To: Nathaniel Persily
From: Samuel Eisenberg
Re: Accuracy of Voter Registration Lists
Date: April 30, 2013

This memo reviews the literature discussing the accuracy of state voter registration lists and the challenges of maintaining accurate lists. After reviewing the statutory framework, the memo discusses various measures of the accuracy of voter registration lists, estimates of the magnitude of the problem, the sources of errors in voter registration lists, and potential solutions.

Overview

Voter registration lists are the heart of a state's election process. The lists are used to establish eligibility to vote, map voters to precincts, authenticate voters at the polls, audit election results, and prevent in-person fraud.[1] Accurate lists facilitate the entire election process; inaccurate lists can improperly exclude legitimate voters, waste public resources, cause headaches for voters at the polls, or invite fraud.[2] List accuracy may also have important spillover effects on public confidence in elections and voter participation. State election administrators therefore spend considerable time and effort on list management and maintenance.[3]

Accurate list maintenance is complicated by outdated paper registration systems, the complexity and shortcomings of computerized registration databases, population mobility, and incompatibility of systems across states, local jurisdictions, and federal and state agencies. While no single measure fully captures the "accuracy" of state voter registration lists, the latest research suggests as many as 8% of registration records (representing 16 million voters) are invalid or significantly inaccurate.[4]

Recommendations for improving the nation's voter registration lists include process suggestions, such as increasing cooperation and data sharing among states and across state agencies, using standardized list maintenance procedures, and the procedures used to track changes of address. Technological suggestions include using modern data mining and matching techniques, and standardizing data requirements and formats. Access and transparency suggestions include increasing public access to their registration data through online registration

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[1] Stephen Ansolabehere and Eitan Hersh, *Voter Registraion: The Process and Quality of Lists* 1, 6-7, in THE MEASURE OF AMERICAN ELECTIONS (Barry C. Burden and Charles Stewart III, eds.) (*forthcoming* 2013) ("Ansolabehere and Hersh"). An earlier version of the study is available as Stephen Ansolabehere and Eitan Hersh, *The Quality of Voter Registration Records: A Sate-by-State Analysis* 1, CalTech/MIT Voting Technology Project Report (2010), *available at* http://www.vote.caltech.edu/sites/default/files/quality_of_voter_report_pdf_4c45d05624.pdf.
[2] *Id.* at 1.
[3] *Id.*; Caltech/MIT Voting Technology Project, *Voting: What Is, What Could Be*, (July 1, 2001) (reporting approximately one-third of local election office budgets devoted to registration lists).
[4] Ansolabehere and Hersh Table 1.

and correction systems, improving standards and oversight for removing voters from registration lists, and increasing the overall transparency of the procedures for list maintenance and use.

Statutory Background

The National Voter Registration Act of 1993 (NVRA, also known as the "motor voter law"), establishes requirements for voter registration lists with respect to federal elections. The NVRA requires states to implement three different voter registration procedures. Section 5 of the Act requires states to allow voter registration on state driver's license application forms.[5] Section 6 of the Act requires states to accept federal mail-in registration forms, and to make the forms available for organized voter registration drives.[6] Section 6 of the Act requires states to designate public assistance and other agencies to accept registration forms and provide assistance to applicants.[7]

The NVRA also places restrictions on states' ability to remove voters from the voter registration lists.[8] List maintenance programs must be uniform, nondiscriminatory, and comply with the Voting Rights Act.[9] States may remove a voter upon a determination that the voter has moved, pursuant to a confirmation or notice requirement and allowing voters to update their

[5] 42 U.S.C. § 1973gg-3.
[6] *Id.* § 1973gg-4.
[7] *Id.* § 1973gg-5.
[8] *Id.* § 1973gg-6.
[9] *Id.* § 1973gg-6(b)(1).

registrations.[10] States may also remove voters who fail to respond to written notice and do not vote in an election within the following two federal elections.[11]

In the wake of the 2000 presidential election, Congress passed the Help America Vote Act ("HAVA") in 2002. In relevant part, HAVA section 303 required states to implement a single, centralized, statewide computerized voter registration list.[12] The Act requires coordination with other state agency databases, accessibility to state election officials, technological security measures, and minimum standards for accuracy. *Id.* The accuracy standards require that voter registration records are accurate and updated regularly, including a "file maintenance" system to remove ineligible voters,[13] with appropriate safeguards.[14] States must coordinate removal of voters ineligible due to felony status or death with other state agencies.[15] List maintenance must ensure completeness, accurate removal, and the elimination

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[10] *Id.*§ 1973gg-6(c)-(f). The procedure for removal is complex, but provides a safe harbor for states following the NVRA's prescribed process:

> a) the NVRA provides that a State may utilize change of address information supplied by the United States Postal Service through its National Change of Address program (NCOA) to identify registrants whose addresses may have changed; b) because this is second-hand information, not directly from the registrant, the NVRA prescribes a subsequent confirmation notice procedure that States must follow to verify possible address changes outside the jurisdiction generated from the NCOA program; and c) the NVRA specifies a subsequent waiting period after the confirmation notice is sent before a State can remove voters from the rolls for address changes outside the jurisdiction absent written confirmation from the voter. . . . A State can only remove the name of a person from the voter registration list on grounds of change of residence upon: 1) the voter's written first-hand confirmation of a change of address to a location outside of the registrar's jurisdiction, *or* 2) reliable second-hand information indicating a change of address outside of the jurisdiction from a source such as the NCOA program, or a general mailing to all voters, *plus* the subsequent failure of the person to respond to a specific forwardable confirmation mailing sent by the State *and* the failure of the person to vote or appear to vote during the period ending on the day after the second federal general election subsequent to the confirmation notice being sent.

United Stated Dep't of Justice, *The National Voter Registration Act of 1993 (NVRA): Questions and Answers*, http://www.justice.gov/crt/about/vot/nvra/nvra_faq.php (emphasis in original). For a description of the process as implemented by one jurisdiction, see Orange County Registrar of Voters, *Voter Registration Accuracy and Voter List Maintenance* (2012), *available at* http://www.ocvote.com/election-library/docs/2012%20Voter%20List%20Maintenance.pdf.

[11] 42 U.S.C. § 1973gg-6(d).

[12] 42 U.S.C. § 15483(a).

[13] "A system of file maintenance that makes a reasonable effort to remove registrants who are ineligible to vote from the official list of eligible voters. Under such system, consistent with the [NVRA], registrants who have not responded to a notice and who have not voted in 2 consecutive general elections for Federal office shall be removed from the official list of eligible voters, except that no registrant may be removed solely by reason of a failure to vote." *Id.* § 15483(a)(4)(A).

[14] Safeguards to ensure that eligible voters are not removed in error from the official list of eligible voters." *Id.*§ 15483(a)(4)(B).

