Pollution

Water utilities serving American cities use tests that downplay contamination

Guardian analysis reveals millions of customers were asked to used testing method condemned by the EPA which may flush out detectable lead content

Jessica Glenza and Oliver Milman in New York

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Utilities asked customers who sample their home's water for lead to remove the faucet's aerator screen and to flush lines hours before tests. Photograph: imagebroker/Alamy

Water utilities in some of the largest cities in the US that collectively serve some 12 million people have used tests that downplay the amount of lead contamination found in drinking water for more than a decade, an analysis of testing protocols reveals.

In the tests, utilities ask customers who sample their home's water for lead to remove the faucet's aerator screen and to flush lines hours before tests, potentially flushing out detectable lead contamination. The distorted tests, condemned by the Environmental Protection Agency (EPA), have taken place in cities including Chicago, New Orleans, Philadelphia and Columbus, Ohio. The improper screening could decrease the chance of detecting potentially dangerous levels of lead in water, the EPA has said.

The analysis comes on the heels of an EPA letter, which repeated earlier warnings to utilities not to use such methods, and reporting that revealed water customers in "every major US city east of the Mississippi" could be drinking water tested using questionable methods.



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"It's a staggering number, and it's alarming and upsetting to hear," said Yanna Lambrinidou, a Virginia Tech professor in the civil engineering department, about the number of Americans potentially affected by the tests. Lambrinidou is also an activist who has worked with the scientist Marc Edwards, who helped uncover Flint's lead-tainted water crisis.

"At the same time, it's why we've been working as long and as hard we've been working on this issue - because we have suspected as much."

An estimated 96 million Americans live with lead service lines - pipes that carry water from mains to meters. Lead lines are one of the most serious risk factors affecting the amount of lead in water that pours from the tap.

The requirement to test for lead in water dates to 1991, when the Safe Drinking Water Act issued a new mandate called the Lead and Copper Rule.

It was in 2006 that the EPA first issued guidance advising against test practices that scientists call deceptive, including removing aerators, pre-flushing lines and using small-necked bottles to collect samples. That year, the agency said removing aerators could result in improperly lowering lead in water samples.

Since then, warnings about the removal of aerators and other dubious testing methods have come every couple of years.

Edwards wrote a paper in 2009 pointing out the "gaming of compliance". Water systems which had documented lead problems, such the Washington DC water and sewer authority, tested water at specific times of the year, and in ways that demonstrably lowered lead levels.

Many of the same methods continue to be used by public water utilities today. Pre-flushing, removal of aerators, using small-necked bottles for samples and instructing samplers to fill them "slowly", testing while the outside temperature is cold, and limiting the time water sits in pipes for samples all limit the lead leaching into water.

In 2011, Edwards wrote to officials at the EPA's office of water, telling them in part that the so-called "gaming" of the rule was undermining its intent. "It is undeniable that such practices will increase public exposure to lead in water, and therefore, pose a direct public health threat to children," Edwards wrote. In 2013, a white paper written for the EPA warned against aerator removal, pre-flushing and the use of small bottles.



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Most recently, on 29 February, the EPA's head of drinking water, Dr Peter Grevatt, again told water utilities to stop in a public letter that was also sent to 49 governors (save Wyoming's). The procedures, he said, "potentially led to the public water system not taking additional actions needed to reduce exposure to lead in drinking water".

But water utilities, from small towns in Maine that serve around 50,000 people to major systems in the Boston metro area, again asked customers in their most recent round of testing to flush lines or remove aerators before a six-hour period when water must sit in lines.

"If [the EPA is] so clear, why is it still a recommendation?" asked Kevin Gagne, the superintendent of public works in Lewiston, Maine, a city of roughly 36,000 served by his water district. Lewiston's testing protocols ask customers to remove the aerator the night before testing, "vigorously" flush lines and "leave the aerator off" during testing. "If it's so definitive, why isn't it mandated?"

