

# Aging voting machines threaten election integrity

April 4 2016, by Lawrence Norden And Christopher Famighetti, New York University

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A WinVote machine. Credit: Rob Pegoraro/flickr, CC BY-SA

Imagine you went to your basement and dusted off the laptop or mobile phone that you used in 2002. What would happen if you tried to turn it on? We don't have to guess. Around the country this election year, people are going into storage, pulling out computers that date back to 2002 and asking us to vote on them.

Following an [election meltdown](#) of epic proportions in 2000, the federal government provided more than US\$2 billion to update the nation's voting infrastructure. More than a decade later, these voting [machines](#) are approaching the end of their expected lifespans. Experts estimate that a reasonable lifespan for electronic [voting machines](#) (which are computers, running mainly on laptop technology developed in the 1990s) is in the 10- to 15-year range.

To determine the state of voting machines across the country, we interviewed more than 100 election administrators in all 50 states. We also consulted scores of public records, spoke with independent technology experts and analyzed data collected by the Verified Voting Foundation. Based on this research, we project that in November [43 states](#) will use voting machines that are at least a decade old.

That's a problem for three big reasons.

## **Breakdowns lead to lines, and lost votes**

First, while no one thinks all the voting machines are going to break down simultaneously, using aging voting equipment on Election Day increases the likelihood of breakdowns. In fact, one New Mexico election official told us that before replacing her machines in 2014, as many as one in three needed to be taken out of service.

We saw the consequences in 2012. People [waited in line for hours](#), which prevented [between 500,000 and 700,000 people](#) from casting a

ballot. Voting machine problems this November could lead to more long waits and lost votes: in March, we saw [thousands of voters in Arizona](#) wait in line for hours.

Equally troubling is that aging machines can be difficult to maintain. In [more than 40 states](#), jurisdictions use voting machines that are no longer manufactured. As these machines get older, [parts become scarcer](#) and [election officials](#) are increasingly forced to hoard rare parts needed to keep their equipment running. Neal Kelley, registrar in Orange County, California – the sixth-largest jurisdiction in the country – told us that he relies on a "back stock" of spare parts to keep his machines running. At some point, the inability to find replacement parts will mean more voters sharing fewer working machines.

Finally, there are security risks. Many older voting systems rely on outdated operating systems, like Windows XP and 2000, which are [no longer supported](#). Several election officials told us that they stockpile refurbished laptops that can run obsolete versions of Windows. Sherry Poland, director of elections in Hamilton County, Ohio, told us that she "stockpiled older PCs that will run Windows XP." Other experts, like Merle King in Georgia, told us that his state hired a contractor to build custom hardware that will work with Windows 2000. [Unsupported software is riskier](#) from a security perspective, since it does not receive regular security updates and is vulnerable to new methods of attack.

## **An enormous price tag**

These anecdotes translate into real problems at polling places. The Virginia Department of Elections conducted a [review](#) after machines crashed during the 2014 election. Investigators easily hacked into several WinVote machines, which used decade-old Wi-Fi encryption standards, exposing serious security vulnerabilities. As a result of these findings, the [Elections Board decertified the machine](#), forcing 30 jurisdictions to

replace their equipment, [costing taxpayers millions](#).

While most business offices upgrade their systems and update computers every few years, critical computing infrastructure for elections is treated differently. We do not expect our laptops or our desktops to last a decade – and this is the kind of technology that voting machines use. The easy answer is to replace the machines, but in much of the country, that is not happening.

Many election officials who believe they need new machines do not have sufficient funding. We identified jurisdictions in 31 states that will need new machines in the next few years. Election officials in 22 of those states told us they do not know how they will pay for them.

According to our estimates, the cost of new machines could exceed \$1 billion. It is unlikely that the [federal government](#) will provide [another infusion of billions of dollars](#) to pay for new voting equipment. Despite hundreds of millions of dollars [flowing abroad](#) to strengthen democratic institutions in other countries, [little to nothing](#) is provided for elections at home.

## **Making systems more nimble for the future**

State and local policymakers have not had to pay for voting machines in the past because of federal funding for updated voting equipment in the wake of the [2000 election debacle](#). Faced with a new demand amid many competing budget priorities, they have been slow to respond to this important need.

While some states and counties will provide funding for new machines, others will not. Disparities in funding between and within states has the potential to create a two-tiered election system, where poorer (and often rural) counties are forced to use aging voting equipment far longer than

they should, while wealthier jurisdictions can afford to replace their hardware.

In late 2014, Virginia Governor Terry McAuliffe proposed that the state invest \$28 million in new voting equipment. Ultimately, Virginia legislators stripped the funding for voting equipment from the budget and the cost for new machines was left to localities. Virginia's commissioner of elections, Edgardo Cortes, told us that that only some Virginia election jurisdictions can afford new machines: "Loudon and Fairfax counties – two of the largest and wealthiest counties in the state – have bought new equipment. Smaller, poorer and more rural counties around the state are going to have a tough time."

Despite the challenges posed by the widespread aging out of voting machines, there is hope for the future.

Our report highlights advances in technology that could make voting systems more affordable and flexible over time. In [places like Los Angeles](#) and [Travis County, Texas](#) (where Austin is located), election officials are looking at using open source software and commercial off-the-shelf hardware to make systems that are more agile – making it possible to replace parts here and there, instead of replacing an entire voting system at the first signs of degradation.

While such advances will help us in future years, they will not resolve today's crisis. There is no escaping the immediate need to plan and set aside sufficient funds to buy new machines.

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