[15] *Id.*§ 15483(a)(2)(A)(ii).

of duplicates.[16] Persons registering to vote must provide a driver's license or the last four digits of their Social Security Number.[17] Voters registering by mail must present valid photo identification or a utility bill, bank statement, paycheck, or government document with their name and address.[18]

The voter registration database requirements in HAVA are minimum requirements, and states may adopt additional and stricter standards if they comply with the Act.[19] Finally, HAVA created the Election Assistance Commission, which among other duties submits biennial reports on elections to Congress, including a survey of state election processes.[20]

State law regulation of the voter registration process, including implementation of the NVRA and HAVA mandates, is truly a "patchwork quilt."[21] A compilation by the National Association of Secretaries of State of state statutory requirements and procedures for list maintenance describes the wide variations among states in the use of list maintenance procedures authorized by the NVRA, and how those procedures are implemented.[22] For example, state laws and regulations vary in how jurisdictions confirm addresses, cross-reference voter registration applications with driver's license databases, remove names upon a change-of-address notification, notify other states when a voter moves into the state, and remove convicted criminals.[23] The EAC has compiled similar information in summary tabular form.[24] The EAC has provided interpretive guidance to the States regarding implementation of the computerized registration systems required by HAVA,[25] but federal law allows for significant flexibility in NVRA and HAVA implementation.

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[16] "[L]ist maintenance . . . shall be conducted in a manner that ensures that-- (i) the name of each registered voter appears in the computerized list; (ii) only voters who are not registered or who are not eligible to vote are removed from the computerized list; and (iii) duplicate names are eliminated from the computerized list." *Id.*§ 15483(a)(2)(B).

[17] *Id.* § 15483(a)(5). Persons without a driver's license or a Social Security Number are given a unique identifying number.

[18] *Id.* § 15483(b)(2).

[19] *Id.* § 15484; United States Election Assistance Commission, *Voluntary Guidance on Implementation of Statewide Voter Registration Lists* 5 (2005), *available at* http://www.eac.gov/assets/1/workflow_staging/Page/330.PDF.

[20] 42 U.S.C. §§ 15321-15472.

[21] R. Michael Alvarez and Thad E. Hall, *Resolving Voter Registration Problems: Making Registration Easier, Less Costly and More Accurate*, Caltech/MIT Voting Technology Project Working Paper #87 at 2 (2009), *available at* http://www.vote.caltech.edu/sites/default/files/wp_87_pdf_4acfa68b61.pdf.

[22] National Association of Secretaries of State, *NASS Report: Maintenance of State Voter Registration Lists* 4-14 (2009), *available at* http://www.hss.caltech.edu/~rma/nass-report-voter-reg-maintenance-sept09.pdf.

[23] *Id.*

[24] United States Election Assistance Commission, *2010 Statutory Overview* 13-21 (2011), *available at* http://www.eac.gov/assets/1/Documents/FINAL_2010%20Statutory%20Overview%20Report.pdf.

[25] EAC 2005 Guidance.

Dimensions and Scope of the Accuracy Problem

Voter registration lists exhibit a variety of types of error, and no single statistic can capture all dimensions of the accuracy question. Ansolabehere and Hersh's (2013) study of data from Catalist, a commercial data vendor that builds its database from publicly available state registration lists,[26] provides the most recent and thorough study of the topic. Their study also reviews other important nationwide data sets cited throughout the literature. Alsolabehere and Hersh provide several measures with which to analyze the accuracy question. They estimate 16.1 million registration records, or 8.7% of the records in the United States, are invalid in some form.[27] Their study analyzes accuracy as it relates to four basic functions of voter registration lists.

The first function of registration lists the authors discuss is to allow election officials, political campaigns, and others to map voters to precincts. Doing so requires a complete address corresponding to a real location the Post Office can deliver to.[28] Nationwide, 1 in 1000 records have an incomplete address.[29] That figure varies widely across states, from near 0% to greater than 2% in Utah.[30] The rate of undeliverable addresses is higher, roughly 4% nationwide, with states typically around 3.5% and ranging from 2% - 7%.[31]

Second, voter registration lists are used to authenticate voters at the polls. For states that require identification, the data on the voter's identification (e.g., name, address, birthdate) must match that in the state's records.[32] The accuracy of the records in states that include birthdays in their publicly available voter files can be checked against what should be a roughly uniform distribution. In several states, an abnormally high percentage of the birthdays are listed as January 1st. Other states appear to list a disproportionate number of birthdays on the first of each month or on November 11th (11/11/XXXX).[33]

Third, voter registration lists can be used to audit elections by comparing the number of people recorded on the list as having voted to the number of ballots cast.[34] Some discrepancy between the two numbers is to be expected. For example, poll workers may make and incorrect notation on the voter lists, a ballot may be invalidated or have an undervote for a given candidate, or voters may be purged from the rolls after an election.[35] However, the discrepancies

[26] While Catalist provides services to the Democratic Party and aligned interest groups, the authors note that the sources Catalist uses for cleaning and cross-checking state list data are generally unbiased, and that it would be against their interest to introduce partisan bias in ways that would affect the basic quality of the data that is of interest here.
[27] Ansolabehere and Hersh Table 1.
[28] Id. at 6.
[29] Id. at 13.
[30] Id. at 13 and Fig. 1.
[31] Id.
[32] Id. at 7.
[33] Id. at 15-16 and Figs. 2-3
[34] Id. at 7.
[35] Id. at 17-19.

vary among the states and between elections,[36] which suggests possible underlying inaccuracies in the voter files.

Fourth, voter registration lists are used to prevent in-person voter fraud. States can guard against possible fraud by eliminating duplicate and obsolete records.[37] To do so requires the lists be accurate: for example, under HAVA, purging records for voters who have failed to vote in two consecutive federal elections requires an accurate voting history for each voter and an accurate registration date. For registration date, the authors looked at the proportion of records without a complete registration date and the distribution of those dates (occurrence of January 1st, for example).[38] Several New England states have high rates of incomplete or missing registration dates, up to nearly 40% in New Hampshire.[39] The authors measured accuracy in terms of obsolete records using Catalist's flags for records appearing to be deceased or otherwise "deadwood."[40] Once again, there are dramatic variations across states. In 20 states, less than 1% of records appear to be deadwood, but 20 states have more than 5% deadwood, two have over 12%.[41]

Ansolabehere and Hersh then compare their data from Catalist to that from other sources. The U.S. Election Assistance Commission's Election and Voting Survey (EAVS)[42] reports that for the 2010 cycle, the median state rejected 1% of new registration applications as invalid, with state rejection rates ranging from 0 to 44%.[43] In total, states rejected or found invalid 1.8 million voter registration applications, or 3% of the national total. Another 2.9 million applications were found to be duplicates. Together, over 9% of registration applications were invalid or duplicates.[44] States removed 15 million voters from registration lists. As part of their NVRA and HAVA list maintenance processes, states sent 14.5 million removal notices to voters.[45] Ansolabehere and Hersh suggest the changes reported rejection rates over time reflect erratic reporting by the states.[46] For example, Indiana reported a 2% rejection rate in 2008 (near median), and a 44% rejection rate in 2010 (the highest of any state).[47]