Gagne said his department wasn't told to stop flushing or removing the aerator by the state of Maine, or by any EPA officials, and said he only found out about the recommendation "a couple months ago".

"Why are we just finding out about it now, after several months of debate in the media and all this information coming out, why wasn't that mandated and brought down to our attention back in 2006?"

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Despite a decade of recommendations to the contrary, the testing methods appear to be widespread, and continuing. The Guardian has found continued use of these protocols in seven cities east of the Mississippi that have responded to freedom of information requests. Populations served were calculated using figures from the US census bureau and customer estimates from water authorities.

The Massachusetts water resources authority, which serves 2.5 million residents in the Boston metro area, asked residents who sample their water for lead to "flush the faucet head" with cold water for "30 to 60 seconds", and not to allow water to sit for more than 12 hours, an arbitrary number.

The Portland water district in Maine, which serves roughly 110,000 residents, advised testers to flush the system for 10 seconds, and not to let it sit in pipes for more than eight hours.

Philadelphia asked samplers to "remove the aerator from the faucet" and "run only the cold water for two minutes" before the test begins.

Columbus, Ohio, a midwest city of 835,000, tells customers to "SLOWLY" fill their sample bottles, to flush cold water lines "thoroughly (for a couple minutes)" and preferably to use a sink with separate hot and cold taps. Scientists believe each of those protocols can decreases the amount of lead likely to leach into samples.

The Champlain water district, which serves South Burlington, Vermont, told samplers: "The water faucet must be flushed for three to four minutes the night before" sampling, and to "slowly" fill the bottle.

Rhode Island's state health department, which serves one million people, advised testers "to flush the tap" before the six-hour period. And Mount Pleasant, South Carolina, the third largest city in the Palmetto state, with 77,000 people, told samplers to "run the water in the tap before you go to sleep at night" and not to wait more than 10 hours to test their water.

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Until 2009, the Chicago department of water management told residents to "remove the aerator, clean out any debris, flush for 5 minutes with cold water and replace the aerator" the evening prior to sampling. That practice only ended in 2012, as the EPA was in the midst of conducting a lead water contamination study in the city.

Edwards, who has spent much of his time recently in Flint, Michigan, where the national guard has been giving out filters and bottled water, criticized both utilities and the EPA. He called the EPA's failure to stop the practices "a sick joke played on an unsuspecting public".

"Frankly, [water utilities] really like to report on the lower levels of water-lead they find after such trickery, even if the lead in water is dangerously higher when people are drinking the water," said Edwards. "It is part of how they fool themselves, and others, that they are doing their job.



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"In part defense of the utilities, EPA repeatedly refused to issue commonsense clarification of the issue until after the Flint debacle and the sample games became an international embarrassment," he said. "Even though we know elevated blood-lead in Flint neighborhoods skyrocketed ... Flint has never officially failed the EPA Lead and Copper Rule," because of how homes there were tested.

As in Flint, some scientists suspect the reason behind using such protocols is to avoid finding lead in the first place. Stakes are high once utilities exceed the federal limit.

"There's absolutely no doubt about that," said Lambrinidou. "Finding lead in water, and potentially exceeding the [EPA's] lead action level, requires numerous steps, numerous remedial actions that take resources and time and people's effort."

Among the requirements are lead service line replacements, corrosion control studies and implementation. In Columbus alone, a chemical to control corrosion costs $1,800 per day, plus another $20m allotted for main breaks and lead service line replacements. The Massachusetts water resources board spends $3.6m on corrosion control alone each year.

For small and medium-sized water systems, exceeding the lead limit would mean being required to install a new corrosion control system, if the system doesn't already have one. It was the failure to implement corrosion control that caused lead to leach into the water in Flint.

Thus far, the EPA's decade of recommendations have failed to become law, though officials say the rules are in the process of being updated. There is no estimate of how many of the nation's 155,000 water utilities flush lines before testing for lead.

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