.[127] Unfortunately, as Professor David Dill of Stanford has noted, we can't be sure "that other counties didn't lose votes that they didn't catch."[128]

ACCESSIBLE VOTING SYSTEMS

The Help America Vote Act (HAVA) requires that every polling place used for federal elections be equipped with a voting system that is "accessible for individuals with disabilities . . . in a manner that provides the same opportunity for access and participation (including privacy and independence) as for other voters."[129] Many disability rights advocates rightly hail this provision of HAVA as a civil rights milestone, providing millions of Americans with the opportunity to vote privately and independently for the first time in their lives.

Unfortunately, however, reports indicate that accessible systems too often malfunction on Election Day, frustrating voters with disabilities.[130] As a result, HAVA's mandate has sometimes gone unfulfilled, and these voters have been forced to either seek assistance and lose their privacy while voting, or to give up on voting in their polling places altogether. Over the past several years, there have been several individual[131] and institutional[132] reports detailing problems that voters with disabilities have experienced using these systems.[133] They have included audio keypads and output that failed to work, VVPAT printers on accessible units that malfunction, and accessible machines that cannot read ballots correctly. Frequently these "malfunctions" could have been avoided if poll workers or election officials were aware of procedures to prevent them.

The appendix available in the online version of this report details some of the defects that have threatened to disenfranchise voters with disabilities, but a comprehensive collection of reported malfunctions in accessible voting systems does not exist in one location. There is no easy way for election officials, disability rights advocates or voters with disabilities to review a comprehensive list of problems associated with these systems, or the countermeasures that election officials can implement to avoid them.

A centralized database that allowed users to search these kinds of problems could greatly improve the voting experience of voters with disabilities. Such a database would not prevent malfunctions. But it would give election officials significant knowledge, so that they could take steps to prevent malfunctions, or quickly correct them. It would also give election officials – and voters – the opportunity to warn their counterparts in other areas of the country about problems experienced in various polling places with accessible units and to remedy such problems prior to Election Day.

Ms. Poucher has stated that it "would be fantastic" if the EAC or other federal agency would establish a searchable database that would allow election officials to see what kind of problems other jurisdictions around the country had with the same systems she was using, whether the vendor had provided them with patches or other fixes, and what procedures they were using to prevent similar problems in the future.[134] She noted that if she discovered a problem during a small, off-year election, it might draw little notice in her own county, but an EAC database would provide her with an opportunity to inform other election officials throughout the country using the same system of the malfunction, and prevent more damaging problems down the road. "I think this kind of database would get integrity back in the system," she added.[135]

Additional case studies further suggest that vendors are too often slow to acknowledge problems with their systems and frequently do not cooperate as fully or as transparently as public officials (and members of the public) would like when problems are confirmed. At the same time, because the last few years have seen a number of voting system vendors go out of business or get bought out by rivals, election officials may not have *any* vendor to turn to for explanation when a problem occurs (see Case Study 11 below and *The Suboptimal Structure of the Voting System Market* at pp. 25 - 26). This is why we believe it is critical that vendors be *required* to report problems to the clearinghouse within a certain time period when certain events occur.[136]

• • •

11. Fairfax County, Virginia, March 2009

In March of 2009, during the post-election canvass for a closely contested special election to fill a vacancy for the County Board of Supervisors, election officials and observers noticed that the combined totals for two AVC WinVote DRE voting machines in a precinct showed a total of 359 votes cast, with 377 votes recorded for the Republican, 328 for the Democrat, and eighteen for other candidates, for a total of 723 votes – or 364 more votes recorded than cast.[137] Officials in Virginia were lucky to catch this problem. As the Brennan Center and others have shown, several jurisdictions in the United States have inadequate ballot accounting and reconciliation practices.[138] In such cases, it is possible to miss this kind of error.

The post-election canvass showed that while one machine recorded 723 votes, only 707 voters had signed-in to that precinct on Election Day, and 348 votes had been cast and correctly counted on another machine in the same precinct. Election officials decided to print the "ballot images" (or the software's digital representation of the ballots cast by voters), and add those up by hand. When they did that, the number of votes on the two machines combined equaled the number of voters who checked in at the polls, and for each machine the number of voters equaled the sum of the number of votes for each candidate. It was only by checking the number of votes against the poll books and by using an alternative method of vote counting that officials were able to determine the result with some certainty. It is important to note, however, that while the ballot images correlated with the number of voters who used the machine, the WinVote does not produce a paper trail; the ballot images are created by the voting system itself, not by voters.

While Fairfax County officials were satisfied that ballot accounting redundancies allowed them to determine accurate election results, they were never able to determine the cause of the problem with certainty.[139] They surmised that the problematic machine did not reset properly after pre-election testing, but they are not sure why this occurred in 2009 after years of using the same machines without

incident.[140] Because the manufacturer of the system was no longer in business, the county had to track down a programmer familiar with the system to corroborate its theory.[141] County Election Manager Judy Flaig acknowledges that conducting the type of investigation necessary to determine the cause of the problem to even this limited extent would not have been possible for every county, and that as much as jurisdictions try to communicate with manufacturers and one another, some information falls through the cracks."Most jurisdictions don't have the resources to do this kind of work," Flaig said, "something like [a database of voting machine problems] would really be helpful."[142]

Rokey Suleman, Fairfax County Registrar at the time of the incident, says he still does not know what caused the problem. Although he no longer works in Fairfax County, he believes other officials using these machines "should certainly want to know what happened, so that they can put the proper procedures in place to ensure it doesn't happen again."[143]

Hinds County, Mississippi also uses the AVS WinVotes. Suleman noted that "unless they read a tiny Vienna, Virginia newspaper where this story was reported, there's no way they would know about this problem."[144] Indeed, the Brennan Center contacted Hinds County Supervisor Robert Graham, and he had never heard of the problems in Fairfax County.

Suleman, who is now the Executive Director of the District of Columbia's Board of Elections and Ethics, noted that in addition to providing election officials with notice of potential problems with the machines they are using, a central database would have other benefits for election officials. Mr. Suleman stated that Washington, D.C. "just went through a procurement process for new voting machines," and that he would have been greatly helped by a central database that could "serve as a repository to let me know what issues exist with the machines, rather than having to rely on what the vendors spoon-feed me."

• • •

12. District of Columbia, September 2008

A District of Columbia Council investigation after the District's 2008 primary found that vote totals originally produced by a Sequoia tally server on election night were "obviously inaccurate."[145] The Board of Elections traced the problem to a cartridge for a Sequoia precinct-count optical scanner in one precinct, which reported voter turnout nearly twice that of the registered population of the precinct and showed 1,554 write-in votes in a race without a write-in campaign.[146] In two reports in the *Washington Post*, election officials indicated that the malfunctioning cartridge caused other problems with the preliminary vote totals.[147] According to acting Executive Director of the D.C. Board of Elections Sylvia Goldsberry-Adams, "one defective cartridge caused vote totals to be duplicated into multiple races on the summary report issued by our office;" on this summary report, 1,542 appeared as the number of overvotes in five contests.[148]

The District Board of Elections asked Sequoia to explain the problems. In an initial response, Sequoia stated that it found "no anomalies or irregularities in either the data or the internal event logs that can be identified as having caused or contributed to the issue experienced on election night."[149] In response to the Board's request for a more detailed explanation, Sequoia issued a report that attributed the problem to human error and ruled out "[e]ndemic hardware and software failures […] as the cause."[150] As for the Board's request for information about past occurrences of this error, Sequoia responded, "[s]ince our customers conduct the actual elections – not Sequoia – we do not have any way of keeping track of such incidents, *nor is it our responsibility to do so.*"[151]

Sequoia identified four possible causes for the problem, including a transient malfunction of the memory pack reader, which transmits information from the memory cartridge to the tally database, but stated that the voting system event logs would not record any of the possible malfunctions, "making it impossible to provide a more definitive answer."[152]

Nine days after the September primary, the D.C. Council subpoenaed information about the voting machines' source code from Sequoia so that it could conduct a more thorough investigation.[153] According to the *Washington Post*, Sequoia objected to this request on the grounds that it constituted trade secrets or otherwise protected material.[154] The vendor also objected to the Council's request for all documents related to any irregularities in similar voting systems, stating that *it had no documentation of such incidents.*[155]

The *Post* reported that when the Council persisted in its attempts to get the information, the company asked for a $20 million bond to guarantee confidentiality.[156] According to board officials, the company still had not responded to the subpoena as of late April 2009.[157] In April, the Council filed a motion in the District of Columbia Superior Court to attempt to force the company to comply with the subpoena.[158] On June 5, under a protective order from a Superior Court Judge, Sequoia agreed to release the source code for the voting system.[159] When news of the agreement broke, Councilwoman Mary Cheh said, "they fought us tooth and nail until now."[160]

The findings of the District of Columbia investigation will soon be made public. In the interim, the Council passed election reform legislation that includes a 'warranty provision' requiring any vendor that sells voting systems to the District to "[p]romptly and fully disclose any flaw, defect, or vulnerability in the voting system of which the vendor is aware or becomes aware" and to remedy the problem appropriately.[161]

While this bill will help D.C. election officials get needed information about voting system defects in the future, Councilmember Mary Cheh still sees a need for a centralized, national database. "It was difficult for us to get the information we needed in D.C. If we were in a smaller, more fragmented, or politically divided jurisdiction, it would have been even harder for us to get necessary information in an expeditious fashion," said Cheh. "As it is now, there's little communication between jurisdictions, so vendors hold all the cards."[162]

• • •

13. New Jersey, February 2008

According to a public records request for results obtained by researchers at Princeton University, thirty-eight Sequoia AVC Advantage DRE voting machines in eight New Jersey counties experienced anomalies during the February 5, 2008 primary election.[163] A county official initially discovered the problem by comparing machine counter totals with the paper printouts produced by the machines at the close of the polls.[164] The county alerted other counties, which do not routinely reconcile these two totals, to the potential malfunction.[165] The *Times of Trenton* reported that the problem initially appeared

to be with the turnout totals – while all votes seemed to be correctly recorded, the total number of individuals who cast votes for each party appeared to be slightly off.[166] Sequoia inspected the equipment and concluded that the problem was poll worker error, not equipment malfunction.[167] In early March, the company issued a technical bulletin advising users of the machine on how to protect against this error in the future.[168]

In March, several counties decided to enlist a team of Princeton computer scientists to conduct an independent study on the equipment used in the February primary. After the counties' intent to hand over their voting machines for assessment became known, one of the researchers who was set to conduct the analysis reported on his blog that he received an e-mail from Sequoia stating that the company will "take appropriate steps to protect against any publication of Sequoia software, its behavior, reports regarding the same, or any other infringement of [its] intellectual property."[169] The *Star-Ledger* reported that at least one county which subsequently backed the effort received a letter from Sequoia stating that conducting an independent investigation would violate the licensing agreement between the vendor and the county, and threatening to sue if the county proceeded with the inquiry.[170] In addition, that same month, advocates at the Rutgers Constitutional Litigation Clinic issued a subpoena for the necessary information to conduct an independent analysis, including the machines' source code, build tools, operator manuals, and maintenance manuals.[171] According to the Princeton researchers' final report, Sequoia "vigorously protested" sharing its source code on grounds of defending its intellectual property and it took "months of litigation" to negotiate a protective order under which Sequoia would share the information.[172] In May, a Superior Court judge issued a protective order permitting the team of Princeton researchers to examine two of the DREs used in the February primary but preventing the disclosure of "any conclusions or comments" about the machines resulting from the investigation.[173]

In June, after the plaintiffs who issued the subpoena and researchers conducting the assessment refused to sign the protective order on the grounds that it violated their speech rights and academic freedom, the judge who issued the initial protective order reversed her ruling with respect to the non-disclosure of the researchers' findings.[174] The results of the released independent analysis showed the researchers concluded that on all but one of the thirty-eight machines that malfunctioned during the primary, the number of votes for candidates of a certain party exceeded the number of individuals who voted on that party's ballot.[175] Some machines logged more votes for Democrats than Democratic voters, and others logged more votes for Republicans than the number of Republican voters.[176] The researchers concluded that it would be "easy and natural" for poll workers to make the mistake that triggered the programming error that produced incorrect vote totals. Some voters were effectively disenfranchised by this error. Those who received the wrong party's ballot could not choose a candidate of their own party as was their legal right, and write-in votes for their chosen party were not counted because it is unlawful for a voter to vote in the primary election of a party to which she does not belong.[177] Furthermore, the researchers identified serious insecurities in the machines, and stated that the machines could be quickly and imperceptibly hacked to steal votes by anyone with "only ordinary training" in computer science.[178]

> OFFICIALS IN MONTGOMERY COUNTY, PENNSYLVANIA, AN AVC ADVANTAGE COUNTY LOCATED LESS THAN FIFTY MILES FROM THE NEW JERSEY BORDER, TOLD THE PHILADELPHIA INQUIRER THAT THEY WERE UNAWARE OF THE PROBLEMS THAT HAD OCCURRED IN NEW JERSEY.

Had advocates and researchers in New Jersey not been persistent in their efforts to overcome Sequoia's resistance to a thorough and independent investigation of its machines, these flaws may never have come to light. Indeed, even given the significant media attention that the incident received, other users of AVC Advantage machines were unaware of the malfunctions that occurred in New Jersey. In March of 2008, after county election officials in New Jersey had begun clamoring for an investigation of the machines' behavior in the February primary, officials in Montgomery County, Pennsylvania, an AVC Advantage county located less than fifty miles from the New Jersey border, told the *Philadelphia Inquirer* that they were unaware of the problems that had occurred New Jersey.[179] Were Sequoia obligated to report any known flaws in its voting system to a federal oversight agency, these problems may have been revealed more expeditiously.

• • •

14. Indiana, May 2006

Less than two weeks before the May 2006 primary election, voting machine manufacturer MicroVote admitted to election officials that the voting equipment it had sold to dozens of Indiana counties was uncertified, in violation of state law.[180] The delay in obtaining certification caused a panic amongst county election officials who faced the threat of legal action by the state if they used uncertified equipment in the primary.[181]

According to testimony and reports in the local media, while MicroVote continued to work toward certification, on April 22, ten days before the primary, it learned from the independent testing authority contracted to complete its certification that the company's voting machines would allow some voters to cast votes for candidates who would not represent them. The testing authority found that the company's Infinity DREs, installed in 47 counties across the state, allowed voters casting straight-ticket ballots in "split precincts," where voters living in the same precincts choose from different sets of candidates, to vote for the wrong set of candidates.[182]

In order to pass the certification process in time for the May 2 primary election, MicroVote opted to shut down the machines' straight ticket functionality altogether, allegedly at the advice of the independent testing lab.[183]

According to the *Indianapolis Star*, MicroVote worked in secret to develop a software update that would resolve the problem before the general election, when the straight-ticket function would be necessary in several split precincts.[184] A sales representative for the company testified that MicroVote installed the update on all Infinity DREs in the state without notifying the Indiana Election Commission, applying for certification only after the installation was complete.[185] Election officials only learned of the problem with the straight-ticket function when MicroVote applied for certification of this update, nearly four months after the company first became aware of the defect.[186]

Fortunately, the straight ticket function is not necessary in primary elections, but Indiana Election Code requires that certified equipment be functional for both primary and general elections.[187] Perhaps more importantly in the minds of Indiana election officials, MicroVote appeared to have concealed information from the Indiana Election Commission for months, and it is unclear what the company would have done had they failed to come up with a solution before the general election.[188] Upon learning of the glitch and of MicroVote's prior knowledge of the problem, Indiana Election Commission chair Tom Wheeler said he was "disturbed by [the company's] lack of candor."[189] One year later, an administrative law judge fined MicroVote over $360,000 for 198 violations of state election law occurring between October 2005 and the 2006 general election.[190]

THE SUBOPTIMAL STRUCTURE OF
THE VOTING SYSTEM MARKET

Discussion of the need for regulatory reform in the voting system market is incomplete without mention of the market's suboptimal structure. Purchasing a particular voting system essentially binds election officials to the vendor who sold them their system for many years to come. Because officials have extremely limited funds, they are unlikely to turn to a new vendor when problems arise: the systems (from precinct voting machines to tally servers) are designed for matched components, which makes it impractical for officials to replace parts with those produced by a different vendor. Instead, they are effectively forced to buy an entirely new system and new machines for every polling place (an exceptionally expensive proposition). In addition to this cost, election officials bear the additional burden of training election workers, poll workers and educating the public on the new systems.

At the same time, as a result of contractual constraints and because voting system vendors generally have monopolies over the production of all replacement parts and exclusive control over the firmware and software in each system, election officials will generally remain extremely dependent upon the voting system vendor to address problems and ensure that their systems are working smoothly. This includes programming their machines, providing them with software patches, diagnosing and fixing malfunctions, and providing replacements when systems fail.

Vendors often constrain election officials in more explicit ways. Many contracts explicitly disclaim liability for damages resulting from problems that cause "data loss."[191] Furthermore, vendors have in the past threatened to sue election officials and others who publicize machine flaws or independently investigate and test machines malfunctioning machines.[192]

Election officials say this encourages them to keep quiet about machine malfunctions. Though understandable, this reluctance to publicize malfunctions contributes to the possibility that election officials and watchdog groups remain in the dark about known problems. Consequently, it is essential to provide election officials with protections against vendor retaliation. One solution is to allow election officials to post information about known problems on a nationwide database "semi-confidentially," meaning that only other election officials and/or the agency charged with maintaining the database could view the official's contact information. Similarly, through statute, Congress or the states could provide monetary penalties and perhaps the creation of a private right of action against vendors that retaliate and/or harass individuals or localities who report problems.[193] Last year's announcement that the largest voting system vendors, Election Systems and Software (ES&S) and Premier (formerly known as Diebold), planned to merge raised concerns. A central worry was that the merger would leave election officials in an even weaker position

relative to voting system vendors. At the time, the *New York Times* estimated that the merger would "mean that nearly 70 percent of the nation's precincts would use machines made by a single company."[194] The newspaper noted that this "would make it harder for jurisdictions to bargain effectively on price and quality" for new purchases.[195] More to the point, it would make jurisdictions more dependent on a single vendor – for everything from repairs to future service – and thus less likely to speak publicly about voting system deficiencies.

After the U.S. Department of Justice and nine state attorneys general filed an antitrust suit over the merger in March of 2010, the Department of Justice announced that it had secured an agreement from ES&S to divest itself of many of Premier's voting system assets (though not necessarily its service contracts).[196] In May, Dominion Voting Systems – another manufacturer with a significant share of the U.S. market – announced that it had acquired the assets of Premier from ES&S in accordance with the Department of Justice's proposed settlement.[197]

The merger highlights two major concerns for election officials in a market that just one vendor could eventually dominate. First, election officials' already weak leverage with vendors would further diminish, for if there is essentially just one vendor, there is no viable alternative vendor available, regardless of how poor the service or function of the machines.

Second, and perhaps more importantly as relates to this report, having the vast majority of the nation's voting systems manufactured and/or serviced by a single company could also mean much greater vulnerability nationwide to software bugs or other problems, particularly if such problems are not immediately publicly reported and corrected throughout the country.[198]

A BETTER WAY TO TRACK AND ADDRESS VOTING SYSTEM PROBLEMS

As this report shows, the current regulatory scheme for voting systems does not adequately ensure that problems with these systems are detected and corrected.[199] The Brennan Center proposes a new regulatory structure to address this inadequacy, one based upon our interviews with election officials and regulatory experts, our review of analogous regulatory structures in other important industries. The new regulations and/or statute must include at least four key provisions:

1. **A Publicly Available, Searchable Centralized Database:** Election officials, in particular, would benefit from a publicly available, searchable online database that includes official (i.e., election official-reported or vendor-reported) and unofficial (i.e., voter-reported) data regarding voting system failures and vulnerabilities, and other reported problems and establishes criteria for the database's contents and organization.

2. **Vendor Reporting Requirements:** Vendors must be required to report to the appropriate government agency via the database and certified mail "early warning" data regarding known and suspected voting system failures and vulnerabilities, and other reported problems, including when vendors receive a complaint from a customer (an election official), when they receive a warranty claim and/or take some action to satisfy a warranty, when they conduct an investigation of a reported problem, and when a customer or other person sues them.

3. **A Federal Agency with Investigatory Powers:** The best way to ensure that vendors address potential problems in a timely manner is to empower the appropriate government agency to investigate all voting system failures and vulnerabilities listed on the database, grant the agency subpoena power to facilitate its investigations, and require vendors to, among other things, maintain records that may help the agency determine whether there are indeed voting system failures or vulnerabilities, and whether the vendor has taken appropriate action to address the failures or vulnerabilities.

4. **Enforcement Mechanisms:** The appropriate government agency must have the power to levy civil penalties on vendors who fail to meet the reporting requirement or to remedy failures or vulnerabilities with their voting systems.[200]

This section discusses in detail how we believe each of these critical provisions should be drafted, analogous legislation and regulations that contain similar provisions, and the key benefits that the new provisions would bring to the regulation of voting systems.

Of course, as with any regulation or law, good definitions will be critical to creating an effective regulatory scheme. We provide suggested definitions for many key terms used in these sections ("voting systems," "vendors" "failures," etc.) in Appendix A.

1. A Publicly Available, Searchable Centralized Database

A robust regulatory system should mandate the creation of a searchable online database. It should be easily accessible through the appropriate government agency's home page. And, it should contain comprehensive information about all reported voting system failures, usability concerns, vulnerabilities,

or potential vulnerabilities by any person, including, among others, machine vendors, election officials, and voters. Vendor reporting of such problems should be mandatory. Reporting from others should be permissive. Additionally, while voters, election officials, and others should be able to simply upload their reports to the database via the Internet (*subject to review by the appropriate agency*), vendors would be required to both upload the reports to the database via the Internet and send the reports to the appropriate government agency via certified mail.

As already discussed (*supra* p. 25), given their ongoing reliance on voting system vendors to repair and service their systems, election officials should have the option of filing reports confidentially, meaning they can request no individuals except other election officials know their identity. This would encourage more honest and timely reporting by those most likely to observe voting system malfunctions.

A SEARCHABLE, CENTRAL DATABASE COULD "SERVE AS A REPOSITORY TO LET ME KNOW WHAT ISSUES EXIST WITH THE MACHINE, RATHER THAN HAVING TO RELY ON WHAT THE VENDORS SPOON-FEED ME." ROKEY SULEMAN, EXECUTIVE DIRECTOR OF THE DISTRICT OF COLUMBIA'S BOARD OF ELECTIONS AND ETHICS

Similarly, it makes sense to provide whistleblowers working for voting machine companies and/or state and local governments with the option of requesting that personal information be kept confidential. To ensure confidentiality, Congress would probably have to provide a FOIA exemption for reports filed by election officials.[201]

A searchable database would have benefits beyond the issuance of "advisories" to customers upon a problem's discovery. In part because of high turnover among election officials, such advisories can get lost from election to election (*see, e.g.,* the Humboldt County, California case study discussed *supra* pp. 12 - 13). Moreover, officials looking to purchase or deploy new systems will not necessarily have easy access to advisories issued by a vendor or the EAC (in the case of EAC certified systems) in the recent or distant past. By making it simple for election officials and the public to search for problems and workarounds associated with voting systems at any time, a well designed database could increase the likelihood that jurisdictions looking to use new machines would learn about potential problems *before* purchase or use.

A. Provision Details

A bill or new regulations addressing this issue should set specific requirements for reports, including: (1) a description of the make and model of the voting machine involved;[202] (2) the jurisdiction(s) in which the machine is being used, if applicable; (3) a description of the nature of the problem or concern with the machine; (4) the date of the discovery of the problem or concern; (5) the name and contact information for the person submitting the report; (6) a verification by the person submitting the report that the information submitted is true and accurate and that the person consents to such information being included in the database; (7) versions of hardware, software, and firmware affected; and (8) any suggested workarounds and fixes, or instructions for how to retrieve this information when it becomes available.

Regulations should stipulate that the database be searchable by: (1) the date of discovery of the problem with the voting machine; (2) the make and model of the voting machine involved; (3) the nature of the problem with the machine; (4) the jurisdiction in which a system is used; and (5) such other categories as the appropriate government agency deems necessary. Additionally, we propose that the legislation or regulatory framework include a provision that prohibits the appropriate government agency from disclosing to anyone other than an election official the contact information of an election official, voter, or vendor employee who submits a report to the database without the express written consent of the person submitting this information.[203]

The database should also be searchable by and distinguish among reports submitted by (1) election officials, acting in their official capacities on behalf of their governmental units; (2) vendors; and (3) all other submitters, including voters, whistleblowers and anyone else. Voters, election officials, and vendors are likely to discover very different issues with voting systems, and their reports are likely to carry different weights with different audiences. This division should particularly help election officials, voting rights groups, and any agency investigating potential problems.

Finally, the agency responsible for creating and maintaining the database should probably be given some ability and responsibility to review reports before they are posted, to ensure that on their face they belong on the database. Allowing anyone to report anything without a filter could allow individuals to overload the database with useless or irrelevant reports, resulting in an essentially useless database.[204]

B. Responsible Agency

The EAC could construct and maintain the database. The EAC is already in the business of establishing "voluntary" guidelines to which new voting systems are tested. Section 202 of HAVA gives the EAC the responsibility of serving as a "national clearinghouse and resource for the compilation and review of information" related to the administration of elections. And, as already discussed (*supra* pp. 8 - 9) the agency collects anomaly reports provided by vendors and election officials for the few systems it has certified. The EAC does not currently list the data it receives from vendors and election officials in the kind of searchable database that other agencies use, and that we believe would be most useful to election officials, but there is no reason it could not do so in the future (in fact, this may be largely addressed with the adoption of a new clearinghouse policy in the near future).

More problematically, the EAC has taken the position that its powers to facilitate the understanding and resolution of problems with non-EAC certified voting equipment is extremely limited, absent explicit Congressional authority that does not currently exist.[205] As the vast majority of machines currently in use in the United States have not been certified by the EAC,[206] this could represent a serious impediment to the creation of a database under the auspices of the EAC, absent a clarification from the EAC or Congress. As the Government Accountability Office has noted, if Congress explicitly expands the EAC's powers in this regard, it should also consider providing the EAC with the additional resources necessary to take on this additional work.[207] The EAC's Voting System Testing and Certification Program currently employs only five staff members.[208]

Alternatively, the Comptroller General and the GAO could assume responsibility for the database. The GAO has a strong reputation of competence and impartiality, and it has a well-established track record for acquiring and publicizing information.[209] It has also already done a considerable amount of work related to HAVA and voting machines,[210] and has in fact noted the void that currently exists in identifying and resolving problems with non-EAC-certified voting systems, in particular.[211]

Finally, the Department of Justice could create and maintain the database. The Department has similar responsibilities in other contexts. For instance, the Anti-Car Theft Improvements Act of 1996[212] gave the DOJ responsibility for creating the National Motor Vehicle Title Information System, a database designed to compile information from a variety of sources on the histories of individual motor vehicles. The Act also provided the Department with enforcement powers in the event someone required to submit information to the database failed to do so.

C. Analogous Regimes

Analogous regulatory regimes for other industries demonstrate the power and usefulness of this kind of regulatory scheme.

The clearinghouse we propose is similar in principle to the database that Congress ordered the Consumer Product Safety Commission (CPSC) to establish as part of the Consumer Product Safety Improvement Act (CPSIA) of 2008.[213] One of CPSIA's key features was Congress's mandate that the CPSC create a publicly available, searchable database that records information from, among others, consumers, government agencies, and healthcare professionals, regarding the harms related to the use of a consumer product regulated by the CPSC.[214] A House Committee Report on the legislation states that the "goal of the CPSC should be to devise a database that can rapidly provide consumers with 'early warning' information about specific products that could pose serious safety hazards."[215]

The National Highway Traffic Safety Administration (NHTSA)[216] and the Food and Drug Administration (FDA) maintain similar "early warning" databases. NHTSA's Early Warning Reporting database collects and makes publicly available property damage reports and death and injury reports provided by manufacturers pursuant to the Transportation Recall Enhancement, Accountability, and Documentation (TREAD) Act of 2000.[217] Meanwhile, NHTSA's Office of Defects Investigations (ODI) database, even before the passage of the TREAD Act, has allowed consumers both to make and search for safety complaints regarding problems with motor vehicles or pieces of motor vehicle equipment.[218] The FDA's Adverse Event Reporting System, moreover, collects and makes publicly available adverse drug reaction information by healthcare professionals and consumers.[219]

These databases, although not quite as robust and user-friendly as the proposed CPSIA database, have played important roles in protecting the public. Indeed, it was independent analysis of NHSTA's complaint database that catalyzed the Bridgestone/Firestone tire recall years ago.[220] And, it was the Bridgestone/Firestone recall that was the impetus behind the passage of TREAD.[221]

In June 2009, researchers mining the NHTSA complaint database discovered the high rate of failure of Chinese valve stems; this ultimately led to the recall of millions of valve stems in vehicle tires.[222] Later in the year, NHTSA launched an investigation of Toyota vehicles after receiving over 400 consumer complaints about acceleration problems with the cars; some of these problems appear to have been responsible for fatal accidents.[223] This investigation led Toyota to announce on November 25 that it would repair the accelerator pedals on some 4.26 million vehicles.[224] After the first recall, reports of problems with Toyota vehicles, which had been steady before acceleration problems began to receive attention in the fall, surged.[225] As more customers came forward with complaints, federal investigators expanded the probe to look at other problems with Toyota vehicles, and the company issued additional recalls for brake and acceleration problems.[226] On April 5, 2010, NHTSA assessed the largest legally permissible fine against Toyota. In his letter to the company notifying them of the fine, NHTSA Chief Counsel O. Kevin Vincent identified the manufacturer's failure to notify authorities in a timely manner after becoming aware of the defects as the primary rationale for levying the harsh penalty.[227]

Results from the FDA's Adverse Event Reporting System have been no less powerful. For example, in 1998 shortly after the System's launch, reports of liver injuries on the system resulted in the FDA's removal of the anti-inflammatory drug Duract from the market.[228] More recently, a handful of reports on the system about a serious condition affecting bone marrow of those taking the antibiotic Zyvox, led to a change to the drug's labeling to inform providers about the risk of this reaction and recommendations for monitoring patients. [229] We chose the CPSIA database as a model because it will be the most comprehensive publicly available "early warning" database ever created, and the CPSC has been developing it based upon lessons from the NHTSA and FDA databases with a desire to improve upon them by, among other things, making them more user-friendly.[230] Indeed, in CPSIA's legislative history, a House Committee urges the CPSC to "examine these and other Agency efforts, if applicable, when designing its own database."[231]

D. Key Benefits

A database that conforms to the specifications we have outlined would allow the appropriate government agency, vendors, and the public to efficiently access, evaluate, investigate, and share information regarding voting system failures or vulnerabilities. This, in turn, would result in earlier detection of system failures and vulnerabilities by vendors and election officials, and ensure more rapid responses to those issues ultimately making it less likely that voting systems will malfunction on Election Day, when it matters most. More specifically, however, the database would achieve the following objectives:

Increase Election Official & Public Awareness of Problems & Solutions

The database would allow election officials to easily access and share information. For example, this would help to ensure that election officials in different states using the same make and model of machine or other voting system element would be

A NATIONAL, SEARCHABLE DATABASE WOULD ALLOW ELECTION OFFICIALS TO EASILY ACCESS AND SHARE INFORMATION.

aware of any problems the other had encountered using that equipment – if one official discovers a vulnerability and posts this information to the database, the other official will be able to check his or her system to ensure that it does not also have that vulnerability. Moreover, if a vendor provides one election official with a procedural solution, such as a workaround to address a problem, the database would provide officials using the same voting equipment in other jurisdictions with that solution.