Ansolabehere and Hersh also examined data from the U.S. Census's Current Population Survey (CPS), which reported that for the 2008 presidential election, of the 15 million registered

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[36] Id. at 18-19 and Fig. 4.
[37] Id. at 7.
[38] Id. at 20-21 and Figs. 7-8.
[39] Id. at 21.
[40] Id. at 19-20 and Figs. 5-6.
[41] Id. at 20.
[42] United States Election Assistance Commission, *The Impact of the National Voter Registration Act of 1993 on the Administration of Elections for Federal Office 2009-2010: A Report to the 112th Congress* (2011), *available at* http://www.eac.gov/assets/1/Documents/2010%20NVRA%20FINAL%20REPORT.pdf.
[43] Ansolabehere and Hersh at 23.
[44] U.S. Election Assistance Committee 2011, at 2.
[45] Id.
[46] Ansolabehere and Hersh at 24-25.
[47] Id.

voters who did not vote, 6% cited registration problems as their reason for not voting.[48] Among states, this rate ranged from 0 to 16% in 2008, with a median of 6%; in 2010, it ranged from near 0 to 13%, with the median state at 3%.[49] Ansolabehere and Hersh note that the CPS data suffers from measurement error due to sample size and the low total number of voters reporting registration problems, especially when broken down to the state level.[50]

As a whole, Ansolabehere and Hersh find the rates of bad address, deadwood, duplicate, and deceased records "reasonable and actually lower than expected" given changes in populations due to mobility and mortality.[51] They see opportunities for improvement in state maintenance of record details, including addresses, birthdates, registration dates, and voting history.[52] Interestingly, the authors find that their various measures of accuracy tend not to be correlated within states. That is, the typical state does well on some measures and poorer on others.[53] Thus, the authors argue any "combined score" of voter registration list accuracy will tend to mask the specific problems of a given state. Further, it is unclear as a theoretical matter what such a score would signify.[54] Additionally, states that have "bottom-up" election administration, with primary control devolved to county officials, do no worse than other states.[55] Preliminarily, they report that rural counties have higher rates of obsolete records than urban counties.[56] The authors recommend that policymakers "should focus on addressing each state's unique set of weak spots rather than identifying states that are overall delinquent or by proposing broad changes to election administration."[57]

A 2010 study by Ansolabehere, Hersh, Gerber, and Doherty studied registration record discrepancies in Florida and Los Angeles by mailing surveys to a random sample of registered

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[48] Thom File and Sarah Crissey, *Voting and Registration in the Election of November 2008* at 13-14 (2012), U.S. Census Bureau, *available at* http://www.census.gov/prod/2010pubs/p20-562.pdf.; *see also* Pew Center on the States, *Inaccurate, Costly, and Inefficient: Evidence that America's Voter Registration System Needs an Upgrade* (2012), *available at* http://www.pewstates.org/uploadedFiles/PCS_Assets/2012/Pew_Upgrading_Voter_Registration.pdf (discussing CPS data)

[49] Ansolabehere and Hersh at 24; *see* U.S. Census Bureau, *Voting and Registration in the Election of November 2010 – Detailed Tables* (2011), *available at* http://www.census.gov/hhes/www/socdemo/voting/publications/p20/2010/tables.html; U.S. Census Bureau, *Voting and Registration in the Election of November 2008 – Detailed Tables*, *available at* http://www.census.gov/hhes/www/socdemo/voting/publications/p20/2008/tables.html.

[50] Ansolabehere and Hersh at 25.

[51] Id. at 28-29.

[52] Id. at 29.

[53] Id. at 21-22.

[54] Id. at 26.

[55] Id. at 28.

[56] Id.

[57] Id. at 28.

voters.[58] Around 10% of respondents in each jurisdiction found some discrepancy in their voting record.[59] Those data, and the rate of undeliverable mail found by the study, are consistent with the Catalist-based data reported in the 2013 study.[60]

Levitt et al. (2006) report that a 2004 comparison of 15,000 voter and DMV records in New York City found that nearly 20% of the records "did not match because of typos by elections officials."

As part of its Elections Performance Index, the Pew Center on the States included data from the EAVS and CPS in its 17 indicators of state election procedures and implementation outcomes.[61] Pew's criteria for developing useful indicators are a useful guide when examining metrics for registration list accuracy: an indicator should be reliable, consistent over time, consistent across states, reflect a salient outcome or measure of good elections, be easily understood by the public and have a relatively unambiguous interpretation, and be currently available or available in the near future.[62]

Some studies have attempted to estimate the number of votes "lost" due to registration issues. A survey by Alvarez et al. puts this number at 2.2 million votes for the 2008 elections, compared to 2.6 million lost due to long lines, 2.2 million for lack of sufficient identification, and 1.9 million for inability to locate polling places.[63]

Despite these difficulties, the last two decades of federal legislation has caused significant improvement in state voter registration systems. For example, HAVA resulted in state implementation of many of the changes recommended by the CalTech/MIT Voting Technology Project's 2001 report.[64] Computerized databases have created "an unprecedented degree of openness and transparency with the voter registration."[65] A survey by Alvarez, Llewellyn, and Hall (2007) found 90% of Americans find voter registration easy, which the

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[58] Stephen Ansolabehere, Eitan Hersh, Alan Gerber, and David Doherty, *Voter Registration List Quality Pilot Studies: Report on Detailed Results* 9 (2010) (Ansolabehere et al.), *available at* http://www.vote.caltech.edu/sites/default/files/voter_registration_list_results_pdf_4c34b18160.pdf

[59] Id. at 1.

[60] Ansolabehere and Hersh at 22.

[61] Pew Center on the States, *Elections Performance Index* (2013), *available at* http://www.pewstates.org/research/reports/elections-performance-index-85899445029

[62] Pew Center on the States, *Elections Performance Index Methodology* (2013), *available at* http://www.pewstates.org/uploadedFiles/PCS_Assets/2013/EPI_methodology.pdf.

[63] R. Michael Alvarez, Stephen Ansolabehere; Adam Berinsky; Gabriel Lenz; Charles Stewart III and Thad Hall, *2008 Survey of the Performance of American Elections, Final Report* (2008), *available at* http://www.vote.caltech.edu/sites/default/files/Final%20report20090218.pdf.

[64] R. Michael Alvarez et al., *Voting: What Has Changed, What Hasn't, and What Needs Improvement*, Report of the CalTech/MIT Voting Technology Project 26-27 (2013), http://www.vote.caltech.edu/sites/default/files/Voting%20Technology%20Report_1_14_2013.pdf.

[65] Id. at 27.

authors attribute to the success of the NVRA.[66]

Diagnosing Sources of Voter Registration List Inaccuracy

Errors in voter registration lists, whether due to overinclusion, underinclusion, duplication, outdatedness, or typographical errors, can occur at any step in the registration and list maintenance process. Ansolabehere et al. (2010) classify errors by the stage of the process at which they are introduced:

(1) [V]oters may provide incorrect or incomplete information,
(2) election administrators may record incorrect or incomplete information, and
(3) election administrators may not keep up with changes to existing records.[67]

A few specific problems are worth highlighting.

