Wastewater testing program puts Tempe on the scientific map

Shows strength of ASU’s partnership with the city

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Devin Bowes prepares samples for SARS-CoV-2 analysis in wastewater.
The city of Tempe has long had a symbiotic relationship with the university residing within its borders. Arizona State University officials meet with the Tempe City Council annually in a public meeting and the two entities often discuss mutual issues, such as traffic, housing, research and more. With ASU’s history as the country’s most innovative university and Tempe quickly becoming a center for technology, it would appear to be a match made in heaven.

That’s clear when it comes to the partnership the two entities have established with its nationally-recognized wastewater testing program, which began in 2018 to determine the spread of opioid addiction in Tempe. ASU first approached the city on the matter through its Biodesign Institute. The Tempe City Council awarded the program $35,000 to start, which ASU then matched.

“Tempe and ASU worked together to create a publicly facing opioid dashboard and information site for the public,” said Devin Bowes, Postdoctoral Research Scholar at ASU. “ASU and Tempe met monthly to discuss the results, which included various entities including Fire Medical Rescue, Water Utilities, and crisis response teams and others. The infrastructure, know-how, and relationships established here were leveraged at the start of the pandemic in 2020 to pivot to SARS-CoV-2 monitoring.”

City staff will collect samples from manholes around Tempe and send to ASU scientists for testing. The data is then reported back to the city for their public dashboard and ultimately reported to the U.S. Centers for Disease Control and Prevention, and the Prevention National Wastewater Surveillance System. The Tempe and ASU teams met once per week when their work on opioid use began, but expanded to three times per week during the pandemic.

Now several years in, the program is still monitoring the presence of COVID-19 in neighborhoods and using the data collected to better inform its public health decisions. In addition to gathering information for the online databases, the data led to better education on the disease in targeted areas where the spread was worst at the height of the pandemic, according to Wydale Holmes, interim director of the innovation and strategic management office for the city of Tempe.

“We were able to go contactless, safely, door to door and give out information about masks,” she said. “We also did some fun stickers about reminding people about safe social distancing to wearing masks or washing hands. That was one example of how we can really target resources a little bit better where there is even greater need, especially when we're talking about supply chain issues during the pandemic and things like that. You want to be very smart about how you deploy your resources.”

Erin Driver, Assistant Research Scientist at ASU, said wastewater testing is not a new technique but has proven effective and non-invasive in the last few years.

“Wastewater-based epidemiology takes the burden off the individual by monitoring the local community’s sewage,” she said. “This allows us to gain a much clearer picture of community infection than with clinical individualized testing alone and without invading the personal lives of individuals.”

Future plans

Holmes said the Tempe program has inspired others just like it, adding that the CDC launched one of their own after speaking to ASU and city officials about it. Similarly, she said the U.S. Navy came calling about the possibility of testing waste on their ships or bases to better protect servicemembers and their families. The University of Arizona began a program of their own during the pandemic as well.

With COVID-19 and opioid addiction research on their plate, Holmes said the program has a wishlist of other diseases they hope to tackle in the future.

“On our wish list, we are working in regards to respiratory health in our community. We also know that that may help us inform strategically where we want to plant more trees and what type of species,” she said. “I know polio is a concern, hepatitis as well. We kind of have some early work that we’re doing right now in regards to those. We're getting that early proof of concept and we'll be sharing that with the community and move those programs forward.”
With another $1 million grant on its way this year and additional partnerships with TGen and Northern Arizona University, the wastewater testing program is just getting started. The program has also been able to expand its geographic coverage area in Tempe and included the nearby Town of Guadalupe in its research, in addition to adding new testing sites.

“ASU has been fantastic,” she said. “They've been quite responsive to first of all approaching Tempe. They were able to kind of tell the story to make a very complex science relatable to [show] how this could benefit our community.”

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