Further, the database would provide voter protection groups, political parties and other concerned members of the public with more knowledge about potential voting system problems. Before an election, they would, among other things, be able to determine whether there have been any issues with the voting systems in their counties and, if so, to advocate corrective action before the election and be on the lookout for similar problems during voting.

Improve the Ability of Government and Others to Identify Failures or Vulnerabilities & Respond Quickly

The database would allow the appropriate government agency, voter protection groups, and other concerned members of the public to mine the information on the database and spot patterns and trends that may indicate voting system failures or vulnerabilities. This is a key reason for allowing individual voters to report problems they encounter. All of the databases hosted by federal agencies that we reviewed allow such reporting from the general public. After collecting and analyzing this information, the appropriate government agency would be able to more quickly launch an investigation to rectify these potential vulnerabilities or failures.

Provide Timely & Organized Access to Information

The database would include all of the reports uploaded to it in an easily searchable format essentially in real time. It would help to eliminate the thousands of state and county government silos by centralizing all the data in one place. Further, placing the database on the Internet via a single home page would significantly increase the accessibility of the information to all.

Assist Election Officials in Evaluating the Comparative Performance of Voting Systems

By allowing for searches by the make and model of a voting machine or other voting system component among other datasets, the database would provide election officials with a helpful resource to determine which equipment has been the most reliable. This information would be particularly useful for election officials considering the purchase of new voting systems.

Provide Election Officials and Others with the Opportunity to Identify Machine Issues without Fear of Retribution

A provision that prohibits the government from disclosing the contact information of any election official or other person who submits a report to the database to persons other than election officials without the written consent of that person protects the confidentiality of these individuals; this protection reduces the risk that a voting system vendor attempts to harass or seek retribution against them for posting a negative report to the database. For similar reasons, there should be monetary penalties and perhaps the creation of a private right of action against vendors that retaliate and/or harass individuals or localities, including especially whistleblowers, who report problems.

2.   Vendor Reporting Requirements

A. Provision Details

New legislation or regulations should require voting system vendors to provide "early warning" data to the appropriate government agency regarding voting system failures or vulnerabilities. This would go well beyond what manufacturers of the few EAC certified systems must currently report to the EAC (see *supra* pp. 8 - 9) if they wish to maintain that EAC certification. We propose that the government require *all* vendors to provide written notification via certified mail (in addition to uploading the information to the database) when they determine that a voting system failure or vulnerability may exist, including when

- they receive a complaint from a customer (an election official);
- they receive a warranty claim and/or take some action to satisfy a warranty;
- they conduct an investigation of a reported problem; and
- a customer or other individual sues them.

The legislation or regulations should set specific requirements for the notification, including: (1) the location of the failure or vulnerability; (2) a description of the failure or vulnerability; (3) the vendor of the voting machine; (4) the jurisdictions where the machine is used; (5) an evaluation of the risk to election outcomes related to the failure or vulnerability; (6) the vendor's intended remedy for it; (7) versions of hardware, software, and firmware affected; and (8) any suggested workarounds and fixes, or instructions for how to retrieve this information when it becomes available. It is critical that the EAC

or other relevant federal agency has the discretion to require vendors to include other information in the notice, and to require further reporting related to any corrective action plan, to ensure that (when necessary) remedial steps are taken and are adequate.

B. Responsible Agency

Just as the EAC, GAO or DOJ would be appropriate agencies to appoint to create and maintain the database, all three would be appropriate agencies to vest the power to require vendors to provide additional information in the required notice. Whichever agency is assigned responsibility for maintaining the database and setting notice requirements for vendors should also probably be the agency which receives such notices.

C. Analogous Regimes

The same federal agencies that maintain the databases discussed above: NHTSA, the CPSC, and the FDA, also require manufacturers to report "early warning" and other data directly to them. Our proposed reporting requirements for voting machine vendors are similar to these regimes, particularly in respect to the contents of the required notices.

There are two types of requirements for reporting problems to NHTSA: reports regarding "early warning" data and reports regarding defects. Regarding "early warning data," rules promulgated by the Secretary of Transportation[232] under the authority of the TREAD Act[233] require manufacturers to submit information on each make and model of vehicle offered for sale in the United States within the previous two years that details (1) incidents involving death or injury that were alleged or proven to be caused by a possible defect, including foreign incidents occurring in substantially similar or identical vehicles; (2) property damage claims, warranty claims, and consumer complaints; and (3) field reports identifying defects, fires, or rollovers.[234] Requirements for other types of vehicles and equipment such as child restraints and tires are substantially similar.[235] After submitting a one-time report of historical information covered by the regulations,[236] manufacturers must submit the information described above on a quarterly basis.[237]

If a manufacturer identifies a defect[238] and determines "in good faith" that the defect has an impact on motor vehicle safety or that the vehicle or equipment does not comply with applicable safety standards, the manufacturer must notify the Secretary of Transportation and all owners, purchasers, and dealers of the vehicle or equipment in question.[239] This notification must contain: (1) a clear description of the defect or noncompliance; (2) an evaluation of the risk associated with the defect; (3) the measures to be taken to obtain a remedy; (4) a statement that the manufacturer will provide the remedy without charge; (5) the period during which the defect will be remedied without charge; and (6) the procedure for notifying the Secretary of Transportation of the manufacturer's failure to remedy a defect as mandated by law.[240] Depending on the magnitude of the risk presented by the defect and the cost of providing public notice relative to number of additional owners the notice is likely to reach, the Secretary of Transportation may also require manufacturers to provide public notice.[241]

Reporting requirements to the CPSC are similar to those for NHTSA. Manufacturers who discover that a product does not comply with product safety rules or standards or contains a defect that creates the risk of injury or death are required to inform the CPSC of the problem.[242] If the CPSC determines that the noncompliance or defect constitutes a substantial product hazard requiring consumer notification,

the CPSC may compel the manufacturer to stop distribution; notify those involved in the transport, distribution, or sale of the product by mail or other means; provide public notice on the Internet, TV, and radio; and/or mail notice to all known purchasers of the product.[243]

The CPSC has the authority to determine the form and substance of any such notice,[244] but the law provides some guidelines for manufacturers. Unless the CPSC rules otherwise, all notices must contain, among other things, (1) identifying information such as a model number and photograph of the product; (2) a description of the action taken to remedy the defect or noncompliance; (3) a description of the hazard caused by the product; (4) a number and description of injuries and deaths caused by the product; (5) a description of available remedies and how to avail oneself of them; and (6) retail information concerning the product.[245]

> MANDATORY VENDOR REPORTING OF FAILURES TO A SEARCHABLE DATABASE WOULD INCENTIVIZE THOSE VENDORS TO ENHANCE INTERNAL CONTROLS.

Finally, the FDA requires all manufacturers of all drugs marketed under an approved FDA application to report to the FDA all serious, unexpected adverse drug experiences associated with the use of their drug products.[246] The FDA mandates that the manufacturer submit to it, within fifteen days of learning of the adverse drug experience, a form[247] that contains: (1) a description (i.e., sex, age, weight, height) of the patient that took the drug; (2) the outcomes attributed to the adverse event; (3) the date of the event; (4) the date of the report; (5) a description of the event; and (6) various information regarding the product suspected to be the cause of the event.[248]

D. Key Benefits

Many of the benefits of mandatory vendor reporting of machine failures and vulnerabilities are the same as those of the proposed database (e.g., assisting election officials in identifying and resolving problems, aggregating information in a timely and organized manner, and allowing election officials to compare the performance of voting systems); below we detail some additional benefits that are particular to the proposed vendor reporting requirements.

Incentivizes Vendors to Enhance Internal Controls

Vendors will presumably want to minimize the number of reports that they must make to the appropriate government agency. One way that they will be able to do this is by enhancing their own testing and internal standards to avoid any late-stage defects that would trigger a requirement to make a report to the appropriate government agency.

Ensures Maximum Disclosure of Information by Vendors

As we detail above, Congress passed the TREAD Act and established these "early warning" reporting requirements, in part, because investigations in the wake of the Firestone tire recall revealed that "both Firestone and Ford knew that there were problems [with the tires] years before they told [NHTSA] or the American public."[249] The case studies in Part III of this report show that, at the very least, many election officials and other concerned citizens worry that voting system vendors have sometimes taken too long to acknowledge and publicize problems with their systems. This provision would require vendors to take

affirmative steps to increase their transparency and would ensure, among other things, that at the very least, election officials and the appropriate government agency will have access to problems soon after vendors discover them.

3. A Federal Agency with Investigatory Powers

A. Provision Details

If this new regulatory structure is going to be effective, a federal agency must have adequate enforcement authority. The most logical model would allow the appropriate federal agency to initiate an investigation after reviewing any of the information posted to the database and determining that a machine failure or vulnerability potentially exists.

In order to facilitate these investigations, new legislation should provide the appropriate federal agency with the power to issue subpoenas and include a provision that would require vendors of electronic voting machines to maintain records, reports, and other information to enable the agency to determine whether there is compliance with other provisions of the legislation.

B. Responsible Agency

The EAC already has some investigatory powers related to its federal certification program. Specifically, manufacturers who register to have new voting systems federally certified by the EAC must, pursuant to the EAC's VSTCPM (discussed previously at page 8),[250] agree to "[c]ooperate with any EAC inquiries and investigations into a certified system's compliance with VVSG standards and the procedural requirements of this Manual . . . ."[251] While the VSTCPM does not currently require vendors to report all of the types of problems we have detailed (*see supra* pp. 8 - 9) to a centralized database (none currently exists, of course), we could imagine an amendment to the VSTCPM which would require such reporting as part of the Voting System Testing and Certification Program, and require manufacturers to cooperate with any investigations into their compliance with such mandates. Of course, as previously noted in this report, the EAC is currently limited to investigating manufacturers registered under the Voting System Testing and Certification Program, and who stay registered under that program.[252] For this reason, Congress might need to explicitly empower the EAC to employ these investigatory powers as applied to problems arising with non-EAC certified systems. It would also probably need to provide the EAC with extra funding, as the EAC has previously stated that even if given this power, it does not have the resources to track and resolve problems related to non-EAC certified systems.[253]

Alternatively, the GAO regularly conducts investigations in support of its mission.[254] As discussed in greater detail below, the GAO is almost certainly constitutionally barred from taking enforcement action against vendors or others, but as a legislative agency, it should have the power to investigate and gather information.[255] Consequently, if the GAO is given responsibility for creating and maintaining the database, it might well make sense to also give it explicit investigatory powers necessary to ensure that the database is accurate.

Finally, it may make sense to vest investigatory powers with the Department of Justice, an agency with a substantial infrastructure to conduct investigations and bring enforcement actions, where necessary.[256] The Voting Rights Section of the Civil Rights Division at the Department of Justice has a long history of taking enforcement actions under a variety of federal laws relating to voting, including voting machines, and also has experience administering complex statutory schemes.[257] The

Civil Division of the Department of Justice has experience enforcing an even wider variety of federal laws and regulations; the Federal Programs Branch of the Civil Division assists federal agencies like the Department of Energy, Housing and Urban Development, the Department of Health and Human Services, and others to carry out their regulatory obligations by initiating litigation against those who violate statutes or regulations.[258] In fact, giving the Department of Justice investigatory and enforcement powers would be consistent with the structure that already exists in HAVA. While HAVA assigns the EAC a clearinghouse and advisory role, it also gives the DOJ enforcement authority to bring an action for declaratory and injunctive relief for failure to comply with HAVA's minimum requirements for voting systems, provisional voting and voter registration.[259]

C. Analogous Regimes

Both NHTSA and the CPSC have broad investigatory powers.[260] The CPSC has the authority to enter and inspect any factory, establishment, or conveyance used to facilitate placing goods into the stream of commerce.[261] NHTSA has similar authority.[262] The simple ability to investigate information uploaded to their databases, of course, falls within the ambit of these agencies' powers. For example, it is the responsibility of the Office of Defects Investigations within NHTSA to "elicit from every available source and evaluate on a continuing basis any information suggesting the existence of a safety-related defect."[263] NHTSA's databases allow the ODI to both elicit and evaluate this information, and as we have discussed above,[264] investigations initiated after reviewing information in the databases have been fruitful.

Both NHTSA and the CPSC have subpoena power[265] and a recordkeeping requirement for the entities that they regulate.[266] We propose that the new provision closely track this language, particularly that of the Consumer Product Safety Act of 1972.[267]

D. Key Benefits

Ensures Reliability of Information on the Database

The information posted to the proposed database must be accurate so that false information does not mislead election officials, the public, the government, EAC, or unfairly sully vendors' reputations. The government will need the tools necessary to ensure that only accurate information is posted to and remains on the site.

Grants the Government Power to Effectively Respond to Information it Receives

A recordkeeping requirement would allow the appropriate government agency to address reported failures or vulnerabilities of the machines quickly, without having to wait for vendors to gather this information. Moreover, granting subpoena power to the appropriate government agency ensures, among other things, that the agency will be able to gather the information it needs to adequately judge the seriousness of reported problems and ensure that proper steps have been taken to prevent malfunctions or other failures from happening in the future.

4.   Enforcement Mechanisms

A. Provision Details

New legislation or regulations should give the appropriate agency adequate enforcement powers by authorizing it to seek civil penalties against voting system vendors for failure to comply with their duty to report any voting system failure or vulnerability or to remedy the issue after learning about it. It should also cap the penalty amount for a series of related violations at a specific dollar amount; similarly, there should be a specific dollar cap on the penalty amount for problems for any individual model and version of a product.

B. Responsible Agency

As already discussed, the Department of Justice and the Voting Rights Section of its Civil Right Division have a long history of taking enforcement actions under a variety of federal laws related to voting. In fact, according the Department's website, it has filed a dozen actions to enforce various HAVA requirements, including requirements related to voting machines.[268] Accordingly, the most logical place to house enforcement powers related to the database is with the Department.

HAVA already divides authority between the EAC and DOJ, giving the EAC responsibility for providing information and advising local jurisdictions, and giving the Department of Justice enforcement powers.

The EAC's ability to take enforcement actions against manufacturers is likely to be more limited. As already discussed, the EAC currently has the power to decertify systems[269] it previously certified (which is only a small percentage of systems currently used in the United States)[270] or suspend the registration of a manufacturer[271] seeking federal certification for new systems for various infractions. This does not include failure to report to a central database, but we can imagine an amendment to the VSTCMP that allows the EAC to take such actions for failure to comply with database reporting requirements. However, using decertification and/or suspension of registration would be rather blunt instruments for what could, in many cases be relatively minor infractions. As the VSTCPM itself notes, "[d]ecertification is a serious matter. Its use will significantly affect Manufacturers, State and local governments, the public, and the administration of elections."[272] It is doubtful that the EAC would want to take such a drastic step for all but the most serious infractions. At the same time, the EAC does not have the power to decertify systems it has not certified, which represents the vast majority of the systems in use today.[273]

> ENSURING THAT THE APPROPRIATE FEDERAL AGENCY CAN ENFORCE NEW VENDOR REPORTING REQUIREMENTS WOULD HELP RESTORE PUBLIC CONFIDENCE IN VOTING SYSTEMS.

While it may be technically possible for the EAC to take additional enforcement action – such as seeking imposition of monetary penalties – if Congress amended HAVA to vest it with that power – it is not clear that the agency currently has the infrastructure or institutional knowledge to carry out such tasks. the GAO is almost certainly constitutionally barred from taking any enforcement action, as it is considered a creature of Congress, which prevents it from taking actions that amount to executing the law.[274]

C. Analogous Regimes

Civil penalty provisions are not uncommon in analogous regulatory regimes. Recently the trend has been for Congress to increase such penalties. For example, in 2002, the TREAD Act increased the penalties originally established in the Vehicle Safety Act of 1966[275] that NHTSA could seek to have imposed on vehicle manufactures from $1,000 per violation to $5,000 per violation and from a penalty cap of $800,000 to a cap of $15,000,000.[276] Similarly, in 2008, CPSIA dramatically increased the civil penalties already provided for in the Consumer Product Safety Act of 1972 (e.g., from $5,000 per violation to $100,000 per violation) for knowing sale of products that do not conform to an applicable rule or standard or failure to make necessary records available to the CPSC.[277] The penalty language legislation should resemble the language of both the Vehicle Safety Act and the Consumer Product Safety Act.

D. Key Benefits

Increases Vendor Accountability

As Part III (*Failures of the Current System: Case Studies*) of this report illustrates, in the past, vendors have not been held accountable for voting machine failures or their inability or refusal to correct them. Legislation with enforcement mechanisms would provide the EAC or another federal agency with the necessary enforcement tools to hold vendors accountable for their acts or omissions after an investigation and hearing shows that this is justified.

Incentivizes Vendors to Quickly Comply with Mandates

Civil penalty provisions would act as a deterrent to wrongdoing by vendors; penalties would be high enough so as to not simply be regarded by vendors as a cost of doing business.

Helps to Restore Public Confidence in Voting Systems

HAVA was meant to help restore public confidence in the integrity of the electoral process. During the signing ceremony for HAVA, President Bush stated that "[t]he legislation I sign today will add to the nation's confidence."[278] He further added, "[t]hrough these reforms, the federal government will help state and local officials to conduct elections that have the confidence of all Americans."[279]

Giving an independent government agency the power to investigate problems and take action to remedy problems should greatly increase public trust in our voting systems and elections.

WHAT LOCAL GOVERNMENTS CAN DO NOW

While a national, centralized and searchable database along the lines we have suggested in this report is ultimately the best way to ensure that problems with machines are publicized and corrected throughout the country, there are important interim steps that county and state governments, in particular, can begin taking immediately to increase the chances that election officials learn of problems with their voting systems and can avoid some of the kinds of problems detailed in this report

Negotiate Better Contracts

As previously detailed in this report, provisions in many voting machine contracts make it much more difficult for election officials and the public to get detailed information about system problems reported in other parts of the country, or to hold vendors responsible for problems when something goes wrong. To increase voting system reliability and maximize vendors' motivation to minimize the risk of such problems, counties and states should begin demanding certain key contract terms, including:

- mandating reports from vendors "on a per occurrence basis of any hardware or software system error occurrences resulting from design or manufacturing defects in any jurisdiction" in which the voting system is being used;[280]

- mandating reports from vendors of any complaints (including usability concerns), warranty claims and lawsuits about their systems, together with the result of any vendor investigation, explanations, and actions taken to address these complaints;

- extending warranty periods for the purchasers;

- mandating financial liability to vendors in the event of a malfunction;

- ensuring that voting systems are tested against the most modern federal guidelines instead of older versions that computer scientists have faulted as inadequate; and

- allowing local election officials to independently test the accuracy of the machines as long as they do not disclose proprietary information or trade secrets.[281]

The New Jersey Department of the Public Advocate discusses how jurisdictions might construct many of these provisions in a document entitled "The Purchase of Voting Systems in New Jersey: How Government Can Better Protect Taxpayer Rights and Voting Security."[282] Washington, D.C. has also passed a law setting more stringent requirements for voting system contracts.[283] We strongly urge election officials entering into contracts with voting system vendors to review the contents of these documents.

Of course, adding these kinds of provisions to contracts will probably only be of benefit to jurisdictions as they negotiate *new* contracts. Jurisdictions not purchasing new voting systems in the near future (i.e., the vast majority of counties and states throughout the country) are unlikely to secure agreement from vendors to substantially amend their contracts along these lines.

Furthermore, even if all jurisdictions were able to get these kinds of provisions into their contracts, it would still be important to mandate many of these provisions in regulation. For instance, if a vendor violates the notification terms of its contract with a small county in Arkansas by failing to inform it of a voting system malfunction in New Jersey, the Arkansas County is unlikely to find out about the violation under current circumstances. More to the point, even if it does learn of such a failure, the county is unlikely to bring an action under the contract (for all of the reasons discussed on pages 25 - 26 of this report) unless the malfunction brings disastrous results in its own election sometime later. The point of the database and stronger regulation is to minimize the likelihood of such occurrences by bringing problems to light *before* they can cause such significant harm.

Implement Stronger State Regulation

The legislature in at least one state, California, has passed legislation requiring vendors selling systems within its borders to notify the Secretary of State and all local election officials using its systems of any "defect, fault or failure" it discovered, within 30 days of discovery.[284] As of the writing of this report, the legislation awaits a decision by the governor, who vetoed an earlier version of the bill in 2009.[285] This bill would empower the Secretary of State to seek monetary penalties against vendors for failing to comply with reporting requirements, and requires the Secretary to notify the EAC of the problem.

While the California proposal would not have solved all of the problems identified in this report, it would have gone a long way toward forcing vendors to begin to publicly report problems with their systems when alerted to them. It could also have provided many of the benefits (albeit on a smaller scale) that a national centralized database would provide: in particular, increasing vendor accountability and incentivizing vendors to enhance internal controls; benefiting state certification programs by supplying tips for targeted testing and review of the effectiveness of mitigations proposed by vendors; allowing election officials (in California, anyway) to get up-to-date information about their systems before deploying them in elections.

The California model presents the best legislative attempt we have seen, to date, to address the problems we have discussed in this report. We hope the governor will sign this bill into law and that other states will follow suit.

Still, the limitations of this proposal as compared to a *national* clearinghouse are obvious. Among other things, the California bill only requires reporting for systems used in

California; the bill does not mandate a searchable database that new election officials could review before each election; and because the bill could not provide a method for election officials and whistleblowers to anonymously report problems that might not technically fall within the definition of "defect, fault or failure" (such as the problems in Pulaski County, Arkansas, described on page 14 of this report), it would not necessarily result in the sharing of information about some kinds of problems that still result in the loss of hundreds and thousands of votes.

Create a Voluntary Database

While the EAC has previously indicated that it does not believe it has the authority or resources to facilitate the understanding and resolution of problems with non-EAC certified voting equipment, we can think of no legal reason why – even absent additional authorization from Congress – it could not create a searchable database to which election officials, voters, and vendors could report. In the alternative, if the EAC determines it does not have the resources to create such a database, election officials, through organizations such as the National Association of Secretary of States, the National Association of State Election Directors, , the National Association of County Recorders, Election Officials and Clerks, or the International Association of Clerks, Recorders, Election Officials and Treasurers could sponsor such a database. There would be no way to force vendors to report to this database, or to provide election officials with whistleblower protections for making voluntary reports – two important suggestions for the mandatory clearinghouse detailed in this report – but it could still lead to a much better resource for election officials than currently exists. Election officials using the same equipment could also create user groups where they could share information about their systems electronically.

Officials we interviewed wanted to see a database that vendors would be required to report to, but many said they viewed a voluntary database as a good first step. For instance, Cuyahoga County, Ohio Board of Elections Director Jane Platten stated that "an exchange of all information about anomalies, malfunctions and failures of voting systems is not only much needed, but should be a requirement." However, she added that "taking the small step of creating a voluntary exchange of information would in my opinion have a huge impact on election administration and operations."

Pressure Vendors to Voluntarily Post Information on Their Own Sites This Year

One drawback of the three previous recommendations – in addition to the larger recommendation of the creation of a central, mandatory, and federal database – is that each will take time to implement, and probably cannot be accomplished in time for this fall's election. By contrast, vendors could significantly reduce the risk of a repetition of past problems with their systems by creating their own databases, and offering election officials who use their machines access to them. As already noted in this report, because there is such high turnover among election officials, a new county director might not be aware of product advisories or software patches sent by a voting system vendor to her predecessor three years earlier. Nor is she likely

to be aware of problems reported by election officials in other counties. Those problems could have been caused by poll worker error, a misuse or misprograming of the system, or a host of other reasons that are not related to a software or hardware malfunction – but that could still easily be repeated in other counties in future elections.

Ideally, vendors would create for election officials a central, easily accessible and searchable site where they could review all previously issued product advisories, software patches and workarounds, and a list of all election official complaints, warranty claims and lawsuits about their systems (together with the result of any vendor investigation, explanations, and actions taken to address these complaints). This would provide election officials with an opportunity to be more fully appraised of potential problems and safeguards that could be taken ahead of each election.

County and state officials can and should demand this voluntary action from vendors now, in time to make a difference for November's election and reduce the likelihood that we will see a repetition of previous system failures.

Ultimately, of course, a mandatory reporting system with clear guidelines will be preferable. As Butler County, Ohio Board of Elections Director Betty McGary put it, "[C]learly when a vendor is continuing to sell their product in a State, they are not going to be excited about *voluntarily* reporting deficiencies in their systems . . . requiring the reporting be mandatory will be the only way" to get comprehensive cooperation.

V.   CONCLUSION

Voting is the most important of all our federal rights. It is the right that protects all other rights. Despite this, we have all too often been strangely cavalier about protecting it. The very different way we regulate voting systems and other commercial products clearly dramatizes this fact.

Given the billions of dollars spent by federal and local government to purchase and maintain new voting systems over the last decade,[286] the failure to take stronger measures to ensure that we are tracking and correcting system failures is particularly troubling.

We propose a regulatory scheme that would greatly improve our election systems. It would:

- help level the playing field between election officials and vendors as they negotiate over service and hardware contracts;
- increase vendor accountability and incentivize vendors to enhance internal controls;
- provide public advocacy and voting rights groups with data on potential problems with voting systems;
- provide the government and concerned citizens with the ability to locate patterns of problems;
- benefit state certification programs by supplying tips for targeted testing and review of the effectiveness of mitigations proposed by vendors;[287] and perhaps most importantly,
- allow election officials to get the most up-to-date information about their systems before deploying them in elections.

In light of the importance of safeguarding our democracy through accurate and fair elections, these are especially worthwhile goals. We encourage policymakers to work with regulatory experts in other fields, consult database experts, and talk to election officials and voting system vendors to ensure the creation and quick use of the best and most effective database possible.

APPENDIX A : IMPORTANT DEFINITIONS

As with any new statute or regulation, defining key terms will be critical to the effective implementation of the proposals in this report. Among other things, a new statute or regulation must clearly define (1) what kind of equipment is covered; (2) what types of problems *must* be reported; and (3) *who* must report such problems.

What equipment should be covered by this new regulatory scheme?

Voting Systems: the new statute should cover "voting systems" as defined in Section 301(b) of the Help America Vote Act,[288] and in addition should include electronic poll books.

Electronic Poll Books: electronic poll books are used with increasing frequency around the country.[289] As with voting machines, electronic poll books rely on software and firmware that can be subject to bugs, misprogramming and other glitches. And as with voting machines, electronic poll book malfunctions have caused long lines, and the likely disenfranchisement of many voters.[290] For this reason, we believe electronic poll books should be covered under a new regulatory scheme. Such poll books might be defined as "an electronic mechanism (including stand-alone software) by which an election official at a polling place, at the time an individual seeks to vote, may obtain information on the individual's eligibility to vote (including whether the individual is registered to vote in an election for Federal office, the polling place to which the individual is assigned, and whether the individual has already voted in the election), whether the mechanism is operated by integration with a voting system or independently."

What types of problems must be reported?

To reduce the kinds of problems that cause lost votes, voting system vendors should be required to report both voting system failures *and vulnerabilities* they have knowledge of. In the course of testing, servicing and repairing machines, vendors may become aware of vulnerabilities that have yet to cause a system failure, but that could be reasonably expected to cause a failure in the future. Vendors should also be required to make reports to the database when they receive a complaint from a customer (i.e., election official), whether or not they agree that their machine was the cause of the alleged problem; when they receive a warranty claim and/or take some action to satisfy a warranty; when they are notified by a customer of a usability issue that could lead voters or poll workers to operated the system in a way that would lead to disenfranchisement or the recording of an unintended vote; when they conduct an investigation of a reported problem; and when a customer or other person sues them.

System Failures[291]: The term "system failure" should mean any event that results in

> (a) loss of one or more voting system functions;
> (b) degradation of performance such that the device is unable to perform its intended function for longer than 10 seconds;
> (c) automatic reset, restart or reboot of the voting device, operating system or application software;
> (d) a requirement for an unanticipated intervention by a person in the role of poll worker or technician before the test or operation of the device can continue;
> (e) error messages and/or audit log entries indicating that a failure has occurred; or
> (f) failure to tabulate, tally, or report results accurately.

System Vulnerabilities: should include any flaw in a voting system which might reasonably lead to a System Failure.

Who must report problems?

Anyone, including election officials, should be permitted to report voting system problems. For the reasons detailed in this report, if the new regulatory scheme is going to have maximum effectiveness, voting system vendors must be *required* to report both failures and vulnerabilities brought to their attention.

