

2022 NM Post Election System Check Precinct Selection

WHY IT IS IMPORTANT AND WHAT WENT WRONG

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What is the Post Election Voting System Check Audit? (1, 2)

- Precincts are randomly selected for a hand count to compare with machine vote totals
- All ballots from all tabulators are gathered for selected precincts
- A hand count is completed and the results are compared to the original machine counts
- The county clerks report their results to pre-selected and approved auditor
- The auditor reviews the results and releases the audit report to the public (3)

Why is random selection of precincts important?

- Detect potential vote manipulation in tabulators (1)
 - “with at least **ninety percent probability** for the selected offices, that faulty tabulators would be detected if they would change the outcome of the election for a selected office”
- Builds public confidence in the election systems (2)
 - “Precincts will be randomly selected using a process that is **visually observable**, such as rolling dice or selecting pieces of paper from a box”
 - “The random sampling process shall be **open to public observation.**”
- Discourage potential vote manipulation knowing there is a “90%” chance that it would be detected in audit

Process used to select precincts in 2022 (3)

- “Obtained a listing of congressional districts by county precincts and downloaded the Statewide Voter Turnout and the Media file from the Secretary of State’s website.”
- “We created a spreadsheet from the above data to cumulate the number of ballots cast to determine the population for sampling, beginning alphabetically with the first Bernalillo County precinct and ending with the last Valencia County precinct.”
- “The required sample of precincts was chosen randomly using a ‘dice roll’ method whereby seven ten-sided dice were rolled, and the **resulting number normalized so that a particular voter (unnamed) could be identified within all the voting precincts in the state.** “

Anomalies of a non-random selection of precincts

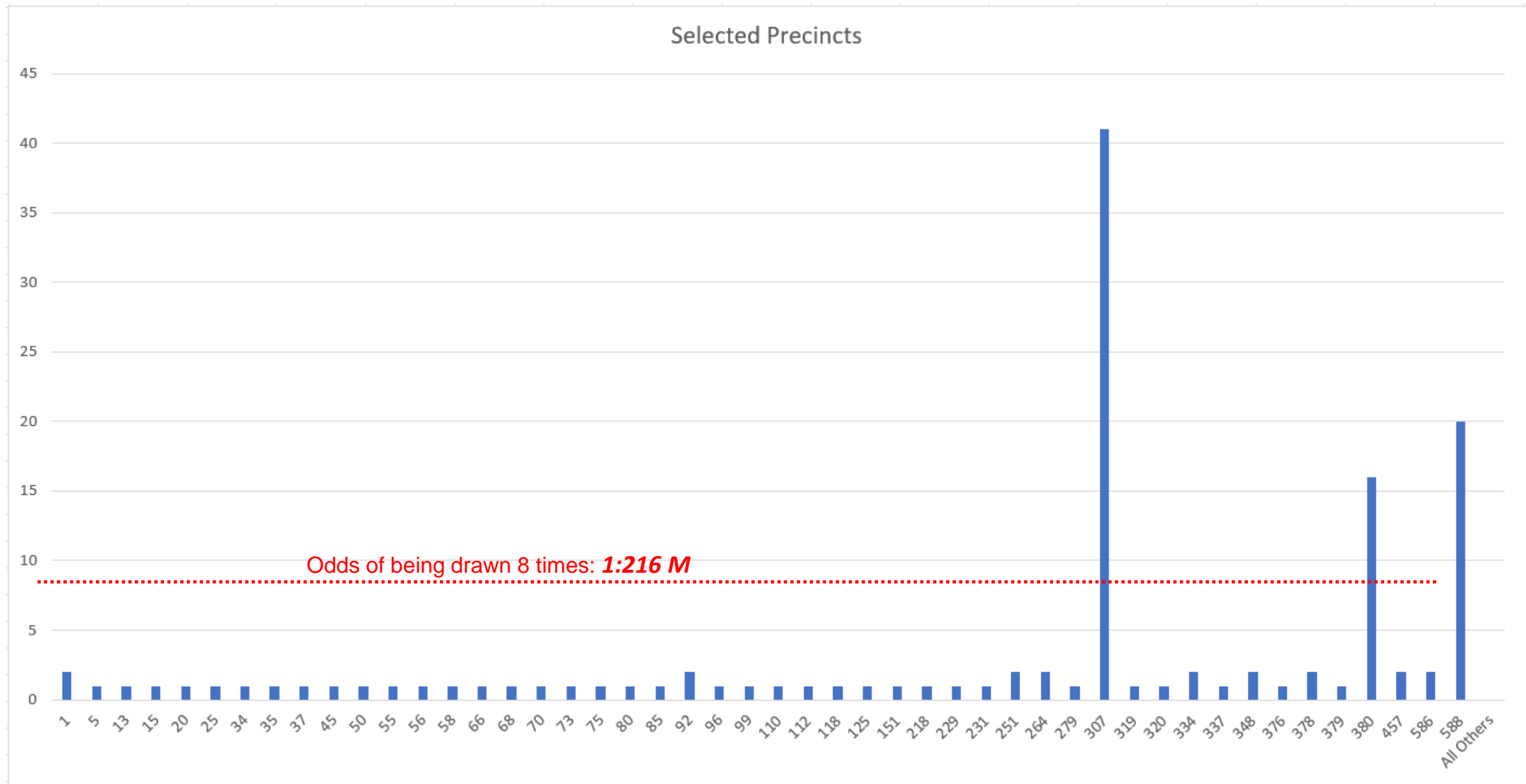
- A spreadsheet was used to normalize the dice roll (from 0 – 9,999,999 random dice roll range to 1 – number of cast ballots) **and select precincts.**
- This normalization spreadsheet is hidden from the public so it cannot be observed or validated through independent testing
- Some precincts were “randomly” selected **many more times than possible in a random process including three times in a row!**