Voter registration systems as a whole, even after HAVA, still rely largely on outdated systems that create systemic inefficiencies and raise costs.[68] In particular, paper voter registration applications and manual data entry increase the risk of clerical error, and many computer systems still rely on rudimentary data matching techniques.[69] Even simple typographical errors can come in a variety of forms.[70]

Computerized registration lists are generally an improvement over the old paper system, but computers introduce other novel problems. In particular, the combination of the difficulty of accurately matching records and the ease with which a computerized system allows large-scale data manipulation can increase the potential for improper removal of voters from the rolls. Removal is problematic where, for example, the states rely on inaccurate lists, removal is done in secret or without notice, poor matching criteria and algorithms are used, or the removals are done without sufficient oversight.[71] Beyond matching and removal, state election officials

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[66] R. Michael Alvarez, Morgan Llewellyn, and Thad E. Hall, *How Hard Can It Be: Do Citizens Think It is Difficult to Register to Vote?*, 18 STANFORD L. & POL'Y REV. 382, 406 (2007).
[67] Ansolabehere et al. (2010) at 3.
[68] Pew Center on the States, *Upgrading Democracy: Improving America's Elections by Modernizing States' Voter Registration Systems* (2010), *available at* http://www.pewstates.org/uploadedFiles/PCS_Assets/2010/Upgrading_Democracy_report.pdf.
[69] National Research Council, Committee on State Voter Registration Databases, *Improving State Voter Registration Databases: Final Report* at B-1 to B-5 (2009), *available at* http://www.eac.gov/assets/1/workflow_staging/Page/52.PDF (discussing matching algorithms); Justin Levitt, Wendy R. Weiser, and Ana Muñoz, *Making the List: Database Matching and Verification Processes for Voter Registration*, Brennan Center for Justice Voting Rights and Elections Series 4-5 (2006), *available at* http://brennan.3cdn.net/96ee05284dfb6a6d5d_j4m6b1cjs.pdf (discussing types of clerical and matching errors).
[70] R. Michael Alvarez and Thad E. Hall, *Resolving Voter Registration Problems: Making Registration Easier, Less Costly and More Accurate*, Caltech/MIT Voting Technology Project Working Paper #87 (2009), *available at* http://www.vote.caltech.edu/sites/default/files/wp_87_pdf_4acfa68b61.pdf (discussing typographical errors found in Ohio's 2009 voter registration list); Levitt et al. (2006), *supra*.
[71] Myrna Pérez, Brennan Center for Justice, *Voter Purges* (2008), *available at* http://www.brennancenter.org/sites/default/files/legacy/publications/Voter.Purges.f.pdf.

must consider interoperability, system availability, security, privacy, backup capability, and the implications of same-day and portable registration when setting up a database.[72] However, the rise of "big data" techniques is helping to reveal the problems inherent in computerized voter registration lists,[73] and technologies already employed in the private sector can help modernize the databases and allow for improved matching and cleaning.[74] A 2013 report by the Brennan Center details the current state of various technological "modernization" efforts by state legislatures and elections officials, including automated voter registration at DMV offices, online voter registration, and online registration information lookup.[75] That report and other work by the Brennan Center detail cost savings to the states for these projects.[76] Merely switching to new technology is not a panacea, however. While many states now allow voters to access information about their registration and polling place online, the quality and ease of use of state websites varies.[77]

List maintenance is inherently challenging when a state or county contains a large population of mobile persons, particularly younger voters.[78] The NCOA program works imperfectly for tracking voters who move,[79] and there is no uniform approach to contacting and removing voters using the NCOA.[80] In 2008, Pew found that one in four Americans believes their voter registration is updated automatically when they move by election officials or the USPS.[81]

Problems with registration lists are compounded by the timing of voter registration, which peaks just before registration cut-off deadlines (when officials are already busy preparing to administer an election) and is driven by third-party groups.[82] A high volume of last-minute registrations increases administrative costs and creates additional potential for error.

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[72] National Research Council (2009) at M-15 - M-27.
[73] Ansolabehere and Hersh at 3.
[74] Pew Center on the States, *Upgrading Democracy* (2010), at 13.
[75] Brennan Center for Justice, *Voter Registration Modernization in the States* (2013), *available at* http://www.brennancenter.org/analysis/voter-registration-modernization-states.
[76] Id.; Chritopher Ponoroff, Brennan Center for Justice, *Voter Registration in a Digital Age* (Wendy Weiser, ed.) (2010), *available at* http://www.brennancenter.org/sites/default/files/legacy/Democracy/Paperless_Registration_FINAL.pdf.
[77] Pew Center on the States, *Being Online is Still Not Enough: State Election Websites* (2011), *available at* http://www.pewstates.org/research/reports/being-online-is-still-not-enough-85899376525.
[78] Ansolabehere et al. 2010; Youjin B. Kim, *Democracy in a Mobile America* (2012), *available at* http://www.demos.org/publication/democracy-mobile-america-0.
[79] National Research Council (2009) at M-15 - M-16.
[80] EAC, *2010 Statutory Overview*, at 21.
[81] Pew Center on the States, *Inaccurate, Costly, and Inefficient: Evidence that America's Voter Registration System Needs an Upgrade* (2012), *available at* http://www.pewstates.org/uploadedFiles/PCS_Assets/2012/Pew_Upgrading_Voter_Registration.pdf
[82] Pew Center on the States, *Upgrading Democracy* (2010); Alvarez and Hall (2009) (more registrations in Franklin County (Columbus), Ohio between August and October 2008 than between January 2007 and March 2008).

Potential Solutions

Several of the groups cited above present recommendations in their reports –

The National Research Council's Committee on State Voter Registration Databases recommendations include: human review of computer-indicated removal decisions, transparency of procedures, public access through online portals, improving the design of registration forms, upgrading matching algorithms and procedures used by election officials, SSA, and DMVs, and developing national standards for data-exchange formats for voter registration databases.[83]

The Pew Center on the States' core recommendations are: comparing voter registration lists with a wider array of data, upgrading to proven matching techniques and data security protocols (already used by the private sector), and establishing new means for voters to submit information online and minimize manual data entry.[84]

The Brennan Center for Justice's recommendations include: automated electronic registration via a range of state information forms, portable registration that can be updated automatically with a change of address at multiple agencies, online voter registration and correction, fail-safe mechanisms to allow voters to correct registration mistakes at the polls, and further federal investment in technology upgrades.[85]

The recommendations of the Caltech/MIT Voting Technology Project Study by Alvarez et al. (2008) of the cooperative data matching pilot program between Oregon and Washington include: procedures to contact other states and resolve duplicates and undeliverable mailing addresses, developing a mechanism to detect and investigate possible instances of double voting, expanding from bilateral programs to regional programs (perhaps beginning with projects between neighboring counties), use of advanced matching techniques, and public transparency.[86]

Several common threads run through these proposals, and are reinforced by the quantitative research into registration list errors:

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[83] National Research Council, Committee on State Voter Registration Databases, *Improving State Voter Registration Databases: Final Report* (2009), *available at* http://www.eac.gov/assets/1/workflow_staging/Page/52.PDF.