Voting System Vendor should include any sole proprietor, partnership, LLC, corporation, commercial entity or non-commercial entity that has contributed to the initial development, building, distribution or other parts of the supply chain, or maintenance of all or part of the voting system.

Who is entitled to ask that their personal information be kept confidential?

At the very least, election officials and whistleblowers who work for vendors or state and local governments, should be entitled to request that their name and identifying information be kept confidential.

A provision establishing this confidentiality option might look like this:

(a) If information is submitted for inclusion in [the database] by or on behalf of an election official who affirmatively requests that his name and identifying information be kept confidential, [the agency] shall not release to the public the submitters' name and identifying information, notwithstanding the provisions of Title 5 United States Code Section 552 or other provision of law, unless the [head of agency] determines that such public disclosure is necessary to advance the purposes of this chapter.

(b) In the case of information submitted for inclusion in [the database] by or on behalf of any person other than an election official or a voting machine vendor, [the agency] shall not release to the public the submitters' name and identifying information, notwithstanding the provisions of Title 5 United States Code Section 552 or other provision of law, unless the submitter affirmatively authorizes such release or the [head of agency] determines that such public disclosure is necessary to advance the purposes of this chapter.

(c) Except as provided in subsections (a) and (b) of this section, [the agency] shall make all information submitted for inclusion in [the database] available to the public.

APPENDIX B : REPORTS OF VOTING SYSTEM ISSUES

Below is a list of close to 200 reports of inaccurate vote tallies and other problems using voting systems over the last few years. These reports come from news stories collected by Common Cause, Voters Unite, ACCURATE and the Brennan Center. News items about voting system troubles often do not include many details; this makes it hard to identify from these reports the precise cause of a particular malfunction. Whatever the causes of a particular problem, it is fair to assume that their occurrence in one jurisdiction will often eventually be repeated in another unless election officials throughout the country are made aware of both the causes of the problem and how to avoid them. A central and national database, to which vendors were required to report, would be one way to ensure that election officials had access to information they might need, so that they could ask voting system vendors the right questions and take steps necessary to avoid repeating the kinds of problems listed below.

Date	Machine Type	State	Location/Description
February 2008	ES&S Optech III-P Eagle	Alabama	**Lauderdale County, AL** The *Times Daily* reported that there was an error in vote tabulations for the 2008 presidential primary race at the Underwood-Petersville precincts. The voting machines in these precincts showed that seven more ballots were cast than were supported by documentation.[292]
November 2006	ES&S Optech III-P Eagle	Alabama	**Baldwin County, AL** According to the Associated Press, an optical scanner used in the general election labeled an unopposed Republican County Commissioner as a Democrat. The error only occurred when voters attempted to cast straight-ticket Republican ballots. Although the election outcome was not affected, the error remained undetected until Election Day had passed and observers noted that the candidate received an uncommonly low number of votes.[293]
November 2002	ES&S Optech III-P Eagle	Alabama	**Baldwin County, AL** The *Birmingham News* and the *New York Times* reported that an error in the way officials downloaded vote data from a computer cartridge led to an incorrect initial tally of votes in the gubernatorial election. The initial tally of the votes showed that the Democratic incumbent had received 19,070 votes in Baldwin County. A reexamination of the vote tallies showed that the incumbent received only 12,736 votes, which gave the victory to his Republican challenger. The incumbent initially called

			for a recount of all counties and questioned the legitimacy of the election until he finally conceded two weeks later.[294]
February 2008	ES&S Model 100	Arizona	**Cochise County, AZ** The *Douglas Dispatch* reported that, in Cochise County, during the 2008 primary presidential race, "a computer glitch that kept counting five polling places over and over again—for five times—caused [a] reporting error" of the election's results. County Election officials reportedly discovered and fixed the "computer error" well after midnight on election day and only after they had sent their final report to the Arizona Secretary of State's Office. Consequently, the error resulted in Mitt Romney erroneously being declared winner of Cochise County over John McCain in news reports on the day after the election. Cochise County Election Officer, Tom Schelling stated that "'[i]t was a cumulative (computer) error that just kept adding the results for five polling places every time new figures were added.'" Moreover, "the error got worse when the cumulative error went through five updates. It was then realized that the total number of ballots cast according to the wrong report was more than the people registered in the county, Schelling said." This realization "led to a scramble to correct the problem and change the official count to 100 percent of the 18 polling places having reported to the state, [Schelling] said. By then, the newspaper was being run."[295]
September 2004	ES&S Optech IV-C	Arizona	**Maricopa County, AZ** According to the *Arizona Republic*, the original totals in the Republican primary for State House in District 20 showed that one candidate led his closest competitor by only four votes. The small margin led election officials to conduct a recount.[296] The *Republic* reported that the optical scan recount found nearly 500 additional votes for the five candidates in the race, and the initial second place candidate won the election by 13 votes.[297]
November 2008	ES&S Model 650	Arkansas	**Carroll County, AR** According to the *Carroll County News*, in the 2008 general election, the inked black block on the upper left hand corner of some of the ballots did not contain enough ink to be processed by the counting machine. After receiving advice from ES&S, the

			machine's vendor, workers manually inked the black block on the ballots. Moreover, they had to have the ballots initialed by at least three separate individuals before feeding them back into the counting machine, a time-consuming process.[298]
October 2008	ES&S iVotronic	Arkansas	**Jefferson County, AR** The residents of the towns of Redfield and Altheimer who cast early ballots for the aldermen elections in the towns were supposed to be able to vote for alderman candidates from any ward. According to the *PineBluff Commercial*, however, the electronic ballots presented to voters in these towns only allowed them to vote for candidates of the ward in which the voters were registered. The County Election Commission discovered and fixed the error by, among other things, using paper ballots for the aldermen races. Voters who had already cast early ballots, however, could not re-vote without a court order.[299]
May 2008	ES&S Model 650	Arkansas	**Faulkner County, AR** The *Log Cabin Democrat* reported that the initial result of the House District 45 election in Faulkner County was incorrect. The mistake was reportedly the result of three cartridges not being included in the vote tally (i.e., human error) and an error in a voting machine that caused votes from another race to be included in the House District 45 race. Local officials were unsure whether human error or a machine malfunction caused the mistake with the machine.[300]
February 2008	ES&S iVotronic	Arkansas	**Benton County, AR** The *Benton County Daily Record* reported that a number of the Benton County polling sites had problems with their electronic voting machines, including failure of the machines to boot up. Many sites used paper ballots until the machines were fixed. Results of the election were not compromised.[301]
February 2008	ES&S iVotronic	Arkansas	**Faulkner County, AR** The *Log Cabin Democrat* reported that when a voter reviewed the voting machine printout after casting her ballot, she discovered only a short horizontal line and a long vertical line. Due to the problem with the printer, the vote went unverified. It did, however, still count.[302]

November 2006	ES&S iVotronic	Arkansas	**Cleburne County, AR** According to the Heber Springs, Arkansas *Sun Times*, some voters who took part in early voting reported that the mayoral candidate they selected was switched when they saw their vote on the review screen. The county clerk confirmed the problem. The vote-switching was blamed on a calibration error and was not caught until 252 votes had been cast on the questionable voting equipment.[303]
November 2006	ES&S iVotronic	Arkansas	**Washington County, AR** The voter-verifiable paper record printed the incorrect voting district numbers for each state representative candidate. As reported by the *Northwest Arkansas Times*, a candidate in the race caught the error as he tried to cast his own ballot. ES&S re-programmed the machines and the county election coordinator insisted that the error "never affected the tallying of votes," just the district listed on the audit trail.[304]
May 2006	ES&S iVotronic	Arkansas	**Pulaski County, AR** The *Arkansas Democrat-Gazette* reported that after several voters complained of problems with the machine used in early voting, officials determined that an optical illusion experienced by voters over six feet tall caused many to select the candidate above the one for whom they intended to vote.[305] According to local television station THV, election officials who contacted the manufacturer to ensure that there wasn't a problem with the machine were told that the company was aware of an issue with optical illusions causing voters to select the unintended candidate.[306] For more on this incident, see case study 4 on page 14 of this report.
November 2004	ES&S M115	Arkansas	**Carroll County, AR** According to the *Carroll County Star Tribune*, an incorrectly programmed chip from an optical scan system skewed results from the race for Justice of the Peace in District 2. Election officials fortunately discovered the glitch when they met to certify the elections. As a result, the ballots were recounted.[307]
May 2004	ES&S M150	Arkansas	**Craighead County, AR**

			The *Jonesboro Sun* reported that the initial results of a constable race in District 13 showed that one candidate received all 158 votes cast in one precinct. When the opponent questioned the results of the elections, the machine was inspected and an error was found in a computer chip's code. A recount showed that both candidates received votes, though the outcome of the election was unchanged.[308]
May 2004	ES&S M150	Arkansas	**Fulton County, AR** According to the *South Missourian*, a malfunction in a ballot scanner caused county election officials to recount ballots for the primary election by hand. County officials blamed the machine manufacturer for incorrectly programming the machine. The company blamed the county officials for not sending all of the sample ballots needed for the company to program the machines accurately.[309]
December 2008	Premier Accu-Vote ES 2000	California	**Humboldt County, CA** According to the *Times Standard*, "a glitch in the [Humboldt] county election's software . . . resulted in almost 200 ballots not being included in initial vote totals and the county certifying inaccurate election results." Carolyn Crnich, the Humboldt County Registrar of Voters, told the paper that she realized there was a problem when "she discovered a deck of 197 vote-by-mail ballots for the precinct that had been run through the ballot counting optical scanner, but did not seem to appear in the final vote tallies."[310] *Wired* and *Computerworld* magazines reported that the voting system manufacturer, Premier, was aware of the software flaw that caused the problem for years, but failed to notify federal or state authorities, opting instead to send an e-mail to county officials. Crnich states that the information in this e-mail was not passed onto her.[311] *For more on this incident, see case study 2 on pages 12 - 13 of this report.*
November 2008	Sequoia AVC Edge II	California	**Santa Clara County, CA** In Santa Clara County, the *San Jose Mercury News* reports, "fifty-seven electronic voting machines for the disabled malfunctioned Tuesday and could not

			be replaced for hours, despite requirements that they be available in each precinct." Indeed, "backup machines took three hours to prepare, with some arriving as late as 2 p.m." It was unclear what caused the malfunction of the machines.[312]
June 2008	Sequoia Optech 400C	California	**San Bernardino County, CA** According to the *Press Enterprise*, a "computer glitch in the San Bernardino County registrar of voters' ballot-counting system sent some losing candidates in Tuesday night's election to bed thinking more precincts were left to be heard from when, in fact, all the votes were in and counted." San Bernardino County voter Registrar Kari Verjil told the paper, "the glitch is embedded in computer vote-counting software provided by Sequoia Voting Systems, the Denver-based contractor that serves many counties in California." A staffer in the registrar's office told the paper that San Bernardino County officials discovered the glitch last year and told the manufacturer. A Sequoia spokeswoman acknowledged that San Bernadino reported problems and stressed that the issue "has absolutely nothing to do with vote totals or tabulations."[313]
March 2008	ES&S Model 650	California	**Sacramento County, CA** The *Sacramento Bee* reports that "improper maintenance of some of Sacramento County's voting machines—and the tint of the Feb. 5 ballots—were to blame for malfunctions that sidelined vote-counting scanners and delayed results of last month's presidential primary, according to the county's top election official." The county, during its investigation, "said that the vendor that supplies and maintains the scanners, Elections Systems & Software, conducted improper recalibration and preventive maintenance on the machines in December." Moreover, according to the *Bee*, "the [county] report said that ballots printed by Consolidated Printers were too dark to allow the ballot to be correctly read by the faulty scanners."[314]
February 2008	Sequoia Optech 400C	California	**Santa Clara County, CA** The *San Francisco Chronicle* reported that, at one polling station, "more than a dozen people trying to

			vote in the Democratic primary at that polling station were almost turned away without casting ballots after paper ballots ran out and the only electronic voting machine at the polling place malfunctioned." An "independent election observer and . . . a software engineer waiting to vote -- who fixed the touch-screen machine -- saved the day for the 13 people waiting to cast their ballots." The *Chronicle* contained no additional information regarding the "malfunction" or what caused it.[315]
February 2008	Sequoia Optech 400C	California	**Riverside County, CA** "The $500,000 ballot counting system bought by the Riverside County Registrar three months ago malfunctioned on election night," the *Desert Sun* reported, "delaying results from [the] presidential primary." Specifically, "three of the six counters had problems, including one that did not work for four hours." According to the paper, the ballot scanners "ran at a tenth of the advertised speed." Although a Sequoia spokeswoman stated that "'[t]he slowness of the machines is due to the printing problems Riverside experienced with the vendor,'" the County Registrar of Voters did not comment on what caused the delays.[316]
November 2004	ES&S Optech IV-C	California	**San Francisco County, CA** According to *Information Week*, the conversion function that translates ballot images into computer-readable data shut down after the amount of data exceeded the limit set by the vendor, apparently as a result of the city's switch to a ranked-choice voting system.[317]
August 2004	Sequoia Edge	California	**Sacramento, CA** *Wired* magazine and the *Tri-Valley Herald* reported that when Sequoia demonstrated its voting machines to the state officials, its touch-screen machine outfitted with a paper trail failed to report votes on Spanish language ballots. "The paper trail itself seemed to work fine but what it revealed was when [the Sequoia representative] demonstrated voting in Spanish, the machine itself did not record his vote," Darren Chesin, staff director for the Senate Elections and Reapportionment Committee, told the *Herald*. "Programming errors can occur and the paper trail was the way we caught it."[318]

March 2004	Diebold AccuVote-OS	California	**San Diego, CA** Weeks after Election Day, local officials discovered an error in eight Diebold scanners that had been used on 208,446 absentee ballots. According to the *North County Times*, votes were miscounted in both the Democratic presidential primary race and the primary race for the Republican U.S. Senate seat.[319] A recount was conducted, revealing that "2,821 absentee ballots cast for Democratic presidential hopeful John Kerry were actually counted for Dick Gephardt." Similarly, in the Senate race, 68 votes for one candidate and six votes for another were credited to a third candidate. The *Union Tribune* reported that multiple scanners caused the error, feeding data into the tabulation system at once.[320]
March 2004	Diebold PCM500	California	**Alameda and San Diego Counties, CA** According to the San Diego *Union Tribune*, more than 700 precinct control modules that activate the cards used to call up ballots on touchscreen machines displayed the wrong start-up screen on primary day, causing delays of up to three hours at the polls.[321] At a hearing called by the Secretary of State's office to investigate the problems during the primary, a Diebold technician called the problem – which occurred when the batteries in the equipment discharged beyond a certain point – "fully known."[322] *For more on this incident, see case study 8 on pages 16 – 17 of this report.*
October 2008	Premier AccuVote-TSX	Colorado	**Adams County, CO** The *Colorado Independent* reported that "[a]n electronic voting machine in Adams County repeatedly failed to accept [one voter's] vote for a Democratic state Senate candidate—instead registering the vote for her Republican opponent—at an early voting site . . . and [that the machine] has been removed from service." "The voter reported the problem to election judges, who canceled her ballot and allowed her to vote—this time accurately—on another machine, ..." After quarantining the machine, Adams County Clerk and Recorder Karen Long "said that election officials hadn't received any other complaints about the particular machine and that no other voting errors have been reported."[323]

February 2008	Hart InterCivic Kodak i840	Colorado	**Douglas County, CO** According to the *Denver Post*, "ballot scanning machines from Hart InterCivic continue to suffer from the same problems that led them to be decertified last year." The *Post* states that the "optical scanners too often read stray marks as votes, even if they are just the tiny dots from somebody resting a pen on the ballot before marking a box, according to the reports [by the Colorado voting machine testing board].[324]
November 2006	Sequoia Insight 400 C	Colorado	**Denver, CO** The *Rocky Mountain News* reported that vote counting in an election for several local offices took nearly a week because 70,000 absentee ballots had been mailed out with barcode misprints. The Sequoia scanners could not sort ballots correctly by district, so election officials had to do so by hand. Additionally, election officials reported that many voters had used incorrect ink pens or marked their ballots in a manner that made it unlikely that the scanners could record their votes. As a result, at least 5% of absentee ballots had to be transcribed onto unused ballots by poll workers in order to be scanned.[325]
November 2005	Diebold AccuVote-OS	Colorado	**Pitkin County, CO** According to the *Aspen Times*, almost 1,200 phantom votes were reported in one precinct. Election officials initially announced that 1,560 people voted in Precinct 5, but later official results showed that 374 people had voted in that precinct. Apparently, the mistake was not caused by an electronic machine error, but instead by faulty spreadsheet formulas used to tally votes from each precinct.[326]
May 2008	Premier AccuVote-OS	Connecticut	**Litchfield County, CT** The *News-Times* reported that the "new optical scanning machine at [New Milford]'s Lanesville district malfunctioned, which necessitated the hand counting of all 426 votes there." At the time, it was unclear what caused the problem.[327]
February 2008	Premier AccuVote-OS	Connecticut	**Hartford County, CT** According to the *Boston Globe*, "[a] new optical scanning machine did not work and voters had to put their ballots in an auxiliary slot to be counted later." The *Globe* reported no further information regarding

			the machine or why it did not work.[328]
February 2008	Premier AccuVote-OS	Connecticut	**Hartford County, CT** *Newsday* reported that "[s]ix out of the 825 [optical scan voting machines] used across the state had to be replaced with back-ups. Two jammed and three were not properly programmed, [Windham Democratic Registrar Paulann Lescoe] said." It was unclear why the last of the six machines had to be replaced.[329]
September 2008	Sequoia Optech III-P Eagle	District of Columbia	**Washington, DC** The *Washington Post* reported that a malfunctioning cartridge for a Sequoia precinct-count optical scanner caused vote totals to be duplicated into multiple races and reported an implausibly high overvote rate of 1,542 in five contests.[330] According to a report on the incident that Sequoia sent the Board of Elections shortly after the incident, the manufacturer could find no irregularities in the system and attributed the problem to human error.[331] *For more on this incident, see case study 12 on pages 21 - 22 of this report.*
February 2008	Sequoia Optech III-P Eagle	District of Columbia	**Washington, DC** According to the *Washington Post*, "[s]ome polling sites . . . [dealt] with jammed machines, which were caused when ballot clerks failed to properly tear the stubs off paper ballots fed to the machines to be counted." Moreover, "[a]t Metropolitan AME Church on M Street NW, the ballot-counting machine broke down. Edgar R.M. Frazier, the precinct captain, said Board of Elections officials brought another one 'within 40 minutes.'" It was unclear at the time what caused the breakdown.[332]
November 2008	Premier AccuVote-OSX	Florida	**Hillsborough County, FL** The *Tampa Tribune* reported that, according to Hillsborough County election supervisor Buddy Johnson, a delay of election results was caused by "problems with the . . .elections system purchased from Premier Election Solutions. Among the problems: Election officials had to break up early voting results into smaller pieces to prevent crashing the computer system, and about 150 optical scanners had trouble transmitting results and had to be manually taken to the elections office."[333]

November 2008	Sequoia Optech Insight	Florida	**Palm Beach County, FL** The *Palm Beach Post* reported that delays in the tabulation of election results were caused "when computers were unable to read cartridges from optical scanners at six polling sites. . . . Exactly what caused the cartridges to malfunction was unclear, said Assistant County Administrator Brad Merriman."[334]
November 2008	Sequoia Optech Insight	Florida	**Palm Beach County, FL** An optical scanner jammed at a local precinct according to local NBC affiliate WPTV. Voters thus had to place their votes in the "Emergency Ballot Box" to be scanned later. As one voter put it: "'I voted. I went to put my vote in the machine and the machine was clogged, so they said 'stick it in this side' which is the emergency bin and I couldn't put it in there because the emergency bin was full,' says Liz Huhn of West Palm Beach." Thus, "[m]any ballots ended up in cardboard boxes . . . ." According to WPTV, "[e]lections officials sa[id] ballots that did not go through the machines, w[ould] be run through the machines . . . after everyone in line has voted."[335]
November 2008	Premier AccuVote-OS	Florida	**Manatee County, FL** According to the *Herald Tribune*, "a software problem . . . prevent[ed] Manatee elections officials from counting nine of the county's voting precincts and two-thirds of the ballots cast during early voting. When the ballots [were] attempted to be uploaded into the county voting system, [election officials] g[o]t an error message that prevent[ed] the tallying of those votes."[336] A later *Herald Tribune* report indicated that "[a] simple change in one Manatee County race, where a candidate dropped out . . . , caused the Premier software program known as GEMS to lock up. That prevented the counting of 46,000 ballots on Tuesday night, Supervisor of Elections Bob Sweat said." Manatee officials eventually "fixed the glitch; results were released at noon and no election outcomes changed."[337]
November 2008	ES&S DS-200	Florida	**Thirteen Florida Counties** A study from the Florida Fair Elections Center shows that counties using the ES&S DS200, which in the

			event of an overvote displayed a confusing message and did not automatically reject a ballot, had an overvote rate on Election Day 2008 that was as much as *18 times* that of systems used in other Florida counties.[338] After being alerted to the results of the Florida study, the State of Wisconsin completed its purchase of the same system on the condition that overvotes would be automatically rejected. New York, which was unaware of the Florida study at time of purchase, opted to set up machines to work in the same way they had in Florida in 2008.[339]
October 2008	Sequoia Optech Insight	Florida	**Palm Beach County, FL** The *Palm Beach Post* reported that creases in some absentee ballots appeared to cause the high-speed optical scanner to read the creases as votes: "When elections officials this week tried to figure out why good ballots were being rejected, they began suspecting that the machines are incorrectly reading the crease as a vote. That would mean they are incorrectly reporting that a person voted for more than one candidate in a race that lines up near the fold." This reportedly caused the machines to read the creased ballots as overvotes. "Since so-called overvotes aren't allowed, the machines are programmed to reject ballots where they occur. Those ballots, along with ones that voters didn't mark properly, are then given to the canvassing board to review." Consequently, election officials "[r]ather than risk miscounting votes in any race . . . are asking staff to duplicate all questionable ballots. They will then review those ballots again to ensure they are duplicated properly."[340]
October 2008	Premier AccuVote-OS	Florida	**Duval County, FL** *First Coast News* reported that nearly half of the voting machines in Jacksonville were malfunctioning, indicating the ballot was too long. Officials insisted that they had measured the ballots and they were regulation length.[341] A report from a local television affiliate stated, that officials eventually learned that "the real problem was with the ballot printers." "If the paper is not loaded

			properly, it can be skewed just enough that the timing marks on the side will produce a ballot that will not be read," an official told the station. "Due to the tolerance of the machines, some machines may accept it and some may not."[342]
October 2008	Premier AccuVote-OS	Florida	**Flagler County, FL** The *Flagler News-Journal* reported that "Flagler County elections officials switched voting machines for early voting Tuesday to eliminate a problem that had kept them from scanning 96 ballots during early voting hours Monday." Election Supervisor Peggy Rae Border told the paper that "the county's vendor thinks slightly shorter ballots—1/32 of an inch in some cases—may have caused the problem. She said she suspected the new machines were more sensitive to the variation in ballot length." The 96 ballots were eventually successfully scanned.[343]
August 2008	Permier AccuVote-OS	Florida	**Brevard County, FL** According to *Florida* Today, "[a] glitch involving a mere 20 votes tallied on touch-screen voting machines Tuesday caused a two-hour delay in election results . . . . About a third of the 140 machines malfunctioned." Interim Supervisor of Elections Bert Childress told the paper that the problem had been identified the previous year, and that the manufacturer was unable to get necessary replacement parts to the county in time to remedy the defect. "'They told us it was our phone lines,' Childress said. 'They finally admitted in July that it was a problem with their machines. About a third of our machines failed to download properly.'" According to the paper, Premier agreed to replace 150 modules at no cost, but told Brevard officials that the units would not be ready in time for the primary.[344]
August 2008	ES&S DS200	Florida	**Pinellas County, FL** The *St. Petersburg Times* reported that "[i]n Pinellas, 12 scanners had to be replaced at voting precincts, according to county elections spokeswoman Nancy Whitlock. Some experienced paper jams, and on some the screens froze, but they were traded out with functioning ones in a matter of minutes, she said." No further information regarding the problem was provided.[345]

August 2008	ES&S DS200	Florida	**Pasco County, FL** According to the *St. Petersburg Times*, eighteen of the 147 machines in Pasco County malfunctioned when election officials tried to transmit election results via modem. Results had to be transmitted via a thumb drive. Five machines experienced other problems. [346]
August 2008	Premier AccuVote-OSX	Florida	**Hillsborough County, FL** According to WMNF Radio, "[r]esults from yesterday's primary in Hillsborough County were slow to be released. Supervisor of Elections Buddy Johnson blames a software issue with the new optical scan machines manufactured by Premier Election Solutions." Director of Government Affairs for Premier Kathy Rogers stated, in response, that "her company did not provide adequate documentation for their GEMS software to Hillsborough County to avoid the problem. The problem was minor, Rogers said, and only affected how fast the results were made public, not the actual results."[347]
August 2008	ES&S AutoMARK	Florida	**Sarasota County, FL** The local ABC affiliate WWSB reported that on election night, absentee ballots had to be hand-counted when the optical scanning machines would not communicate with the server. More than 10,000 absentee ballots had to be hand counted and then re-scanned. "'We could not get the absentee ballots totals to upload into the main server to combine all of the totals together for absentee early voting,' says Supervisor of Elections Kathy Dent. So workers had to count them individually. 'We had to manually add those together, and obviously when you're doing something manually it takes a lot more time.'" At the time, it was unclear what caused the problems with the server.[348]
June 2008	Sequoia Optech Insight	Florida	**Palm Beach County, FL** The *Palm Beach Post* reported that, after the special city commission election in Palm Beach County, "[n]early 700 votes from three precincts—14 percent of the total cast—were added into the final results released by the supervisor of elections office after the

			standard post-election audit Wednesday and Thursday."
			During the audit, "three cartridges containing vote totals were labeled 'suspended,' meaning their votes hadn't been counted on election night when all the cartridges were brought to a tabulation center to be 'read' by vote-counting machines, said elections office spokeswoman Kathy Adams.
			Adams "said the office didn't know why the cartridges weren't read properly the first time. She said it was possible that one reader wasn't working properly and that all three cartridges were read by that reader."[349]
June 2008	ES&S DS200	Florida	**Pinellas County, FL** According to the *St. Petersburg Times*, two software viruses attacked the center tabulation system in Pinellas County. The worms were eventually safely removed and did not corrupt the software or affect any elections.[350]
January 2008	Premier AccuVote-TSX	Florida	**St. Lucie and Okeechobee Counties, FL** *TC Palm* reported that poll workers at three precincts in both counties were unable to send the voting data electronically to the central election office. "Votes were delayed from two precincts at Harbour Place, an assisted living facility in Port St. Lucie, as poll workers tried unsuccessfully to electronically send them over, said Supervisor of Elections Gertrude Walker." It was unclear why the poll workers could not send the voting data electronically.[351]
January 2008	ES&S iVotronic	Florida	**Broward County, FL** According to the *Sun-Sentinel*, new electronic voter check-in machines caused confusion and long waits for primary voters as some staffers were unfamiliar with the new equipment. Moreover, a few voters complained of problems with party registration.[352]
January 2008	Sequoia Optech Insight	Florida	**Palm Beach County, FL** Supervisor of Elections Arthur Anderson told the *Palm Beach Post* that a "defective early-voting cartridge" slowed the production of vote results. "Although a backup tape allowed elections staff to recoup the results, Anderson said the problem was so

			significant it may lead to the elections office having to reprogram all of its voting machines."[353]
January 2008	Premier AccuVote-OS	Florida	**Volusia County, FL** After scanning 3,986 ballots and noticing a four ballot discrepancy, election officials planned to scan the ballots a second time according to the *Daytona Beach News Journal*. The Supervisor of Elections, Ann McFall, blamed the error on the voting machine: "McFall said she received an advisory from the equipment's vendor last week saying similar problems had been encountered elsewhere. 'The other sites balanced perfectly,' McFall said. 'I think it's the machine.'"[354]
January 2008	ES&S AutoMARK	Florida	**Sarasota County, FL** The *Herald Tribune* reported that the voting machines were not working and had to be replaced. "'They were all tested before and for various reasons they just went bad,' said Kathy Dent, Sarasota County supervisor of elections. "Some machines had problems with the memory card, while others had a faulty scanner. Dent said backup machines are located downtown and in south Sarasota County, and crews are on standby to rush the new machines to precincts where problems are reported. 'They are replacing the scanners as soon as we get the call,' Dent said."[355]
January 2008	ES&S DS200	Florida	**Miami Dade County, FL** The *Miami Herald* reported that for reasons that are unclear, a ballot for the presidential primary candidates did not appear on at least one voter's machine.[356]
January 2008	Premier AccuVote-OSX	Florida	**Hillsborough County, FL** *10Connects.com* reported that some voters had trouble casting their votes on the touch-screen machines. A machine's screen went blank. Moreover, some of the machines were reading votes for one candidate as having been for the candidate that the voters had not chosen. "Supervisor of Elections Buddy Johnson says the current touch screen system will be replaced this spring in time for November's General Election. 'It counts correctly, but it's been like steering a car

			where you can't get the alignment right sometimes,' Johnson says. 'It's just that it is difficult to manage.'"[357]
November 2006	Sequoia AVC Edge	Florida	**Palm Beach County, FL** Voters told the *South Florida Sun-Sentinel* that vote-switching had occurred as they cast their ballots in the 2006 House race. Additionally, others reported problems when the wrong ballots appeared on their touch screens while voting.[358]
November 2006	ES&S iVotronic	Florida	**Sarasota County, FL** According to the *Sarasota Herald Tribune*, there were over 18,000 undervotes in the 13th Congressional race between Vern Buchanan (R) and Christine Jennings (D).[359] Buchanan defeated Democrat Christine Jennings by a slim 369 vote margin.[360] The *Tribune* reported on numerous complaints that the 13th Congressional District race was not appearing or recording properly on the touchscreen voting machines in use in the county. Some voters told the paper that votes for Christine Jennings failed to appear on the review screens at several polling locations.[361]
November 2006	ES&S Optech Eagle	Florida	**Orange County, FL** The Florida Division of Elections reported that Orange County experienced the highest undervote rate in the state for absentee ballots cast in the U.S. Senate and Governor's races.[362] According to the Flordia Fair Elections Center, which contacted Orange County about the undervote rate, the machines' vendor told county officials that the issue appeared to be a calibration problem that caused the machines to fail to read certain kinds of gel ink. Further investigation by the Center revealed that the same problem had occurred on ES&S and Sequoia scanners in previous elections.[363] *For more on this incident, see case study 3 on page 13 of this report.*
October 2006	ES&S iVotronic; M650	Florida	**Broward County, FL** The Miami Herald reported numerous complaints that votes cast for the Democratic gubernatorial candidate were given to his Republican opponent during early voting. A spokeswoman for the

