V. A Democratic Process

which Uses Equipment that Reliably Clarifies and Registers the Voter's Choices

In the 2000 presidential election, more than two million voters went to the polls but did not have any vote counted in the race for president. Specialists call these votes in which no choice is counted "residual votes." These millions of voters either spoiled their ballots by overvoting (appearing to vote for more than one candidate), or by undervoting, i.e., they marked their choice in a manner that could not be counted, or they marked no choice at all—accidentally or intentionally.

In addition to those two million voters, some further, unknown number of voters may have had their votes counted, but voted for a different candidate than the one they were trying to choose. No one can know how often this happens. But some initial research disturbingly suggests that a significant number of voters commit errors simply because some voting systems are badly designed.[47] In addition, large numbers of disabled individuals encounter difficulty in using certain kinds of voting equipment at all, or cannot do so without disclosing their vote to others.

Every analyst of voting equipment agrees that the number of residual votes and the rate of voter error is greatly affected by the kind of equipment that is used. An important precept in "human usability engineering" (to use a technical term) is that predictably high levels of user error are evidence of system failure, just as constant complaints that people cannot seem to "follow instructions" are usually symptoms of flawed instructions or faulty system design.[48]

These effects matter. They matter in principle, since the choice of voting equipment should not be the reason why hundreds of thousands of votes will not be counted. They also matter in practice, since elections are frequently very, very close.

President Harry Truman with Election Day edition of the *Chicago Tribune*, November 4, 1948.

Very Close Elections Happen—Often

Some might wonder if the extraordinary closeness of the 2000 vote in Florida was just a unique anomaly in American politics. But elections where the margin of error is as little as one percent or less are common.

In presidential elections since 1948, nearly half of all the states have had at least one occasion when the winner of their electoral votes was decided by less than one percent of the vote. In 1948 Truman carried California and Illinois each by margins of less than 1%; had he lost both states the election would have gone to the House of Representatives for decision. In 1960 the winner in six states was decided by this tiny margin, more than enough to have changed the outcome.[49] In 2000 the winners in four other states, in addition to Florida, was decided by less than 1% of the vote.[50] In a given election, past experience indicates a 90% chance that at least one state will have a presidential election decided within such a 1% technological margin of error. Very close elections are also common in elections for other federal offices or for governor. Since 1948 half of the states have had at least one senatorial race decided by less than 1% of the vote; some have had as many as three such narrowly decided senatorial races.

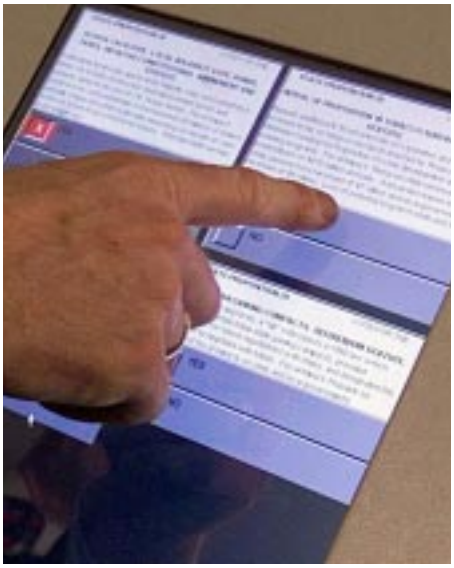
Benchmarks, Not Mandates

Voting equipment is generally selected by local election jurisdictions, usually counties. Different kinds of systems are therefore used all over the country. There are five basic kinds of systems. In order of the percentage of people using them in 2000, they are:

Punch Card	34.4%
Marksense (Optical Scan)	27.5
Lever	17.8
Electronic (DRE)	10.7
Paper Ballots	1.3
Mixed (within county)	8.1

During the last twenty years the biggest technological trend has been the shift away from lever machines toward newer electronic equipment, specifically optical scan types and the Direct Read Electronic (DRE, or touch-screen, ATM-like) machines. Punch card usage has held steady.[51] Various fixes have been proposed for improving voting equipment. One of the most popular is the idea of abolishing or buying out punch card voting machines.