[84] Pew Center on the States, *Upgrading Democracy: Improving America's Elections by Modernizing States' Voter Registration Systems* (2010), *available at* http://www.pewstates.org/uploadedFiles/PCS_Assets/2010/Upgrading_Democracy_report.pdf.

[85] Brennan Center for Justice, *The Case for Voter Registration Modernization* (2013), *available at* http://www.brennancenter.org/sites/default/files/publications/Case%20Voter%20Registration%20Modernization.pdf

[86] R. Michael Alvarez, Jeff Jonas, William E. Winkler, and Rebecca N. Wright, *Interstate Voter Registration Database Matching: The Oregon-Washington 2008 Pilot Project*, CalTech/MIT Voting Technology Project Working Paper #84 (2009), *available at* http://vote.caltech.edu/sites/default/files/wp_84_pdf_4acf7a043a.pdf.

- Standardization of data requirements, file formats, and data handling procedures;[87]
- Standardization of matching and list maintenance procedures across states;
- Increased cooperation among states, among state agencies, and between states and federal agencies to share data and technological resources;[88]
- Increased cross-referencing of state voter registration lists with databases from other sources;[89]
- Improvement of the Postal Service National Change of Address database, Post Office procedures, and procedures for using NCOA data to update registration lists;
- Use of modern data mining and matching techniques;[90]
- Improved standards and oversight for removal of voters from registration lists;
- Increased public transparency and access;[91] and
- Availability of online voter registration and correction.[92]

Conclusion

While the NVRA and HAVA have improved state voter registration lists, especially through mandating centralized computerized databases, a substantial portion of voter records are either outdated or inaccurate, a problem that may prevent several million Americans from voting during a typical presidential election. Continued modernization of the technology and procedures used for registering voters and maintaining registration lists can help ameliorate these problems, allowing easier access to the voting process for ordinary citizens and strengthening the integrity of the process.

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[87] This could be done by standardizing database formats across states, or by converting data to standard forms when it is exported for sharing between states. *See* National Research Council, *supra*, at M-61.

[88] For example, sharing data across states can improve matching accuracy, improving the ability of states to confirm whether a registration record is obsolete. *See, e.g.*, Brennan Center, *supra*, at 13-14.

[89] Some databases may be unfit for cross-referencing, however, because they are error-prone, do not check for citizenship, might result in the disclosure of personal information, or could show a person in states in which they are not registered to vote (e.g., property or tax records). Hans A. von Spakovsky, *Mandatory Voter Registration: How Universal Registration Threatens Electoral Integrity* (2013), http://www.heritage.org/research/reports/2013/03/mandatory-voter-registration-how-universal-registration-threatens-electoral-integrity.

[90] For example, the use of automated name rooting (checking for equivalents such as William and Bill), automated name ordering (to search for matches in, for example, multiple Hispanic surnames), wildcard matching capability, and blocking and string comparators (returning a match score rather than a binary yes/no match output). National Research Council, *supra*, at M-49-51.

[91] For example, Nebraska, https://www.votercheck.necvr.ne.gov/, and Nevada, https://nvsos.gov/VoterSearch/, have public access portals built into their voter registration websites.

[92] As an interim measure, providing fill-in PDF forms that could be printed and signed by the voter is a simple way to reduce clerical errors. National Research Council, *supra*, at M-38.

Recommended Sources

Government and Government-Sponsored Reports

United States Election Assistance Commission, *Voluntary Guidance on Implementation of Statewide Voter Registration Lists* (2005), *available at* http://www.eac.gov/assets/1/workflow_staging/Page/330.PDF.

- Provides non-binding guidance to the States regarding HAVA implementation, including requirements for state databases, coordination with other state agencies, security, retention requirements, and public access.

United States Election Assistance Commission, *2010 Statutory Overview* (2011), *available at* http://www.eac.gov/assets/1/Documents/FINAL_2010%20Statutory%20Overview%20Report.pdf. Compiles statistics about voting statutes, definitions, and procedures in the states. Section 2 of the report compiles information about state voter registration systems, including (pp. 14-21):

- Whether a state has a top-down centralized system or is periodically compiled from local data (bottom-up), and how often local jurisdictions transmit information to the state level.
- Whether states share information electronically with the state driver's license agency and whether the voter registration database can be linked with databases from other agencies.
- The triggers for moving voters from active to inactive status, and for removing them from the voter registration database system.
- Whether states use NCOA data.
- Whether states have internet-facilitated voter registration, and in what form.

United States Election Assistance Commission, *The Impact of the National Voter Registration Act of 1993 on the Administration of Elections for Federal Office 2009-2010: A Report to the 112th Congress* (2011), *available at* http://www.eac.gov/assets/1/Documents/2010%20NVRA%20FINAL%20REPORT.pdf; http://www.eac.gov/registration-data/.

- Latest survey data by the EAC. "States reported receiving nearly 45.5 million voter registration forms. Use of mail, fax, or email to submit forms was down from the previous election cycle, with 20.9% of registration forms being delivered through these means. Another 14.5% of applications were submitted in person at elections offices, and 37.1% through motor vehicle agencies. Seventeen States reported receiving voter registration applications over the Internet.
    - Of the 45.5millionvoterregistrationforms received, nearly 14.4 million of these applications were from new voters who were not previously registered in the local jurisdiction or had not previously registered in any jurisdiction. This represents fewer new registrants than in either of the two previous elections – there were 24.6 million new registrants in the 2006 to 2008 election cycle and slightly fewer than 17 .3 million new registrants during the 2004 to 2006 election cycle. More than 18.4 million of the registration forms that were submitted requested a change of name, address, or party of the registrant

  - States found invalid or otherwise rejected nearly 1.4 million applications, and almost 2.9 million applications were duplicates of existing registrations. Altogether, 9.4% of registration applications were invalid or duplicates.
  - More than 168,000 voter registration applications were "pre-registrations" from people under the age of 18, who were registering under State laws that allow them to preregister to vote before the age of 18 and vote upon turning 18 (or in a primary if they would be 18 by the general election). This number is down from the 2008 election cycle when 273,000 pre-registrations were processed.
  - States sent 14.5 million removal notices to names on their registration rolls, pursuant to provisions of the NVRA.
  - States removed more than 15 million voters from voter registration lists, for reasons including death, felony conviction, failure to respond to a confirmation notice and failure to vote in consecutive Federal elections, having moved from one jurisdiction to another, or at the voter's request. More States were able to report the number of voters that were removed than the number of removal notices that were sent."

National Research Council, Committee on State Voter Registration Databases, *Improving State Voter Registration Databases: Final Report* (2009), *available at* http://www.eac.gov/assets/1/workflow_staging/Page/52.PDF.