			Supervisor of Elections told the paper that the machines likely needed to be recalibrated.[364]
November 2004	ES&S M650	Florida	**Broward County, FL** According to the *South Florida Sun-Sentinel*, a programming error in an optical scan tabulator would have changed the outcome of a ballot measure had it not been caught by alert election officials. The optical scan tabulator was used to count absentee ballots. The glitch occurred because the machines in use were programmed to accept only 32,000 votes per discrete ballot item, after which it started counting backward. Once the machines were reprogrammed to allow for counting of all of the votes, the measure received more than 64,000 "yes" votes and it passed.[365] *For more on this incident, see case study 6 on page 15 of this report.*
November 2004	Diebold AccuVote OS	Florida	**Volusia County, FL** According to local media, seven Diebold optical scan memory cards failed, causing votes to disappear.[366] One card's tally was missing 13,244 votes.
June 2004	ES&S iVotronic	Florida	**Eleven Florida Counties** Five months before the 2004 general election, *Miami Herald* reported that state election officials had learned of a flaw in the touchscreen voting machines in use in eleven of the state's counties that would prevent the conduct of a manual recount in the event of a close race.[367] It later came to light that Miami-Dade county discovered the problem more than a year earlier, when the director of the county's technology department found during an audit that the electronic log of voting activity produced by the system scrambled the machines' serial numbers.[368] *For more on this incident, see case study 7 on page 16 of this report.*
November 2002	ES&S iVotronic	Florida	**Broward County, FL** CNN reported that a software error caused 103,222 votes, cast with ES&S iVotronic paperless machines, to be left uncounted in the original tally. The error

			was discovered the morning after Election Day. When the missing votes were added, voter turnout for the county was adjusted from 35% to 45%.[369]
September 2002	ES&S M100	Florida	**Union County, FL** Black Box Voting reported that a programming error in Union County, Florida caused machines to read 2,642 Democratic and Republican votes as entirely Republican in the September 2002 election. The vendor, ES&S, accepted responsibility for the programming error and paid for a hand recount.[370]
April 2002	ES&S iVotronic (M650 Unity Election Reporting Management System used to combine totals)	Florida	**Miami-Dade County, FL** According to the *Miami Herald*, the vote tallies for two city council races in Medley, Florida were miscounted when the results of the absentee votes from optical scan machines were combined with the results of the electronic ballots. The initial count showed victories for two candidates who had actually lost the election. The Miami-Dade elections supervisor told the paper that all software had been tested before the election without a hitch, but poll workers noticed the problem as they fed results into the computers. Evidently, a technician from the voting machine manufacturer inadvertently bumped the first candidate to the last position when he opened the ballot program on the memory cards to change the heading of the ballot. When the results of the two systems were combined, they didn't match properly.[371]
November 2008	Premier AccuVote TS R6	Georgia	**Fulton County, GA** In North Fulton County, according to the *Atlanta Journal-Constitution*, a group of voters had to vote using provisional ballots because the election database reported that they already voted; they had not. Also, in south Fulton County, all voting machines in a precinct were down for about an hour. While the machines were down, the polling place ran out of printed ballots and paper provisional ballots. An hour later, however, the machines began to work again.[372]
October 2008	Premier AccuVote TS R6	Georgia	**Fulton and DeKalb Counties, GA** The *Atlanta Journal-Constitution* reported that people in line to vote had to, at times, wait anywhere from 45 minutes to 8 hours. The delay was caused by problems with the computers used for check in. The

			computers were sluggish and sometimes crashed. It was unclear why the machines crashed.[373]
October 2008	Premier AccuVote TS R6	Georgia	**Fulton County, GA** The local CBS affiliate reported that "[c]omputers at the North Fulton Government Center and other county polling places lost their connection to the state's database, officials told CBS 46's Joanna Massee. That glitch created a big headache for election workers and long waits for voters." It was unclear why the computers lost their connection to the database.[374]
February 2008	Premier AccuVote TS R6	Georgia	**Muscogee County, GA** In Muscogee County, according to the *Ledger-Enquirer*, the express poll machine was not "functioning properly" so 16 voters had to cast provisional votes. "'It's not that they didn't work,' said Nancy Boren, executive director of the Muscogee County Office of Elections and Registrations. 'It was that they were slow in coming up.' "Once the machines were functioning correctly, voting returned to normal. The 16 provisional ballots will be counted as regular votes, Boren said."[375]
February 2008	Premier AccuVote TS R6	Georgia	**DeKalb, Fulton and Cobb counties, GA** According to the *Atlanta Journal-Constitution*, four of five voting machines went offline and became inoperable.[376]
February 2008	Premier AccuVote TS R6	Georgia	**McIntosh County, GA** The *Florida Times-Union* reported that the electronic voting machines did not work when the polls first opened. "'The touchscreen voting machines had worked well when tested, but didn't when the precinct first opened,' [election official Phillip Kempton] said." Poll workers recorded the names of the individuals they had to turn away from voting. They later contacted them when the machines were working, and got them to come and vote. It was unclear why the machines did not work initially.[377]
November 2006	Diebold TS-R6; TS-RS	Georgia	**DeKalb, Fulton, and Cobb Counties, GA** According to the *Atlanta Journal-Constitution*, touch-screen voting machines in three counties switched votes for Democratic candidates to Republicans.

			Technicians were dispatched to recalibrate machines. The vote-switching problems significantly slowed down the voting process for those who went to the polls. By mid afternoon, at least 30-40 voters reported experiencing the vote-switching problem.[378]
September 2004	Hart eSlate 3000	Hawaii	**Honolulu, HI** A local TV news station reported that voting machines gave voters the option of selecting a Green Party ballot, although there were no Green Party candidates. As a result, 22 voters wasted their votes and were essentially disenfranchised.[379]
November 2006	ES&S M550	Idaho	**Bannock County, ID** According to the *Casper Star Tribune*, ES&S scanners failed to recognize the ink that the vendor instructed county election officials to use for ballot marking. Once the uncounted ballots were identified, poll workers marked each ballot with ink that would be recognized by the scanner and fed them into the machine for a second time.[380]
May 2009	Premier AccuVote-OS	Illinois	**St. Clair County, IL** The *Bellville News-Democrat* reported that a mayoral candidate contested the results of a mayoral race in St. Clair County after "a voting machine malfunction caused several hundred ballots to go uncounted." No further information was given regarding the malfunction.[381]
April 2009	Premier AccuVote-OS	Illinois	**St. Clair County, IL** In the village president race in St. Clair County, according to the *Bellville News-Democrat*, 400 uncounted ballots affected the results of the race. The origin of the uncounted ballots: "'There were two machines at [a certain] polling place, one with the touch screens for people with disabilities and optical scan everybody else votes in,' [County Clerk Bob] Delaney said. 'When voting was done, we uploaded both cards to be counted. But for some reason (the computer) did not count optical scan.'" It was unclear why.[382]
March 2008	Premier AcuVote-TSX	Illinois	**DuPage County, IL** The *Chicago Daily Herald* reported that during a special election, the Diebold (Premier) touch-screen election machine had the word "Republican" flashing at the beginning of each ballot as though the

			election was a primary election. To solve the problem, some election officials placed tape on the screen over where the word flashed.[383]
February 2008	ES&S Model 100	Illinois	**Lake County, IL** The *Chicago Daily Herald* reported that the optical scan vote-tabulation machine was unable to transmit electronically the voting results. Thus, election officials were forced to drive the machines to the nearest transfer station for tabulation. Election officials launched an investigation to determine the cause of the problem.[384]
February 2008	Sequoia Optech Insight	Illinois	**Cook County, IL** According to the *Daily Northwestern*, votes were miscounted at one precinct in Cook County during a local race. The results "were missing 247 of the 540 ballots."[385]
October 2006	Sequoia AVC Edge II Pl	Illinois	**Chicago and Cook County, IL** According to the *Chicago Tribune*, Chicago and Cook County officials said they had received a few complaints from early voters about pressing once candidate name on the touch screen and having the machine register another. This type of event can occur if the machine is not adequately calibrated.[386]
April 2003	ES&S M100	Illinois	**Lake County, IL** The *Chicago Tribune* reported that because of a programming error that failed to account for the option of "no candidate" on the ballot, election results were placed next to the names of the wrong candidates in four different races. The problem was corrected by 10pm on the evening of Election Day.[387]
November 2008	ES&S iVotronic	Indiana	**Wayne County, IN** Officials in Wayne County ran into problems, according to the *Palladium-Item*, when officials tried to get a final tally of the vote. "When local officials tried to tally the vote they received a 'system error' message. They stopped the count, secured the votes and then had to wait for an answer to the problem from company officials at Election Systems & Software, which provided the computer system for the local election." The call to ESS alone took over an hour but issue was resolved on the call. It was unclear why the "system error' message appeared.[388]
November	ES&S	Indiana	**Madison County, IN**

2008	iVotronic		The *Herald Bulletin* reported "that as many as 7,400 of the 12,000-some ballots used for early voting could not be counted by the machines. As it turns out, the coding on that portion of the early ballots was in the wrong position on the paper, tripping up the machines." According to an editorial in the paper, "an official from Omaha-based Election Systems & Software, which provided the counting system, seemed to acknowledge that the company had sent the county ballots that wouldn't work. But the county should take some blame too for not taking the precaution of testing the new set of ballots when they arrived."[389]
November 2006	ES&S iVotronic	Indiana	**Marion County, IN** According to WISH-TV, workers were unable to retrieve votes from the 520 touch-screen machines used by disabled voters when the polls closed at 6:00pm on Election Day. The problem occurred because ES&S had programmed the machines for Pennsylvania's polling hours, which stayed open until 8:00pm. Disabled voters were concerned that their votes would not be counted. In fact, when the incident was reported three days after the election, those same votes had not yet been recovered or counted.[390]
May 2006	MicroVote Infinity	Indiana	**47 Indiana Counties** The *Star Press* reported that ten days before the 2006 primary election, voting system manufacturer MicroVote discovered a defect in the function that allows voters to cast ballots in "split precincts," where voters in the same precincts choose from different sets of candidates.[391] According to the *Indianapolis Star*, the manufacturer shut down the split precinct function on the machines and worked in secret to develop a software upgrade that would restore the function, all without notifying the Indiana Election Commission. The paper noted that the Commission only learned of the defect when MicroVote applied for certification for the software upgrade.[392] *For more on this incident, see case study 14 on page 24 of this report.*
November	Fidlar	Indiana	**Franklin County, IN**

2004	AccuVote 2000 ES		The Associated Press reported that a glitch caused optical scanners to count Democratic straight-line votes as Libertarian votes. After the error was found, the recount changed the results of the county commissioner's race in favor of the Democratic candidate. The glitch was suspected when a Libertarian congressional candidate was receiving four times the vote in Franklin County than in the rest of the district. The voting machine manufacturers called the glitch an "isolated incident."[393]
November 2008	Premier AccuVote-OSX	Iowa	**Blackhawk County, IA** In a recount in Blackhawk County, according to the *WCF Courier*, out of the 19 ballots rejected by an optical scanner, 18 of them were found to be valid votes; the other was a no vote. "Officials don't yet know what happened, and said they will try to determine the mistake's origin."[394]
November 2008	Premier AccuVote-OS	Iowa	**Scott County, IA** The *Quad-City Times* reported that, in Scott County, vote tabulations were delayed due to two memory card failures. "The problem started with two memory card failures before 11 p.m., as early voting results were being added to Election Day results. The memory cards held the results of 11,627 ballots cast in early voting. Election officials turned to printout tapes of the summary reports to be manually entered into the computer system, but the software required more detailed and time-consuming precinct-by-precinct information to be entered." Poll workers "tried to find a different way to deliver the vote totals but didn't complete the task until shortly before 1 a.m.," delaying the results for hours. It was unclear what caused the failures.[395]
June 2006	ES&S M100	Iowa	**Pottawattamie County, IA** According to the *Daily Nonpareil*, a ballot programming error caused the new optical scan system to tabulate votes incorrectly. When absentee ballots were tabulated for a county recorder's race in the Republican primary, results showed one candidate, a University of Nebraska at Omaha student, had 99 votes, while his opponent, the county recorder since 1983, had only 79. The surprising outcome led to a recount of absentee ballots, revealing that the incumbent actually received

			153 votes while his challenger received 25.[396]
November 2004	ES&S Optech III	Iowa	**Scott County, IA** The *Des Moines Register* reported that optical scan machines malfunctioned when tabulating absentee ballots. As a result, poll workers had to manually feed about 23,000 ballots one by one.[397]
November 2008	ES&S Model 100	Kansas	**Crawford County, KS** In Crawford County, the *Morning Sun* reported that a programming glitch failed to follow sequencing numbers that differentiate between ballots with candidates in different positions. Under Kansas law, the order in which candidates appear on a ballot must alternate. Because the machines counted all ballots as if they were configured the same, it misrecorded the results for the race. "For instance, in the Crawford County attorney's race on ballot 15, John Gutierrez is listed first, and Michael Gayoso Jr. second. But on ballots 16 and 17, Gayoso is the top name, with Gutierrez underneath. With the error then, a vote for Gayoso on ballot 17 was counted for Gutierrez, and vice versa. At the same time, there are some races where a vote on ballot 16 would be the same as a vote on ballot 17." County Clerk Don Pyle stated that "the glitch could affect four races," but that the precise outcome would be unknown until testing was complete.[398]
April 2008	ES&S iVotronic	Kansas	**Saline County, KS** In Saline County, according to the *Salina Journal*, during the Salina City Commission race, some machines were flipping votes—"When a voter pressed a certain candidate's bar on the voting machine's screen, the candidate above the selected candidate instead received the checkmark. "The error, [County Clerk Don] Merriman said, most likely was caused by a calibration problem in the machine caused during transit to the polling places."[399]
August 2002	ES&S Optical Scan (model unknown)	Kansas	**Clay County, KS** According to the *Lawrence Journal World & News*, a computer glitch in an optical scan voting system showed that a challenger in a primary race for county commissioner had won, but a hand recount showed

			that the incumbent commissioner won by a landslide: 540 votes to 175. The computer had mistakenly reversed the totals for the candidates in one ward.[400]
November 2008	Hart InterCivic eScan	Kentucky	**Madison County, KY** The *Richmond Register* reported that results were delayed because a data disc from a Berea precinct voting machine was generating an error message "[b]ecause its data could not be downloaded, not even a preliminary [vote] total could be generated." A technician eventually fixed the problem.[401]
November 2008	Hart InterCivic eScan	Kentucky	**Kenton County, KY** In Kenton County, according to the *Cincinnati Enquirer*, election officials were forced to eventually halt voting on the handicap accessible machines. The voting machines were not recording straight ticket voting. In a hearing regarding the problems, "Harp Elections Services President Roger Baird took responsibility for the machine's malfunctions. "Baird blamed a proof-reading error made while the E-slate machines were being programmed by his staff."[402]
May 2008	Danaher Controls Shouptronic 1242	Kentucky	**Bullitt County, KY** The *Louisville Courier-Journal* reported that election results were delayed. County Clerk Kevin Mooney stated "that the delay in the tallying was mainly due to some newer machines for special-needs voters that had trouble reading memory cards." It is not clear why the machines had trouble reading the cards.[403]
November 2006	Hart eSlate	Kentucky	**Calloway County, KY** According to VoteTrustUSA, vote-switching appeared to have occurred on the review screens of Hart InterCivic eSlate machines. Straight-ticket Democratic votes were switched to Republican straight-ticket votes in all contested races.[404]
October 2008	Sequoia AVC Advantage	Louisiana	**Vermilion Parish, LA** According to the *Daily Iberian*, one of the candidates in an alderman's race "said a glitch in the Vermilion Parish Clerk of Court's electronic voting system prevented District 3 voters in Delcambre from voting for him or for [his opponent], both Democrats, from

			the time the polls opened at 6 a.m. to 1 p.m" "Secretary of State spokesman Jacques Berry described what occurred as a 'reverse lockout. There was no machine malfunction at all,' Berry said. 'It was strictly a programming error that was discovered by a voter. We determined that 60 voters had cast votes in that precinct prior to 1 p.m. and those are the voters who should have had the opportunity to cast a vote in that election but did not.'"[405]
November 2006	ES&S 3P Eagle	Maine	**Waterville, ME** The *Journal & Morning Sentinel* reported that unidentified machine malfunctions caused election results to indicate that one Senate candidate for District 25 received 27,000 votes on one of the three machines used by the town. 27,000 is about 16,000 more votes than the number of registered voters in the whole city.[406]
February 2008	Premier AccuVote-TS	Maryland	**Anne Arundel County, MD** According to the *Capital*, three voting machines went "down" as the election day began. In response, local officials got "two machines going again by basically unplugging and plugging them back in." A local official told the paper that the problems were "beyond her ability to fix, and apparently beyond the skills of the Diebold [Premier] technical assistant posted at Cape St. Claire Elementary."[407]
September 2008	ES&S AutoMARK	Massachusetts	**Bristol County, MA** The *Standard-Times* reported that in New Bedford, one week before the state primary election, "the Automark voting machines won't work with the city's Republican ballots." Elections Commissioner Maria Tomasia "said technicians from ES&S have about 48 hours to get the machines set up properly, and that the problem 'seems to be the ink,' but that nobody is certain."[408]
May 2008	Premier AccuVote-OS	Massachusetts	**Plymouth County, MA** After a recount of a voter proposition, the *Boston Globe* reported, local officials discovered that the scanner had counted four votes wrong. Local officials blamed the problem on the machine getting jammed while counting the votes: "'The machines jammed a few times when counting the votes,' [Town Clerk Linda] Adams said."[409]

February 2008	Premier AccuVote-OS	Massachusetts	**Bristol County, MA** The *Taunton Daily Gazette* reported that votes from two precincts had to be counted separately due to a "glitch" with a memory card. "The reason for the extra work, [Taunton's City Clerk Rose Blackwell] said, was a result of a problem she detected last Friday with regard to the memory card the city received from LHS Associates of Methuen—the company that provided the voting machines." Local officials said this separate count did not compromise the outcome of the election. It was unclear what caused the "glitch" wi th the card.[410]
May 2006	Premier AccuVote-OS	Michigan	**Barry County, MI** According to the *Grand Rapids Press*, flawed ballot programming caused an optical scan system to tally votes incorrectly. The problem was discovered when a county clerk received the voting results from the precinct where he had voted and saw that one candidate received no votes, despite the fact that he himself had voted for the candidate. He also thought it peculiar that 90 out of 127 votes cast in one precinct selected the option to write in a candidate on the ballot. Because there were widespread problems with machines incorrectly tallying votes, county workers hand counted votes for the school board election.[411]
August 2004	Sequoia Optech III-P Eagle	Michigan	**Muskegon, MI** According to the *Muskegon Chronicle*, Optech scan machines failed to detect 2% of votes in the race for Township Clerk. Initially, the machines indicated that the incumbent had been defeated by a five vote margin. After a recount, 39 additional votes were factored into election totals and the challenger won by two votes.[412]
May 2005	ES&S Optical Scan (model unknown)	Mississippi	**Forrest County, MS** The *Hattiesburg American* reported that the primary election for a city council race was not certified for days after the election because of discrepancies in vote tallies. The number of ballots counted by optical scanners reportedly did not correspond to the vote totals on the voting machines.[413]
May 2006	ES&S M150, M550	Montana	**Yellowstone County, MT**

			According to the *Billings Gazette*, a programming error caused voting machines to inaccurately record all votes. An election official explained that he suspected the problem had occurred because he forgot to hit the "zero out" button required between entering absentee and regular ballots on the machine. Consequently, as many as 3,000 absentee ballots may have been counted a second time when the regular ballots were being run through the machines. Officials decided to conduct a full recount to ensure that the election outcome was accurate.[414]
November 2004	ES&S M550	Nebraska	**Lancaster County, NE** The *Lincoln Star Journal* reported that a number of malfunctions occurred on optical scan machines in use during the general election. According to the paper, some machines shut down completely. When the problems began, election officials stopped to test the six machines, revealing that two were not producing correct vote tallies. Those two machines were shut down, but later in the day, the remaining machines began to have similar mechanical problems.[415]
November 2004	ES&S M650	Nebraska	**Sarpy County, NE** Local TV news station WOWT 6 reported that after ballots were counted in a race for city council, election officials realized that there were more votes than voters. According to the officials, the error affected 32 of 80 precincts and as many as 10,000 votes. It was believed that the glitch affected the candidates equally and did not alter the outcome of the elections. The evidence and explanation for the miscount were inconclusive at the time.[416]
November 2002	ES&S M100	Nebraska	**Sarpy County, NE** According to the *Omaha World-Herald*, the optical scan machines failed to tally "yes" votes on the Gretna school-bond issue, giving the false impression that the measure was defeated. The measure had actually passed by a 2-1 margin.[417]
November 2002	Sequoia: Edge	Nevada	**Clark County, NV** According to the *Albuquerque Tribune*, the software used to aggregate the vote totals on a Sequoia voting system was overwhelmed by the volume of ballots cast and omitted some votes from total reports.

			Although a technician for the vendor fixed the problem in Clark County and provided officials there with a software patch, the same problem occurred a few weeks later in Bernalillo County, New Mexico.[418]
March 2008	Premier AccuVote-OS	New Hampshire	**Rockingham County, NH** The *Eagle Tribune* reported that "a single key on a faulty computer keyboard" caused the election results from optical scanners to be mis-entered by election officials. Consequently, the initial election result was erroneous.[419]
June 2009	Sequoia AVC Advantage	New Jersey	**Monmouth County, NJ** According to the *Asbury Park Press*, "results from a half-dozen towns were delayed because of problems in transmitting data from machine cartridges, County Clerk M. Claire French said on Wednesday." The cartridges thus had to be physically taken to the central election offices. "We're studying what caused these problems," French said.[420]
November 2008	Sequoia AVC Advantage	New Jersey	**Essex County, NJ** The *Star-Ledger* reported that "[v]oters arriving at Conklin Hall near the Rutgers-Newark campus were thwarted this morning by two malfunctioning voting machines. Voters said they were told the machine would have to be replaced and to come back later. "Carmen Cassiano, Essex County's commissioner of registration, said about half of the machines malfunctioned because they were turned on incorrectly, which caused them to jam. "They could not be reset, and had to be replaced, Cassiano said. All the jammed machines were replaced by mid-morning, but there were sporadic problems throughout the day."[421]
November 2008	Sequoia AVC Advantage	New Jersey	**Hudson County, NJ** According to the *Jersey Journal*, "the system of counting votes at Hudson County Clerk's office has gone haywire." "According to County Clerk Barbara Netchert, the way things were supposed to work is that local town clerks were supposed to be able put the cartridges from the electronic voting machines into a reader and the information would be sent via computer to her

			office.
			"But the readers in several municipalities, including Bayonne, Union City, Secaucus, and West New York aren't working, Netchert said about 9 p.m."
			Results were therefore delayed by a few hours. It was unclear what caused the problems.[422]
June 2008	Sequoia AVC Advantage	New Jersey	**Monmouth County, NJ** The *Asbury Park Press* reported that "a computer being used by the municipal clerk malfunctioned." Local election officials could not fix the error, so the cartridges were physically taken to the central tabulation office. Results were therefore delayed by a few hours. It was unclear what caused the "malfunction."[423]
February 2008	Sequoia AVC Advantage	New Jersey	**Eight New Jersey Counties** The *Star-Ledger* reported,, "[t]he numbers from the cartridges that print out vote tallies and the paper-tape backup within the machine didn't match" when officials in Union County, New Jersey attempted to obtain vote totals after the 2008 presidential primary. According to the paper, several other counties, including Bergen, Gloucester, Middlesex and Ocean, uncovered similar problems when Union County officials encouraged them to double-check their results.[424] According to a report produced by a team of Princeton researchers who conducted an independent analysis of the voting equipment used in the primary, the malfunction, which caused some voters to receive the wrong party's ballot, was triggered by human error that would be "easy and natural" for many pollworkers to make.[425] *For more on this incident, see case study 13 on pages 22 - 24 of this report.*
February 2008	Sequoia AVC Advantage	New Jersey	**Essex County, NJ** The *Montclair Times* reported that "[i]n Essex County, Superintendent of Elections Carmine Casciano said that 12 out of about 650 Sequoia Advantage electronic voting machines were replaced on Tuesday. Of that amount, four machines were replaced due to Board of Election workers mistakenly

			turning off the machines and thereby deactivating them." The other eight had to be replaced due to a "software malfunction"—Casciano said ""[b]y checking further into it, we have found no evidence that we think triggered it. So we're blaming it on the system. A software malfunction.'"[426]
February 2008	Sequoia AVC Advantage	New Jersey	**Hudson County, NJ** The *Star-Ledger* reported that some election workers failed to take cartridges from individual balloting machines before election officials officially sealed the machines. The election results were therefore delayed.[427]
November 2006	Sequoia: AVC Advantage	New Jersey	**Passaic, Paterson, Scotch Plains, and North Bergen Counties, NJ** WABC-TV New Jersey reported that the US Attorney for New Jersey dispatched investigators to address complaints of voting machines that were preventing voters from casting ballots for the Republican Senate candidate. Some reported that their ballot was pre-voted in favor of the Democratic incumbent, while others said the machine would not register their selections.[428]
February 2008	Avante Vote-Trakker	New Jersey	**Warren County, NJ** According to the *Express-Times*, various electronic voting machines stopped working in Warren County, apparently because of an election official error regarding the programming of the machine. 900 voters were forced to use emergency ballots.[429]
June 2008	ES&S Model 100	New Mexico	**Curry County, NM** According to the *Clovis News Journal*, "county officials reported to the [Curry County Canvass] board that memory cards — used to transfer tallies from the ballot machines to a computer — experienced corruption issues that rendered them unusable. "However, staff were able to bypass the problem because those same voting machines generated paper tape printouts, which they were able to manually count and tally."[430]
March 2008	ES&S Model 100	New Mexico	**Various Counties, NM** Various counties in New Mexico, the *Associated Press* reported, experienced problems with the memory

			cards used for the ES&S e-voting machines. The "[p]roblem-prone memory cards used in voting machines across New Mexico are being recalled to make certain they're working properly in preparation for the June primary election. . . . "Secretary of State Mary Herrera ordered a recall of the cards in an e-mail sent Thursday to the 33 county clerks."[431]
November 2004	Sequoia: Edge; AVC Advantage ES&S: iVotronic Danaher: Shouptronic	New Mexico	**Bernalillo County and other counties, NM** Throughout the state of New Mexico, significantly high phantom vote rates and undervote rates led voting analysts to question the outcome of the elections in New Mexico. New Mexico led the nation in the highest undervote rates. Also, certified results showed a remarkably high number of phantom votes.[432]
November 2002	Sequoia: Edge	New Mexico	**Bernalillo County, NM** According to the *Albuquerque Tribune*, local officials discovered that about 12,000 early votes were not included in the totals produced by the voting system after Election Day. Apparently, the software program used to aggregate vote totals was "overwhelmed by the data." Reportedly, the error was confined to early voting machines, on which approximately 48,000 people cast their ballots. The *Tribune* reported that the same problem had occurred a few weeks earlier in Clark County, Nevada. Apparently, the technician assigned to address the problem in Clark County never notified officials in Bernalillo County of the problem or provided them with the software patch necessary to fix it. [433] *For more on this incident, see case study 9 on pages 17 - 18 of this report.*
November 2008	Sequoia ImageCast	New York	**Essex County, NY** Local television station WPTZ reported that the Essex County commissioner complained of the unreliability of the vote scanning machines. "Essex County Elections Commissioner Lew Sanders said big problems with the new scanning voter machines for the disabled may translate into problems for all voters come next election."[434]

November 2008	Sequoia ImageCast	New York	**Tompkins County, NY** According to the *Ithaca Journal*, a ballot-marking machine at a polling place froze during the instruction phase and could not be used for the rest of the voting period. "Democratic Tompkins County Board of Elections Commissioner Stephen DeWitt said the problem lies in a software glitch that causes the machine to freeze up during the instructions segment. The machine at Titus Towers seems to be the only one with that problem, he said."[435]
November 2008	ES&S Model 100	North Carolina	**Craven County, NC** According to the *Sun Journal*, local officials discovered that at least 3,643 more votes were cast than originally reported in unofficial election results. "The additional votes surfaced when state elections technician Rosemary Blizzard worked with the Craven County elections director . . . to 'read the media cards back into the tabulation software,' Blizzard said. . . . "'There was an error on a flash card at the main one-stop sight. Partial results downloaded election night from that site. I believe there were also some data entry errors which unfortunately happen,' Blizzard said. 'That's why the results are unofficial until after the canvass. Blizzard "said there will probably be at least 54 more votes to add to results once the audit is complete." The results of the race were not affected by the additional votes.[436]
November 2008	ES&S Model 100	North Carolina	**Forsyth County, NC** The *Winston-Salem Journal* reported that "a mistake caused the software to omit results for the 74th N.C. House District in . . . two precincts." Officials eventually discovered the error and fixed it. It was not clear what caused the "mistake."[437]
November 2008	ES&S Model 100	North Carolina	**Rockingham County, NC** According to *GoDanRiver.com*, after votes had been entered into the central tabulator, votes from only one of the five precincts registered. It was unclear

			what caused the problem.[438]
November 2008	ES&S iVotronic	North Carolina	**Polk County, NC** The *Tryon Daily Bulletin* reported that the County Board of Elections left the public confused as the results continued to flip-flop between candidates. This was caused by a malfunction in the computer reporting system. Eventually, local officials resolved the problem and were able to announce a winner of the race.[439]
May 2008	ES&S Model 100	North Carolina	**Onslow County, NC** The *Jacksonville Daily News* reported that "there were a significant number of votes missing—approximately 4,000" after a "tabulator broke" on election night. Rose Whitehurst, director of the county board of elections, said ""[w]hen we started looking over the report, we found that the votes didn't all go into the software,' . . . . 'We started doing an audit and ran through the information (and found that) both one-stops weren't counted.'" No further information regarding the missing votes was provided.[440]
May 2008	ES&S iVotronic – Mecklenberg Co. Model 100 – Wake Co.	North Carolina	**Mecklenburg & Wake Counties, NC** Local news station, News 14, reported that due to a "problem" with an optical scanner, certain votes in the primary election were counted twice. The error was corrected, and the errors did not change the outcome of the races but the number of votes involved was large. "For example, when Democratic presidential candidate Barack Obama declared victory Tuesday night in North Carolina's primary, he was given approximately 15,000 votes more than he should have been. That's 1 percent of all ballots cast. "In Wake County, early and absentee ballots were counted as part of the individual voters precincts and again as a whole. 'So in essence, those voters were recorded double,' said Cherie Poucher of the Wake Co. Board of Elections. It was around 37,000 votes. It was unclear what caused the problem with the scanner.[441]
November 2004	Sequoia AVC Advantage	North Carolina	**Buncombe County, NC** According to the *Mountain XPress*, touch-screen

			voting machines in at least two precincts did not display one of the races on the ballot. One election official estimated that the error affected at least 600 voters. Because there was no paper record, it was impossible to determine how many votes were lost.[442]
November 2004	Unilect Patriot	North Carolina	**Carteret County, NC** The Associated Press reported that about 4,400 votes were lost in the election for state agricultural commissioner. On election night, 3.3 million ballots were cast and the Republican candidate led his Democratic opponent by 2,287 votes. The touch-screen DREs that had caused the problems did not have a backup system, making the lost votes irrecoverable. With almost twice as many votes permanently erased as were needed to win the election, a contentious legal battle ensued, and only ended three months later when the contesting candidate decided to concede the election.[443]
November 2004	Diebold (Model unknown)	North Carolina	**Gaston County, NC** According to local news media, 12,000 early votes were unrecorded in the initial tally due to an "interrupted download error" that occurred during the transfer of election data to the tally server.[444] A later review by the *Charlotte Observer* found that the number of voters who signed in at the polls differed from the number of votes tallied in over 60 percent of the county's precincts.[445]
November 2004	Fidlar AccuVote 2000 ES	North Carolina	**Franklin County, North Carolina** According to the Associated Press, Fidlar optical scanners recorded democratic straight-ticket votes as straight-ticket votes for the Libertarian party. Correcting the error changed the outcome of a congressional race. [446]
November 2002	ES&S: Optech III-P	North Carolina	**Chatham County, NC** According to the *News and Observer*, machine programming error caused all straight-ticket Republican votes to go to the Libertarian candidate in N.C. House District 54.[447]
November 2002	ES&S: Optech III-P Eagle	North Carolina	**Wayne County, NC** The *News and Observer* reported that a programming error caused machines to skip several thousand party-line votes, both Republican and Democrat.

