

# Fact Sheet



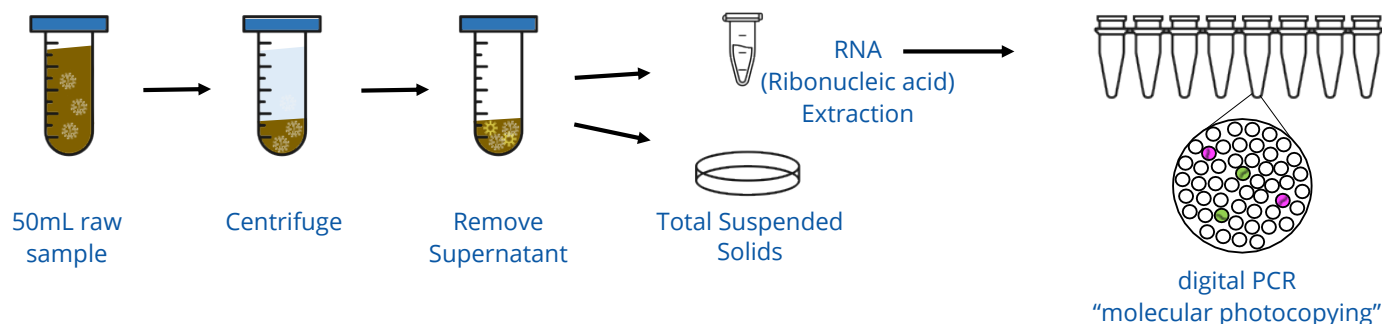
**Metropolitan Water  
Reclamation District  
of Greater Chicago**

December 13, 2021

## Sewage surveillance: Detecting COVID-19

The Metropolitan Water Reclamation District of Greater Chicago (MWRD) remains committed to gaining a better understanding of the spread of the COVID-19 virus (SARS-CoV-2), while protecting the public health of the region. The MWRD has participated in numerous studies to help researchers analyze sewage samples and to gain a retrospective understanding of how COVID-19 spread in communities might be detected in sewers. On average, the MWRD transforms more than 1.2 billion gallons of wastewater into clean water each day at seven water reclamation plants (WRPs) to ensure the public health and the environment are protected across an 882-square-mile service area covering the majority of Cook County. The MWRD also protects area waterways and manages stormwater to mitigate flooding.

The MWRD's Monitoring and Research Department has been collecting samples from seven WRPs to support studies on sewage surveillance monitoring for COVID-19 and tracking its spread in the Chicago area. The risk of transmission of the virus through wastewater is low, but traces of viral RNA sampled in the water offer insight. An effective way to conduct COVID-19 monitoring is through community-level targeted monitoring of wastewater samples. Although it is retrospective and cannot prevent COVID-19 or its spread, targeted monitoring can effectively survey communities for potential spread and hot spots and give public health agencies an edge in evaluating the presence of the virus and implementing additional strategies. The MWRD does not own local sewers that would allow it to conduct a detailed surveillance at the local community level, but the agency can collect wastewater samples flowing into its treatment plants via local sewers and the MWRD's intercepting sewers. The MWRD maintains the best quality control in sample collection to ensure reliable data production and assists with data interpretation and timely use of data to warn public health departments of possible outbreaks. The MWRD has provided plant operating data, information and mapping data about the sewerage system within the WRPs, and assisted researchers to assess different sampling frequency and methods for concentration and quantification of virus genetic particles in samples.



*Samples are shipped or transported locally to research partners where they perform the analysis steps, such as centrifuge, extraction, and polymerase chain reaction (PCR). The wastewater samples provided by the MWRD have helped researchers detect virus genetic particles at a higher concentration in solid samples than in liquid samples. (Image provided by Marlene Wolf, Stanford University)*

### Sewage surveillance studies

**Research partners:** [Stanford University](#) and [University of Michigan](#). **Funder:** [National Science Foundation](#) (NSF). Between March 2020 and March 2021, the MWRD collected and froze samples each week and shipped them to researchers at Stanford University along with metadata associated with the samples and sewershed information about the MWRD's WRPs. Researchers developed methodologies for detecting genetic markers of the COVID-19 virus in sewage resulting from feces shedding from symptomatic and asymptomatic patients at a community scale and using the data generated to develop models to predict the prevalence of COVID-19 in the community. The MWRD's samples were taken from six MWRD WRPs and included both influent (raw sewage) and primary sludge solids. The study included 49 wastewater treatment utilities across the United States.