- Recommendations include: Human review of computer-indicated removal decisions, transparency of procedures, public access through online portals, improving the design of registration forms, upgrading matching algorithms and procedures used by election officials, SSA, and DMVs, and developing national standards for data-exchange formats for voter registration databases.

Thom File and Sarah Crissey, *Voting and Registration in the Election of November 2008* (2012), U.S. Census Bureau, *available at* http://www.census.gov/prod/2010pubs/p20-562.pdf

- Of the 15 million registered voters who did not vote in the 2008 presidential election, 6 percent cited registration problems as their reason for not voting. Of the 30 million citizens who were not registered to vote in 2008, 15 percent reported that they did not register because they did not meet the registration deadlines; 4.2 percent reported that they did not know where or how to register.

U.S. Census Bureau, *Voting and Registration in the Election of November 2008 – Detailed Tables*, *available at* http://www.census.gov/hhes/www/socdemo/voting/publications/p20/2008/tables.html

U.S. Census Bureau, *Voting and Registration in the Election of November 2010 – Detailed Tables* (2011), *available at* http://www.census.gov/hhes/www/socdemo/voting/publications/p20/2010/tables.html.

Jamieson, Amie, Hyon B. Shin and Jennifer Day, *Voting and Registration in the Election of November 2000*, U.S. Census Bureau (2001), http://www.census.gov/prod/2002pubs/p20-542.pdf.

- Reports Census Continuing Population Survey (CPS) data, including registered non-voters who reported not voting because of confusion about registration (7 % of 19 million registered non-voters).

Voter Registration and List Maintenance, Hearing before the Subcomm. on Elections, H. Comm. on House Admin., 110th Cong., Oct. 23, 2007, http://www.gpo.gov/fdsys/pkg/CHRG-110hhrg40619/pdf/CHRG-110hhrg40619.pdf; http://www.gpo.gov/fdsys/pkg/CHRG-110hhrg41330/pdf/CHRG-110hhrg41330.pdf.

Modernizing the Election Registration Process, Hearing Before the Subcomm. on Elections, H. Comm. on House Admin., 111th Cong., Oct. 21, 2009, http://www.gpo.gov/fdsys/pkg/CHRG-111hhrg53788/pdf/CHRG-111hhrg53788.pdf.

United States Government Accountability Office, *Additional Data Could Help State and Local Elections Officials Maintain Accurate Voter Registration Lists* (2005), *available at* http://www.gao.gov/new.items/d05478.pdf.

- "Federal data sources have the potential to help state election officials identify registrants who may be convicted felons or non-citizens. While the potential number identified may be small, an election can be decided by a few votes. Regarding felons, U.S. Attorneys are required to notify state election officials of federal felony convictions, but the information was not always easy for election officials to interpret or complete. Federal jury services generally do not now, but might feasibly be able to notify elections officials when potential jurors drawn from local voter registration lists claim to be non-citizens."

National Association of Secretaries of State, *NASS Report: Maintenance of State Voter Registration Lists* (2009), *available at* http://www.hss.caltech.edu/~rma/nass-report-voter-reg-maintenance-sept09.pdf

- "The National Association of Secretaries of State (NASS) developed this document in order to foster a better understanding of each state's requirements for maintaining its voter registration information. This overview covers four areas of voter registration list maintenance: (1) verification of the information on new voter registration applications; (2) identification of voters who no longer reside where they are registered to vote; (3) criteria for removing names from the voter registration list; and, (4) processes for obtaining the names of voters who are no longer eligible to vote. Additionally, this document provides a summary of recent state efforts to share voter registration information in order to identify duplicate registration records."
- "In summary, state laws provide a variety of mechanisms for meeting federal requirements concerning maintenance of the voter registration list. State and local election officials work in concert to identify voters who have moved, remove ineligible voters from the registration list, and verify the information on voter registration applications. Other state offices and federal agencies also play a role in this process by providing information about a voter's status (deceased, convicted of a crime, etcetera). As shown by the state summaries, this cooperation among actors at all levels of government is necessary to properly implement voter registration maintenance procedures and to keep registration lists up-to-date."

Research Literature and Advocacy Organization Reports

R. Michael Alvarez, Morgan Llewellyn and Thad E. Hall, *How Hard Can It Be: Do Citizens Think It is Difficult to Register to Vote?*, 18 STANFORD L. & POL'Y REV. 382 (2007).

- Discusses effects of HAVA on access to voter registration and public perceptions of the voter registration process.

R. Michael Alvarez, Stephen Ansolabehere; Adam Berinsky; Gabriel Lenz; Charles Stewart III and Thad Hall, *2008 Survey of the Performance of American Elections, Final Report* (2008), *available at* http://www.vote.caltech.edu/sites/default/files/Final%20report20090218.pdf.

- Internet survey of 200 registered voters in each state, including their experiences on election day, confidence in votes being counted, and reasons for not voting.

R. Michael Alvarez and Thad E. Hall, *Resolving Voter Registration Problems: Making Registration Easier, Less Costly and More Accurate*, Caltech/MIT Voting Technology Project Working Paper #87 (2009), *available at* http://www.vote.caltech.edu/sites/default/files/wp_87_pdf_4acfa68b61.pdf.

- Discusses problems with "patchwork quilt" of voter registration systems and suggests solutions in active, rather than passive, registration systems, such as increased state matching and notification to voters to verify or update information.

R. Michael Alvarez, *Measuring Election Performance*, Caltech/MIT Voting Technology Project Working Paper #94 (2009), *available at* http://www.vote.caltech.edu/sites/default/files/wp_94_pdf_4b676033ef.pdf.

R. Michael Alvarez, Jeff Jonas, William E. Winkler, and Rebecca N. Wright, *Interstate Voter Registration Database Matching: The Oregon-Washington 2008 Pilot Project*, CalTech/MIT Voting Technology Project Working Paper #84 (2009), *available at* http://vote.caltech.edu/sites/default/files/wp_84_pdf_4acf7a043a.pdf.

- Discusses Oregon-Washington interstate voter registration database matching project, including matching methods, results, reception by election officials, and recommendations for the two states and broader interstate collaboration.

R. Michael Alvarez et al., *Voting: What Has Changed, What Hasn't, and What Needs Improvement*, Report of the CalTech/MIT Voting Technology Project (2013), http://www.vote.caltech.edu/sites/default/files/Voting%20Technology%20Report_1_14_2013.pdf; research bibliography at http://www.vote.caltech.edu/sites/default/files/WP%20108_0.pdf.

- "HAVA prompted states and local jurisdictions to implement many of these changes [recommended in 2001]. HAVA itself mandated that states implement statewide, computerized voter registration databases, and that all states develop provisional-balloting systems. Many counties and states have gone further, and have deployed innovative means for voters to verify their voter registration status prior to an election; many have used new technologies to push voter registration data to polling places and

early-voting sites where it can be used actively during elections.
The transition toward statewide, centralized, computerized voter registration databases has led to developments that were not necessarily predictable in 2001. Statewide computerized voter registration files are allowing an unprecedented degree of openness and transparency with the voter registration system. States can now audit their entire voter registration databases—and researchers associated with the VTP have shown that such auditing procedures, if implemented well, can produce more accurateand usable voter registration files.
These statewide computerized databases have allowed states to pool their voter registration information, and studies have shown that this pooling helps identify duplicate records across state lines and improves the accuracy and integrity of state voter registration databases. States are even developing multi-state regional compacts for matching and analyzing databases. As states move to standardize their voter registration databases, such data-sharing will become easier and more efficient."

