



## Risk-Limiting Audits

### What is a Risk-Limiting Audit (RLA) and how does it work?

An RLA is a statistically based type of post-election audit. It is designed to (1) limit the risk that the reported election outcome is incorrect, (2) establish confidence in election results through a publicly verifiable and observable process, and (3) count the fewest number of ballots necessary to achieve the desired risk limit. To do this, an RLA generally has the following steps:

1. All ballots are tabulated, organized, stored, and logged on a ballot manifest.
2. An election for a specific public office is chosen (e.g., state representative for District 42), also known as the “target contest” (multiple contests may be chosen and audited jointly according to specific procedures).
3. The ballots that contributed to the contest outcome (and the tabulation of those ballots) are identified.
4. The number of ballots that must be counted is statistically determined (i.e., the sample size) and ballots are randomly selected for audit (see reverse).
5. A manual count of the selected ballots occurs, which is then compared to the reported outcome.
6. The comparison is either conclusive or inconclusive (i.e., it supports the reported outcome or there is not enough information to confirm it).
7. If the comparison is inconclusive, additional ballots must be counted, with potential for a full hand recount.

#### What is a risk limit?

A risk limit is the percentage chance an RLA will fail to catch that the reported outcome (e.g., the declared winner) is incorrect. If an RLA has a 5% risk limit, that means the audit would catch an error in the reported outcome 95 out of 100 times.

#### What is a ballot manifest?

A ballot manifest is a detailed description of how the ballots are stored and organized, listing at least the physical location of every ballot cast so that individual ballots or batches of ballots can be found, retrieved, and examined manually during an RLA.

# Are there different methods for conducting RLAs?

Yes. There are primarily three different methods for conducting an RLA, as follows:

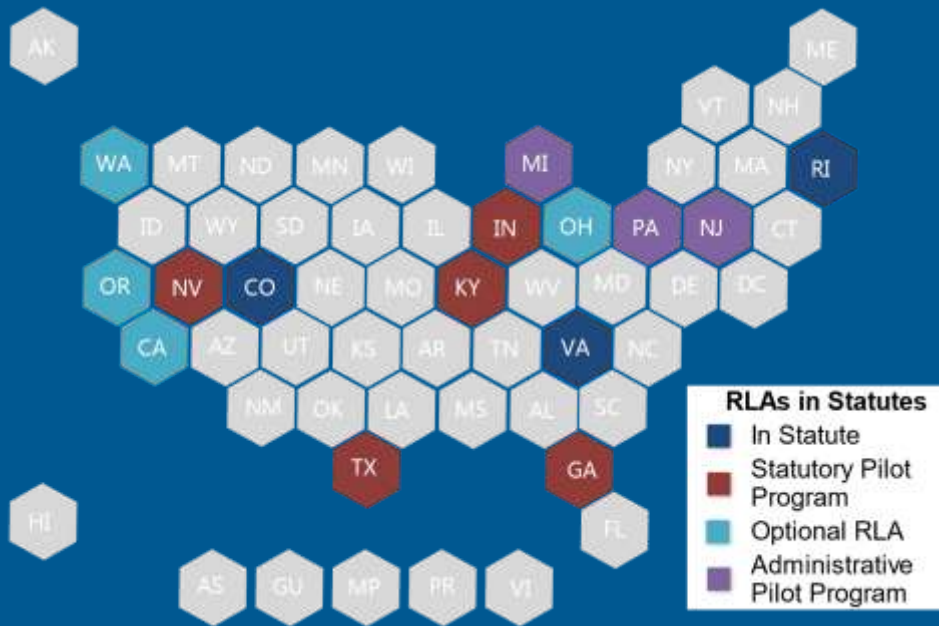
**Ballot comparison:** Electronic tabulators produce a record of their interpretation of each ballot (the "cast vote record" or CVR). Randomly sampled ballots are manually examined and checked against the CVR.

**Ballot polling:** Randomly chosen ballots are manually tabulated. The tabulated margin is checked against the reported margin to see if the comparison provides strong statistical evidence to support the reported outcome (similar to exit polling).

**Batch comparison:** Ballots are organized in "batches" with the electronic results tabulated for each batch. Batches are randomly selected and all ballots in the batch are manually counted. The counted results are compared against the tabulated results for each batch.

Each method has strengths and weaknesses. When selecting a method, there are different considerations including the (1) election official time, (2) technology involved, and (3) information provided by the audit.

## What states use RLAs?



Source: NCSL, Risk-Limiting Audits (data as of Sept 2021), available at <https://www.ncsl.org/research/elections-and-campaigns/risk-limiting-audits.aspx>

## How is the sample size determined?

The sample size is statistically determined by the:

1. number of ballots cast for that race,
2. established risk limit, and
3. margin of victory.

For example, a target contest with a closer margin of victory requires a review of more ballots to achieve a conclusive result.

## How are ballots selected?

A random seed number is generated (e.g., rolling a ten-sided dice twenty times, creating a string of numbers) and input into a computer program.

A ballot "pull sheet" is generated from that seed, listing random ballots on the ballot manifest to be audited. If the ballots do not have unique identifiers, there are different methods for identifying the chosen ballots.



*Risk-Limiting Audits were first adopted in Colorado in 2009*



**Learn More**

RLA Recommendation Working Group, [RLA Recommendations for Connecticut](#), Feb. 2022

National Conference of State Legislatures (NCSL), [Risk-Limiting Audits](#), Sept. 2021

RI RLA Working Group, [Pilot Implementation Study of RLA Methods in the State of Rhode Island](#), Aug. 2019

Verified Voting, [Risk-Limiting Audits](#)



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