Protecting Students From a Deadly Virus

For Clemson University, tracking disease spread through wastewater was a 'tremendous opportunity'

Challenge:

Clemson University found its Covid-19 wastewater testing program extremely helpful, until 2021, when wastewater results weren't matching spiking case counts.

Outcome:

Biobot's wastewater results were 20 times higher, more accurately reflecting the Omicron wave. This gave the administration several days of lead time before a bump in clinical cases, allowing them to take proactive measures to slow the spread on campus, and in the community. Clemson felt so confident in Biobot's results that the University decided to publish a data science article in an academic journal.

Clemson University was quick to adopt wastewater testing in 2020, when Covid-19 was swiftly spreading through the country, and testing was still very limited. As the University was preparing for students to return to the South Carolina campus, school leaders wanted a tool to monitor the spread of the virus, and keep the community safe. After all, viruses can spread like wildfire on college campuses, where people intermingle and live in tight quarters. For about a year, wastewater testing provided crucial information that helped the local City Council impose mask mandates and other measures. But in 2021, it was clear something was off.

Even though Omicron case counts were spiking, there was no parallel increase in wastewater concentrations. "I knew something was wrong," says Dr. David Freedman, Professor and Chair of Environmental Engineering and Earth Sciences, who began the wastewater testing program at Clemson. So Dr. Freedman brought in Biobot's testing services to compare results.

Over the course of a couple of weeks, it became clear: Biobot's results were 20-fold higher than the results from the other lab and tracked much more closely to the reported clinical case counts. Clemson pivoted to partner with Biobot instead. "Not only was it a practical quantitation issue about making the switch, but also a cost issue," Dr. Freedman says.

"We started using Biobot in February of 2022. And I'm now a Biobot evangelist. I think I just couldn't be more pleased with the level of service and have great confidence in the accuracy of the data that's coming out."

DR. DAVID FREEDMAN, PROFESSOR & CHAIR OF ENVIRONMENTAL ENGINEERING AND EARTH SCIENCES

To establish the ongoing wastewater testing program with Biobot, Clemson University began collecting weekly wastewater samples from three wastewater treatment plants that handle sewage from the whole Clemson population. They then shipped those representative samples back to Biobot's lab in Cambridge, Massachusetts. Biobot's lab team processes each sample through qPCR, technology that detects and quantifies how much virus is in a given sample, then sends the results to Biobot's Data Quality team, which ensures that the results pass the company's rigorous quality control standards. Then the results were released back to Clemson officials.

The wastewater data provided Clemson officials several days of lead time before they would start to see clinical case counts increase. This allowed Clemson time to act in order to prevent large COVID-19 outbreaks from spreading across campus. It was also helpful in preventing spread to the larger community. "As an infectious disease epidemiologist, I think wastewater is a fantastic tool," said Lior Rennert, Clemson University Assistant Professor of Biostatistics in the Department of Public Health Sciences. "For the community, wastewater was very useful, because we could also look at associated trends in COVID-19 for populations that were not being subjected to our weekly testing program."

Not only did the wastewater data serve as a valuable early warning tool and support program design, but also an effective education mechanism for the campus community to highlight the volume of asymptomatic cases and the risk to immunocompromised individuals. Dr. Freedman and other officials found that many students had a "young person's view of the pandemic, which was, 'So what if I get it? It's just going to be a cold.'" Wastewater results made it easier to communicate the risks spreading the disease had to other people in the community.

Though the threat of Covid-19 is less dire, thanks to vaccinations and acquired immunity, wastewater testing offers a huge opportunity for containing it and other diseases on college campuses, where pathogens spread quickly. "Wastewater surveillance is a valuable tool when tracking public health issues in a college town," Dr. Freedman says.

Questions about wastewater testing and the spread of disease on campus?

If you're interested in a customized demo of Biobot's infectious disease monitoring platform for universities, request a meeting with our team via hello@biobot.io.