			Correcting the error turned up 5,500 more votes and reversed the outcome of the race for State House District 11.[448]
November 2002	ES&S iVotronic	North Carolina	**Jackson and Wake Counties, NC** *Wired News* reported that voting machine vendor ES&S discovered a glitch in its voting system firmware that caused the company's touchscreen machines to falsely sense that their memories were full. According to the magazine, officials in neighboring Wake County discovered the same problem by chance later that year. There, six touchscreen voting machines lost a total of 436 ballots, and the voters who cast those ballots had to be given the opportunity to revote.[449] *For more on this incident, see case study 10 on page 18 of this report.*
September 2002	ES&S: M100	North Carolina	**Robeson County, NC** According to VotersUnite!, ballot-tabulating machines malfunctioned in 31 of 41 precincts during a Senate primary. Local election officials stated that it was due to a software glitch related to faulty memory card programming and recounted the ballots.[450]
December 2008	Premier AccuVote-TSX	Ohio	**Montgomery County, OH** The *Dayton Daily News* reported that because of a problem at a polling place in Trotwood where five votes were lost on a machine, the county completed a state ordered audit. During the audit, "[w]hen the card was put back into its original machine, it re-synced and showed the votes, a procedure that would never occur during a typical count, [Elections Director Steve] Harsman said. The manufacturer was unable to determine the cause of this anomaly. The audit also revealed additional problems with the voting system; on three occasions, the paper record failed to track when a user rejected a ballot to make corrections, and the scanners failed to read some clearly-marked ballots as valid.[451]
November 2008	ES&S iVotronic	Ohio	**Franklin County, OH** According to the *Columbus Dispatch*, some voters reported that electronic touch-screen voting machines were flipping votes. No further information was

			provided.[452]
November 2008	ES&S iVotronic	Ohio	**Knox County, OH** The *Columbus Dispatch* reported that one touch-screen electronic voting machine in Knox County omitted Obama and McCain from the electronic ballots. An election worker eventually solved the problem by resetting the machine. It was not clear what caused the issue.[453]
November 2008	Premier AccuVote-TSX	Ohio	**Stark County, OH** Some of the voting machines in Stark County, according to the *Canton Repository*, experienced difficulties. One of the machines "failed to print out a paper ballot." And voters had difficulties with other machines. Jeanette Mullane, Stark County Board of Elections director, said, "'The machine issue is more of a paper jam issue,' . . . . 'It's not that the machines are down. I think it's a problem with the set-up and our elections technicians are going out to handle those calls.'[454]
March 2008	Premier AccuVote-TSX	Ohio	**Butler County, OH** In a letter to voting system manufacturer Premier, Butler Count officials stated that they noticed votes being dropped when they transferred totals from individual machines to the system's central tally server after the March 2008 primary election.[455] The Dayton Daily News reported that a subsequent investigation by election officials revealed that at least 1000 ballots were undercounted in 44 counties.[456] Though Premier initially blamed the problem on antivirus software installed on the machines, the president of the company later conceded in a letter to the Secretary of State that the server software contained a "logic error" that caused the problem.[457] *For more on this incident, see case study 1 on pages 10 - 11 of this report.*
March 2008	ES&S iVotronic	Ohio	**Franklin County, OH** According to the *Columbus Dispatch*, an e-voting machine reportedly removed the name of a Democratic candidate from some electronic ballots and replaced it with a gray bar that said "candidate withdrawn." Secretary of State Jennifer Brunner was one of the voters who received an erroneous ballot.

| | | | Investigators from SysTest Labs told Brunner, "That's exactly what you'd see if someone masked a name," and noted that voters in other precincts reported seeing a similar grey bar with the words "candidate withdrawn."

During its investigation of the incident, SysTest investigators also found election officials had not tested each voting machine to be used during the election.[458] |
|---|---|---|---|
| March 2008 | Premier AccuVote-TSX | Ohio | **Lucas County, OH**

The *Columbus Dispatch* reported that "[t]here was a report from one precinct in Lucas County where ballot issues were not appearing on touch-screen voting machines because of a problem with the encoder for the devices."

According to the paper, "[a] technician was dispatched to the precinct to fix the problem…[and] [o]fficials do not think anyone lost the chance to vote as a result."[459] |
| November 2004 | ES&S: iVotronic | Ohio | **Mahoning County, OH**

According to the *Vindicator* and the *Roanoke Times*, sixteen of the 312 precincts experienced problems with voting machines on Election Day, resulting in delays when tabulating the results. The problems were attributed to a number of issues, including machine malfunctions, problems with cartridges, and human error.[460] |
| November 2004 | ES&S: M550 | Ohio | **Sandusky County, OH**

The *News-Messenger* reported that an election turnout of 131% in one town indicated a tabulation error. Officials concluded that some ballots, in nine precincts, had been counted twice. They speculated that some ballots had been fed through the machine more than once.[461] |
| November 2004 | Danaher/Guardian ELECTronic | Ohio | **Franklin County, OH**

USA Today reported that an unexplained malfunction caused the voting system to record nearly 4,000 extra votes for George Bush when a voting machine cartridge was plugged into a laptop computer.[462] |
| November 2008 | Premier AccuVote-TSX | Pennsylvania | **Northumberland County, PA** |

			In Northumberland County, the *Daily Item* reported, "poll workers discovered that voters who cast a straight-party ticket could not see a summary of the candidates they voted for. Mike Anderson, deputy director of elections, said many of the county's 94 precincts were notified immediately and told to inform voters not to cast straight-party tickets." This apparently did not happen, and later that evening, a judge ordered the machines impounded.[463]
May 2008	Danaher Controls Shouptronic 1242	Pennsylvania	**Bucks County, PA** The *Bucks County Courier Times* reported that voting machines in five municipalities malfunctioned. The cause of the problems was unknown. County spokeswoman Stacey Hajdak said, "I can't tell you the exact problems of each machine until a technician examines it."[464]
April 2008	Danaher Controls Shouptronic 1242	Pennsylvania	**Philadelphia County, PA** According to local television station KDKA, at one polling location, an electronic voting machine "wouldn't work" and voters were forced to use paper ballots. A poll worker speculated that the problems were caused by a morning power outage in the precinct: "'We did have a problem with the electricity for a minute. It must have gone off and on – and maybe that triggered what the problem ended up being.'"[465]
November 2006	ES&S: iVotronic	Pennsylvania	**Allegheny County, PA** The *Pittsburgh Post-Gazette* reported that twenty voting machines were removed from polling stations across Allegheny County due to technical glitches. The faulty machines failed to "zero out," or reset the vote tally at zero before the voting started.[466]
May 2006	ES&S: Optical Scan (model unknown)	Pennsylvania	**Luzerne County, PA** According to the *Times Leader*, unofficial tallies differed by nearly 6,000 votes from official ballot counts. Some candidates' vote totals were hundreds of votes short of the initial count. Officials attributed the tabulation errors to the voting machine vender, who failed to reset a counter on a ballot scanner.[467]
July 2005	Danaher: 1242	Pennsylvania	**Berks County, PA** The *Reading Eagle* reported that 111 votes were lost during the primaries for the county election board. The error occurred when the cartridges used to

			record votes were accidentally programmed as training cartridges. Election results showed that three races were determined by less than 111 votes.[468]
May 2005	ES&S: M550	Pennsylvania	**Cumberland County, PA** A ballot programming error for straight-line ticket votes gave the office of magisterial district judge to the wrong candidate, according to the *Sentinel*. Straight-ticket Democratic votes were given to the Republican candidate. Straight-ticket Republican votes were not counted at all. Initial vote totals showed the Republican candidate had won by a 1,650 to 1,468 margin. Ultimately, however, the Democratic candidate won by a two-vote margin – 1,703 to 1,701 – in the recount.[469]
November 2008	ES&S iVotronic	South Carolina	**Charleston County, SC** According to local television station WSCS, local officials experienced "an error with the machine that automatically reads the electronic votes. The commission instead decided to enter the information into the system manually, a process that took more than 6 hours." It was unclear what caused the error.[470]
October 2008	ES&S iVotronic	South Carolina	**Beaufort County, SC** *Island Packet* reported that the votes of some voters for Bluffton Town Council did not appear on the review screen of the electronic voting machines, leading voters to believe that the votes were not recorded correctly. Voters who recognized the problem were able to cast their votes with paper ballots.[471]
January 2008	ES&S iVotronic	South Carolina	**Florence and Horry Counties, SC** According to the *Sun News*, election officials incorrectly programmed the voting machines to close on the wrong date: "In both counties, the voting machines were incorrectly set to close on Jan. 26, the date of the Democratic presidential primary, instead of Jan. 19, the date the Republican primary was held." Results were thus delayed as officials could not access the data until technicians manually closed each machine. During polling, voters in Horry County also complained of malfunctioning machines; according to the paper, supplies of emergency paper ballots "were running out."[472]
November	ES&S:	South Carolina	**Charleston County, SC**

2006	iVotronic		The *Post & Courier* reported that iVotronic machines failed to allow voters to review their choices in contests in which they voted for more than one candidate. "If voters can vote for only one candidate, the review screen shows who they voted for, but if they can vote for two or more candidates, as is the case in a Charleston County School Board race and the Charleston County Soil and Water Commission race, then the review screen indicates only whether they have voted for the maximum number allowed. It does not state for whom they voted."[473]
November 2005	ES&S: iVotronic	South Carolina	**Kershaw County, SC** According to *The State*, initial vote totals in the Republican and Democratic primary races for a County Council seat, showed that 3,208 votes had been cast in District 2. A manual count discovered that only 768 votes had been cast. Election officials suspected that the error had occurred because machine cartridges were incorrectly programmed to record some votes more than once. A state election official apparently did not check a box that would have prevented multiple readings.[474]
June 2009	ES&S Model 650	South Dakota	**Pennington County, SD** KOTA Radio reported that a "glitch" with the electronic scanning machine caused additional votes to be added to the total number of votes from the county. The problem was discovered and corrected, but the cause was unclear.[475]
November 2008	Premier AccuVote-TSX	Tennessee	**Shelby County, TN** The *Memphis Commercial Appeal* reported that the Bartlett municipal election "ballot did not load onto the voting machines" in Shelby County. Consequently, some voters used paper ballots instead while others simply did not vote in that race at all. According to the paper, "Election Commission officials said part of the problem was poll workers not putting the proper code in for the Bartlett ballot in precincts, such as Bartlett Elementary, where residents and non-residents are registered." Precincts where all registrants were Bartlett residents also had problems, which candidates said they understood to

			be the result of a "computer glitch."[476]
October 2008	ES&S iVotronic	Tennessee	**Davidson County, TN** According to the *Tennessean*, a voting "machine malfunctioned" in Davidson County, when it would not let a voter see her ballot. Election officials nevertheless told her that she had already voted, and asked her to "move on." At another site in the county, at least one voter had trouble using the touch-screen machine.[477]
October 2008	Hart InterCivic eSlate	Tennessee	**Knox County, TN** The *Knoxville News Sentinel* reported that an "anomaly in the voting machines" caused only the first three letters of the candidates' first names to appear on the review screen. This caused some voters to be confused about for whom their votes were recorded.[478]
October 2008	ES&S iVotronic	Tennessee	**Decatur County, TN** According to the *Decatur County Chronicle,* several voters complained that voting machines "switched" their votes in the presidential race, checking a candidate for whom they did not intend to vote. Voters told the paper that Election Commissioner Rick Box told them that the problem could occur when an individual touched the screen close to the border of the button containing a candidate's name. "[Box] blames the problem in part on poor design by software programmers, and adds that there may be sensitivity issues with the screen itself. Election Registrar Irene Campbell disagrees. She said there was no problem with the machines, though at the urging of state officials machine technicians were called in late Monday afternoon to investigate the problem."[479]
October 2008	ES&S iVotronic	Texas	**Jefferson County, TX** According to local television station KBMT, Jefferson County had some problems with electronic voting machines flipping votes. "[County Clerk Carolyn] Guidry says she has received less than a dozen complaints about the machines. Guidry said it is important for voters to make sure they are completely within the lines on the screen when selecting a candidate."[480]
October 2008	Premier	Texas	**Collin & Galveston Counties, TX**

	AccuVote TS R6; Hart InterCivic eScan; Premier AccuVote TSX		According to *Wired*, "[a] number of voters in several Texas counties have been complaining that voting machines they used to cast early votes flipped their votes from Democratic choices to Republican ones" when they tried to use the straight-party option on the machines. The problem was reported in at least seven counties which use several different voting systems manufactured by Hart InterCivic, ES&S, and Premier. "A Hart InterCivic spokesman said that at least one of the scenarios that a voter described isn't possible on the company's machines. A spokesman for ES&S said very few voters had complained and as far as he knew poll workers were never able to replicate the situation they described." According to the magazine, voters in jurisdictions West Virginia and Tennessee that use the same ES&S machines have also complained of vote flipping, though not when using the straight-party function.[481]
October 2008	ES&S iVotronic	Texas	**Jefferson County, TX** According to CNN, voters in Jefferson County had problems with the electronic voting machines flipping votes. A man reported that his mother "went to punch the selection for Obama and it flipped to McCain." Jefferson County Clerk Carolyn Guidry told CNN that she "received about a half a dozen calls about touch screen machines that were not recording voters' preferences accurately…. 'We go out immediately and re-calibrate machines that [polling workers] say they are having problems with,' Guidry said." Calibration, the process of identifying for the machine the point on the screen that is being touch, generally resolves the problem until repeated use of the machine requires another re-calibration." "But Guidry concedes that the problem . . . is something that needs fixing. 'I wish we could more or less double the space between each box [with the candidates' names on the touch screen],' said Guidry. 'But the program is not designed to do that right now.' Guidry also told CNN that Jefferson County has asked Election Systems & Software, the manufacturer of the county's machines, to look into making that change in the next iteration of the

			software."[482]
October 2008	ES&S iVotronic	Texas	**Palo Pinto County, TX** According to the *Mineral Wells Index*, "[a]t least two Palo Pinto County residents say they experienced early voting problems when the touch-screen voting machines they used kept switching their straight-party vote from Democratic to Republican.[483]
May 2008	Hart InterCivic eSlate	Texas	**Cass County, TX** The *Atlanta Citizens Journal* reported that an "error" allowed voters who did not live in District 1 to vote for the District's city council. City Manager Mike Ahrens told the paper that the mistake was made by the manufacturer, which failed to program the machines to restrict voting in the District 1 election to voters who live in the district. According to Ahrens, the company admitted fault.[484]
March 2008	Hart InterCivic eSlate	Texas	**Travis County, TX** There were delays in voting at one polling location, the *Daily Texan* reported, after "[a] technician discovered that the machine responsible for printing out access codes for voters was broken. Voting resumed about 10 a.m. after the machine was shut down and replaced with a new one." Travis County Clerk Dana DeBeauvoir told the paper that her office had received reports of broken machines from other precincts, as well.[485]
March 2008	ES&S Model 100	Texas	**Angelina County, TX** According to the *Lufkin Daily News*, a "programming error" caused the central tabulator to be unable to read the cards containing the count data. "'Each machine will only take 10 precincts,' [Acting Tax Assessor Thelma] Sherman said. 'The precinct numbers labeled on the cards did not match the information inside the card, and the machines would not accept them. We had to go back and start from scratch, physically counting ballots at times.'"[486]
November 2006	Diebold: TS-R6	Texas	**El Paso County, TX** El Paso County Attorney Jose Rodriguez told KFOX-TV News that 16 people complained that a vote cast on their touch-screen ballot registered to the wrong candidate. Five of the people called Rodriguez's office to complain. Eleven others called a local radio show to complain.[487]

November 2006	ES&S: iVotronic	Texas	**Hidalgo County, TX** According to the *Dallas Morning News*, election officials had to recount votes for U.S. House District 28 manually after discovering that the device used to download election totals from its touch-screen machine malfunctioned. "The director of elections for the Texas Secretary of State's office, Ann McGeehan, said votes would be counted using a printout generated by each voting machine."[488]
October 2006	ES&S: iVotronic; M650	Texas	**Bexar County, TX** The *San Antonio Express News* reported that the tabulation of election results was delayed for one and a half hours because the tabulation computers had not been programmed with updated data in order to count "mail-in" paper ballots. The computer system was taken off-line and updated with the information needed to process the 3,000 paper ballots, which were then tabulated using high-speed scanners.[489]
October 2006	ES&S: iVotronic	Texas	**Jefferson County, TX** During early voting, voters complained that when they selected a particular candidate, another candidate's name would light up. KDFM reported that the vote switching occurred with voters who had cast a straight Democratic ticket as well as individual votes.[490]
March 2006	Hart: eSlate; eScan	Texas	**Tarrant County, TX** According to the *Fort Worth Star-Telegram*, a programming error during the Tarrant County primary election caused an extra 100,000 votes to be recorded than had been cast. Initial tallies indicated that 158,000 people had voted when actually only approximately 58,000 had voted. The problems stemmed from a programming error created by the vendor, Hart InterCivic. The error caused the computer to compound vote totals each time the election totals were updated throughout the night, rather than simply keeping a running total.[491]
March 2004	ES&S: M315	Texas	**Lubbock County, TX** According to the *Lubbock Avalanche Journal*, machines failed to count votes in the race for Precinct 8 Democratic chairman. The ballots had to be recounted with alternate software, provided by

			ES&S.[492]
November 2002	ES&S: M650	Texas	**Scurry County, TX** An unanticipated landslide victory for two Republican commissioner candidates caused poll workers to question the results. According to the *Houston Chronicle*, a chip in the ES&S M650 contained an incorrect ballot program. After ES&S sent a new chip and the county officials counted the votes by hand, the opposing Democratic candidates actually won by a large margin.[493]
October 2008	Premier AccuVote-TSX	Utah	**Washington County, UT** According to the *Spectrum*, "Washington County Clerk Cal Robison said a technical glitch slowed the voting early in the morning….The machines were fixed within a couple of hours." No further information was given.[494]
March 2009	Premier AccuVote-OS	Virginia	**Fairfax County, VA** The *Washington Post* reported that, in Fairfax County, an electronic "voting machine broke down" at the end of the election day while "officials were tallying" votes. [495] According to the *Reston Connection*, the machine totals initially showed 364 more ballots recorded than were actually cast. Election officials had to run the "ballot images" generated by the machine and hand-count them in order to obtain accurate vote totals. It was unclear what caused the problem.[496] *For more on this incident, see case study 11 on pages 20 - 21 of this report.*
November 2008	Advanced Voting Systems WinVote	Virginia	**Fairfax County, VA** According to CNN, "General Registrar Rokey Suleman said a handful of memory cards did not work when machines were started this morning …. He said a 'very, very small number of machines' were affected." No further information was given.[497]
November 2006	AVS: WinVote	Virginia	**Fairfax County, VA** According to *Connection Newspapers*, there were reports that if voters touched the screen around the U.S. Senate box, the wrong candidate would light up. Election officers told voters to make sure to use their fingertips and to notify them of any malfunctions they encountered. Fairfax's general registrar called the

			WinVote manufacturer to report the glitch and was told it was a calibration issue and couldn't be immediately fixed.[498]
November 2003	AVS: WinVote	Virginia	**Fairfax County, VA** The *Washington Post* reported voter complaints that the machines were failing to register their votes for incumbent school board member Rita S. Thompson (R). Local election officials told the paper that testing later indicated that for every 100 votes cast for Thompson, the machines subtracted approximately one vote for her. According to voters, the machine would initially display an "x" aside Thompson's name, but the "x" would disappear seconds later. One voter said it took him about 4 or 5 attempts before he successfully voted for Thompson. It was impossible to determine whether lost votes were intended for Thompson or whether other candidates also lost votes.[499]
November 2009	Sequoia Optech Insight	Washington	**Pierce County, WA** The *News Tribune* reported that new vote tabulation software ran so slowly in Pierce Co. that technicians had to add memory to the computer system. Election results were delayed.[500]
November 2004	Sequoia AVC Edge	Washington	**Snohomish County, WA** According to KING 5 News, voters in at least four polling precincts reported that they experienced vote-switching errors. They explained that the review screen showed they had chosen the opposing candidate. It took several attempts for each voter to correct the mistakes. Review screens showed that the correct candidates had been selected. Snohomish County elections official Bob Terwilliger reported that the problem only occurred in 15 out of 950 electronic voting machines throughout the county.[501]
November 2008	ES&S iVotronic	West Virginia	**Marion County, WV** The *Times West Virginian* reported that initially "4,600 early votes could not be counted because of a glitch in the PEB reading software." An ES&S technician was on hand but some were frustrated by the technician's performance: "'I'm very frustrated with the fact that we had an ES&S technician here and he couldn't get the machine to tally the early votes,' said Commission [sic] Randy Elliott." Eventually the problem was resolved, and election

			officials managed to get the votes uploaded and tallied.[502]
November 2008	ES&S iVotronic	West Virginia	**Marion County, WV** According to local television station WHSV, "[t]he machines that scan the ballots quit tabulating votes around 7:30 p.m. when clerks tried to feed in the results of early voting. [County Commissioner Wayne] Stutler says that caused a glitch in the software and stopped all vote-counting." The cause of the problem was unclear.[503]
October 2008	ES&S iVotronic	West Virginia	**Jackson, Putnam, Ohio, Monongalia, and Greenbrier Counties, WV** According to the *Charleston Gazette*, at least 14 voters from these counties reported that the electronic voting machines switched their votes from Democratic to Republican candidates. In each case, election officials helped the voters to correct the ballots.[504]
October 2008	ES&S Model 650	West Virginia	**Berkeley County, WV** The *Charleston Gazette* reported that in Berkeley County some voters experienced problems—their votes for Obama repeatedly to votes for McCain. In response to voter complaints, the WV Secretary of State advised county clerks to recalibrate machines if necessary.[505]
October 2008	ES&S iVotronic	West Virginia	**Ohio County: WV** According to the *Wheeling News Register*, a touch-screen voting machines flipped a voter's ballot. The voter tried multiple times to cast her vote but kept running into the vote- flipping problem. She was, however, eventually able to cast her vote for her candidate of choice. The paper noted that similar incidents had been reported in at least two other West Virginia counties as well. West Virginia Secretary of State Betty Ireland identified calibration problems as the likely culprit, saying that the machines can become miscalibrated when jostled, but she also stated that touching near, but not directly on, a candidate's name "confuses the machine." Ireland ordered Ohio county to recalibrate the machines in use during early voting; according to the *News Register*, other counties in the state also took this precaution.[506]

October 2008	ES&S iVotronic	West Virginia	**Jackson County, WV** According to the *Charleston Gazette*, voters in Jackson County complained of their votes being flipped from Democratic to Republican candidates. In response, election officials were directed by the Deputy Secretary of State to recalibrate the voting machines.[507]
October 2008	ES&S iVotronic	West Virginia	**Putnam County, WV** The *Charleston Gazette* reported that several voters in Putnam County complained of their votes being flipped from Democratic to Republican candidates.[508]
May 2008	ES&S iVotronic	West Virginia	**Wayne County, WV** According to the *Huntington Herald-Dispatch*, eight to ten voting machines in Wayne County malfunctioned during the primary election. Wayne County Clerk Bob Pasley told the paper that the problem was with the printers attached to the machines that are intended to create a paper record of voters' actions: "Pasley said several of the printers jammed, causing certain votes to be counted and digitally saved, but not displayed on the paper receipt." Pasley told the paper that voters also had trouble selecting their intended candidate on touch screen machines in use in the county due to calibration issues.[509]
February 2008	Premier Accu-Vote ES 2000	Wisconsin	**Walworth County, WI** According to the *Janesville Gazette*, memory card problems caused delays in election results in the village of Darien. Walworth County Clerk Kim Bushey told the paper that the card failed midmorning and needed to be 'redownloaded' for voting to continue. "'Any votes cast while the card was down were placed in a locked box in the voting machine,' Bushey said." A second memory card malfunction prevented poll workers from submitting results electronically. Bushey asked village election officials to fax her the results, which she then entered into the county totals manually.[510]
November	ES&S:	Wisconsin	**Taylor County, WI**

2006	M150		According to the *Marshfield News Herald*, four and a half months after the election, a consulting firm discovered that the optical scanners were programmed incorrectly. All straight-party votes were lost, affecting approximately 600 ballots.[511]
November 2004	ES&S: Optech III-P Eagle	Wyoming	**Natrona County, WY** According to the *Casper Star Tribune*, the Unity Election Management System, used to tally votes from both optical scan machines and paperless electronic voting machines, failed to tally votes correctly in several municipal races. Noticing that the ballot totals in the city of Evansville seemed low, election officials checked the printouts from the precinct voting machines. They found that the totals didn't match the totals computed by the Unity software. Election officials conducted a recount using printouts from the voting machines and the paper absentee ballots.[512]

DuPage County Election Summary
General Primary Election – March 16, 2004

May 18, 2004

Introduction

This document outlines the areas of DuPage election support that I was personally involved with where I believe there is room for improvement. Some of these ideas were generated by discussions at the DuPage post-election meeting and others from my own evaluation of the processes that I observed during the recent election.

Suggestions for Improvement

Pre-election planning – In order to properly plan for all the tasks and deadlines that are involved with an election in DuPage, we need to develop a formal project plan and project schedule. These planning devices will help ensure that important tasks are not overlooked, and that critical dates and deadlines are recorded and shared between the DuPage Election Commission staff and Fidlar.

Suggestions:

DELETED

GEMS Upload Failure on York 58 – This memory card had a failed upload transmission on election night that was not detected until the next day when reports were run on the precinct, and zero results were found for each race within the precinct. The status of the memory card upload within GEMS was "successful" but the upload record showed the ballot count to be zero. It is rather discomforting that this failed transmission was not detected on election night.

*Sections of this document have been deleted by the Brennan Center to include only those paragraphs relevant to this report. A complete copy of the document is on file with the Brennan Center.

ENDNOTES

1. Definitions for key terms such as 'voting systems' used in the report can be found in Appendix A.

2. Telephone Interview with Denise Lamb, Chief Deputy Clerk for Elections, Santa Fe County, New Mexico (Sept. 30, 2009).

3. United States Election Assistance Commission, *Election Administration and Voting Survey Frequently Asked Questio*ns, http://www.eac.gov/research/election_administration_and_voting_survey_faqs.aspx (last visited Aug. 9, 2010); Spencer Overton, *Stealing Democracy*, http://www.stealingdemocracy.com/facts.cfm (last visited Aug. 9, 2010).

