



State of Michigan COVID-19 Wastewater Surveillance Feasibility Pilot Project

Success Stories

June 23, 2021



Pilot Project: Overall Success



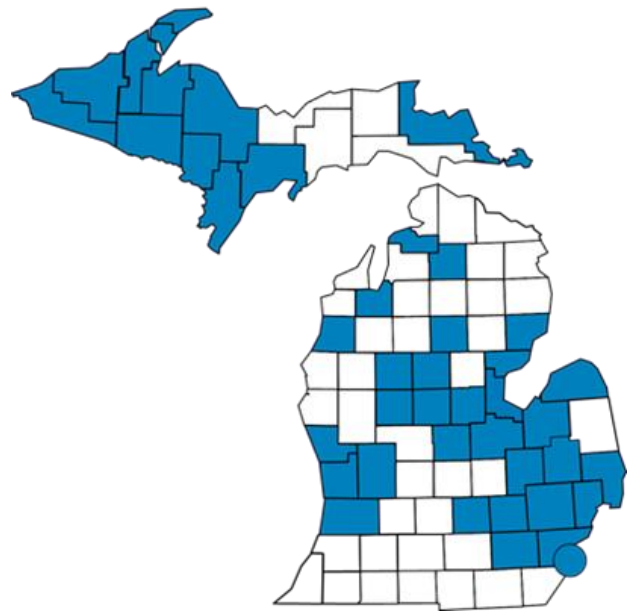
The State of Michigan COVID-19 Wastewater Surveillance Feasibility Pilot Project achieved many successes in the short three-month project timeframe from October to December 2020.

To design and implement a project of this size and scope in a short period of time was no small feat. Local projects overcame multiple issues with equipment and supply shortages, testing and data workbook problems, and shipping delays to successfully implement wastewater testing to help their communities in the fight against COVID-19.

Local projects identified multiple success stories; many of which followed similar themes:

- **Increased virus detections.**
- **Public health actions taken following increased detections.**
- **Increased partnerships and improved communications.**
- **Investment in infrastructure and capacity building.**

These achievements closely mirror the overall goals that were set at the beginning of the project.



20 local projects tested 280 sites in 41 counties and the City of Detroit

Pilot Project Highlights

- **3,204** wastewater samples were tested from April 5-December 30, 2020 (the project incorporated results from testing that occurred before the pilot began).
- **62.5%** of these samples were positive.
- The average positivity rate of all sampling sites combined was **66.3%** from October 1-December 30, 2020.
- While a few sites did not experience any positive detections, many sites had 100% of their samples test positive.

Increased Virus Detections



Detecting the presence of the virus in wastewater and identifying trends was an objective of this pilot project. Labs in all regions of the state were able to detect the presence of SARS-CoV-2 in wastewater and begin tracking trends. For instance:

Grand Valley State University detected SARS-CoV-2 in more than 50% of all samples collected. They noted spikes in active cases in campus dorms that were found to correlate with wastewater surveillance data.

Macomb County Public Works Office noted a rise in sewershed-level COVID-19 numbers in Clinton Township. This allowed for increased alertness by the health department and public works office. The statistics indicated that up to a one-week advance signal was available at the township level, and that the next week's cases were predictable based on current week's sewer signal data.

Wastewater results from the **Health Department of Northwest Michigan** provided information that loosely correlated with the COVID-19 positive case numbers in the area. This data showed increases around November, when they were experiencing a surge in cases and hospitalizations.

Oakland County Health Division detected SARS-CoV-2 in all samples, at all time points and locations.

Throughout the project, the **City of Traverse City** noted a general increase in the number of viruses detected by roughly 50% in their eight sample locations, although many locations increased or decreased by a factor of ten from week to week.

Lake Superior State University sampled sites on campus and at the Bay Mills Indian Community. The results showed a clear correlation between SARS-CoV-2 in wastewater and increases in COVID-19 diagnoses. Campus data showed an increase in positive cases as the fall semester progressed.

Dr. Xagorarakis' lab at Michigan State University detected SARS-CoV-2 in 98% of samples. Statistical analysis showed a lag time of four weeks between SARS-CoV-2 concentrations in wastewater and COVID-19 reported cases in the community. The observed data was discussed in weekly meetings between the lab and local partners.

Resulting Public Health Actions



Another project goal was to provide additional data to support local COVID-19 testing strategies. Following increased detections of SARS-CoV-2 in wastewater, agencies were able to use the data in their decision-making processes to take further action in preventing transmission.

Ferris State University used wastewater data to help direct resources and focus clinical testing to “hotspots” on campus. If wastewater data showed concern, communication was sent out to affected areas encouraging testing of residents in that building. This helped identify infected cases and exposed close contacts, and subsequent isolation and quarantine measures were implemented.

Hope College administration used daily wastewater data from campus residential dorms to initiate follow-up clinical testing. Over the fall semester, results from wastewater testing initiated 29 follow up testing events (e.g., all students living in a wastewater zone with virus signal were tested). This resulted in the identification and isolation of 41 asymptomatic positive cases.



