

STATEMENT ON CHICAGO VOTER DATABASE VULNERABILITY

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It is not too surprising that this vulnerability has been around for quite a long time. I myself was aware it existed at least two or three years ago and wasn't very concerned. I only really comprehended its full potential in recent days, after experimenting with Bob Wilson and Roy Lipscomb of the Illinois Ballot Integrity Project and Art Golab of the Sun-Times, when we realized social security numbers were also exposed.

Two main areas for exploitation exist with this flaw. First, there is the ability to read sensitive information from the database about any and all voters — including birthdate, full address, and social security number — individually or in bulk. The potential for widespread identity fraud exists here, particularly due to this information being all together in one place, available to any Internet-connected computer in the world.

There are 2.2 million entries in the database. This is conceivably the largest gaping hole for identity theft available worldwide. This information may already have been taken.

The second exploit lies in the ability to temporarily modify this copy of the master database, which can allow one to manipulate elections. One could invalidate or delete certain voters based on certain target demographics, but more damaging might be simply to list the wrong polling place address or to cause other disruptions to a normal election. This can be done on a precinct, ward, or citywide level and it has real potential to affect the outcome of any election for which it is exploited. Invalidating voters, confusing the data, deleting certain records, or deleting the entire database would distract voters and technical staff.

In early August, I described the problem to the responsible party at the Board of Elections while meeting with him on campaign matters. I even attempted to demonstrate the problem on his computer. Although the hole could have been sealed up in moments with one or two lines of code, this was not done, and I am not surprised. The staff at the board, particularly the technical staff, have been increasingly strapped for time in recent years, due entirely to the introduction of additional technologies.

Chicago election staff are also very busy with two election cycles one on top of the other. Like me, this employee could not have realized the full force of this problem without further investigation, and he can't be blamed for that.

This is a problem of bureaucracy, not of personnel. Technological developments since the late 1990s have left election authorities all over the country with no time to breathe. New technologies are not simplifying the job. In the 1990s, Chicago election officials introduced the 456-position ballot, 50% denser than its predecessor. This pressed hard against the technical limitations of the punch design, leading to engineering problems resulting in significantly increased residual votes. This in turn led to the expenditure of millions of dollars for new precinct ballot counters and judge- and voter-training efforts, which were promptly discarded. Ultimately, this all led to the death of punch. But what has replaced the punch-card ballot is probably even more disturbing.

With their staffs already stretched to the limit, election authorities have difficulty managing existing resources. Now we have entered an era where officials with very limited technical knowledge are, for the first time, pushing technology into the voting

booths themselves, tempted by a powerful lobbying effort. The process is governed by irrational thought, panic, and hype and it is the greatest threat yet to the democratic process. I have been publicly criticizing this unsavory trend, as have groups like our Illinois Ballot Integrity Project and many others nationwide. For years, election staff have been caught like rats in a maze, and every time they get proficient, authorities replace the maze.

It was the Help America Vote Act that encouraged impetuous technocratic decision-making by election authorities nationwide. Voter-verified audit trails are a nasty necessary evil, a cheap patch on a very troubling technological development.

There is a great misconception that if touching a screen has the look and feel of marking a ballot, it is practically the same thing. The allure of glistening new equipment even makes us feel that it is somehow better, more secure. But these are dangerous illusions that could not be further from the truth: there can be no more immediate, secure, and economical method of voting than marking paper with a writing tool. Every layer of technology we add increases significantly the number of weaknesses. A touch-screen system may feel just like paper, but there are many invisible layers, and trillions of fuzzy information paths stretching out — literally for miles — in the void between finger and vote.

An important principle is now emerging: the more layers of technology in a system, the broader the vulnerability. More and more automation means that ever-smaller manipulations can have ever more widespread effects. This has serious structural ramifications: whereas it once took legions of precinct captains armed with \$20 bills or paper clips to threaten a paper-based election, today it may take a few bytes of code slipped into any of a million points in a system. We end up chasing our tails.

There will never be a better system if we keep piling on technology; it will only get worse.

Ironically, it is the country's most experienced technologists who are balking at this and urging us to return to the sensible form of the paper ballot. With 30 years in document production and human factors, I personally favor the letter-size sheet of paper as the standard unit for a ballot, with multiple sheets or folds for additional space. Ballots should be printed, typically only on a single side, conventionally or on demand, centrally or even inside a polling place, as economics and reason may allow. In an emergency, with proper documentation, ballots may even be printed on copier paper. Ballots should be marked by hand by voters whenever possible, and computing power, networked to the bare minimum, should be employed primarily as an aid to voter registration, generation and printing of ballot styles, and assisting in tabulation.

Technology should be permitted inside voting booths solely as an aid to those who could not otherwise easily use the standard paper-and-pencil ballot. Other applications in the voting booth are not now justified, nor do I see how they ever could be. Ideally, such systems should do nothing more than generate their marked ballot for the voter to review and insert into the ballot box. When technology is used, it need not be proprietary; it should be open and economical. In fact, in emergencies, replacement devices in a polling place — such as printers or scanners — could be consumer plug-and-play devices available for purchase down the street by any election official. This is appropriate use of our technological wealth.

Paper ballots, when properly designed, are also the most convenient and reliable to use, and the most readable human interface. With voting back to normal on the appropriate media, there should be no more justification for recent laws which protect voters from residual vote problems, such as those

which require overvote/undervote control at the ballot box. Such laws call for inappropriate and untenable technologies at the ballot deposit point. Wherever such laws are justified, it signals a problem with a ballot's form factor primarily, and also with office crowding in a jurisdiction, and those are the things that must be reviewed. Therefore, judges should be able to do publicly monitored end-of-day tabulation or central counts, with appropriate counting technology for support, or by hand when necessary.

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