

American Statistical Association Endorses Post-Election Audits Principles



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Imagine someone counted hundreds of blue, red and white marbles in a bag and concluded there are many more red marbles than blue marbles. How can you trust that conclusion? You could dump out the marbles and count each one.

Or you could use statistics to do the job faster.

If you pull out 20 blue marbles in a row, you'll want to recount the whole bag. But if you pull them out one at a time and end up with 19 reds and one blue, you can stop—there's too small a chance that you did that with more blues than reds in the bag.

You've established the basis of risk-limiting audits, one of nine post-election auditing principles in [Principles and Best Practices for Post-Election Tabulation Audits](#), endorsed by the American Statistical Association. The December 2018 document updates a [2008 document](#) with the latest statistical research and best practices.

“Given heightened concerns about foreign subversion of election systems and processes, election officials and legislators around the country are turning their attention to post-election audits as part of the solution,” said Mark Lindeman, a senior officer with Verified Voting who has expertise in risk-limiting audits and co-wrote the document. “The interest in audits has never been greater. Unfortunately, a lot of specific proposals for how to conduct audits are inadequate or fundamentally misguided.”

[*Principles and Best Practices for Post-Election Tabulation Audits*](#) includes guidelines for auditing elections and a brief appendix explaining risk-limiting audits.

“The principles document should be readable by anyone interested in implementing best practice post-election audits,” Lindeman said. “Election officials, legislators, citizens advocating for better election verification can read this document and use it as a starting point for their strategies and implementation.”

Principles to support democracy

“A healthy democracy requires widespread trust in elections,” is the first line of the new document.

After the recount in Florida in 2000, many Americans became aware of the difficulty of full hand recounts. Before you read the ballots, you have to count them to make sure none are stuck together with static or left in the ballot boxes, according to Tammy Patrick, former election official in Arizona and commissioner of the [Presidential Commission on Election Administration](#).

“People can’t count to 10 consistently,” Patrick said. “In about 10 years of conducting post-election audits, at every single table in every single room I ever oversaw, I would go through a stack [of ballots] and find the one that had 11.”

“The problem is, if you’re trying to audit large quantities of ballots, we humans are terrible at repetitive tedious tasks and so audit has a bad taste in a lot of election officials’ mouths for that reason,” added former Arapahoe County deputy of elections Jennifer Morrell, who co-edited *Principles and Best Practices for Post-Election Tabulation Audits*.

Post-election audits decrease the number of hand-counted ballots while ensuring the correctness of the outcome. A few principles the ASA supports include the following:

- The public should be able to monitor the process. Transparency is key to building trust in the electoral process.
- Use humans to inspect paper ballots. Voters can verify paper ballots, which are more immune to tampering than electronic systems.
- If an audit indicates a full hand count is necessary and that changes the winner, then the changed outcome should hold. Audits should do what they are intended to do.

The guiding principles—which also include separating responsibility between the auditor and policymakers, considering mail-in and absentee ballots, and protecting the ballots—should help people perform audits without a statistician.

“We don’t expect the public to be able to prove the theorem, but they ought to be able to verify the arithmetic themselves with just addition and multiplication,” said UC Berkeley statistics professor Philip Stark, who developed risk-limiting audits and offered the marbles analogy for a simple explanation.

“Some jurisdictions have done this on their own, with no statistician present.”

Risk-limiting audits: A more effective, cheaper way to ensure outcomes

If you know how many marbles are in the bag, you could decide to inspect one percent of the marbles. You'd be in good company—[California law has dictated the hand-count audits of one percent of precincts since 1965](#). But if you have millions of marbles, or ballots, one percent can be a lot of work.

A risk-limiting audit trades the efficiency of checking a small number of ballots for an acceptable risk that the wrong outcome is not found. That is, if red won but blue was the actual winner, there's a chance our risk-limiting audit doesn't notice.

"The idea is that you need to convince me that the outcome is right, so we're going to collect convincing evidence," Stark said. "If that means we have to look at every ballot, so be it. But as soon as we get to the point that it's clear that a full hand count would give us the same winners that have been reported, we stop."

In the 2008 presidential election in California, where Barack Obama received 61% of the vote, you'd check only 97 ballots to complete a risk-limiting audit with 10% risk. That's a miniscule .0007% of 13.7 million votes cast. If the margin had been 52%, you'd still only check 3,860 votes, as explained in [a 2012 paper by Lindeman and Stark](#).

Risk-limiting audits have been endorsed by the [Senate Intelligence Committee](#), the bipartisan [Presidential Commission on Election Administration](#), and the [National Academies of Sciences, Engineering and Medicine](#).

Implementing the principles

Stark based risk-limiting audits on statistics research from the 1940s. He started this project after taking part in a California working group on voting and realizing "there was no particular motivation" for the flat one percent law. Colorado put Stark's series of papers to the test for a pilot study in 2014.

"My team was not a fan of [risk-limiting audits]; they thought it was a terrible idea that didn't make sense, and we hoped we would never see [advocates of these audits] again," Morrell said. "Three years later, the same staff who said this was gobbledygook could see the value in it and totally embraced it."

After Colorado formed a mandate to run risk-limiting audits by 2017, Morrell's team had to implement them. They formed a working group with election officials, state lawyers, election machine vendors, individual advocates in the community and researchers including Stark and Lindeman. Collaboration will be crucial for implementing risk-limiting audits in other localities, Morrell said.

"In the past, [risk-limiting audits] were seen as on the fringe because they're complex," Morrell said. "The [2008] document of first principles of best practices was seen as something for advocates and not pertinent to election officials. Now, it's got to election officials everywhere and it's made its way all the way up to the federal purview."

The authors hope these principles will reassure Americans of the security of the election process.

"It takes us from black boxes, where no one's sure how they know who won the election, to transparent processes, where anyone who cares can drill down into the details and convince themselves that things are going well," Lindeman said. "That's democracy. These are elections that belong to the people, and when we create processes that help people own the election, then we're doing it right."

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About the American Statistical Association

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