4. The Proposed Final Judgment and Competitive Impact Statement are reprinted in 75 Fed. Reg. 12256-12270 (Mar. 15, 2010).

5. S.B. 1404, 2009-10 Reg. Sess. (Cal. 2010).

6. Specifically, S.B. 223 2005-06 Reg. Sess. (N.C. 2005) states that "[t]he vendor shall promptly notify the State Board of Elections and the county board of elections of any county using its voting system of any decertification of the same system in any state, of any defect in the same system known to have occurred anywhere, and of any relevant defect known to have occurred in similar systems."

7. *See* Michael Traugott, et. al., The Impact of Voting Systems on Residual Votes, Incomplete Ballots, and Other Measures of Voting Behavior (conference paper presented at the Midwest Political Science Association, Chicago, IL, Apr. 7-10, 2005), Charles Stewart III, *Residual Vote in the 2004 Election* (Caltech/MIT Voting Technology Project, VTP Working Paper No. 2.3, 2005).

8. 42 U.S.C. §§ 15322, 15371(a) (2009).

9. 42 U.S.C. § 15322 (2009).

10. Sarah F. Liebschutz and Daniel J. Palazzolo, *HAVA and the States*, 35 Publius: J. of Federalism 497 (2005), *available at* http://publius.oxfordjournals.org/cgi/reprint/35/4/497.pdf; Press Release, Representative Rush Holt, Holt Urges Election Assistance Commission to Address Voting Machine Failures, Accessibility in 2010 Election Survey (Nov. 19, 2009), *available at* http://www.house.gov/apps/list/press/nj12_holt/111909.html; VotersUnite!, Proposal to the EAC: A Public Information-Exchange Mechanism Regarding Fielded Voting Systems (May 2008), *available at* http://www.votersunite.org/info/EACInfoClearinghouseProposal.pdf.

11. E-mail from Jeannie Layson, Director of Communications and Congressional Affairs, U.S. Election Assistance Commission, to Lawrence Norden, Senior Counsel, Brennan Center for Justice (Sept. 10, 2010, 15:01 EST) (on file with the Brennan Center).

12. Testimony of Jeannie Layson, Director of Communications and Congressional Affairs, U.S. Election Assistance Commission, *available at* http://www.eac.gov/News/docs/04-08-10-eac-public-mtg-testimony-layson-final.pdf/attachment_download/file.

13. Testimony of Jeannie Layson, Director of Communications and Congressional Affairs, U.S. Election Assistance Commission, *available at* http://www.eac.gov/assets/1/AssetManager/05-27-10%20EAC%20Public%20Mtg%20 Testimony%20Layson%20FINAL.pdf.

14. E-mail from Jeannie Layson, Director of Communications and Congressional Affairs, U.S. Election Assistance Commission, to Lawrence Norden, Senior Counsel, Brennan Center for Justice (May 19, 2010, 13:58 EST) (on file with the Brennan Center).

15. United States Government Accountability Office, Report to the Chairman, Committee on House Administration, House of Representatives: Federal Program for Certifying Voting Systems Needs to Be Further Defined, Fully Implemented, and Expanded 4-5, 31 (September 2008), *available at* http://www.gao.gov/new.items/d08814.pdf?source-ra [hereinafter *GAO Voting Systems Report*]. ("The scope of EAC's efforts to track

and resolve problems with certified voting systems does not extend to those systems that were either qualified by NASED or were not endorsed by any national authority. According to program officials, the commission does not have the authority or the resources needed to undertake such a responsibility … As a result, the commission's efforts to track and resolve problems with voting systems do not include most of the voting systems that will be used in the 2008 elections.").

16. United States Election Assistance Commission, Testing and Certification Program Manual Version 1.0 (2007) [hereinafter VSTCPM].

17. E-mail from Jeannie Layson, Director of Communications and Congressional Affairs, U.S. Election Assistance Commission, to Lawrence Norden, Senior Counsel, Brennan Center for Justice (May 14, 2010, 17:09 EST) (on file with the Brennan Center).

18. *Id.*

19. VSTCPM, *supra* note 16 at 2.3.2.7.

20. Telephone Interview with Jeannie Layson, Director of Communications and Congressional Affairs, U.S. Election Assistance Commission (Aug. 25, 2010).

21. VSTCPM, *supra* note 16 at 8.7.3.

22. United States Election Assistance Commission, Voting System Testing and Certification Program Voting Systems Technical Advisory Intermittent Freeze/Shutdowns with EAC Certified ES&S Unity 3.2.0.0 System (2010), http://www.eac.gov/assets/1/AssetManager/Product_Advisory-ES&S-06.25.10%20FINAL.pdf.

23. *Id.*

24. United States Election Assistance Commission, Voting System Testing and Certification Program Voting System Technical Advisory Configuration Management Issues with EAC certified MicroVote EMS 4.0B (Modification) (2010), http://www.eac.gov/assets/1/AssetManager/MicroVoteEMS40B_Product_Advisory-final_august_23_2010.pdf.

25. E-mail from Matt Masterson Deputy Director of the EAC's Testing and Certification Program to Lawrence Norden, Senior Counsel, Brennan Center for Justice (July 1, 2010, 11:20 EST and Aug. 26, 2010, 15:32 EST) (on file with the Brennan Center) (Confirming that two counties in Ohio, two counties and twenty-two towns, cities, and villages in Wisconsin, twenty-two counties in Florida, and nine counties in Iowa, use certified equipment); E-mail from Matt Masterson Deputy Director of the EAC's Testing and Certification Program to Lawrence Norden, Senior Counsel, Brennan Center for Justice (Aug 31, 2010, 11:16 EST) (on file with the Brennan Center) (Confirming that Delaware uses EAC certified central count machines to count absentee ballots. Its polling place machines are not EAC certified).

26. Counties may "upgrade" existing systems to versions that will be EAC certified. But for the most part, given the current economic climate, counties and states around the country are unlikely to receive big grants to purchase entirely new equipment.

27. United States Election Assistance Commission, State Requirements and the Federal Voting System Testing and Certification Program, 5 (2009), http://www.eac.gov/assets/1/Page/State%20Requirements%20and%20the%20Federal%20Voting%20System%20Testing%20and%20Certification%20Program.pdf.

28. VSTCPM, *supra* note 16 at 8.7.4.

29. Letter from Douglas A. Kellner, Co-Chair of the New York State Board of Elections to the Honorable Thomas R. Wilkey, Director of the EAC (June 30, 2010).

30. *Compare* County of San Diego Registrar of Voters Contract No. 46619 between County of San Diego and Diebold Election Systems, Inc. and Diebold Incorporated at 20-21 (2003), *available at* http://accurate-voting.org/contracts/CA/San_Diego/CA_sandiego_2003.pdf (demonstrating an contractual obligation for the county to inform the vendor of defects in the voting system with no similar obligation on the part of the vendor), *with* Contract No. 08455, Voting Equipment Agreement between Election Systems and Software, Inc. and Kansas Secretary of State at 7 (Nov. 16, 2005) (stating that the contractor will notify the customer of any defects or problems that arise).

31. E-mail from Jane Platten, Director, Cuyahoga County Board of Elections, to Lawrence Norden, May 27, 2010.

32. For examples of a lag in vendor acknowledgement of voting system problems, see the case studies in this report from Butler County, Ohio (at pp. 10 - 11) and Humboldt County, California (at pp. 12 - 13).

33. By usability concerns we mean flaws in the machine's programming, software or hardware that make poll worker or voter error significantly more likely, and which lead to significant disenfranchisement.

34. This appears to be precisely what occurred in Humboldt County, California in 2008. This case is detailed on pages 12 - 13.

35. E-mail from Betty McGary, Executive Director, Butler County Board of Elections, to Lawrence Norden, Senior Counsel, Brennan Center for Justice (May 17, 2010 11:58 EST) (on file with the Brennan Center); *see also* Letter from Betty McGary, Executive Director, and Lynn Kinkaid, Deputy Director, Butler County Board of Elections, to Dave Byrd, President, Premier Election Solutions (Apr. 4, 2008) (on file with the Brennan Center) [hereinafter *McGary Letter 1*].

36. Lynn Hulsey, *Voting Machine Maker Says Error May Cause Votes to be Uncounted*, Dayton Daily News, Aug. 23, 2008, at A6.

37. Editorial, *That's a Pretty Big Glitch*, N.Y. Times, Oct. 9, 2008, at 36. The paper refers to the manufacturer in this incident as Diebold.

38. McGary Letter 1, *supra* note 35.

39. Letter from Betty McGary, Executive Director, and Lynn Kinkaid, Deputy Director, Butler County Board of Elections, to Dave Byrd, President, Premier Election Solutions (Apr. 9, 2008) (on file with the Brennan Center).

40. *See* Premier Election Solutions, Review of Butler County March 2008 Primary Election Issues (May 2008).

41. E-mail from Betty McGary to Lawrence Norden, *supra* note 35.

42. Office of the Ohio Sec'y of State, Premier Memo (Aug. 21, 2008) (on file with the Brennan Center).

43. *Id.*

44. *Id.*; Letter from Dave Byrd, President, Premier Election Solutions, to Jennifer Brunner, Ohio Sec'y of State (Aug. 19, 2008) (on file with the Brennan Center).

45. *Id.*

46. E-mail from Betty McGary to Lawrence Norden, *supra* note 35.

47. Telephone Interview with Carolyn Crnich, Registrar of Voters, Humboldt County, California (Sept. 29, 2009) [hereinafter *Crnich Interview*].

48. Thaddeus Greenson, *Software Glitch Yields Inaccurate Election Results*, The Times-Standard, Dec. 12, 2008, http://www.times-standard.com/localnews/ci_11145349; Kim Zetter, *Serious Error in Diebold Voting Software Caused Lost Ballots in California County*, Threat Level (Blog of Wired Magazine), Dec. 8, 2008, http://www.wired.com/threatlevel/2008/12/unique-election [hereinafter *Zetter 2008*].

49. E-mail from Carolyn Crnich, Clerk, Humboldt County, California, to Lawrence Norden, Senior Counsel, Brennan Center for Justice at New York University School of Law (May 1, 2010, 12:00 EST) (on file with the Brennan Center).

50. *Id.*

51. Crnich Inteview, *supra* note 47.

52. Zetter 2008, *supra* note 48; Jaikumar Vijayan, *California Finds E-Voting Software Had Errors, Data Deletion Functions*, Computerworld, Mar. 4, 2009.

53. Debra Bowen, California Sec'y of State, Report to the Election Assistance Commission Concerning Errors and Deficiencies in Diebold/Premier GEMS Version 1.18.19 2, 4 (2009).

54. *Errors and Deficiencies in Diebold/Premier GEMS version 1.18.19, Hearing before California Secretary of State Panel* 19 (Mar. 17, 2009) (statement of Justin Bales, General Manager for Western States, Premier Elections Solutions) [hereinafter *Bales Testimony*].

55. Crnich Interview, *supra* note 47.

56. Bales Testimony, *supra* note 54, at 20.

57. Crnich Interview, *supra* note 47.

58. *See* Florida Division of Elections, Analysis and Report of Overvotes and Undervotes for the 2006 General Election, General Over Undervote Table, *available at* http://election.dos.state.fl.us/reports/index.shtml.

59. Mary K. Garber, Voting System Performance Problems – Conclusions and Recommendations, in *Assessing Election Accuracy in Florida's 2006 General Election: A Comparison of Voting System Performance Using Undervote Rates in Statewide Races in Florida's 2006 General Election* (Dec. 2008) (unpublished manuscript, on file with the Brennan Center) [hereinafter *Garber manuscript*].

60. *Id.*

61. *Id.*

62. Kim Zetter, *Lost E-Votes Could Flip Napa Race*, Wired, Mar. 15, 2004, *available at* http://www.wired.com/politics/security/news/2004/03/62655.

63. *Id.*

64. *Id.*

65. Garber manuscript, *supra* note 59.

66. *Id.*

67. E-mail from Mary K. "Kitty" Garber, Associate Director, Florida Fair Elections Center, to Lawrence Norden, Senior Counsel, Brennan Center for Justice at NYU School of Law (Apr. 12, 1010, 15:17 EST) (on file with the Brennan Center).

68. E-mail from Bill Cowles, Supervisor of Elections, Orange County, Florida, to Laura Seago, Research Associates, Brennan Center for Justice at NYU School of Law (May 5, 2010, 9:34 EST) (on file with the Brennan Center).

69. Lawrence Norden, et. al., Is America Ready to Vote? State Preparations for Voting Machine Problems in 2008 (Brennan Center 2008), *available at* http://www.brennancenter.org/content/resource/is_america_ready_to_vote [hereinafter *Is America Ready to Vote*].

70. Daniel Nasaw, *Voting Machine Claim to be Studied by County*, Arkansas Democrat-Gazette, May 20, 2006 [hereinafter *Nasaw*].

71. Nasaw, *supra* note 70; Height Could Make a Difference in this Year's Elections (THV Broadcast, May 20, 2006) (transcript available at http://www.todaysthv.com/news/news.aspx?storyid=28836) [hereinafter *THV*];

72. THV, *supra* note 71.

73. *See* Margaret McDowell, Cheryl Fryar, Cynthia Ogden, and Katherine Flagal, National Center for Health Statistics, National Health Statistics Reports No. 10, Anthropometric Reference Data for Children and Adults: United States, 2003–2006 16 (2008).

74. Nasaw, *supra* note 70.

75. *See, e.g.,* Sarah Everett, The Usability of Electronic Voting Machines and How Votes Can Be Changed Without Detection (May 2007) (Unpublished PhD dissertation, Rice University) *available at* http://chil.rice.edu/research/pdf/EverettDissertation.pdf, Bryan Campbell and Michael Bryne, Do Voters Notice Review Screen Anomalies? A Look at Voting System Usability (2009) (paper presented at 2009 Electronic Voting Technology Workshop/Workshop on Trustworthy Elections) *available at* http://www.usenix.org/event/evtwote09/tech/full_papers/campbell.pdf.

76. Nasaw, *supra* note 70.

77. *Id.*

78. M.C. Moewe, *Voting Machine Maker Admits Problem*, Daytona Beach News-Journal, Nov. 3, 2007, at 1A. In the article, the paper refers to the manufacturer as Diebold.

79. *Id.*

80. *Id.*

81. *Id.*

82. *Id.*

83. *Id.*

84. *Id.*

85. *Id.*

86. *Id.*

87. *Id.*

88. M.C. Moewe, *Info on Voting Flaws Not Shared*, Daytona Beach News-Journal, Nov. 12, 2007, at 1A.

89. *Id.*

90. *Id.*

91. Jeremy Milarsky and Rafael A. Olmeda, *Software Tweak Restores Votes*, Sun-Sentinel, Nov. 5, 2005, at 23A.

92. Eliot Kleinberg, *Broward Machines Count Backward*, Palm Beach Post, Nov. 5, 2004, at 29A [hereinafter *Kleinberg*]; *see also* Mark Leon Goldberg, *Don't Count on It: Why We Need Paper Trails to Back Up Compromised and Fallible Voting Machines – and Why We're Not Getting Them*, The American Prospect, Jan. 2005, at A20.

93. Milarsky and Olmeda, *supra* note 91.

94. Milarsky and Olmeda, *supra* note 91, Kleinberg, *supra* note 92.

95.   Kleinberg, *supra* note 92.

96.   Mary Ellen Klas and Gary Fineout, *Touchscreen Voting Machines Have Software Flaw, Florida Officials Learn*, Miami Herald, Jun. 12, 2004, at 1B [hereinafter *Klas and Feinout*].

97.   Mary Ellen Klas, *Flaw in Florida Touch-Screen Voting Machines Was Known in 2002*, Miami Herald, Jun. 12, 2004, at 1B.

98.   Klas and Fineout, *supra* note 96.

99.   *Id.*

100.   *Id.*

101.   Klas, *supra* note 97.

102.   Helen Gao, *Faulty Switches Blamed for Voting Woes*, San Diego Union Tribune, Apr. 14, 2004, at B-3 [hereinafter *Gao*].

103.   Luis Monteagudo Jr. and Helen Gao, *Glitches in Voting Machines Examined*, San Diego Union Tribune, Mar. 4, 2004, at B-1 [hereinafter *Monteagudo and Gao*].

104.   *Id.*

105.   *Id.*

106.   Gao, *supra* note 102.

107.   Bill Ainsworth, *Tech Says Diebold Knew of Problem*, San Diego Union-Tribune, Apr. 22, 2004, at B-1 [hereinafter *Ainsworth*]; Hearing Before the Cal. Sec'y of State Voting Systems and Procedures Panel (Apr. 21, 2004) (statement of James Dunn) [hereinafter *Dunn Testimony*]; *Touch-Screen Trouble*, ABC News, Oct. 27, 2004, *available at* http://abcnews.go.com/Politics/Vote2004/story?id=203866&page=1.

108.   Dunn Testimony, *supra* note 107, at 73.

109.   *Id.* at 77-78.

110.   Ainsworth, *supra* note 107; Hearing Before the Cal. Sec'y of State Voting Systems and Procedures Panel (Apr. 21, 2004) (statement of Robert Urosevich) at 59.

111.   Frank Zoretich, *Election Results Certified After Software Blamed*, Albuquerque Tribune, Nov. 19, 2002 (on file with the Brennan Center) [hereinafter *Zoretich*].

112.   Dan McKay, *County Certifies Vote Tally*, Albuquerque Journal, Nov. 19, 2002, at D1; Zoretich, *supra* note 106.

113.   Zoretich, *supra* note 111.

114.   Dan McKay, *Voting Machines Criticized*, Albuquerque Journal, Sept. 26, 2004, at A1.

115.   Supplemental Brief for the petitioner at 10 (citing James A. Noel Aff. ¶¶ 3-8) Lopategui v. Vigil-Giron ex. rel., No. CV 2005-0433 (N.M. 2d Dist. Ct. Dec. 20, 2005).

116.   *Id.*

117.   *Id.*

118.   Zoretich, *supra* note 111.

119. Telephone Interview with Denise Lamb, Chief Deputy Clerk for Elections, Santa Fe County, New Mexico (Sept. 30, 2009).

120. Kim Zetter, *E-Vote Machines Drop More Ballots*, Wired, Feb. 9, 2004, *available at* http://www.wired.com/politics/ security/news/2004/02/62206 [hereinafter *Zetter 2004*].

121. *Id.*

122. Telephone Interview with Cherie Poucher, Director, Wake County Board of Elections, in Raleigh, N.C. (Oct. 5, 2009) [hereinafter *Cherie Poucher interview*].

123. Zetter 2004, *supra* note 120.

124. *Id.*

125. Is America Ready to Vote, *supra* note 69.

126. Cherie Poucher interview, *supra* note 122.

127. Zetter 2004, *supra* note 120. According to Poucher, all but 78 recast their votes.

128. Zetter 2004, *supra* note 120.

129. 42 U.S.C. § 15481(a)(3)(A) (2010).

130. Noel Runyan, Collection of my Electronic Voting Experiences on the Sequoia Edge II (Verified Voting Foundation 2009), *available at* https://www.verifiedvotingfoundation.org/article.php?id=6717; *See, e.g.*, Noel Runyan and Jim Tobias, Accessibility Review Report for California, Top-to-Bottom Voting Systems Review (Office of the California Secretary of State 2007), *available at* http://www.sos.ca.gov/elections/voting_systems/ttbr/ accessibility_review_report_california_ttb_absolute_final_version16.pdf.

131. Runyan, *supra* note 130.

132. *See, e.g.,* Runyan and Tobias, *supra* note 130.

133. In 2008 alone, there were 480 complaints characterized as "accessibility problems" logged on the Election Protection 866-OUR-VOTE system.

134. Cherie Poucher interview, *supra* note 122.

135. *Id.*

136. We suggest triggers for mandatory voter reporting at p. 32.

137. Julia O'Donoghue, *Big Questions about Voting Machines*, Reston Connection, Mar. 18, 2009, *available at* http:// www.connectionnewspapers.com/article.asp?article=326929&paper=71&cat=104.

138. *See generally* Is America Ready to Vote, *supra* note 69.

139. Telephone Interview with July Flaig, Election Manager, Fairfax County, Virginia, Office of Elections (April 13, 2010).

140. *Id.*

141. *Id.*

142. *Id.*

143. Telephone Interview with Rokey Suleman, Executive Director, Washington, DC Board of Elections and Ethics (Apr. 1, 2010).

144. *Id.*

145. Mary M. Cheh, Phil Mendelson, and Harry Thomas, Council of the District of Columbia, Restoring Confidence in the District's Elections: Preliminary Report and Recommendations of the Council Board of Elections and Ethics Investigation Special Committee 1 (Oct. 8, 2008) [hereinafter *D.C. Council Report*].

146. *Id.*

147. Nikita Stewart and Elissa Silverman, *Primary Vote Still Doesn't Add Up*, Wash. Post, Sept. 22, 2008 at B1; Nikita Stewart, *District's Primary Results Certified*, Wash. Post, Sept. 26, 2008 at B1.

148. *Id.*

149. D.C. Council Report, *supra* note 145, at 4; Sequoia Voting Systems, Report to the District of Columbia Board of Elections and Ethics 1 (Sept. 22, 2008).

150. Sequoia Voting Systems, *supra* note 149.

151. *Id.* at 3 (emphasis added).

152. *Id.* at 1 (Sept. 22, 2008).

153. Committee Protective Order between Board of Elections and Ethics Investigation Special Committee of the District of Columbia Council and Sequoia Voting Systems, Inc. (Jun. 5, 2009), *available at* http://www.voteraction.org/files/Exhibit%20I%20-%20DC%20protective%20order.pdf [hereinafter *D.C. protective order*].

154. Nikita Stewart, *Cheh to Seek Court Order in Elections Code,* Wash. Post, Apr. 23, 2009.

155. Letter from Mary Ellen B. Offer to Mary M. Cheh, *Re: Subpoena Duces Tecum to Sequoia Voting Systems, Inc.*, (Sept. 26, 2008) ("[T]here are no documents that are responsive to this request with regard to the voting system used by the DCBOEE - a combination of the Eagle III-P precinct-based optical scan units, Edge I non-VVPAT touchscreen units and WinEDS 3.1.012.").

156. D.C. protective order, *supra* note 153; Tim Craig, *Firm to Give D.C. Information about Its Voting Devices*, Wash. Post, Jun. 6, 2009.

157. Stewart, *supra* note 154.

158. *Id.*

159. D.C. protective order, *supra* note 153; Craig, *supra* note 156.

160. D.C. protective order, *supra* note 153; Craig, *supra* note 156.

161. City Council R. 18A18-0238, 2009, Council Period 18 (D.C. 2009), 2009 D.C. Law L18-0103.

162. E-mail from David Zvenyach, Chief of Staff, Office of Councilmember Mary Cheh, to Lawrence Norden, Senior Counsel, Brennan Center for Justice (Apr. 12, 2010, 18:17 EST) (on file with the Brennan Center).

163. Andrew W. Appel, et. al., Princeton University, Insecurities and Inaccuracies of the Sequoia AVC Advantage 9.00H DRE Voting Machine 117 (October 17, 2008) [hereinafter *Princeton Study*].

164.   E-mail from Penny Venetis, Co-Director, Rutgers Constitutional Litigation Clinic, to Lawrence Norden, Senior Counsel, Brennan Center for Justice (Apr. 8, 2010, 12:38 EST) (on file with the Brennan Center) [hereinafter *Venetis E-mail*].

165.   *Id.*

166.   Robert Stern, *Makers Defend Voting Booths; Tally Errors Blamed on Polling Workers*, Times of Trenton, Mar. 1, 2008, at A1.

167.   *Id.*

168.   Joe McIntyre, Senior Project/Account Manager, Sequoia, *WinEDS Technical Product Bulletin – AVC Advantage Party Turnout Issue/Operator Panel Usage* March 4, 2008.

169.   Posting of Ed Felten to Freedom to Tinker, *Interesting E-mail from Sequoia*, http://freedom-to-tinker.com/blog/felten/interesting-email-sequoia (Mar. 17, 2008, 14:25 EST).

170.   Carly Rothman, *Plan for Voting Machine Probe Dropped After Lawsuit Threat*, Star-Ledger, Mar. 18, 2008, *available at* http://www.nj.com/news/index.ssf/2008/03/voting_machine_maker_threatens.html.

171.   Princeton study, *supra* note 163 at 113-114.

172.   *Id.* at 1-2.

173.   Joshua Brockman, *N.J. Voting Machines May Be Tested for Accuracy*, Nat'l Public Radio, http://www.npr.org/templates/story/story.php?storyId=90727541.

174.   Venetis E-mail, *supra* note 164; Joe Ryan, *Judge Rules Public Can See Voting Machine Test Results*, Star-Ledger, Jun. 20, 2008, http://www.nj.com/news/index.ssf/2008/06/judge_lifts_gag_order_on_votin.html.

175.   Princeton study, *supra* note 163 at 117-118.

176.   *Id.* at 118.

177.   Venetis E-mail, *supra* note 164.

178.   Princeton study, *supra* note 163 at 8-10.

179.   Derrick Nunnally, *Voter Interest Surges in Pennsylvania Suburbs*, Philadelphia Inquirer, Mar. 6, 2008, http://www.philly.com/philly/news/politics/suburban_pa/16327086.html?viewAll=y.

180.   IC § 3-11-7.5-4(d); Rick Yencer, *Election Software Not Certified*, Star Press, Apr. 20, 2006, at 3A [hereinafter *Yencer 1*]; Cindy Larson, *Uncertified Voting Machines to Be Used*, News-Sentinel, Apr. 21, 2006 [hereinafter *Larson*]; Robert Annis, *Some Voting Results Questioned*, Indianapolis Star, Jan. 8, 2009, at 4Y [hereinafter *Annis*].

181.   Yencer 1, *supra* note 180; Larson, *supra* note 180.

182.   MicroVote General Corp, Admin Cause No. 06-003-ED (eResolution May 21, 2007), *www.in.gov/sos/elections/files/SOS_MicroVote_Order.pdf at 21* [hereinafter *Indiana administrative order*]; Rick Yencer, *Voting Machines to be Repaired*, Star Press, Sept. 26, 2006, at 3A [hereinafter *Yencer 2*].

183.   Indiana Administrative order, *supra* note 182, at 21; Yencer 2, *supra* note 182; Jason Thomas, *Poll Machine Flaw Hidden, State Says*, Indianapolis Star, Sept. 25, 2006, at 1 [hereinafter *Thomas*].

184.   Thomas, *supra* note 183.

185.   Indiana administrative order, *supra* note 182, at 39.

186.   *Id.* at 38.

187.	*Id.* at 22.

188.	*See* Thomas, *supra* note 183.

189.	Thomas, *supra* note 183; Yencer 2, *supra* note 182.

190.	Annis, *supra* note 180.

191.	New Jersey Department of the Public Advocate, The Purchase of Voting Systems in New Jersey: How Government Can Better Protect Taxpayer Rights and Voting Security 3 (2009), *available at* http://www.state.nj.us/publicadvocate/public/pdf/The_Purchase_of_Voting_Systems_in_NJ_11-24-09.pdf [hereinafter New Jersey Public Advocate Report].

192.	*Id.* at 5; Online Policy Group v. Diebold, 337 F. Supp. 2d 1195 (Cal. Dis. Ct. 2004); Cory Doctorow, *Sequoia Voting Systems Threatens Felten's Princeton Security Research Team,* Boinboing, Mar. 17, 2008, http://boingboing.net/2008/03/17/sequoia-voting-syste.html.

193.	For a detailed discussion of how this kind of system could work, see pages 27 - 38 of this report.

194.	Editorial, *The Voters Will Pay,* N.Y. Times, Feb. 25, 2010, at A26 [hereinafter *Voters Will Pay*].

195.	*Id.*

196.	Kim Zetter, *Feds Move to Break Voting-Machine Monopoly*, Wired, Mar. 8, 2010, *available at* http://www.wired.com/threatlevel/2010/03/ess-sued-in-antitrust-cas.

197.	Press Release, Dominion Voting Systems, Dominion Voting Systems, Inc. Acquires Premier Election Solutions Assets from ES&S (May 19, 2010), *available at* http://www.dominionvoting.com/images/pdfs/DominionAcquiresPremierReleaseFinal4.pdf.

198.	See Voters Will Pay, *supra* note 194.

199.	*See* Help America Vote Act of 2002, Pub. L. No. 107-252, 116 Stat. 1666 (codified at 42 U.S.C. §§ 15301–15545 (2008)).

200.	ACCURATE, the multi-institution voting research center funded by the National Science Foundation (NSF), suggests a fifth provision that would greatly improve regulation of voting systems. Specifically, that "there should be a rich feedback loop – from problems to investigation to testing – that uses actual problems to inform future testing procedures." Deirdre Mulligan and Joseph Lorenzo Hall, Preliminary Analysis of E-Voting Problems Highlights Need for Heightened Standards and Testing, NRC Whitepaper 23 (2004). They note that current voting system guidelines "lack a process to incorporate suspected system failures or to address changing technology. In particular, [they] fail to establish standards that ensure performance data from the used to improve systems so that the same problems do not contaminate future elections. Problems need to be investigated, understood, and then fedback into the process of recertifying (at times recalling) existing systems and establishing the next set of [certification criteria]." Erica Brand, Cecilia Walsh, Joseph Lorenzo Hall and Deirdre K. Mulligan, Public Comment on the 2005 Voluntary Voting System Guidelines 30 (2005), *available at* http://accurate-voting.org/accurate/docs/2005_vvsg_comment.pdf.

201.	There is precedent for creation of such FOIA exemptions. The Homeland Security Act (6 USC § 133) granted an exemption for voluntarily submitted critical infrastructure information. Federal whistleblower protections similarly work to keep individuals who report problems from suffering reprisals. The Whistleblower Protection Act of 1989 states that the Special Counsel tasked with investigating allegations made under the act may not disclose the identity of the individual who filed the complaint without that person's consent except in cases where imminent danger to public health or safety makes such disclosure necessary. 5 U.S.C. § 1213(h). *See generally* 5 U.S.C. § 552(b)(3), which authorizes legislative carve-outs of FOIA, so long as such carve-outs are specific enough and leave no agency discretion.