We do not think, however, that the federal government can effectively pick winners and losers in rapidly evolving competition among private sellers of voting equipment. Nor do we think one size will fit all—for several reasons:



- The performance of voting systems is affected by several inputs that go beyond the equipment. Some of the most important are ballot design, voter education, and the skill and training of poll workers. Some administrators believe, with cause, that they can get more improvements, dollar for dollar, from voter education and poll worker training than they can from investments in new equipment.
- Punch card systems sometimes serve specific local needs. With a punch card machine, each voter just needs a blank punch card. With an optical scan machine, each voter needs a separate ballot. In Los Angeles County, with its 4 million voters, long ballots with many offices and propositions, and requirement to offer ballots in seven different languages (soon to be ten), punch cards thus make much more sense than optical scanners—at least unless enough money can be found to upgrade to high quality DRE (touch screen) machines.
- Punch card systems can be very different. The Datavote system, for instance, seems to have a much better performance record than the Votomatic-style systems most familiar from the television coverage of the Florida election.[52]
- Optical scan systems and DRE (touch-screen) systems can also be quite different. The different brands of optical scan systems vary, especially between those that are centrally counted and the precinct count systems that allow voters to correct errors. The earliest DRE systems had relatively high rates of voter error, which are now apparently being significantly reduced by more modern hardware and more sophisticated software designs that improve the user interface.[53]

These considerations lead us to favor a strategy of focusing on outputs rather than inputs for measuring improvements in the accuracy with which votes are counted. A benchmark expressed as a maximum acceptable percentage of residual votes would allow each state to set a standard for reliable performance and require election jurisdictions to disclose and be accountable to the public for how they did. This strategy lets state and local managers decide how they want to tackle the problem but gives citizens and their elected representatives a clear standard for judging the results.

★ ★ Policy Recommendation ★ ★ ★

Each state should set a benchmark for voting system performance, uniform for that state in each local jurisdiction that conducts elections. The benchmark should be expressed as a percentage of residual vote (the combination of overvotes, spoiled votes, and undervotes) in the contest at the top of the ballot and should take account of deliberate decisions of voters not to make a choice.

1. Benchmarks should consider the results obtained by best practices within that state, taking local circumstances into account. In general, we suggest that the benchmarks in the next election cycle should be set no higher than 2%, with the goal of further reductions in succeeding cycles.
2. Each state should require its election jurisdictions to issue a public report on the number of residual votes after every statewide election, including the probable causes of error, if any.
3. Each state should determine for itself how to hold its election jurisdictions accountable for achieving the benchmarks.

In considering an appropriate benchmark, officials must make allowance for the voters' right to choose no one at all. Some portion of the residual vote number comes from such intentional undervotes, which can vary considerably from place to place along with local culture and traditions.

Scholars have made progress, however, in suggesting how often this practice occurs. Survey questions from the National Election Studies indicate that on average, between 1980 and 2000, about three-quarters of 1% of voters (0.73%) deliberately made no choice in the presidential race. Exit polling data from the Voter News Service allows another check on this estimate. In 1992, the only year of sufficient data on this point, again about three-quarters of 1% of voters (0.77%) said they had chosen not to cast a vote for president. The number of candidates on the ballot and the availability of straight ticket voting appear to make no difference in these numbers. Voters are more likely to pass on the presidential contest when there is a senatorial or governor's race on the ballot, or when the presidential race was not competitive in that state. Based on this data, ethnic and partisan differences were

unimportant, but older and poorer voters were more likely to skip a presidential race. Even where intentional undervotes were more frequent, the rate was still under 1%.[54]

Another way of bounding the problem is to look at the same jurisdictions as they move from one voting technology to another. Where, as in Detroit, the rate of invalid presidential ballots goes from 3.1% in 1996 to 1.1% in 2000, after a shift from punch card to precinct-count optical scan technology, observers can see that machines make a difference. A broader study of many counties across the country that changed from lever machines to other technologies between 1988 to 2000, after controlling for several variables, indicates that the underlying residual vote rate, the percentage unrelated to the type of technology, is no higher than 2%.[55]

Ballots are taken for recount, Miami-Dade County, FL, December 9, 2000.