Examples of multiple selection of same precinct (4)

Roll #	Dice 1	Dice 2	Dice 3	Dice 4	Dice 5	Dice 6	Dice 7	Aggregation	Roll Number Normalized	Row Matched	County	Precinct #	US Rep District
211	5	0	1	5	0	2	1	5015021	358,472	1,087	Eddy	PRECINCT 33	DISTRICT 2
212	0	9	9	5	8	8	4	0995884	71,186	234	Bernalillo	PCT 307	DISTRICT 1
213	6	9	1	0	3	5	7	6910357	493,950	1,562	San Juan	PRECINCT 044	DISTRICT 3
214	3	7	8	7	7	9	8	3787798	270,751	794	Cibola	PRECINCT 025	DISTRICT 2
215	8	2	2	6	0	8	4	8226084	587,998	1,812	Sandoval	PCT 157	DISTRICT 3
216	9	4	0	6	2	7	8	9406278	672,358	2,041	Taos	PRECINCT 011	DISTRICT 3
217	4	2	8	4	1	9	2	4284192	306,233	904	Dona Ana	PRECINCT 015	DISTRICT 2
218	8	9	0	5	2	6	4	8905264	636,546	1,916	Santa Fe	PRECINCT 098	DISTRICT 3
219	9	6	1	1	7	1	7	9611717	687,043	2,095	Torrance	PRECINCT 018	DISTRICT 1
220	5	6	2	8	5	9	0	5628590	402,330	1,252	Los Alamos	PCT 004	DISTRICT 3
221	8	5	8	9	2	8	1	8589281	613,959	1,881	Santa Fe	PRECINCT 069	DISTRICT 3
222	6	4	9	5	6	6	5	6495665	464,308	1,449	Quay	PRECINCT 012	DISTRICT 3
223	0	3	6	0	7	4	1	0360741	25,786	78	Bernalillo	PCT 070	DISTRICT 2
224	5	7	9	3	9	9	1	5793991	414,153	1,277	Luna	PRECINCT 006	DISTRICT 2
225	8	4	2	0	5	1	1	8420511	601,896	1,850	Santa Fe	PRECINCT 038	DISTRICT 3
226	9	5	7	9	0	6	8	9579068	684,709	2,085	Torrance	PRECINCT 008	DISTRICT 1
227	4	7	0	8	2	2	8	4708228	336,543	1,025	Dona Ana	PRECINCT 158	DISTRICT 2
228	9	7	9	6	0	2	0	9796020	700,217	2,108	Valencia	PRECINCT 11	DISTRICT 1
229	9	1	4	3	0	7	5	9143075	653,544	1,978	Santa Fe	PRECINCT 166	DISTRICT 3
230	1	8	0	4	9	9	9	1804999	129,021	234	Bernalillo	PCT 307	DISTRICT 1
231	1	0	0	5	9	2	8	1005928	71,904	234	Bernalillo	PCT 307	DISTRICT 1
232	0	8	9	3	1	4	5	0893145	63,842	234	Bernalillo	PCT 307	DISTRICT 1
233	5	3	5	9	1	8	6	5359186	383,073	1,185	Lea	PRECINCT 029	DISTRICT 3

BERN 307-CV Weighted ODDS
 Drawn (each roll): **1:1430**
 Drawn Twice in a row: **1:2.0 M**
 Drawn Three times in a row: **1:2.9 B**

Counts of precincts selected in Bernalillo (3)





Consequences of a non-random selection process

- Can not know with 90% confidence that the election results are accurate
- Can not know for sure that tabulator counts were not manipulated
- Lack of public confidence in the election results
- Unable to persuade the public that our process is working as intended

Auditor's Lack of Opinion on Accuracy of Tabulators

“with at least ninety percent probability for the selected offices, that **faulty tabulators would be detected** if they would change the outcome of the election for a selected office” (1)

“We were not engaged to and did not conduct an examination or review engagement, the objective of which would be the expression of an opinion or conclusion, respectively, **on the accuracy of voting system machine tabulators** used in the conduct of the 2022 General Election held on November 8, 2022. **Accordingly, we do not express such an opinion or conclusion.** Had we performed additional procedures, other matters might have come to our attention that would have been reported to you.” (3)

1.10.23.9 NMAC.

(c) **Precincts will be randomly selected using a process that is visually observable**, such as rolling dice or selecting pieces of paper from a box, with the probability of selection being proportional to the number of persons registered to vote in the last election in each precinct.

