



Sewer Sentinel Phase 2

Localized Actionable Sewer Testing for COVID-19

SEWER SENTINEL INITIATIVE OVERVIEW

SSI is a \$1 million wastewater testing program that builds upon an earlier 90-day pilot project and serves as an early warning sentinel of COVID-19 virus in targeted entities and facilities. The pilot project tested wastewater in six large, medium, and smaller communities around the state of Maryland. The initial entities where wastewater is to be tested includes 27 low-income housing areas and 10 correctional facilities, both with a potential to increase. Other possible entities include schools and dormitories.

BACKGROUND

Reports from projects in Maryland and around the country demonstrate that strategic sewer monitoring can, when used with testing/tracing and behavior changes, offer communities an opportunity to identify and prevent increases in transmission.

The Maryland Department of the Environment (MDE) and the Maryland Department of Health (MDH) conducted a 90-day pilot study to monitor the concentration of SARS-CoV-2 (COVID-19) in five wastewater treatment plants in Baltimore, Montgomery, Prince George's, Allegany and Wicomico counties. Staff at the wastewater treatment plants collected wastewater samples for analysis at a private laboratory, CosmosID, in Rockville.

The study demonstrated that in selective locations monitoring sewer for virus load has two important characteristics: (1) in the setting of smaller community sewersheds it provides a good estimate of community viral transmission at a significantly decreased cost, compared with widespread personal testing; and (2) in smaller congregate settings like dormitories, it provides a useful indicator of early transmission, potentially more sensitive than individual testing, and can be useful in routine surveillance to control and eliminate infections.

We conclude that using this pooled sampling approach will support Maryland's response to surges in vulnerable populations and provide useful, actionable information.

GOALS

1. Protect targeted entities with early warning sewer testing in vulnerable communities.



Sewer Sentinel Phase 2

Localized Actionable Sewer Testing for COVID-19

2. Find outbreaks by testing the sewer locations on a weekly/monthly cycle.
3. Sharing results on the State COVID dashboard.
4. Provide rapid response with targeted clinical testing at locations with positive detection in sewer testing.

Maryland will be the first state in the nation to implement sewer testing as a strategy to prevent and reduce outbreaks in shared housing settings. Monitoring can help communities know that their homes are safe. If the virus is detected in large quantities it may signal that one or more people are infected.

With support from MDH and local health departments, access to testing can identify those with the virus who can take steps to protect themselves and others. Even asymptomatic carriers can be detected with wastewater sampling. Housing management companies can respond with increased cleaning, and efforts to increase mask wearing and social distancing.

WHO WILL BE HELPED?

The project will start by identifying congregate housing units with vulnerable populations. The Department of Public Safety and Correctional Services has identified 10 locations to begin with an additional 100 potential locations. The Baltimore Housing Authority has identified 27 potential locations. Other sites will be identified throughout the state in collaboration with housing authorities and MDH.

Priority will be given to sites with compatible wastewater infrastructure and where testing will result in actions that can help save lives and prevent outbreaks.

WHAT'S INVOLVED?

To be successful, several logistical and legal criteria must be met. Wastewater professionals need access to infrastructure, which may include a manhole, lift station, pump station or other access point. Sites will be sampled weekly to monthly depending on the risk of an outbreak. A composite sample device will be placed for 24 hours at a location inaccessible to the public.

The sample of raw wastewater will be transported to a laboratory where quantified Polymerase Chain Reaction (qPCR) analysis will determine the amount of virus in a sample. This step may take 2-3 days. Once the sample is analyzed and validated the information



Sewer Sentinel Phase 2

Localized Actionable Sewer Testing for COVID-19

about the virus quantity in a particular sample will be communicated to the local health department, MDH and shared on the COVID dashboard.

WHAT HAPPENS IF THE VIRUS IS DETECTED?

Individual behavior is the most important tool we have to combat this virus and knowing that the virus has been detected will encourage people to get tested and protect themselves and others with masks, distancing and handwashing. Local health and MDH professionals will guide DPSCS and public housing sites about the response to the presence of the virus.

- Low levels of virus may not require any action
- A strong signal or uptick in virus quantity in a sample may prompt one or more of the following response:
 - Retesting to confirm
 - Encouraging housing residents and staff to participate in clinical testing
 - Increased cleaning/sanitization
 - Increased education and public engagement to promote social distancing, mask wearing, and isolation/tracing with a positive follow up clinical test
- A signal showing a decrease in virus quantity indicates outbreak response is effective.
- Absence of virus in a sample indicates the population is free from virus during the 24- hour period of sampling

HOW DOES IT WORK?

The proof of concept for finding and tracking SARS CoV-2 in wastewater is well established at sites throughout the U.S. and around the world. A recent study in Bozeman, Montana, showed the relationship between symptom onset in the population and COVID-19 levels detected in wastewater, which lagged several days behind the onset of symptoms.

Limitations

CDC notes [additional considerations](#) when evaluating the use of wastewater surveillance in a community, including:

- It is not currently feasible to estimate the number of infected individuals based on wastewater COVID-19 levels.
- The utility wastewater testing is highest in smaller settings like dormitories and small communities.



Sewer Sentinel Phase 2

Localized Actionable Sewer Testing for COVID-19

Waste stream testing has been explored by countries, states and federal agencies. Virus in the wastestream serves as a pooled test for COVID-19, but does not require active participation by people or health care providers.

WHO IN MARYLAND HAS TESTED WASTEWATER?

The St. Mary's County Health Department, St. Mary's College of Maryland (SMCM), the St. Mary's County Metropolitan Commission, and other wastewater treatment services are collaborating to collect and test wastewater samples at multiple locations within the county. The samples are tested in a biological laboratory at SMCM for virus particles. Data provided reflects point-in-time samples and not a composite measure over time. Results are given as a concentration of the amount of virus particles per liter of wastewater. Wastewater in the county could be diluted if there is recent rainfall and then may under represent actual viral amounts.

Frederick County government is taking an innovative approach to help public health officials assess the severity of the community's COVID-19 outbreak. Any infected person, whether or not they are experiencing symptoms, sheds the virus. So Frederick County is testing untreated wastewater at its largest plant to gain insights on how widespread the virus is. Frederick County began testing wastewater at its Ballenger-McKinney wastewater treatment plant in early May, contracting with a Massachusetts company to test samples. In June, the county switched to a Maryland company, CosmosID® in Rockville. Beginning this week, samples from the City of Frederick's Gas House Pike Wastewater Treatment Plant will be included as part of the testing program. (excerpt from July 13 press [release](#)).

University of Maryland professor Dr. Birthe Kjellerup and colleagues have started testing wastewater on the campus of UMD College Park. In September and October, researchers found traces of the novel coronavirus at least once in wastewater from South Campus Commons, as well as from the Denton, Cambridge and South Hill [dorm] communities. In the most recent available testing for the week of Oct. 16, researchers found traces of the virus in wastewater from the South Campus Commons and Denton communities. Samples at all other sites tested negative. (The [Diamondback](#))