Since there is bound to be some understandable variation in local conditions, we are reluctant to mandate any single federal benchmark. States should set their own standards. We encourage states (and their citizens) to judge performance at four levels. Residual vote rates at or below 1% should be considered good. Residual vote rates between 1 and 2% can be viewed as adequate, but citizens should consider local circumstances and decide what is possible. Rates between 2 and 3% should be viewed as worrying. Rates higher than 3% should be considered unacceptable.

Benchmarks Applied— The Forty Most Populous Counties

For a concrete illustration of how transparency and accountability can work, we apply this scale below to the forty most populous election jurisdictions in the United States. In judging performance it is better to assess particular counties or cities, rather than look at statewide averages that wash out the differences between jurisdictions that are using different types of machines. This list is ranked by percentages of residual vote in the 2000 election, from lowest to highest.[56]

Good Zero to 1%	
Hennepin County, Minnesota (Minneapolis)	0.3%
City of Milwaukee, Wisconsin	0.3
St. Louis County, Missouri (St. Louis)	0.3
Dallas County, Texas (Dallas)	0.4
King County, Washington (Seattle)	0.7
Oakland County, Michigan	0.7
Suffolk County, New York	0.7
Bergen County, New Jersey	0.7
Franklin County, Ohio (Columbus)	0.8
Orange County, California	0.8
Bexar County, Texas (San Antonio)	0.9
Fairfax County, Virginia	0.9
Riverside County, California	0.9
Middlesex County, Massachusetts	1.0

Adequate 1–2%	
Clark County, Nevada (Las Vegas)	1.1%
Nassau County, New York	1.2
Wayne County, Michigan (Detroit)	1.3
Alameda County, California (Oakland)	1.5
Tarrant County, Texas (Fort Worth)	1.6
Erie County, New York (Buffalo)	1.7
Maricopa County, Arizona (Phoenix)	1.7
Sacramento County, California (Sacramento)	1.7
Santa Clara County, California (San Jose)	1.8
Westchester County, New York	1.9
San Bernardino County, California	2.0
San Diego County, California (San Diego)	2.0

Worrying 2–3%	
Pinellas County, Florida (St. Petersburg)	2.1%
Harris County, Texas (Houston)	2.2[57]
Broward County, Florida (Fort Lauderdale)	2.5
Cuyahoga County, Ohio (Cleveland)	2.7
Los Angeles County, California (Los Angeles)	2.7

Unacceptable Above 3%	
Manhattan County, New York	3.2%
Queens County, New York	3.5
Kings County, New York (Brooklyn)	4.0
Miami-Dade County, Florida (Miami)	4.4
Bronx County, New York	4.7
Cook County, Illinois (Chicago)	6.2
Palm Beach County, Florida	6.4

Philadelphia County, Pennsylvania (Philadelphia) and Allegheny County, Pennsylvania (which includes Pittsburgh) did not report total voter turnout.

This table highlights only forty out of the hundreds of counties in the United States. It also lists only urban counties, yet some of the most serious residual vote problems are in rural counties that are often especially short of resources. There are many counties in the United States with double-digit percentages of residual votes.

Setting benchmarks always has a downside. People may try hard to meet them. Sometimes they try too hard and create new problems. For instance, legislators will need to be more careful to be sure the data they receive is accurate. They should be watchful for any efforts that discourage less capable voters from attempting to cast a ballot. Officials will also have a strong incentive to count every vote. That is good. But, given that incentive, it is vital to be sure that election jurisdictions in a state share common, reasonably objective definitions of just what constitutes a vote—an issue we will take up in Chapter VI of this report.

Jim Dickson, American Association of People with Disabilities.

Standards for More Effective and Accessible Voting Technology

As computer technology was used more and more in voting, the FEC's small Office of Election Administration prepared a set of Voting System Standards, approved in 1990, to guide the certification of machines by state and local administrators. The standards have been adopted by 32 states. The National Association of State Election Directors chooses independent testing authorities (ITAs) to examine systems and determine whether they meet the federal standards. Implementation of the standards through the ITAs has been going on since 1995. The FEC is now preparing an updated set of standards for adoption this year.

