



## PROTECTING ELECTIONS IN AN ELECTRONIC WORLD

### Summary

- All three of the most commonly purchased electronic voting systems have significant security and reliability vulnerabilities.
- Few jurisdictions have implemented any of the key countermeasures that could make the least difficult attacks against voting systems much more difficult to execute.
- Millions of Americans with disabilities cannot vote independently and secretly on the voting machines in their precincts.
- The design of ballots and instructions has a large and demonstrable effect on loss of votes as a result of residual errors.
- The initial costs of a voting system are likely to be a small percentage of the total cost over its life-span.

**All three of the most commonly purchased electronic voting systems have significant security and reliability vulnerabilities.** These vulnerabilities pose a real danger to the integrity of national, state, and local elections. When the goal of an attack on voting systems is to change the outcome of a close statewide election, attacks that involve the insertion of corrupt software are the least difficult attacks. Voting machines that have wireless components are significantly more vulnerable to a wide array of attacks.

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Of the 27 states that mandate voter-verified paper trails, only 13 require regular audits. Current federal guidelines for voting systems do not ban wireless components; only two states, New York and Minnesota, ban wireless components in voting machines. Only four states conduct parallel testing statewide. After evaluating more than 120 possible attacks on voting systems for more than a year, the Brennan Center's Task Force on Voting System Security recommends: (1) automatic routine audits of paper records; (2) parallel testing of voting machines; (3) banning of wireless components on all voting machines; (4) transparent and random selection procedures for parallel testing and audits; (5) decentralized programming and voting system administration; and (6) implementation of effective procedures for addressing evidence of fraud or error.

**Millions of Americans with disabilities cannot vote independently and secretly on the voting machines in their precincts.** According to the 2000 Census, at least 44.5 million adult residents (ages 21 and above) of the United States have some form of disability. Moreover, because many disabilities are associated with advanced age, a rapidly aging population stands to produce increases in the number of voters with disabilities. 19.1 million Americans have trouble seeing, while 30.8 million Americans have trouble hearing.

**The design of ballots and instructions has a large and demonstrable effect on loss of votes as a result of residual errors.** Several studies indicate that “residual vote rates,” the difference between the number of ballots cast and the number of valid votes cast in a particular contest, are higher in low-income and minority communities. The failure of a voting system to protect against residual votes is likely to disproportionately harm low-income and minority voters. The Brennan Center’s usability recommendations include: (1) do not assume familiarity with technology; (2) provide mechanisms for recording and reviewing votes; (3) make clear when the voter has completed each step or task in the voting process; (4) ensure the voting system plainly notifies the voter of errors; and (5) make it easy for voters to correct their errors.

**The initial costs of a voting system are likely to be a small percentage of the total cost over its life-span.** Voting systems that initially cost a jurisdiction less money may end up being more expensive than other systems after a few years due to operating costs such as the purchase and use of consumables like ballots, paper, and ink, as well as costs associated with operations, maintenance, upgrades and training. Additionally, large purchases are likely to produce significant savings over smaller purchases, as most vendors offer volume discounts. The total comparative costs of systems will vary from jurisdiction to jurisdiction. The Brennan Center has identified seven jurisdiction-dependent factors that are most significant in determining the initial and/or long-term cost of voting systems.

## THE WORK OF THE BRENNAN CENTER

► **Providing legal analysis and legislative counseling.** The Brennan Center offers legal support to state officials interested in policy change. In conjunction with the California Secretary of State’s office, we held a seminar for the chief election offices in ten other states to explain our security findings and recommendations. We have worked with a number of legislators and policymakers on the federal, state, and local level to adopt legislation and regulations that will ensure that voter preferences are counted accurately. Since the release of our report on voting system security, Arizona, Utah and Wisconsin have announced they will audit voter verified paper records in this November’s elections.

► **Working with local jurisdictions to increase the effectiveness of voting systems.** The Brennan Center consults with county election officials to help them put measures in place to ensure the accuracy, accessibility, and security of their voting systems. Specifically, we have worked with Palm Beach County, Florida to develop a Parallel Testing regime for their paperless DREs this November. Pima County, Arizona (which includes Tucson) explicitly adopted a number of the Brennan Center’s security recommendations for this November’s elections. And the Cuyahoga County Election Review Panel, which was asked by Cuyahoga County, Ohio officials to review election and voting system practices, used the Brennan Center security report in developing new security recommendations for the county.