202. For voters who may not know the specific make and model of the machine involved, a simple description of the type of machine will suffice as the EAC will be able to determine a machine's make and model from the other data submitted by the voter in the report.

203. New legislation should also authorize the relevant agency to seek penalties against voting machine vendors who take any retaliatory action against election officials who post to the site.

204. This type of screening occurs with similar reporting databases. For example, some states screen reports for inclusion in their highway accident databases. *See, e.g.*, Alaska Department of Transportation and Public Facilities, 2001 Alaska Traffic Accidents (May 2003), *available at* http://www.dot.state.ak.us/stwdplng/highwaydata/pub/accidents/2001aktraffix.pdf.

205. See *GAO Voting Systems Report*, *supra* note 15 at 31; Email from Jeannie Layson, Director of Communications and Congressional Affairs, U.S. Election Assistance Commission to Susan Greenhalgh, Spokeswoman, Voter Action, Sept. 22, 2008 (on file with the Brennan Center).

206. GAO Voting Systems Report, *supra* note 15 at 4-5.

207. *Id.* at 32-33.

208. E-mail from Jeannie Layson, Director of Communications and Congressional Affairs, U.S. Election Assistance Commission, to Lawrence Norden, Senior Counsel, Brennan Center for Justice (Sept. 10, 2010, 15:01 EST) (on file with the Brennan Center).

209. *See generally* Institute of Internal Auditors, The Government Accountability Office: Government Audit Standards and Institute of Internal Auditors: International professional Practices Framework: A Comparison; Frederick M. Kaiser, GAO: Government Accountability Office and General Accounting Office, CRS Report for Congress (Sept. 10, 2008) .

210. *See, e.g.*, Government Accountability Office, Election Reform: Nine States' Experiences Implementing Federal Requirements for Computerized Statewide Voter Registration Lists (Feb. 7, 2006); Government Accountability Office, Elections: Results of GAO's Testing of Voting Systems Used in Sarasota County in Florida's 13th Congressional District (Feb. 8, 2008); Government Accountability Office, Elections: States, Territories, and the District Are Taking a Range of Important Steps to Manage Their Varied Voting System Environments (Sept. 2008).

211. The GAO has asked Congress to consider expanding the EAC's role under HAVA to address this problem. GAO Voting Systems Report, *supra* note 15 at 34.

212. Pub L. 104-152, 49 U.S.C. §§ 30501-30505 (2010).

213. Consumer Product Safety Improvement Act, Pub. L. No. 110-314, 122 Stat. 3016 (2008) (codified in scattered sections of 15 U.S.C.).

214. *See* § 212, 122 Stat. at 3048–49 (codified at 15 U.S.C. § 2055a(a), (b)). There is currently a March 2011 deadline for implementation of the database, which is tentatively named Saferproducts.org. *See, e.g.*, *Consumer Product Safety Commission Oversight: Current Issues and a Vision for the Future: Hearing before the House Energy and Commerce Subcommittee on Commerce, Trade and Consumer Protection*, 111th Congress (2009) (statement of Inez Tenenbaum, Chairman, Consumer Product Safety Commission).

215. H.R. Rep. No. 110–501, at 43–44 (2007).

216. Congress created NHTSA in 1970. *See* Highway Safety Act, Pub. L. No. 91–605 § 201, 84 Stat. 1739 (1970).

217. *See* Transportation Recall Enhancement, Accountability, and Documentation (TREAD) Act, Pub. L. No. 106–414, 114 Stat. 1800 (2000) (codified in scattered sections of 49 U.S.C.). Congress mandated that NHTSA conduct rulemaking to determine the manner and extent of the early warning data and its collection. § 3(b), 114 Stat. at

1801 ("[T]he Secretary shall initiate a rulemaking proceeding to establish early warning reporting requirements for manufacturers of motor vehicles and motor vehicle equipment to enhance the Secretary's ability to carry out the provisions of this chapter."). The regulations resulting from this mandate ultimately form the structure of the "early warning" database. *See, e.g.*, C.F.R. § 579.29 (a)(1) ("[E]ach report . . . must be submitted to NHTSA's early warning data repository identified on NHTSA's Internet homepage . . . . A manufacturer must use templates provided at the early warning website, also identified on NHTSA's homepage, for submitting reports.").

218. *See* Safercar.gov, http://www-odi.nhtsa.dot.gov/index.cfm (last visited May 28, 2010).

219. *See* Adverse Event Reporting System, http://www.fda.gov/Drugs/GuidanceComplianceRegulatoryInformation/Surveillance/AdverseDrugEffects/default.htm (last visited May 28, 2010).

220. *See, e.g.*, Keith Bradsher, *Firestone Engineers Offer a List of Causes for Faulty Tires*, N.Y. Times, Dec. 19, 2000, at C1.

221. *See, e.g.*, 146 Cong. Rec. 1778 (2000) (statement of Rep. Markey) ("This legislation was initially prompted by the Firestone recall of some over 6 million tires used primarily by the Ford Explorer.").

222. *See, e.g.*, David Shepardson, *Agency Ends Probe of Ford Tire Valves*, Detroit News, Apr. 30, 2009, at 6B.

223. *See, e.g.*, *Losing its Shine*, Economist, Dec. 12, 2009, at 76.

224. *Id.*

225. Alexandra Burzon, *Toyota Complaints Surged After First Recall*, Wall Street Journal, Mar. 11, 2010, at B7.

226. Posting of David Bailey and Chang-Ran Kim to Reuters.com, Toyota Faces New Probe on Corolla Steering, http://www.reuters.com/article/idUSTRE61D2TS20100217 (Feb 17, 2010, 18:56 EST).

227. Posting of Peter Valdez-Dapena to CNNMoney.com, NHTSA Seeks Maximum Fine Against Toyota, http://money.cnn.com/2010/04/05/autos/toyota_nhtsa_fine/index.htm?cnn=yes&hpt=Sbin (April 6, 2010, 14:01 EST)

228. *See, e.g.*, Editorial, *Caution Flags at the F.D.A.*, N.Y. Times, July 2, 1998, at A20.

229. *See* United States Food and Drug Administration, The Public's Stake in Adverse Event Reporting, http://www.fda.gov/Drugs/GuidanceComplianceRegulatoryInformation/Surveillance/AdverseDrugEffects/ucm179586.htm (last visited May 28, 2010).

230. For example, it is slightly onerous for a person to make a complaint on the NHTSA Complaint Reporting Form. It spans a minimum of six pages, and consumers are, among other things, asked to code portions of their complaints. *See* Defects & Recalls, File a Safety Complaint, http://www-odi.nhtsa.dot.gov/ivoq/index.cfm (last visited May 28, 2010).

231. H.R. Rep. No. 110–501, at 44 (2007).

232. The Secretary of Transportation has delegated this authority, among others, to NHTSA.
See 49 C.F.R. § 1.50 (2009).

233. *See* 49 U.S.C. § 30166(m) (2008) ("[T]he Secretary shall initiate a rulemaking proceeding to establish early warning reporting requirements for manufacturers of motor vehicles and motor vehicle equipment to enhance the Secretary's ability to carry out the provisions of this chapter.").

234. 49 C.F.R. § 579.21(a)–(c) (2009).

235. 49 C.F.R. §§ 579.21–579.26.

236. 49 C.F.R. § 579.28(c).

237. 49 C.F.R. § 573.1(b)(3) (2009).

238. A defect is defined by law to mean "any defect in performance, construction, a component, or material of a motor vehicle or motor vehicle equipment." 49 U.S.C. § 30102(a)(2) (2008).

239. 49 U.S.C. § 30118(c). Manufacturers must send notification via first class mail to all registered owners of the vehicle or equipment in question. If the manufacturer is unable to notify the registered owner, it must notify the most recent known purchaser. 49 U.S.C. § 30119(d).

240. 49 U.S.C. § 30119(a)(1)-(6).

241. 49 U.S.C. § 30119(3).

242. 15 U.S.C. § 2064(b) (2008).

243. 15 U.S.C. § 2064(c)(1).

244. 15 U.S.C. § 2064(c)(1).

245. 15 U.S.C. § 2064(i)(2).

246. *See* 21 C.F.R. § 314.80, § 314.98 (2009). Moreover, due to the Dietary Supplement and Nonprescription Drug Consumer Protection Act of 2006, similar requirements also apply to OTC drugs that are marketed without an approved FDA application. *See* Dietary Supplement and Nonprescription Drug Consumer Protection Act, Pub. L. No. 109–462, 120 Stat. 3469 (2006) (codified as amended at 21 U.S.C. §§ 379aa–381 (2008)).

247. The Form is FDA Form 3500A. 21 C.F.R. 314.80(f) (2009).

248. *See, e.g.*, Medwatch, FDA Form 3500A, http://www.fda.gov/downloads/Safety/MedWatch/HowToReport/DownloadForms/UCM082728.pdf (last visited May 28, 2010).

249. 146 Cong. Rec. 1778 (2000) (statement of Rep. Markey). Similarly, Congress initially established the reporting requirements with the non-"early warning" defect in the Motor Vehicle and Schoolbus Safety Amendments of 1974. *See* Motor Vehicle and Schoolbus Safety Amendments, Pub. L. No. 93–492, 88 Stat. 1470 (1974) (codified as amended in scattered sections of 49 U.S.C.). Congress passed this legislation, in part, because some manufacturers refused to notify the public of defects; or, if the manufacturers acknowledged that there were defects, failed to timely notify consumers of them. *See, e.g.*, H.R. Rep. No. 93–1191, at 5 (1974).

250. VSTCPM, *supra* note 16.

251. VSTCPM, *supra* note 16 at 2.3.2.6.

252. That currently includes most manufacturers of voting systems used in the United States today. *See* United States Election Assistance Commission, Registered Manufacturers, http://www.eac.gov/voting%20systems/voting-system-certification/registered-manufacturers/ (last visited May 28, 2010).

253. GAO Voting Systems Report, *supra* note 15 at 31.

254. *See generally* Frederick M. Kaiser, *supra* note 209.

255. *See* Bowsher v. Merck & Co., 460 U.S. 824 (1983) (enforcing statutory requirement that government contractors provide data to the GAO).

256. See 42 U.S.C. § 1971(c).

257. United States v. New York State Board of Elections, *et. al,* 2006 U.S. Dist. LEXIS 27664 (N.D.N.Y 2006); 28 C.F.R. § 51 (2009).

258.   *See* United States Department of Justice, Federal Programs Branch, http://www.justice.gov/civil/Federal%20Programs.htm (last visited May 28, 2010).

259.   42 U.S.C. § 15511 (2009).

260.   *See* 49 U.S.C. § 30166 (2009); 15 U.S.C. § 2065(b) (2009).

261.   15 U.S.C. § 2065(a) (2009).

262.   *See, e.g.*, 49 U.S.C. § 30166(b) (2009) ("The Secretary of Transportation may conduct an inspection or investigation that may be necessary to enforce this chapter.").

263.   49 C.F.R. § 554.5 (2009).

264.   *See* Part IV.1.C, *supra*.

265.   *See* 49 U.S.C. § 30166(g)(1)(B) (2009) ("[T]he Secretary . . . may conduct hearings, administer oaths, take testimony, and require (by subpena [sic] or otherwise) the appearance and testimony of witnesses and the production of records the Secretary considers advisable."); 15 U.S.C. § 2076(b)(3) (2009) ("The Commission shall also have the power . . . to require by subpena [sic] the attendance and testimony of witnesses and the production of all documentary evidence relating to the execution of its duties.").

266.   *See* 49 U.S.C. § 30166(e) (2009) (The Secretary . . . reasonably may require a manufacturer of a motor vehicle or motor vehicle equipment to keep records, and a manufacturer, distributor, or dealer to make reports, to enable the Secretary to decide whether [it] has complied or is complying with this chapter or a regulation prescribed or order issued under this chapter.); 15 U.S.C. § 2065(b) (2009) ("Every person who is a manufacturer, private labeler, or distributor of a consumer product shall establish and maintain such records, make such reports, and provide such information as the Commission may, by rule, reasonably require for the purposes of implementing this Act, or to determine compliance with rules or orders prescribed under this Act.").

267.   Consumer Product Safety Act, Pub. L. No. 92–573, 15 U.S.C. §§ 2051–2089 (2009).

268.   *See* United States Department of Justice, Voting Section Litigation, Cases Raising Claims Under the Help America Vote Act (HAVA), http://www.justice.gov/crt/voting/litigation/caselist.php#hava (last visited May 2010).

269.   VSTCPM, *supra* note 16 at 7.

270.   *See* GAO Voting Systems Report, *supra* note 15 at 4-5.

271.   VSTCPM, *supra* note 16 at 2.6.

272.   *Id.* at 7.1.

273.   *See e.g.*, GAO Voting Systems Report, *supra* note 15 at 31, *Hearing on the Election Assistance Commission: Hearing Before the Subcomm. on Elections of the House Committee on House Administration*, 110th Cong. (2008) (statement of Caroline Hunter, Vice Chair, Election Assistance Commission), *available at* http://cha.house.gov/UserFiles/82_testimony.pdf (stating that the EAC's power to decertify machines is limited to machines it has certified).

274.   Bowsher v. Synar, 478 U.S. 714 (1986).

275.   National Traffic and Motor Vehicle Safety Act of 1966, Pub. L. No. 89–564, 80 Stat. 731 (1966) (codified as amended at 49 U.S.C. §§ 30101–70 (2009)).

276.   49 U.S.C. § 30165(a)(1) (2009).

277.   *See* 15 U.S.C. 2069 (2009).

278.   Presidential Statement on Signing the Help America Vote Act of 2002, Pub. Papers 1926 (Oct. 29, 2002), *available at* http://www.america.gov/st/washfile-english/2002/October/20021029140043gorin@pd.state.gov0.1174127.html.

279.   *Id.*

280.   *See* Contract No. 071B4200234 between the State of Michigan and Election Systems and Software, Inc. at 70 (May 24, 2004), *available at* http://accurate-voting.org/contracts/MI/MI_ess_2004.pdf; Contract Award No. NEG-21231, Group 22300 – Voting Systems and Related Services and Ballot Marking or Other Voting Devices Accessible to Individuals with Disabilities (Rev. May 9, 2008), *available at* http://www.panix.com/~burstein/NY_state_2008.pdf.

281.   Much of this was adapted from the model contract in the New Jersey Public Advocate Report, *supra* note 191.

282.   *See generally* New Jersey Public Advocate Report, *supra* note 191.

283.   City Council R. 18A18-0238, 2009, Council Period 18 (D.C. 2009), 2009 D.C. Law L18-0103.

284.   S.B. 1404, 2009-10 Reg. Sess. (Cal. 2010).

285.   S.B. 541, 2009-10 Reg. Sess. (Cal. 2009).

286.   *See* National Association of Secretaries of State, How States are Using Federal Funds to Carry Out the Help America Vote Act (HAVA) (2010), *available at* http://www.nass.org/index.php?option=com_docman&task=doc_download&gid=945.

287.   This would be particularly important for states that do not require federal certification and rely on their own testing programs.

288.   42 U.S.C. § 15481 (a) (2009) defines a voting system as "(1) the total combination of mechanical, electromechanical, or electronic equipment (including the software, firmware, and documentation required to program, control, and support the equipment) that is used— (A) to define ballots; (B) to cast and count votes; (C) to report or display election results; and (D) to maintain and produce any audit trail information; and (2) the practices and associated documentation used— (A) to identify system components and versions of such components; (B) to test the system during its development and maintenance; (C) to maintain records of system errors and defects; (D) to determine specific system changes to be made to a system after the initial qualification of the system; and (E) to make available any materials to the voter (such as notices, instructions, forms, or paper ballots)."

289.   *See* Brennan Center for Justice, VRM in the States: Electronic Poll-Books, http://www.brennancenter.org/content/pages/vrm_electronic_poll-books (last visited Apr. 26, 2010).

290.   *See, e.g.,* Mike Saewitz, *Chesapeake's electronic pollbooks were voting-delay villains*, The Virginian-Pilot, Nov. 6, 2008, *available at* http://hamptonroads.com/2008/11/chesapeakes-electronic-poll-books-were-votingdelay-villains, Mary Lou Pickel, *Countdown 2008: Computer Woes Slow Georgians at Polls*, The Atlanta Journal-Constitution, Oct. 28, 2008, *available at* http://www.ajc.com/services/content/printedition/2008/10/28/advancevote.html. T.J. Aulds, *No 'Super' Glitches Reported for New Voting System*, The Galveston County Daily News, Nov. 4, 2009, *available at* http://www.galvnews.com/story.lasso?ewcd=2dfb9d86700788db, Posting of Mike McPhee to denverpost.com, Ritter Victorious, Voters Struggle, http://www.denverpost.com/outdoors/ci_4616285 (last updated Jul. 9, 2009, 17:37 EST).

291.   Definition from Technical Guidelines Development Committee, Voluntary Voting System Guidelines Recommendations to the United States Election Assistance Commission, Appendix A 6 (2007).

292.   Trevor Stokes & Bernie Delinski, *Northwest Alabama Counties Pick Huckabee and Clinton*, Times Daily, Feb. 6, 2008, *available at* http://www.timesdaily.com/article/20080206/NEWS/802060333?Title=Northwest -Alabama-counties-pick-Huckabee-and-Clinton.

293.   *Another Voting Glitch in Baldwin County*, Associated Press (Nov. 14, 2006).

294. John Archibald & Brett J. Blackenridge, *Early Printout Was Only Source of Wrong Tally*, Birmingham News (Nov. 10, 2002); Jeffrey Gettleman, *Alabama Governor Ends Challenge of Vote Count*, New York Times (Nov. 19, 2002).

295. Bill Hess, *Computer Glitch Causes Hiccup in Cochise County Tally*, Douglas Dispatch, Feb. 7, 2008, *available at* http://www.douglasdispatch.com/articles/2008/02/07/news/doc47ab6bc4d0b70550988123.txt.

296. *McComish GOP Winner in District 20 by 13 Votes, Recount Shows*, The Arizona Republic (Sept. 21, 2004).

297. Nedra Lindsey, *McComish's District 20 2nd-place Finish Confirmed*, The Arizona Republic (Sept. 24, 2004).

298. Anna Mathews, *Williams, Link Ousted in General Election*, Carroll County News, Nov. 6, 2008, *available at* http://www.carrollconews.com/story/1475931.html.

299. Wes Clement, *Error On Redfield, Altheimer Ballots Addressed at Emergency Meet*, Pinebluff Com., Oct. 26, 2008, *available at* http://www.votersunite.org/article.asp?id=8058.

300. Rachel Paul Dickerson, *Recount Reverses Results in District 45 Race*, Thecabin.net, May 24, 2008, http://www.thecabin.net/stories/052408/loc_0524080001.shtml.

301. Gary Lookadoo & Tom Treweek, *Slow Going: County Results Trickle In: Unofficial Numbers Show Clinton, Huckabee in Lead*, Benton County Daily Record, Feb. 6, 2008, *available at* http://www.votersunite.org/article.asp?id=7502.

302. Joe Lamb, *Haggard Notes Problems with Voting Machines*, Thecabin.net, Feb. 6, 2008, *available at* http://thecabin.net/stories/020608/loc_0206080006.shtml.

303. Louis Short, *Vote Machine Problems Reported*, (Heber Springs, AR) Sun-Times (Nov. 27, 2006).

304. Trish Hollenbeck, *Voting Machines To Get Fix After Audit Trail Prints Right Vote For The Wrong District*, Northwest Arkansas Times (Oct. 26, 2006).

305. Daniel Nasaw, *Voting Machine Claim to be Studied by County*, Arkansas Democrat-Gazette, May 20, 2006.

306. Height Could Make a Difference in this Year's Elections (THV Broadcast, May 20, 2006) (transcript available at http://www.todaysthv.com/news/news.aspx?storyid=28836).

307. Anna Mathews, *Computer Glitch Blamed for Miscount in JP Voting*, Carroll County Star Tribune (Nov. 10, 2004).

308. LeAnn Askins, *Commission OKs Results of Elections*, Jonesboro Sun (May 28, 2004).

309. George Jared, *No Explanation for Ballot Machine Malfunction*, South Missourian (May 27, 2004).

310. Thadeus Greenson, *Software Glitch Yields Inaccurate Election Results*, Times Standard, Dec. 5, 2008, *available at* http://www.times-standard.com/localnews/ci_11145349.

311. Kim Zetter, *Serious Error in Diebold Voting Software Caused Lost Ballots in California County*, Threat Level (Blog of Wired Magazine), Dec. 8, 2008, http://www.wired.com/threatlevel/2008/12/unique-election; Jaikumar Vijayan, *California Finds E-Voting Software Had Errors, Data Deletion Functions*, Computerworld, Mar. 4, 2009.

312. Karen de Sá, *More Touch-Screen Machines Malfunction*, San Jose Mercury News, Nov. 5, 2008, *available at* http://www.votersunite.org/article.asp?id=8173.

313. Darrell R. Santschi & Cindy Martinez Rhodes, *Software Glitch Led to Precinct, Vote Uncertainty in SB County*, Press Enterprise, June 5, 2008, *available at* http://www.pe.com/localnews/inland/stories/PE_News_Local_N_glitch05.41ce262.html.

314. Bobby Caina Calvan, *Machine Vendor Miscalibrated Vote Scanners, County Officials Say*, Sacramento Bee, Mar. 24, 2008, *available at* http://www.votersunite.org/article.asp?id=7613.

315. John Cote & Jonathan Curiel, *Gaming Initiatives in Lead as Voters Crowd Polls*, S.F. Chron., Feb. 6, 2008, *available at* http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2008/02/06/BA7NUSERR.DTL.

316. Nicole C. Brambila, *Glitches in System Slowed Vote Count*, Desert Sun, Feb. 7, 2008, at 1A; *Correction*, Desert Sun, Mar. 8, 2008, at 1A.

317. Antone Gonsalves, *San Francisco Finds Fix for Election Day Tech Snafu*, InformationWeek.com, Nov. 5, 2004, 15:03 EST.

318. Ian Hoffman, *Lawmakers Cut E-Voting's Paper Trail: Manufacturers Demonstrating New Printers in Nevada Were Embarrassed When Machine Failed to Recognize Votes*, Tri-Valley Herald (Aug. 13, 2004); Kim Zetter, *Wrong Time for an E-Vote Glitch*, Wired News (Aug. 12, 2004).

319. Conaughton Gig, *New Electronic Scanners Miscounted Some County Votes*, North County Times (Apr. 7, 2004).

320. Luis Monteagudo Jr. & Helen Gao, *Some Votes Miscounted in Primary, Officials Say*, Union-Tribune (Apr. 8, 2004).

321. Luis Monteagudo Jr. and Helen Gao, *Glitches in Voting Machines Examined*, San Diego Union Tribune, Mar. 4, 2004, at B-1.

322. Hearing Before the Cal. Sec'y of State Voting Systems and Procedures Panel (Apr. 21, 2004) (statement of James Dunn).

323. Ernest Luning, *Adams County 'Quarantines' Machine That Switched Candidate's Vote*, Col. Indep., Oct. 29, 2008, *available at* http://coloradoindependent.com/13187/adams-county-quarantines-machine-that-switched-candidates-vote.

324. John Ingold, *Vote Scanners Still Face Doubts*, Denver Post, Feb. 17, 2008, *available at* http://www.denverpost.com/headlines/ci_8283953.

325. Ann Imse, *Big Bar Code Backfire*, Rocky Mountain News (Nov. 14, 2006).

326. Allyn Harvey, *Phantom Votes Haunt Pitkin County Election Officials*, Aspen Times (Nov. 3, 2005).

327. Editorial, *Voting Problems: Count Every Vote, But Not by Hand*, News-Times, May, 30, 2008, *available at* http://www.votersunite.org/article.asp?id=7727.

328. *State Officials Expecting Record Turnout for Presidential Primary*, Boston Globe, Feb. 5, 2008, *available at* http://www.votersunite.org/article.asp?id=7497.state_officials_expecting_record_turnout_for_presidential_primary/.

329. Dave Collins, *Registrars Busy Keeping Up with Demand for Ballots*, Newsday, Feb. 5, 2008, *available at* http://www.votersunite.org/article.asp?id=7489.

330. Nikita Stewart and Elissa Silverman, *Primary Vote Still Doesn't Add Up*, Wash. Post, Sept. 22, 2008 at B1; Nikita Stewart, *District's Primary Results Certified*, WASH. POST, Sept. 26, 2008 at B1.

331. Sequoia Voting Systems, Report to the District of Columbia Board of Elections and Ethics 1 (Sept. 22, 2008).

332. Michael E. Ruane, *District Voters Line Up at Polls*, Wash. Post, Feb. 12 2008, *available at* http://www.washington post.com/wp-dyn/content/article/2008/02/12/AR2008021200818.html?sid=ST2008021200978.

333. Christian M. Wade, *Voting Glitches Mar Election*, Tampa Trib., Nov. 5 2008, *available at* http://www2.tbo.com/content/2008/nov/05/na-voting-glitches-mar-election/news-politics/.

334.	Jane Musgrave, *Palm Beach County Vote Results Still Incomplete*, Palm Beach Post, Nov. 5 2008, *available at* http://www.palmbeachpost.com/localnews/content/local_news/epaper/2008/11/05/1105votecount.html.

335.	Paige Kornblue, *Palm Beach County Precinct Problems*, WPTV.com, Nov. 4 2008, *available at* http://truevote.us/nucleus/index.php?itemid=749.

336.	Christopher O'Donnell, *Glitch Prevents Manatee County From Issuing Final Election Results*, Herald Trib., Nov. 4 2008, *available at* http://www.heraldtribune.com/article/20081104/BREAKING/811040175?Title=Glitch_prevents_Manatee_County_from_issuing_final_election_results.

337.	Christopher O'Donnell & Todd Ruger, *Vote Software is Under Fire*, Herald Trib., Nov. 6 2008, at BN1, *available at* http://www.heraldtribune.com/article/20081106/ARTICLE/811060374?p=3&tc=pg.

338.	Mary K. Garber, *Examining Florida's High Invalid Vote Rate in the 2008 General Election Part I: How Voting System Design Flaws Led to Lost Votes*, Florida Fair Elections Center, June 23, 2009, *available at* http://www.ffec.org/documents/Invalid_Vote_Report_Revised_23June2009.pdf.

339.	Lawrence Norden, *Concerns About New York's New Voting Machines*, ReformNY, (Jan. 25, 2010) http://reformny.blogspot.com/2010/01/concerns-about-new-yorks-new-voting.html.

340.	Jane Musgrave, *Creases Delay Tally of Absentee Ballots*, Palm Beach Post, Oct. 31 2008, *available at* http://www.palmbeachpost.com/politics/content/local_news/epaper/2008/10/31/a1a_absentee_1101.html.

341.	Dave Wax, *Early Voting off to Rough Start*, FirstCoastNews.com, Oct. 20, 2008, http://www.firstcoastnews.com/news/breaking/news-article.aspx?storyid=121489&catid=17.

342.	*Lines, Voting Problems Continue on 2nd Day*, News4Jax.com, Oct. 21, 2008, http://www.news4jax.com/news/17770664/detail.html.

343.	*Problems Force Flagler to Switch to Old Voting Machines*, Flagler News-J., Oct. 22, 2008, *available at* http://truevote.us/nucleus/index.php?itemid=381.

344.	John A. Torres, *Tally Delay Blamed on Machines*, Fl. Today, Aug. 28, 2008, at A7.

345.	Steve Bousquet, Janet Zink, Anne Lindberg & Craig Pittman, *Voter Turnout Worst in Ten Years*, St. Petersburg Times, Aug. 27, 2008, at 1B, *available at* http://www.tampabay.com/news/politics/elections/article785994.ece.

346.	*Id.*

347.	Seán Kinane, *Vendor Blamed for Optical Scan Problems*, WMNF Evening News, Aug. 27, 2008, *available at* http://www.wmnf.org/news_stories/vendor-blamed-for-optical-scan-problems.

348.	*Computer Glitch Delays Vote Count in Sarasota County*, WWSB ABC 7 MySunCoast.com, Aug. 27, 2008, http://www.mysuncoast.com/Global/story.asp?S=8911224.

349.	Thomas R. Collins, *Nearly 700 West Palm Votes not Tallied Election Night*, Palm Beach Post, June 28, 2008, *available at* http://www.palmbeachpost.com/localnews/content/local_news/epaper/2008/06/27/0627wpbelex.html.

350.	*Bugs Removed from Pinellas Vote Tabulation System*, St. Petersburg Times, June 4, 2008, *available at* http://www.tampabay.com/news/localgovernment/article605711.ece.

351.	Derek Simmonsen, *Delay, Glitch Creates Headache for St. Lucie Voters*, TCPalm, Jan. 31, 2008, *available at* http://www.tcpalm.com/news/2008/jan/31/delay-glitch-tallied-in-st-lucie-voting/.

352.	David Fleshler, *Debut of Voter Check-in System Marred by Complaints*, Sun-Sentinel, Jan. 30, 2008, at 1B.

353.	Hector Florin, Kathleen Chapman, & Jennifer Sorentrue, *County Officials' Good Day Turns into Rough Night*, Palm Beach Post, Jan. 30, 2008, at 10A.

354. James Miller, *Canvassing Board Orders Another Count of Early Ballots*, Daytona Beach News J., Jan. 29, 2008, *available at* http://voteraction.org/node/342.

355. *At the Polls: Problems with Voting Machines; Reaction Mixed on Tax Amendment*, Herald Tribune, Jan. 29, 2008, *available at* http://www.heraldtribune.com/article/20080129/BREAKING/63466273.

356. Luisa Yanez & Martin Merzer, *Glitches Blemish South Florida Voting*, Miami Herald, Jan. 29, 2008, *available at* http://www.voteraction.org/node/344.

357. Beau Zimmer, *Touch-Screen Problems Reported in Hillsborough*, 10Connects.com, Jan. 29, 2008, http://www.wtsp.com/news/local/story.aspx?storyid=72767.