This system provides a good foundation. But every aspect of it needs to be built up. Overhauling and simplifying the system is vital to encouraging innovation in the research and development of voting technology. Indeed, an able task force made up exclusively of state and local election administrators, organized under the auspices of the Elections Center, took "an unprecedented leap in recommending a more active federal involvement in developing standards for the processes involved in conducting elections." "[W]ith some trepidation" this task force of administrators decided in favor of "a major departure from an historic 'hands-off' attitude toward the federal government" and called for active federal involvement "in development and maintenance of, not only vote counting system standards, but operational standards and guidelines as well."[58] We agree.

The accessibility of voting technology by disabled individuals is a serious problem.

★ ★ Policy Recommendation ★ ★ ★

The federal government should develop a comprehensive set of voting equipment system standards for the benefit of state and local election administration.

1. Congress should grant statutory authority to an appropriate federal agency to develop such standards in consultation with state and local election officials.
2. The scope of the voting system standards should include security (including a documentary audit for non-ballot systems), procedures for decertification as well as certification of both software and hardware, assessment of human usability, and operational guidelines for proper use and maintenance of the equipment. The agency should maintain a clearinghouse of information about experience in practice.
3. Voters should have the opportunity to correct errors at the precinct or other polling place, either within the voting equipment itself or in the operational guidelines to administrators for using the equipment.
4. Each voting tally system certified for use should include, as part of the certification, a proposed statement of what constitutes a proper vote in the design and operation of the system.
5. New voting equipment systems certified either by the federal government or by any state should provide a practical and effective means for voters with physical disabilities to cast a secret ballot.
6. In addition to developing the voting system standards, the federal agency should provide its own certification and decertification of hardware and software, including components in voter registration systems. These federal certifications and decertifications, like the remainder of the standards, will be recommendations to states which they can adopt or not.
7. This federal service should include selection and oversight of a federally supervised set of independent testing authorities who will apply the standards in assessing equipment. After the federal agency develops and approves the relevant voluntary voting system standards in consultation with state and local administrators, this further, technical task should be delegated to the highly regarded and relatively independent National Institute of Standards and Technology (NIST) of the Department of Commerce.

Our recommendation does not just expand the scope of the standards. We stress the importance, borne out in practice, of insuring that systems permit second-chance voting in some suitable form. We note that voting equipment designers should place on the record their assumption about what should be tallied as a vote under their system.

The accessibility of voting technology by disabled individuals is a serious problem. In an earlier section of the report we discussed the issue of physical access to polling places. Here we address the issue of whether voting machines are accessible to those who can actually get to them. Of particular concern is access for the millions of people who are blind or visually impaired. Our solution, in point five of this recommendation, is modeled on the Texas statute signed into law by then-Governor Bush in 1999. Senior election officials in Texas are satisfied so far with this statute, as are advocates for the blind and disabled.

Like the Texas law, this recommendation for accessible voting technology will tend to promote the future acquisition of DRE (touch-screen) electronic systems equipped with an audio feedback device. Such systems are already on the market. Local jurisdictions can also opt to buy just one such system for each polling place, although that may be administratively inconvenient. The standard can be met with marksense (optical scan) or even lever machines, but the adaptation is not easy.[59]

Finally, and very important to the reform of the research and development system in voting technology, we think the federal government should offer to relieve each state of the burden of performing a separate testing and certification of whether a system meets the guidelines, which in principle can require a system to be tested again and again and force dozens of individual states to acquire the technical expertise to oversee such a process. Now this task is coordinated by the National Association of State Election Directors. We recommend instead that a technically expert institution of the federal government perform this service capably and transparently. Many states may find this service extremely helpful. Private firms may also prefer this simpler and more expeditious process. Other states need not heed the federal conclusions and can run their own testing and certification processes. But citizens and their representatives may then ask proper questions about why or how their election administrators were persuaded to buy systems that NIST-supervised testers found unacceptable.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