- "In the 2008 presidential election, [our] estimates show that the range of votes lost due to registration problem was between 910,000 and 3 million. Overall, lost votes due to registration problems have fallen over the past decade, but not by much—and the drop-off has not been nearly as great as that experienced because of improvements in voting technologies."
- "States should continue to standardize their voter registration databases so they can be pooled with databases from other states, and should investigate policies and technologies to insure that voter registration information is secure and private."

Stephen Ansolabehere and Eitan Hersh, *Voter Registraion: The Process and Quality of Lists* 1, 6-7, in THE MEASURE OF AMERICAN ELECTIONS (Barry C. Burden and Charles Stewart III, eds.) (*forthcoming* 2013).

- Survey of types and measures of accuracy in state voter registration databases, based on data from Catalist, a commercial data vendor that cross-references state voter file records against other state and national databases as well as data from commercial firms. Analyzes ten possible data quality indicators. An earlier version of the study is Stephen Ansolabehere and Eitan Hersh, *The Quality of Voter Registration Records: A State-by-State Analysis*, CalTech/MIT Voting Technology Project Report (2010), *available at* http://www.vote.caltech.edu/sites/default/files/quality_of_voter_report_pdf_4c45d05624.pdf.
- "Summary of Key Results [from 2010 version]
    - Of the 185,445,103 listed registration records in the United States, 16,130,325 are estimated to be invalid.
    - Aside from invalid records, in the typical state 1 in 65 records is duplicative, meaning that the same registrant is listed multiple times.
    - 1 in 25 records contains a mailing address that is likely to be undeliverable because of a typo, a street that no longer exists, or poor penmanship on registration applications.
    - In the typical state, 1 in 40 counted votes in the 2008 general election cannot be matched to a registrant listed as having voted.
    - 1 in 100 listed registrants is likely to be deceased.

  - 1 in 7 records does not have a listed birthdate, and for many voters who do have a listed birthdate, the date entered is inaccurate.
  - 1 in 25 registration records is estimated to be deadwood, because of registrants who have not voted in a very long time, have moved elsewhere and re-registered, or are thought to be deceased.
  - 1 in 60 registrants do not have a date of registration associated with their record, and implausibly large number of registrants who do have a registration date (1 in 50) are listed as registering on January 1st."

Stephen Ansolabehere, Eitan Hersh, Alan Gerber, and David Doherty, *Voter Registration List Quality Pilot Studies: Report on Detailed Results* (2010), *available at* http://www.vote.caltech.edu/sites/default/files/voter_registration_list_results_pdf_4c34b18160.pdf; methodology at Ansolabehere et al., *Voter Registration List Quality Pilot Studies: Report on Methodology* (2010), *available at* http://www.vote.caltech.edu/sites/default/files/voter_registration_list_methodology_pdf_4c34b18186.pdf.

- "Voter registration records were audited in two jurisdictions: the state of Florida and the county of Los Angeles. The purpose of this study is to measure the quality of voter lists by assessing registration application procedures in each jurisdiction as well as by sending mail surveys to randomly selected registrants.
- County-level data on registration applications reported to the U.S. Election Assistance Commission (EAC) do not correspond to data gathered from individual counties. In Los Angeles County, 5% of registration applications in 2008 were initially rejected due to incomplete information. In a report to the EAC, Los Angeles reported no applications rejected. A similar inconsistency was found for Miami-Dade County, Florida.
- Survey respondents identified discrepancies in their listed name, birthdate, address, and other details listed in registration records. Among Florida respondents, 12.0% found a discrepancy in their record. In L.A., 9.6% found a discrepancy.
- Registrants who recently registered or recently updated their registrations were more likely to report discrepancies on their voter records.
- Undeliverable mail and registrant-reported discrepancies are associated with the age of registrants, with the highest rates of invalid records occurring for registrants in their twenties and for registrants in their eighties and nineties. The large proportion of elderly residents in Florida contributes to a higher rate of undeliverable mail there.
- Undeliverable mail does not appear to be related to the population size and density of counties in the state of Florida."

Stephen Ansolabehere, Testimony Before the S. Rules Comm. Mar. 11, 2009, http://vote.caltech.edu/sites/default/files/03112009Ansolabehere_Testimony.pdf.

- Discusses Caltech/MIT, Census, and other studies of voter registration list accuracy and reasons for failures to vote.

Brennan Center for Justice, *Voter Registration Modernization in the States* (2013), *available at* http://www.brennancenter.org/analysis/voter-registration-modernization-states.

- Discusses the spread of automated voter registration, online registration and information lookup, and other "modernization" tools, and realized cost savings to states and local jurisdictions. For example, 23 states have or will soon have automated voter registration

at DMVs, 34 states allow online registration information lookup, and 16 states currently or will soon allow online voter registration. Washington spent $280,000 to automate voter registration at DMV offices and introduce online registration, from which the state (not including counties) has saved over $125,000 in the first year.

Brennan Center for Justice, *The Case for Voter Registration Modernization* (2013), *available at* http://www.brennancenter.org/sites/default/files/publications/Case%20Voter%20Registration%20Modernization.pdf

- "In the wake of Election 2012, we need basic national standards to minimize long lines at the polls and ensure that every eligible American who takes responsibility to vote is properly registered and can cast a ballot that counts. Voter Registration Modernization is a key reform to achieve these goals.
    - It establishes voluntary, automated registration of all consenting citizens when they interact with a wide range of government agencies.
    - It makes registration portable, keeping voters on the rolls even when they move.
    - It provides fail-safe procedures to ensure that eligible voters whose information is not on the rolls or not up to date can correct the information online or at the polls.
    - It offers states federal funding to make necessary technological upgrades.
    - The benefits are substantial:
    - It boosts election integrity, providing safeguards against hacking and curbing the potential for fraud.
    - It could help bring up to 50 million eligible voters into the political process.
    - It costs less than the current paper-based system."

Chritopher Ponoroff, Brennan Center for Justice, *Voter Registration in a Digital Age* (Wendy Weiser, ed.) (2010), *available at* http://www.brennancenter.org/sites/default/files/legacy/Democracy/Paperless_Registration_FINAL.pdf.

