

# Still time for an election audit: Column

Ron Rivest and Philip Stark 11:26 a.m. EST November 18, 2016

*This should be standard — and it's easy, too.*



(Photo: Seth Perlman, AP)

A *Washington Post*–*ABC News* poll found that 18% of voters — 33% of Clinton supporters and 1% of Trump supporters — think Trump was not the legitimate winner (<https://www.washingtonpost.com/news/the-fix/wp/2016/11/13/one-third-of-clinton-supporters-say-trump-election-is-not-legitimate-poll-finds/>) of the election. Sen. Lindsey Graham, R-S.C., has called on Congress (<http://www.latimes.com/nation/politics/trailguide/la-na-trailguide-updates-gop-sen-lindsey-graham-wants-congress-1479254194.htmlstory.html>) to investigate the Russian cyberattack on the Democratic National Committee and the election.

There are reasons for concern. According to the director of national intelligence, the leaked emails from the DNC were “intended to interfere (<http://www.wsj.com/articles/intelligence-officials-reiterate-russian-responsibility-for-recent-hacks-1476981467>) with the U.S. election process.” The director of national intelligence, the Department of Homeland Security, and the National Security Agency concluded that the Russian government (<http://www.nytimes.com/2016/07/27/us/politics/spy-agency-consensus-grows-that-russia-hacked-dnc.html>) is behind the DNC email hack and that Russian hackers attacked U.S. voter registration databases (<http://www.nbcnews.com/news/us-news/russians-hacked-two-u-s-voter-databases-say-officials-n639551>).

We know that the national results could be tipped by manipulating the vote count in a relatively small number of jurisdictions (</story/opinion/2016/09/02/election-rigging-hacked-servers-russians-reid-comey-dhs-column/89733204/>) — a few dozen (<http://www.alternet.org/election-2016/forget-swing-states-presidential-election-will-be-determined-20-swing-counties>) spread across a few key states. We know that the vast majority of local elections officials have limited resources to detect or defend against cyberattacks. And while pre-election polls have large uncertainties, they were consistently off. And various aspects of the preliminary results, such as a high rate (<http://www.dallasnews.com/news/local-politics/2016/11/11/yes-people-wait-line-vote-cast-presidential-ballots>) of undervotes ([http://www.mlive.com/politics/index.ssf/2016/11/michigans\\_presidential\\_electio.html](http://www.mlive.com/politics/index.ssf/2016/11/michigans_presidential_electio.html)) for president (<http://www.newsnet5.com/news/local-news/oh-cuyahoga/record-number-of-cuyahoga-co-voters-leave-the-presidential-portion-of-their-ballots-blank>), have aroused suspicion.

Computers counted the vast majority of the 130 million votes (<http://cookpolitical.com/story/10174>) cast in this year's election. Even without hacking, mistakes are inevitable. Computers can't divine voter intent perfectly; computers can be misconfigured; and software can have bugs.

Did human error, computer glitches, hacking, or other problems change the outcome? While there is, as yet, no compelling evidence, the news about hacking and deliberate interference makes it worth finding out.

About 25% of voters (<https://www.verifiedvoting.org/key-facts-2012/#fnref-51388-2>) used machines that do not generate a paper trail. Any hacking, glitches or other errors that affected their votes could be undetectable. But the other 75% of the vote, including the key states of Michigan and Wisconsin ([https://ballotpedia.org/Voting\\_methods\\_and\\_equipment\\_by\\_state](https://ballotpedia.org/Voting_methods_and_equipment_by_state)), could be double-checked in various ways.

A full manual recount of the paper records would be definitive, but that's unnecessarily difficult, expensive and time-consuming if the results are actually right.



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(<http://www.usatoday.com/story/opinion/2016/11/14/trump-clinton-popular-vote-electoral-college-democracy-column/93773104/>)

There's an easier way: an audit that manually examines a random sample of the ballots in a way that has a large chance of detecting and correcting incorrect results. This is called a “risk-limiting” audit. If the reported winner of a contest really won, a risk-limiting audit generally needs to examine only a small fraction of the ballots. But if the reported winner actually lost, a risk-limiting audit has a large chance of indicating that a full hand count is needed to set the record straight.

Risk-limiting audits are a crucial check on election integrity and accuracy even when elections are not controversial and margins are wide. They have been endorsed by the Presidential Commission on Election Administration and many organizations concerned with election integrity. Colorado law requires risk-limiting audits (<https://ebenchmark.wm.edu/colorado/statutes/1-7-515-risk-limiting-audits-rules-legislative-declaration-definitions/>) starting in

2017, and California law requires them [for deploying some new voting systems \(https://www.verifiedvoting.org/resources/post-election-audits/#fn-36489-10\)](https://www.verifiedvoting.org/resources/post-election-audits/#fn-36489-10).

There is no federal law mandating election audits. A number of states perform some kind of audit, but our research shows those audits have little or no chance of detecting and correcting erroneous results. To audit this election effectively will require immediate legal action.

Auditing surprisingly few ballots could give 95% confidence that the results are correct in every state: about 1.5 million ballots in all, a bit over 1% of the ballots cast.

But if we just want to check whether Donald Trump won the election, an audit might examine even fewer ballots, because it could proceed in stages.

First it would check the results in the states Trump won. If auditing confirms those results, there's no need to audit in the states Clinton carried: Trump really won. That means auditing about 700,000 ballots in the 29 states Trump won, about 0.5% of the ballots cast in this election.



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How could checking just 0.5% of the ballots give such high confidence?

States where the contest wasn't close probably won't have to check many ballots. If their results are right, even a small random sample is likely to have a majority for Trump that would be implausible if Clinton had actually won.

Missouri had such a wide margin that examining just 10 ballots should give high confidence. Texas would need to check about 700.

The few states where the contest was tight would have to do more work. Michigan had the smallest margin among states that Trump carried. To get 95% confidence there would require checking about 11% of the ballots.

It does not take much technology to conduct these audits: dice (to select random ballots), a pencil and paper, and access to the paper ballots. The calculations are simple addition and subtraction. They could be done by a fifth-grader. No programming would be required.

This is an assurance of democracy our nation can afford and should perform routinely. Electronic-only voting systems should be replaced with systems that generate a paper trail, and election results should be audited against the paper trail to ensure that election outcomes are correct.

There is still time to audit this election — barely. States only have [until Dec. 13 \(https://www.archives.gov/federal-register/electoral-college/key-dates.html\)](https://www.archives.gov/federal-register/electoral-college/key-dates.html) to give their final results to the Electoral College.

Americans should demand this simple step to ensure that the machinery of democracy worked. To add your voice, please [sign this petition \(https://www.change.org/p/demand-an-audit-of-the-2016-presidential-election\)](https://www.change.org/p/demand-an-audit-of-the-2016-presidential-election).

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