358. Luis F. Perez, *Palm Beach County Records 32,000 Early Votes for Tuesday's Election*, South Florida Sun-Sentinel (Nov. 2, 2006).

359. *Dozens of Voters Complain about Glitch*, Herald Tribune (Nov. 8, 2006).

360. Doug Sword & Anna Scott, *House Could End up in 13th District Dispute*, Sarasota Herald Tribune (Nov. 9, 2006).

361. Todd Ruger, *Voting Glitch Prompts Warning*, Sarasota Herald Tribune. (Nov. 5, 2006).

362. *See* Florida Division of Elections, Analysis and Report of Overvotes and Undervotes for the 2006 General Election, General Over Undervote Table, *available at* http://election.dos.state.fl.us/reports/index.shtml.

363. Mary K. Garber, Voting System Performance Problems – Conclusions and Recommendations, in *Assessing Election Accuracy in Florida's 2006 General Election: A Comparison of Voting System Performance Using Undervote Rates in State-wide Races in Florida's 2006 General Election* (Dec. 2008) (unpublished manuscript, on file with the Brennan Center).

364. Charles Rabin & Darran Simon, *Glitches Cited in Early Voting; Early Voters are Urged to Cast Their Ballots with Care Following Scattered Reports of Problems with Heavily Used Machines*, Miami Herald (Oct. 28, 2006).

365. Jeremy Milarsky & Rafael A. Olmeda, *Broward County, Fla., Fixes Computer Error To Correct Statewide Gambling Vote*, South Florida Sun-Sentinel (Nov. 5, 2004).

366. Deirdre Mulligan and Joseph Lorenzo Hall, Preliminary Analysis of E-Voting Problems Highlights Need for Heightened Standards and Testing, NRC Whitepaper 18 (2004) [hereinafter Mulligan and Hall]

367. Mary Ellen Klas and Gary Fineout, *Touchscreen Voting Machines Have Software Flaw, Florida Officials Learn*, Miami Herald, Jun. 12, 2004, at 1B.

368. Mary Ellen Klas, *Flaw in Florida Touch-Screen Voting Machines Was Known in* 2002, Miami Herald, Jun. 12, 2004, at 1B.

369. *Election Glitch Missed 103,000 Votes in Florida County*, CNN (Nov. 8, 2002).

370. Bev Harris, *Can We Trust These Machines?*, Black Box Voting 4 *available at* http://www.blackboxvoting.org/bbv_chapter-2.pdf.

371. Oscar Corral, *Technician's Error, Not Machines, to Blame in Dade Election Mix-Up*, Miami Herald (Apr. 4, 2002).

372. Rhonda Cook, *Senior Citizens Among Those Who Have Voting Problems*, Atlanta Journal-Constitution, Nov. 4., 2008, *available at* http://www.ajc.com:80/traffic/content/metro/atlanta/stories/2008/11/04/problems_election.html.

373. Mary Lou Pickel, *COUNTDOWN 2008: Computer Woes Slow Georgians at Polls*, Atlanta Journal-Constitution, Oct. 28, 2008, *available at* http://www.ajc.com/ajchomefinder/content/printedition/2008/10/28/advancevote.html?cxntlid=inform_artr

374. *Glitch Keeps Fulton Voters Waiting For Hours*, CBSAtlanta.com, Oct. 23, 2008, *available at* http://www.cbsatlanta.com/news/17785206/detail.html.

375. Alan Riquelmy, *Turnout Higher than Expected*, Ledger-Enquirer, Feb. 7, 2008, *available at* http://www.votersunite.org/article.asp?id=7517.

376. Stephanie Reid, *State Workers Fan Out When Problems Arise at Polls*, Atlanta Journal-Constitution, Feb. 5, 2008, *available at* http://www.votersunite.org/article.asp?id=7472.

377. Terry Dickson, *Grovner Beats Deverger in a Court-ordered Rematch for McIntosh County*, Fl. Times-Union Feb. 6, 2008, *available at* http://jacksonville.com/tu-online/stories/020608/geo_244103741.shtml.

378. Rhonda Cook, *Georgia Votes 2006: Machine Glitches: Smooth Day? No Way*, Atlanta Journal-Constitution (Nov. 8, 2006).

379. *Primary Election Runs Into Problems; Some Problems Caused by Electronic System*, KITV 4 News (Sept. 24, 2004).

380. *Rebecca Boone, Dems Critical of Idaho Election Officials*, Casper Star Tribune (Nov. 9, 2006).

381. Scott Wuerz, *Shiloh Mayoral Hopeful is One of 5 Candidates Seeking Recounts in April Elections*, Bellville News-Democrat, May 2, 2009, *available at* http://www.votersunite.org/article.asp?id=8392.

382. Scott Wuerz, *With Discovery of Uncounted Ballots, Vernier Now Appears to Have Won Re-Election in Shiloh*, Bellville News-Democrat, April 8, 2009, available at http://www.votersunite.org/article.asp?id=8371.

383. Nancy Gier, *Democrats Reporting Irregularities in 14th District Voting Machines*, Chi. Daily Herald, Mar. 8, 2008, *available at* http://www.dailyherald.com/story/?id=150092.

384. Russell Lissau, *Consultant to Investigate Lake County Malfunction*, Chi. Daily Herald, Feb. 7, 2008, *available at* http://www.dailyherald.com/story/?id=130066&src=3.

385. Stephen Blackman & Megan Crepeau, *Election '08: City Precinct Misses Half of Ballots in Count*, Daily Northwestern, Feb. 6, 2008, *available at* http://www.dailynorthwestern.com/2.13893/election-08-city-precinct-misses-half-of-ballots-in-count-1.1922000.

386. John McCormick,*Voting Equipment Glitches Lingering*, Chicago Tribune (Nov. 2, 2006).

387. Susan Kuczka, *Returns Are In: Software Goofed – Lake County Tally Misled 15 Hopefuls*, Chicago Tribune (Apr. 4, 2003).

388. Bill Engle, *County's Count Last in State; Glitch Delays Wayne Election Results Until After Midnight*, Palladium-Item, Nov. 6, 2008, *available at* http://www.votersunite.org/article.asp?id=8181.

389. Editorial, *Ballot-Counting Problem Should Have Been Avoided*, Herald Bull., Nov. 4, 2008, *available at* http://www.theheraldbulletin.com/opinion/local_story_309220039.html?keyword=topstory.

390. *Disabled Voters Disappointed with Touch-Screen Problems*, WISH-TV (Nov. 10, 2006).

391. Rick Yencer, *Voting Machines to be Repaired*, Star Press, Sept. 26, 2006, at 3A.

392. Jason Thomas, *Poll Machine Flaw Hidden, State Says*, Indianapolis Star, Sept. 25, 2006, at 1.

393. *Computer Error on Ballot Count Changes Results for County Commissioner in Indiana*, Associated Press (Nov. 12, 2004).

394. Jens Manuel Krogstad, *Rogers Requests Total Recount; Danielson Clings to Lead by 14 Votes*, WCF Courier, Nov. 13, 2008, *available at* http://www.wcfcourier.com/news/local/article_0ef93257-c12f-5706-b764-04ac8697e04b.html.

395.   Kurt Allemeier, *Computer Glitch Slows Scott County Vote Reporting*, Quad-City Times, Nov. 6, 2008, *available at* http://www.qctimes.com/news/local/article_23535b59-8472-5286-9633-b75cd40a1c96.html?mode=story.

396.   Tim Rohwer, *Faulty Voting Machines Delay Results; Counting Under Way*, The Daily Nonpareil Online (June 7, 2006).

397.   Lynn Campbell, *Broken Vote-Counting Machines, Moveon Draw Complaints In Iowa*, Des Moines Register (Nov. 3, 2004).

398.   Kevin Flaherty, *Error Comes from Voting Machine Programming*, Morning Sun, Nov. 6, 2008, *available at* http://www.morningsun.net/news/x635432391/Error-comes-from-voting-machine-programming

399.   Gary Demuth, *Errors Found in Voting Machines*, Salina J., Apr. 8, 2009, *available at* http://www.saljournal.com/news/story/Faulty-Election-booths-4-7.

400.   *Aug. 6 Ballot Problems Alleged; Clay, Barton County Candidates Seek Review of Races*, Lawrence Journal-World & News (Aug. 22, 2002).

401.   Bill Robinson, *Local Turnout Heavy as Computer Glitch Delays Count*, Richmond Reg., Nov 4, 2008, *available at* http://www.richmondregister.com/localnews/local_story_310073742.html?keyword=secondarystory.

402.   Patrick Crowley, *E-Slate Ballot Glitch Ignites Blame Game*, Cincinnati Enq., Nov. 5, 2008, at 1A.

403.   Melissa Gagliardi, *Council Results Finally Released*, Louisville Courier-J., May 22, 2008, *available at* http://www.votersunite.org/article.asp?id=7714.

404.   Warren Stewart, *All Four Major E-Voting Machines Flip Votes in Early Voting*, VoteTrustUSA (Nov. 5, 2006), *available at* http://www.votetrustusa.org/index.php?option=com_content&task=view&id=1967&Itemid=26.

405.   Steve Wilson, *Electronic Voting Glitch Reported in Delcambre Race*, Daily Iberian, Oct. 9, 2008, *available at* http://www.iberianet.com/articles/2008/10/09/news/doc48ee56fed1702965734605.txt.

406.   Colin Hickey, R*esults Slowed by Machine Trouble*, Journal & Morning Sentinel (Nov. 9, 2006).

407.   E.B. Ferguson III, *Election Workers Prepare for Long Day as Polls Open*, The Capital, Feb. 12, 2008, *available at* http://www.voteraction.org/node/401.

408.   Steve Urbon, *Ballot Glitch A Mystery*, Standard-Times, Sep. 10, 2008, *available at* http://www.southcoasttoday.com/apps/pbcs.dll/article?AID=/20080910/NEWS/809100332.

409.   Robert Carroll, *Recount Affirms: Abington Approves Another Override*, Boston Globe, May 18, 2008, *available at* http://www.boston.com/news/local/articles/2008/05/18/recount_affirms_abington_approves_another_override/.

410.   Charles Winokoor, *Local Vote for Hillary, Mitt*, Taunton Daily Gazette, Feb. 7, 2008, *available at* http://www.tauntongazette.com/news/x1224705221.

411.   Ben Cunningham, *Malfunction Delays Hasting Results*, Grand Rapids Press (May 4, 2006).

412.   Steve Gunn & Lynn Moore, *Election Turns Around When Inspectors 'See The Light'*, Mukegon Chronicle (Sept. 4, 2004).

413.   *Problems Delay Final Vote Count*, Hattiesburg-American (May 7, 2005).

414.   Ed Kemmick, *Software Flub Leads to County Recount*, Billings Gazette (Nov. 8, 2006).

415.   Nate Jennings, *Problem Machines Spur Call for Recount*, Lincoln Journal Star (Nov. 14, 2004).

416.   *Countinghouse Blues: Too Many Votes*, WOWT 6 Omaha (Nov. 5, 2004).

417. Joe Dejka & Chris Olson, *A Late Night in Sarpy; Glitches Delay Results,* Omaha World-Herald (Nov. 6, 2002).

418. Frank Zoretich, *Election Results Certified After Software Blamed*, Albuquerque Tribune, Nov. 19, 2002 (on file with the Brennan Center) [hereinafter Zoretich].

419. Gordon Fraser, *Faulty Keyboard Leads to Erroneous Vote Result in Salem*, Eagle Trib., Mar. 13, 2008, *available at* http://www.eagletribune.com/punewsnh/local_story_073055256.html?keyword=topstory.

420. Bob Jordan, *Problems Persist with Monmouth Election Computer System*, Asbury Park Press, June 3, 2008, *available at* http://www.votersunite.org/article.asp?id=8435.

421. Paul Cox, *Voting-Machine Malfunctions Crop up at Some Polling Places*, Star-Ledger, Nov. 4, 2008, *available at* http://www.nj.com/news/index.ssf/2008/11/votingmachine_malfunctions_cro.html.

422. Ken Thorbourne, *Hudson County Vote Count Hits Major Snag*, Jersey J., Nov. 4, 2008, *available at* http://www.nj.com/elections/index.ssf/2008/11/hudson_county_vote_count_hits.html.

423. Bob Jordan, *Delays Reported in Recording Election Results*, Asbury Park Press, June 5, 2008, *available at* http://www.votersunite.org/article.asp?id=7740.

424. Diane C. Walsh, *Machines Get Vote of No Confidence After Errors in Primary*, Star-Ledger, Feb. 20, 2008, http://blog.nj.com/newsletters/2008/02/am_edition_19.html.

425. Andrew W. Appel, et. al., Princeton University, Insecurities and Inaccuracies of the Sequoia AVC Advantage 9.00H DRE Voting Machine 117 (October 17, 2008).

426. Erica Zarra, *Two Electronic Ballot Machines Replaced in Montclair During Vote*, Montclair Times, Feb. 7, 2008, *available at* http://www.votersunite.org/article.asp?id=7512.

427. Brian T. Murray, *An Error at Hudson Polls Delays Official Tally of Primary Ballots*, Star-Ledger, Feb. 7, 2008, at 19.

428. Dave Evans, *Voting Problems Reported in NJ*, WABC-TV New Jersey (Nov. 7, 2006).

429. Sara K. Satullo, *Voting Machines Stopped Working*, Express-Times, Feb. 7, 2008, *available at* http://voteraction.org/node/376.

430. Sharna Johnson, *County Vote Canvass Approved*, Clovis News J., June 13, 2008, *available at* http://www.cnjonline.com/news/county-28628-canvass-election.html.

431. Barry Massey, *New Mexico to Check Troubled Voting Equipment*, Associated Press, Mar. 21, 2008, *available at* http://votersunite.org/article.asp?id=7610.

432. Warren Stewart & Ellen Theisen, *Summary Report on New Mexico State Election Data* (www.HelpAmericaRecount.org Jan. 4, 2005), *available at* http://www.democracyfornewmexico.com/democracy_for_new_mexico/files/NewMexico2004ElectionDataReport-v2.pdf.

433. Zoretich, *supra* note 418; *12,000 Early Votes Skipped in Count*, Albuquerque Tribune (Nov. 16, 2002).

434. *New Voting Machines Falter, Could Cost Big Bucks*, WPTZ.com, Nov. 10, 2008, http://www.wptz.com/news/17949935/detail.html.

435. Liz Lawyer, *One Sequoia Machine Faulty; No Other Major Hiccups in Tompkins County*, Ithaca J., Nov. 4, 2008, *available at* http://www.votersunite.org/article.asp?id=8135.

436. Sue Book, *Revised Numbers Add to Turnout in Craven Election*, Sun J., Nov. 13, 2008, *available at* http://www.enctoday.com/news/votes-42894-nbsj-election-county.html.

437.	Wesley Young, *Gap in Judicial Contest Narrows*, Winston-Salem J., Nov. 8, 2008, *available at* http://www2.journalnow.com/content/2008/nov/08/gap-in-judicial-contest-narrows/.

438.	Steve Lawson, *Voting Glitch in Rockingham County*, GodanRiver.com, Nov. 5, 2008, *available at* http://www.votersunite.org/article.asp?id=8158.

439.	Chris Dailey, *Revised Results Give Democrats Sweep in County Board Race*, Tryon Daily Bull., Nov. 6, 2008, *available at* http://tryondailybulletin.com/index.php?option=com_content&task=view&id=1370&Itemid=192.

440.	Heather Gale, *Thousands of Votes Missed in Tuesday Tallies*, Jacksonville Daily News, May 9, 2008, *available at* http://www.jdnews.com/news/votes-56535-board-onslow.html.

441.	Shawn Flynn, *Mecklenburg, Wake Find Vote Flaws*, News14.com, May 5, 2008, http://news14.com/charlotte-news-104-content/top_stories/595595/mecklenburg--wake-find-vote-flaws/.

442.	Cecil Bothwell, *Buncombe Machines Disenfranchise Voters*, Mountain Xpress (Nov. 10, 2004).

443.	Gary D. Robertson, *Months After Election, North Carolina's Agriculture Commissioner Agrees He Lost*, Associated Press (Feb. 5, 2005).

444.	Binyamin Appelbaum, *Gaston Investigates Election Tally Errors*, The Charlotte Observer, November 16, 2004, at 4B.

445.	*See* Binyamin Appelbaum, *Names, Ballots Fail to Tally in 29 Gaston Precincts*, The Charlotte Observer, November 18, 2004, at 1B.

446.	Associated Press, *Recount Changes One Franklin Co. Race*, Indianapolis Star, Nov. 12, 2004, *available at* http://www.votersunite.org/article.asp?id=3804.

447.	Jessica Rocha, *Mechanic to Smooth Vote*, News & Observer (Oct. 14, 2004).

448.	Wade Rawlins & Rob Christensen, *"Winners" May Be Losers*, News & Observer (Nov. 12, 2002).

449.	Kim Zetter, *E-Vote Machines Drop More Ballots*, Wired, Feb. 9, 2004, *available at* http://www.wired.com/politics/security/news/2004/02/62206.

450.	Ellen Theisen, *Ballot Definition Files: No Review is Provided for a Key Component of Voting System Software*, VotersUnite! (June 2004, updated Oct. 2005 & June 2006), *available at* http://www.votersunite.org/info/BallotProgramming.pdf.

451.	Lynn Hulsey, *Audit Shows Issues with Area Voting Machines*, Dayton Daily News, Dec. 17, 2008, at A6, *available at* http://www.daytondailynews.com/n/content/oh/story/news/local/2008/12/17/ddn121708 votingmachine.html.

452.	Ben Marrison & Jill Riepenhoff, *Voting Machine Complaints Trickle In*, Columbus Dispatch, Nov. 4, 2008, *available at* http://blog.dispatch.com:80/vote08/2008/11/a_woman_who_voted_at.shtml.

453.	Paul Souhrada, *Obama, McCain Missing From Some Ballots*, Columbus Dispatch, Nov. 4, 2008, *available at* http://blog.dispatch.com:80/vote08/2008/11/obama_mccain_missing_from_some.shtml.

454.	*Stark County Voters Bemoan Machine Troubles*, Canton Repository, Nov. 4, 2008, *available at* http://www.truevote.us/nucleus/index.php?itemid=801.

455.	Letter from Betty McGary, Executive Director, and Lynn Kinkaid, Deputy Director, Butler County Board of Elections, to Dave Byrd, President, Premier Election Solutions (Apr. 4, 2008) (on file with the Brennan Center).

456.	Lynn Hulsey, *Voting Machine Maker Says Error May Cause Votes to Be Uncounted*, Dayton Daily News, Aug. 23, 2008, at A6.

457.   Letter from Dave Byrd, President, Premier Election Solutions, to Jennifer Brunner, Ohio Sec'y of State (Aug. 19, 2008) (on file with the Brennan Center).

458.   Barbara Carmen, *County's Voting Machines Examined*, Columbus Dispatch, Mar. 16, 2008, *available at* http://www.dispatch.com/live/content/local_news/stories/2008/03/16/BOEPROBE.ART_ART_03-16-08_ B1_9F9LIV3.html.

459.   Mark Niquette, *Officials See Few Glitches Across Ohio*, Columbus Dispatch, Mar. 4, 2008, *available at* http://blog.dispatch.com/primary/2008/03/officials_see_few_glitches_acr.shtml.

460.   *Errors Plague Voting Process in Ohio, Pa*, Vindicator (Nov. 3, 2004); Brian Gottstein, *Back Up! We Need Back Up!*, Roanoke Times (Nov. 11, 2004).

461.   LaRaye Brown, *Some Ballots Counted Twice: Discovery Raises Further Doubt About Close Treasurer Race*, News-Messenger (Nov. 16, 2004).

462.   John McCarthy, *Machine Error Gives Bush 3,893 Extra Votes in Ohio*, USA Today, Nov. 6, 2005, *available at* http://www.usatoday.com/tech/news/techpolicy/evoting/2004-11-06-ohio-evote-trouble_x.htm.

463.   Rob Scott, *Computer Glitch Stalls Northumberland County Vote Count*, Daily Item, Nov. 4, 2008, *available at* http://www.dailyitem.com/0100_news/local_story_309211730.html.

464.   George Mattar, *Machines Malfunction in 5 Towns*, Bucks County Courier Times, May 20, 2009, *available at* http://www.phillyburbs.com/news/local/courier_times/courier_times_news_details/article/28/2009/may/20/machines-malfunction-in-5-towns.html.

465.   *Early Polling Issue Reported in Green Tree*, KDKA-TV, Apr. 22, 2008, http://www.votersunite.org/article.asp?id=7644.

466.   Gabrielle Banks, *Scattered Problems Reported with Voting Machines*, Pittsburgh Post-Gazette (Nov. 7, 2006).

467.   Michael P. Buffer, *Errors Discount Election More*, Times Leader (May 23, 2006).

468.   *Board Should Hold a Revote for the City*, Editorial, Reading Eagle (July 20, 2005).

469.   John Hilton, *DJ Race Still Up in the Air*, The Sentinel (Nov. 11, 2005).

470.   Marika Kelderman, *Charleston County Suffers Voting Problems on Election Day*, Live5News.com, Nov. 5, 2008, http://www.live5news.com/Global/story.asp?s=9300365&clienttype=printable.

471.   Renee Dudley, *Machine Ballots Omit Candidates' Names*, Island Packet, Oct. 22, 2008, *available at* http://www.islandpacket.com/news/local/story/645376.html.

472.   Mike Cherney & Aliana Ramos, *Results are In: McCain Wins*, Sun News, Jan. 22, 2008, *available at* http://www.votersunite.org/article.asp?id=7423; Mike Cherney, *Vote Results Further Delayed*, Sun News, Jan. 21, 2008, *available at* http://www.votersunite.org/article.asp?id=7421.

473.   Robert Behre, *Charleston County Voting Under Way*; B*allot Misprint, Machine Quirk Get Attention*, Post & Courier (Nov. 3, 2006).

474.   Kristy Eppley Rupon, *Counting Error Overstates Votes*, The State (Apr. 29, 2005).

475.   *Vote Counting Machine Error Results in Election Vote Changes*, KOTA Radio 1380, June 4, 2009, http://www.kotaradio.com/news.asp?eid=5002&ID=3296.

476.   Clay Bailey, *Dozens in Bartlett Unable to Vote in City's Election*, Memphis Com. Appeal, Nov. 4, 2008, *available at* http://www.commercialappeal.com/news/2008/nov/04/dozens-bartlett-unable-vote-citys-election/.

477.   Anne Paine, *Tennesseans Report Voting Problems*, Tennessean, Oct. 25, 2008, *available at* http://www.votersunite.org/article.asp?id=8052.

478.	Rebecca Ferrar, *Voting Machine Issue Confusing to Some*, Knoxville News Sentinel, Oct. 22, 2008, *available at* http://www.knoxnews.com/news/2008/oct/22/voting-machine-issue-confusing-some/.

479.	Jennifer Clendenion, *Machine Problems Frustrate Early Voters*, Decatur County Chron., Oct. 22 2008, *available at* http://www.decaturcountyonline.com/article.asp?art=1244.

480.	*State Rep Advises Voters to Check Ballot Twice*, KBMT News, Oct. 31, 2008, http://www.kbmt12.com/news/local/33637934.html.

481.	Kim Zetter, *Texas Voters Say Straight-Party Voting Flipped Votes; Activists Urge Voters to Avoid Straight-Party Voting*, Wired, Oct. 29 2008, http://www.wired.com/threatlevel/2008/10/straight-party/.

482.	Martina Stewart, *Texas County's Machines Causing Concern for Some Voters*, CNN (Oct. 28, 2008), http://politicalticker.blogs.cnn.com/2008/10/28/tx-countys-machines-causing-concern-for-some-voters/.

483.	Libby Cluett, *Concerns Raised Over Electronic Voting*, Mineral Wells Index, Oct. 24, 2008, *available at* http://www.mineralwellsindex.com/local/local_story_298161535.html.

484.	Marti Alexander, *City Discovers Error*, Atlanta Citizens J., May 19, 2008, *available at* http://www.votersunite.org/article.asp?id=7709.

485.	Lauren Winchester, *Problem Machines Cause Voting Delay*, Daily Texan, Mar. 5, 2008, *available at* http://www.votersunite.org/article.asp?id=7585.

486.	Steven Alford, *Late-Night Vote-Tally Snafus 'Probably Set Some Records'*, Lufkin Daily News, Mar. 5, 2008, *available at* http://www.votersunite.org/article.asp?id=7587.

487.	*El Paso's Electronic Voting Machines Have Problems*, KFOX-TV News (Nov. 3, 2006); Vic Kolenc, *Voting Machine Problems Checked*, El Paso Times (Nov. 4, 2006).

488.	*Glitch Forces Manual Tabulation for U.S. House Race*, Dallas Morning News (Nov. 8, 2006).

489.	Tom Bower, *Bexar Computer Glitch Delays Counting of Votes*, San Antonio Express News (Mar. 10, 2004).

490.	*Jefferson County Voters Continue to Raise Concerns About Voting Machines*, KFDM-TV (Oct. 28, 2006).

491.	Anna M. Tinsley & Anthony Spangler, *Vote Spike Blamed on Program Snafu*, Fort Worth Star-Telegram (Mar. 9, 2006); Anna M. Tinsley, *Judicial Candidate Files Challenge*, Fort Worth Star-Telegram (Apr. 6, 2006).

492.	Brian Williams, *Software Blamed in Precinct 8 Democratic Chair Race Mixup*, Lubbock Avalanche-Journal (Mar. 11, 2004).

493.	*Ballot Glitches Reverse Two Election Results*, The Houston Chronicle (Nov. 8, 2002).

494.	David Demille, *Washington County Vote Underway*, Spectrum, Oct., 22, 2008, *available at* http://www.votersunite.org/article.asp?id=8025.

495.	Sandhya Somashekhar, *Ballot Machine Malfunctions, Fairfax Race Left in Limbo*, Wash. Post, Mar. 11, 2009, at B1, *available at* http://www.washingtonpost.com/wp-dyn/content/article/2009/03/10/AR2009031002068.html.

496.	Julia O'Donoghue, *Big Questions about Voting Machines*, Reston Connection, Mar. 18, 2009, *available at* http://www.connectionnewspapers.com/article.asp?article=326929&paper=71&cat=104.

497.	Marsha Walton, *Memory Cards Cause Problems in Fairfax County, VA*, CNN, Nov. 4, 2008, http://politicalticker.blogs.cnn.com/2008/11/04/vafairfax-county-machine-problems/.

498.   Lauren Glendenning, *Voting Glitch in Fairfax*, Connection Newspapers (Nov. 8,2 006).

499.   David Cho, *Fairfax Judge Orders Logs of Voting Machines Inspected*, Washington Post (Nov. 6, 2003).

500.   David Wickert, *Slow Going For Local Counting*, News Trib., Nov. 6, 2008, at A1.

501.   *Scattered Reports of Voters Being Blocked and Machine Malfunctions*, King5.com (Nov. 2, 2004).

502.   Paul Fallon, *Software Glitch Delays Vote Count*, Times W.V., Nov. 5, 2008, *available at* http://www.timeswv.com/ todaystopnews/local_story_310033002.html.

503.   *Glitch Stops Vote Counting in Marion*, WHSV.com, Nov 4, 2008, http://www.whsv.com/westvirginiaap/ headlines/33863909.html.

504.   Paul J. Nyden, *ES&S Official Left Company in May*, Charleston Gazette, Oct. 26, 2008, at 1A.

505.   Paul J. Nyden, *More Voting Problems Reported*, Charleston Gazette, Oct. 23, 2008, at 1A.

506.   Joselyn King, *Voting is a Touchy Business*, Wheeling News Register, Oct. 21, 2008, *available at* http://www.news-register.net/page/content.detail/id/515728.html.

507.   Paul J. Nyden, *Some Early Voters Miffed Jackson County Touch-Screens Switched Votes, 3 Residents Say*, Charleston Gazette, Oct. 18, 2008, at 1A.

508.   Paul J. Nyden, *Early-Voting Problems in Putnam*, Charleston Gazette, Oct. 18 2008, at 1A.

509.   Christian Alexandersen, *Printers Slow Voting Machines*, Huntington Herald-Dispatch, May 21, 2008, *available at* http://www.herald-dispatch.com/homepage/x642013931.

510.   *Voting Machine Problem Causes Delay*, Gazette, Feb. 18, 2009, *available at* http://gazettextra.com/news/2009/feb/18/ voting-machine-problem-causes-delay/.

511.   Jake Rigdon, *About 600 Medford Ballots Cast in November Ignored*, Marshfield News-Herald (Mar. 12, 2004).

512.   Matthew Van Dusen, *Clerk Changes Election Vote Totals*, Caspar Star-Tribune (Aug. 21, 2004).

NEW AND FORTHCOMING BRENNAN CENTER PUBLICATIONS

Renewing Democracy After Citizens United
Susan Liss, Michael Waldman

Small Donor Matching Funds: The NYC Election Experience
Susan Liss, Angela Migally

New Politics of Judicial Elections, 2000-2009: Decade of Change
James Sample, Adam Skaggs, Jonathan Blitzer

The Filibuster: Its Use and Abuse
Mimi Marziani

Voter Registration in a Digital Age
Christopher Ponoroff, edited by Wendy Weiser

User Fees for Criminal Justice?
Rebekah Diller

Buying Justice: The Impact of Citizens United *on Judicial Elections*
Adam Skaggs

A Citizen's Guide to Redistricting, Revised and Updated: 2010
Justin Levitt

Domestic Surveillance: New Rules, New Risks
Emily Berman

Domestic Counter-Terrorism and Radicalization
Faiza Patel

Corporate Campaign Spending: Giving Shareholders a Voice
Ciara Torres-Spelliscy

Foreclosures: A Crisis in Legal Representation
Melanca Clark with Maggie Barron

Racial Disparities in Federal Prosecutions
Brennan Center for Justice &
the National Institute on Law and Equity

For more information, please visit www.brennancenter.org