Data from **Dr. Xi's lab at University of Michigan** was used by their COVID Health Response Committee to monitor the outbreak on campus and develop appropriate intervention measures, such as mandatory testing and residence reassignment.

The **Oakland University** project used wastewater data to track COVID-19 on several campuses. Data from Oakland University and Eastern Michigan University sites were used by their respective officials to notify students in affected dorms to get tested.

Wastewater data from **Michigan Technological University** informed and optimized diagnostic testing efforts on campus to focus on performing COVID-19 tests on residents of dorms that had SARS-CoV-2 in wastewater. Individuals who tested positive for COVID-19 were then identified and relocated to isolation units and their close contacts could also be identified and placed in quarantine, if appropriate.

Increased Partnerships & Communication Efforts



Participating agencies reported new and increased partnerships and improved communication efforts, especially at the local level. This finding aligns with the pilot project's goal of better informing local and statewide healthcare and public health response stakeholders. New partnerships, enhanced existing partnerships, and increased regular communication between local health departments, laboratories, wastewater treatment agencies, and other partners were all noted. Some examples are described below.

Kent County Health Department developed a great partnership with Grand Valley State University. This partnership will be beneficial not only for continued wastewater testing in the future but also with their beach monitoring project as well.

Wayne State University developed relationships within their university and externally with the Detroit Health Department and Detroit Water and Sewerage. The picture to the right shows Wayne State University's Civil and Environmental Engineering program working with colleagues in Housing and Facilities to identify and gain access to sampling locations.



Saginaw Valley State University renewed existing relationships and created new relationships with local health departments and wastewater treatment plants. They tested seven wastewater treatment plants, one casino, and the SVSU campus; these sites were encompassed by five different local health departments.

White Water Associates, Inc. established important lines of communication and protocols between their laboratory, local health departments, wastewater treatment plants, other lab partners, and the State of Michigan.

Central Michigan University worked with the Central Michigan District Health Department to identify municipal wastewater treatment facilities that could provide samples throughout the pilot project. CMU also began to communicate weekly with CMDHD about trends in the tested communities.

Investment in Infrastructure and Capacity-Building



The pilot project provided funding for new equipment, testing supplies, and personnel to labs across the state. Labs were trained in new digital droplet PCR (ddPCR) methods and will be able to utilize this equipment and knowledge for a wide range of future testing applications.

Installing the ddPCR equipment at **Northern Michigan University** provided an excellent opportunity for the professional development of students. The skill set acquired in this project will prepare the students for potential jobs in their future careers.

The lab of **Drs. Bakker and Wigginton at University of Michigan** was able to train three new members, set up a new laboratory, and get the method working to start generating results. They also established strong ties with their two wastewater treatment plant partners. These efforts allowed them to continue sampling throughout 2021.

Dr. Rose's lab at Michigan State

University, the project's lead laboratory, noted the Michigan PCR Network increases the state's capacity for rapid movement into new areas of monitoring and assessment. The project demonstrated that the network was able to build on its success in assessing beach water quality and transition to new methods to address a critical societal need. The collaboration and support from the network allows them to quickly test methods and learn from each other to address emerging needs and issues. For example, members of the network were able to discuss testing wastewater for SARS-CoV-2 variants and begin testing immediately by building on the existing capacity.



Wastewater sampling from Michigan State University – Dr. Rose's lab

Next Steps: How Do We Build On This Success?



Of nine pilot project labs who responded to a post-project survey, 100% indicated interest in continuing COVID-19 wastewater testing if additional funds were available (one lab responded not applicable due to already having funding). These results indicated a perceived value of wastewater testing, the success experienced during the pilot, and a continued commitment to contributing to pandemic response efforts.

The success stories described in this document encompass only a brief snapshot of the value this type of project provided to the participating agencies and their respective communities. With continued funding, existing projects can build upon this work to expand testing capabilities, improve wastewater data reporting timeframes, and continue incorporating this data into their decision-making processes.

Future Surveillance

In April 2021, Michigan Department of Health and Human Services announced additional funding to support COVID-19 wastewater surveillance in Michigan and reestablish the coordinated surveillance network that was developed in the Fall 2020 pilot project. Pending final budget approvals, the project will run from June 1, 2021 through July 31, 2023.

The State of Michigan SARS-CoV-2 Epidemiology – Wastewater Evaluation and Reporting Network will continue utilizing locally coordinated projects to conduct surveillance for SARS-CoV-2 virus shed into Michigan public sewer systems. This project will focus on providing useful, timely, and consistent wastewater data to support local COVID-19 public health responses, including testing for variant strains.

Beyond the COVID-19 pandemic, the infrastructure and workforce established through this network could have additional applications. This technology could help future surveillance efforts for other diseases of public health interest.

For more information:

To view data from the pilot project, visit the [Michigan COVID-19 Wastewater Dashboard](#).

For more details about the pilot project, visit the [EGLE story map website](#).

For more details on Michigan wastewater surveillance, visit michigan.gov/covidwastewater.