- Discusses accuracy, cost savings, and effect on voter registration rates of paperless voter registration. "It cost Arizona less than $130,000 and Washington just $279,000 to implement both online voter registration and automated voter registration at DMVs. Delaware's paperless voter registration at DMVs saves election officials more than $200,000 annually on personnel costs, above the savings they reaped by partially automating the process in the mid-1990s. Officials anticipate further savings.Our paper-based voter registration system may be the best the 19th century had to offer, but it is out of step with the higher-tech approach in other spheres of American life. Online and automated DMV registrations saved Maricopa County, Arizona over $450,000 in 2008. The county spends 33¢ to manually process an electronic application, and an average of 3¢ using a partially automated review process, compared to 83¢ for a paper registration form."
- "Officials [in AZ, DE, KS, MI, PA, SD, WA] consistently confirm that paperless registrations produce fewer errors than paper forms and reduce opportunities for fraud."
- "DMV voter registrations have nearly doubled in Washington and Kansas, and increased by even more in Rhode Island. Seven times as many South Dakotans submitted voter registrations at DMVs after the state implemented an automated system. Registration rates among 18-24 year-old citizens rose from 28 to 53 percent after Arizona introduced online and automated registration."

Myrna Pérez, Brennan Center for Justice, *Voter Purges* (2008), *available at* http://www.brennancenter.org/sites/default/files/legacy/publications/Voter.Purges.f.pdf.

- Discusses accuracy, transparency, standards, and oversight of voter removal from registration lists.
- "[T]hirty-nine states and the District of Columbia reported purging more than 13 million voters from registration rolls between 2004 and 2006.1 Purges, if done properly, are an important way to ensure that voter rolls are dependable, accurate, and up-to-date. Precise and carefully conducted purges can remove duplicate names, and people who have moved, died, or are otherwise ineligible. Far too frequently, however, eligible, registered citizens show up to vote and discover their names have been removed from the voter lists. States maintain voter rolls in an inconsistent and unaccountable manner. Officials strike voters from the rolls through a process that is shrouded in secrecy, prone to error, and vulnerable to manipulation"

Justin Levitt, Wendy R. Weiser, and Ana Muñoz, *Making the List: Database Matching and Verification Processes for Voter Registration*, Brennan Center for Justice Voting Rights and Elections Series (2006), *available at* http://brennan.3cdn.net/96ee05284dfb6a6d5d_j4m6b1cjs.pdf.

- Enumerates the difficulties within and across states in matching names, birthdates, Social Security numbers, and driver's license numbers. Tabulates methods used by states and the likelihood of error of those methods.

Caltech/MIT Voting Technology Project, *Voting: What Is, What Could Be*, (2001), *available at* http://www.vote.caltech.edu/sites/default/files/voting_what_is_what_could_be.pdf.

- Post-2000 study.
- "Our data show that between 4 and 6 million votes were lost in the 2000 election. Our analysis of the reliability of existing voting technologies and election systems shows that the U.S. can substantially reduce the number of lost votes by immediately taking the following steps:
    - Upgrade voting technologies. Replace punch cards and lever machines with optical scanners. We estimate 1.5 million of these lost votes can be recovered with this step.
    - Improve voter registration systems. We recommend improved database management, installing technological links to registration databases from polling places, and use of provisional ballots. We estimate this could save another 3 million lost votes. Aggressive use of provisional ballots alone might substantially reduce the number of votes lost due to registration problems."

Youjin B. Kim, *Democracy in a Mobile America* (2012), *available at* http://www.demos.org/publication/democracy-mobile-america-0.

- Discusses implications of current voter registration system and variations on registration rules across jurisdictions on mobile voters and mobile segments of the U.S. population.

Pew Center on the States, *Being Online is Still Not Enough: State Election Websites* (2011), *available at* http://www.pewstates.org/research/reports/being-online-is-still-not-enough-85899376525; and Pew Center on the States, *Being Online is Not Enough: State Election Websites*. (2008), *available at* http://www.pewtrusts.org/our_work_report_detail.aspx?id=45170.

- Discusses state election websites and the availability of voter registration services and data for each state.

Pew Center on the States, *Elections Performance Index* (2013), *available at* http://www.pewstates.org/research/reports/elections-performance-index-85899445029; methodology discussed at Pew Center on the States, *Elections Performance Index Methodology* (2013), *available at* http://www.pewstates.org/uploadedFiles/PCS_Assets/2013/EPI_methodology.pdf.

- Measures 17 indicators of state election procedures and outcomes, including registration rejection, registration problems, data completeness, and voter registration and information look-up availability.

Pew Center on the States, *Inaccurate, Costly, and Inefficient: Evidence that America's Voter Registration System Needs an Upgrade* (2012), *available at* http://www.pewstates.org/uploadedFiles/PCS_Assets/2012/Pew_Upgrading_Voter_Registration.pdf.

- Using Census CPS data, discusses rate of voter registration inaccuracy and invalidity, causes, and costs to states, and suggests possible solutions.

Pew Center on the States, *Election Administration by the Numbers: An Analysis of Available Datasets and How to Use Them* (2012), *available at* http://www.pewstates.org/research/reports/election-administration-by-the-numbers-85899377331.

- Analyzes the "completeness, strengths, weaknesses, and usefulness of data from sources such as state election divisions, the U.S. Census Bureau, the U.S. Election Assistance Commission and its Election Administration and Voting Survey (EAVS), public opinion surveys, and expert assessments."

Pew Center on the States, *Upgrading Democracy: Improving America's Elections by Modernizing States' Voter Registration Systems* (2010), *available at* http://www.pewstates.org/uploadedFiles/PCS_Assets/2010/Upgrading_Democracy_report.pdf.

- Discusses solutions to voter registration database accuracy problems through comparison of registration lists with other data sources, matching techniques and security protocols, and online voter information submission; and innovations currently taking place in the states.

Matt A. Barreto et al., *Online Voter Registration (OLVR) Systems in Arizona and Washington: Evaluating Usage, Public Confidence and Implementation Processes* (2010), *available at* http://www.pewstates.org/uploadedFiles/PCS_Assets/2010/online_voter_reg.pdf

- "[S]tate governments have become more interested in reaching out to voters through the Internet. In some states, voters can look up their polling place location, read candidate statements, read an official voter pamphlet, and download and print a voter registration application. However, as of the 2008 election cycle, only two states allowed voters to fill out and complete an official voter registration form through the Internet – Arizona and

> Washington. . . . There is much to learn about the processes that went into planning and implementation, and the efforts that go into the continued operation and enhancement of these systems. How successful has the implementation of online voter registration been in these states? This report provides a comprehensive examination of the implementation, operation, public confidence and usage of online voter registration in Arizona and Washington. This may be particularly important as other states already move forward towards Internet-based registration, and Congress considers paving the way towards national online registration."

Hans A. von Spakovsky, *Mandatory Voter Registration: How Universal Registration Threatens Electoral Integrity* (2013), http://www.heritage.org/research/reports/2013/03/mandatory-voter-registration-how-universal-registration-threatens-electoral-integrity.

- Discusses implications of voter registration modernization, including mandatory and same-day registration, for election integrity and voter fraud. Argues based on Census CPS data that registration problems "do not disproportionately affect minorities and low-income citizens." Discusses problems with using other state agency databases to register voters or cross-check voter registration lists.