

Since May 2020, the Missouri Department of Health and Senior Services (DHSS), Department of Natural Resources (DNR) and researchers at the University of Missouri – Columbia have been collaborating on a statewide project to test wastewater for genetic markers of SARS-CoV-2, the virus that causes COVID-19. The project recently received new funding through a grant from National Institutes of Health (NIH) to expand wastewater testing to additional congregate living facilities. Public health experts have identified wastewater testing as a useful tool for early detection of outbreaks, even as vaccination efforts progress and clinical testing improves. The purpose of this letter is to provide you with information about this project and in an effort to recruit 20 congregate living facilities to participate in an expansion of this testing. Ideally, facilities would have 50 or more residents who contribute to the sewer system. Facilities who are interested will receive a follow-up contact from the Missouri Department of Natural Resources to determine if their sewer system will work for this type of testing.

While the virus that causes COVID-19 is novel, using wastewater to track disease is not new. Wastewater testing has been used to track outbreaks of polio and norovirus and is now becoming an increasingly useful tool for SARS-CoV-2 surveillance. SARS-CoV-2 virus particles are shed in the feces of infected individuals, both symptomatic and asymptomatic, and detected in wastewater. Studies from across the United States and worldwide have found a direct correlation between the amount of SARS-CoV-2 genetic material in sewage and the number of reported cases within a given “sewershed,” or the area that drains into a community’s wastewater collection system. Wastewater testing can provide an early indication of outbreaks in communities or congregate living facilities and is a complementary strategy to monitor population-level trends in the prevalence of infection. The utility of wastewater testing for predictive models is limited, in part, because infected individuals may continue to shed viral particles up to 33 days after they are no longer contagious.

Missouri’s COVID-19 sewershed surveillance project has grown from testing at 9 wastewater treatment facilities to testing over 100 locations each week. Current testing locations include 60 community wastewater treatment facilities, 21 Department of Corrections facilities, 7 Department of Mental Health facilities, 3 veterans homes, and 4 universities. To date, we have analyzed over 2,300 wastewater samples.

Our results indicate that sewage data best correlates with confirmed COVID-19 case counts with a 4 to 6 day time lag, suggesting wastewater results can be an early indicator of disease transmission. In our analysis of community sewershed data, we have found that, approximately 70% of the time, when the viral load in wastewater increases over a threshold amount of 40% in one week or 25% over two consecutive weeks, clinical cases increase by 25% or more in the following week. This pattern is evident even given variability across sewersheds in wastewater flow rates, chemical matrices, industrial activities, non-resident populations, rates of human COVID-19 testing and other factors.

For more information about the project and the data it has generated, we encourage you to view the [Sewershed Surveillance Project - COVID-19 Tracking Tool](#), which describes how the project works and features an interactive map with test results. Note that only community sewershed data are displayed in the Tracking Tool. Wastewater samples collected from congregate living facilities and universities are not displayed publically.

We provide participating facilities with all sampling supplies, sample collection equipment and training. We share test results via Box.com, typically two to five days after samples are collected and shipped.

As advancements in vaccination efforts and improvements in clinical testing occur, we are continuing to advance wastewater surveillance to keep it a useful tool. To do that, the team is currently investigating the usefulness of sewershed monitoring in identifying variants and measuring community immunity.

Please contact the Department of Health and Senior Services Environmental Public Health Tracking Team at EPHTN@health.mo.gov or 866-628-9891 or 573-751-6102 with any questions.