**Research partners:** [Argonne National Laboratory](#) (Argonne), [Northwestern University](#) (NU), and the [University of Illinois at Chicago](#) (UIC). **Funder:** [Walder Foundation](#). Beginning in October 2020, the MWRD provided raw sewage and final effluent samples each week from all seven MWRD WRPs, along with information about the MWRD's WRPs and collection system. Researchers have developed sampling and testing procedures and logistics among collaborators for the study titled: "Tracking SARS-CoV-2 in Chicago Area Waterways and nearshore Lake Michigan." The Argonne/UIC/NU team analyzes samples, evaluates data and communicates findings to the local public health departments, including the Cook County and Chicago departments of Public Health. Researchers have also received support from the Illinois Department of Public Health and are working with other partners to test new technologies that will allow for analytical results to be obtained in as little as one day for potential statewide application.

**Project partner:** [AquaVitas LLC](#). **Funder:** [U.S. Department of Health & Human Services](#) (HHS). (Phase 1) The HHS conducted a study that took place in two phases involving samples from the MWRD's Stickney, Calumet, O'Brien, Kirie and Egan WRPs. Phase 1 was from January to February 2021 and covered about 10 percent of the U.S. population (36 million people), including approximately 100 wastewater treatment plants. Phase 2 was from June to August 2021 and covered about 30 percent of the U.S. population from approximately 320 wastewater treatment plants. The study included sampling, analysis and uploading the analytical data. The HHS has created a national database that makes the data available for local public health departments.

**Additional studies:** The MWRD's scientists communicate regularly with the [Illinois Water Environment Association](#) (IWEA), the [Illinois Association of Wastewater Agencies](#) (IAWA), [Water Research Foundation](#) (WRF), the [Water Environment Federation](#) (WEF) and [National Association of Clean Water Agencies](#) (NACWA) to learn more about COVID-19, sewage surveillance, wastewater and biosolids analysis. The MWRD has also engaged with the [U.S. Center for Disease Control](#) (CDC), the [Council for State and Territorial Epidemiologists](#) and [U.S. Environmental Protection Agency](#) (EPA) on the potential of national wastewater surveillance programs and stands ready to be called on for additional research. The MWRD follows the guidelines of the CDC and [Illinois Department of Public Health](#) (IDPH) and consults with local agencies like the [Chicago Department of Public Health](#) and [Cook County Department of Public Health](#) on how to best utilize sewage surveillance data. In September 2020, the MWRD signed a letter of support to the [California Association of Sanitation Agencies](#) for requesting funding support for sewage surveillance for COVID-19 from several non-profit organizations.

## Monitoring the water environment



The MWRD's Monitoring and Research Department employs 291 staff members, including many talented and essential lab technicians who sample and test the region's water and wastewater and ensure water quality meets the highest standards. At any given time, the MWRD encounters unpredictable and unique situations. COVID-19 is no exception. Monitoring and Research staff analyze groundwater, organic compounds and both wastewater entering the WRPs (influent) and clean water discharged from the WRPs (effluent) and shares its water quality analysis at [mwrdd.org/reports](http://mwrdd.org/reports). The MWRD also collects monthly river water samples at 29 locations throughout Cook County. They then return these samples to the lab, where they analyze the water for dozens of chemical and biological constituents. The

MWRD also operates continuous monitors, which collect hourly dissolved oxygen levels, specific conductance measurements, and temperature readings at 21 locations throughout the waterways in the MWRD service area.



*Recovering Resources, Transforming Water*