(d) **The random sampling process shall be open to public observation.** At least seven days prior to the random sampling conducted pursuant to this subsection, the secretary of state shall post notice on its web site of the time, date, and location of the random sampling.

Need to see the spreadsheet!

Probability Calculations (Statewide Data)

- Probability of single occurrence based on ballots cast (4)
 - Probability of selecting Precinct 307 = $500/714,754 = .0007$
 - Probability of selecting Precinct 380 = $272/714,754 = .0004$
 - Probability of selecting Precinct 588 = $516/714,754 = .0007$
- Probabilities for precincts selected number of times
 - Pct 307 41 times = $2.37 \text{ E-}70$
 - Pct 380 16 times = $5.85 \text{ E-}26$
 - Pct 588 20 times = $1.58 \text{ E-}28$

Probability Calculation Methodology

- The Binomial probability formula was used to find the probability of a certain number of occurrences of a single precinct in Bernalillo out of a total number of 486 dice rolls. (5)
- $nCr = n!/(r!(n-r)!)$
- $P(X=r) = nCr \times p^r \times (1-p)^{n-r}$
- where:
 - n – Total number of events;
 - r – Number of required successes;
 - p – Probability of one success;
 - nCr – Number of combinations (so-called "n choose r"); and
 - $P(X=r)$ – Probability of an exact number of successes happening.
- A program was written to calculate $P(X=r)$ using the formula above

Attempt to Replicate Precinct Selection per Audit

Microsoft Excel window: PrecinctSelectionShield... • Saved to this PC

File Home Insert Draw Page Layout Formulas Data Review View Automate Developer Add-ins Help

07

1	County	Precinct Results	Eligible Vo	Votes Cast	PrecinctName1	Cumulative Cast	Roll	Voter								
2	Bernalillo	PCT 001	437	263	PCT 001	263										
3	Bernalillo	PCT 002	939	575	PCT 002	838	154,322	518,669								
4	Bernalillo	PCT 003	426	296	PCT 003	1,134										
5	Bernalillo	PCT 004	725	502	PCT 004	1,636										
6	Bernalillo	PCT 005	622	420	PCT 005	2,056										
7	Bernalillo	PCT 006	780	529	PCT 006	2,585	357	2,510								
8	Bernalillo	PCT 007	802	455	PCT 007	3,040										
9	Bernalillo	PCT 008	436	295	PCT 008	3,335										
10	Bernalillo	PCT 009	1,053	594	PCT 009	3,929										
11	Bernalillo	PCT 010	706	346	PCT 010	4,275										
12	Bernalillo	PCT 011	682	470	PCT 011	4,745										
13	Bernalillo	PCT 012	520	365	PCT 012	5,110										
14	Bernalillo	PCT 013	807	566	PCT 013	5,676										
15	Bernalillo	PCT 014	1,010	520	PCT 014	6,196	278	6,056								
16	Bernalillo	PCT 015	614	380	PCT 015	6,576										
17	Bernalillo	PCT 016	494	299	PCT 016	6,875	49	6,579								
18	Bernalillo	PCT 017	751	507	PCT 017	7,382										
19	Bernalillo	PCT 018	940	543	PCT 018	7,925										
20	Bernalillo	PCT 019	737	481	PCT 019	8,406										
21	Bernalillo	PCT 020	867	505	PCT 020	8,911										
22	Bernalillo	PCT 021	422	277	PCT 021	9,188	399	9,169								
23	Bernalillo	PCT 022	531	295	PCT 022	9,483										
24	Bernalillo	PCT 023	571	326	PCT 023	9,809										
25	Bernalillo	PCT 024	772	450	PCT 024	10,259										
26	Bernalillo	PCT 025	737	430	PCT 025	10,689										
27	Bernalillo	PCT 026	859	472	PCT 026	11,161	427	11,110								
28	Bernalillo	PCT 027	1,144	475	PCT 027	11,636										
29	Bernalillo	PCT 028	939	392	PCT 028	12,028										
30	Bernalillo	PCT 029	785	417	PCT 029	12,445										
31	Bernalillo	PCT 030	753	490	PCT 030	12,935										
32	Bernalillo	PCT 031	942	414	PCT 031	13,349										

Buttons: Find Voter Precinct, Shield Voter Precinct, Populate Voters

Taskbar: Ready, Accessibility: Investigate, 100%

References

- 1. State Law: 1-14-13.2. Post-election duties; voting system check
- 2. State Administrative Code: NMAC 1.10.23.9 Voting System Check Procedures
- 3. Audit Reports: <https://www.sos.nm.gov/voting-and-elections/voter-information-portal-nmvote-org/election-audits-2/>
- 4. Voter Turnout by Precincts for 2022 Election: <https://electionresults.sos.state.nm.us/VoterTurnoutDetails.aspx?map=TURN&eid=2838>
- 5. <https://www.omnicalculator.com/statistics/binomial-distribution>
- 6. <https://apps.apple.com/us/app/calculate84/id1459712793>