The new frontier of COVID-19 testing may be in your toilet

Abby Haglage

Yahoo Life • August 28, 2020

The University of Arizona reportedly identified two cases of COVID-19 before they spread using a technique called wastewater testing. (Photo: Getty Images)

As colleges across the U.S. scramble to ensure the safety of their students amid the COVID-19 pandemic, the University of Arizona revealed this week that an unusual test may have allowed it to stop an outbreak before it began. The special specimen? Sewage.

Wastewater, for those unfamiliar with the term, is water that has been contaminated through human use, leaving behind things like food, oil, chemicals and human waste. Wastewater base epidemiology, as the technique of studying it is called, is a fairly new concept, which has been used to explore things like human exposure to toxins or to help locate cases of polio.

Now, thanks to a sophisticated RNA testing process, multiple colleges have begun quietly performing wastewater analysis in hopes of circumventing smaller COVID-19 outbreaks before they happen.

The University of Arizona, one of the first to discuss its analysis publicly this week, has been doing routine wastewater testing since March, analyzing the sewage of 20 different buildings, including multiple dorms. This week, after the wastewater from one dorm showed copies of SARS-CoV-2 (the scientific name of the virus that causes COVID-19), administrators tested all 311 individuals who lived there and discovered two asymptomatic cases.

In a press conference Friday afternoon, Ian Pepper, an environmental microbiologist and director of the university’s Water and Energy Sustainable Technology Center, told reporters it’s a perfect example of what
the test can do — predict an outbreak before it occurs. “It’s a leading indicator,” Pepper says of the wastewater. “The virus shed by individuals happens seven days prior to visible symptoms, and so you have seven precious days in which you can undergo intervention, and it’s particularly useful for detecting the onset of a pandemic.”

Aaron Best, chair of the biology department at Hope College in Holland, Mich., has been carrying out the same tests on his campus. He says the process is complicated, requiring his team to monitor multiple sewers, pull and pump samples every 20 minutes using a device called an autosampler, and then produce a composite to be tested.

But this testing mechanism doesn’t just tell him if someone is positive, but how many people are positive. “So instead of just getting a yes-no answer, you get a ... how many copies of the virus did I detect in this sample?” Best tells Yahoo Life. Like Pepper, he notes that one of the advantages is that the shedding often occurs before symptoms have emerged, meaning there is still time before an outbreak begins.

“It’s possible that the signal that you see in the wastewater is actually a leading indicator of when you would actually see cases come up in a clinical setting ... and it might even tell you about things when they never would have known,” says Best. “So the idea is that there is possibly this lead time — could be anywhere from four days to 10 days ... so you could say, ‘I’m going to have an outbreak going on in 10 days from now where I’m seeing it. What can I do now to mitigate that?’”

Best is quick to note that the test isn’t some miracle fix that could replace other testing protocols. “I wouldn’t consider it to be a panacea,” he says. “I think this has to be part of a comprehensive testing strategy that would include ... asymptomatic testing, some kind of surveillance level, wastewater testing, symptomatic testing and of course then the correct follow-up procedures such as contact tracing. It’s kind of pool testing of sorts — sort of the same concept. It’s just your starting sample isn’t saliva or a nasal swab, it’s sewage.”

Dr. Michael Mina, assistant professor of epidemiology at the Harvard T.H. Chan School of Public Health, applauds the concept. “I think it’s very valuable — it’s a really creative and true public health approach to this virus,” says Mina. But although he commends the creativity, he’s not optimistic about widespread applicability. “We have seen ... cases increase
[a few months ago] in Massachusetts, and we saw that from the wastewater data that we were getting. So I think that it’s a terrific approach. But I think people have to understand that it’s not the most scalable thing at the moment. You can do it at a university, but then there have to be a lot of resources to put in place for how to act on it.”
UMaine System expands COVID-19 testing as 4th student tests positive

Moving in at the University of Maine in Orono looked different this year. Monday was the first day of a week-long moving-in process for students. Every student was assigned a day and a one hour time slot to move their items into their dorm rooms following a COVID-19 screening and test. Credit: Linda Coan O'Kresik / BDN

The University of Maine System is expanding COVID-19 testing so the state’s public universities are testing students throughout the time students are on campus this fall.

The testing expansion came as the university system said Monday that a fourth student tested positive for COVID-19, after three University of Maine undergraduate students tested positive last week. The fourth student is a University of Maine School of Law student who was returning from out of state.

That student, who wasn’t tested as part of the university system’s testing program, is quarantining, according to the university system.

As part of the expanded testing regimen, the seven universities will test random samples of about 2,000 students and employees every 10 days through Thanksgiving, when students are expected to leave campus and finish the semester remotely. All students who spend time on campus will be subject to the testing. Only students studying remotely won’t be subject to testing.

The university system initially planned two phases of testing, only for students living in residence halls, out-of-state students, student-athletes and students participating in clinical experiences off campus. The university system is conducting those tests in a partnership with The Jackson Laboratory, which is testing the samples, and ConvenientMD, which is collecting the samples.
UMaine adding second round of COVID-19 tests

Bangor Daily News

by Nick Sambides Jr., August 11, 2020

So far, the university system has conducted nearly 1,400 tests — with the vast majority conducted in the last two weeks — with only one positive result, because three of the four students who have tested positive so far weren’t tested at their universities. The universities expect to test 12,500 people as part of the first two rounds of tests.

In addition to the expanded testing, wastewater will be tested at UMaine, the University of Maine at Fort Kent and the University of Southern Maine to monitor conditions throughout the semester. Since people can shed the virus in their stool before they show symptoms, wastewater could show signs of a virus outbreak one to two weeks in advance of clinical diagnoses, researchers have found.

Students at the flagship University of Maine campus in Orono began moving in on Monday.