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Department of
Environmental Quality

L. Scott Baird
Executive Director

Kim Shelley
Deputy Director

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CONTACT
Jared Mendenhall
Public Information Officer
Cell: 801-707-0817
jmendenhall@utah.gov

Utah Scientists Using Sewage to Track Coronavirus

Results from a sewage sampling pilot program holds promise of providing early detection

SALT LAKE CITY – Monitoring for coronavirus in Utah's sewage systems may offer health officials a tool for early detection of rising infections, monitoring overall community infection trends, and confirmation of low infection rates.

In April, a pilot program was launched to determine whether monitoring sewage could provide a useful tool for public health officials. Scientists at the Utah Department of Environmental Quality's (DEQ) Division of Water Quality (DWQ), the University of Utah, Utah State University, and Brigham Young University measured the genetic material of the SARS-CoV-2 virus — the virus that causes COVID-19 — in sewage entering ten treatment plants across Utah. These plants represent approximately 40% of Utah's population. Results from this pilot program are available today at wastewatervirus.utah.gov.

"The initial results show that we can not only detect the virus in sewage but we can see trends that are broadly consistent with known infection rates in Utah's communities," said Erica Gaddis, director of the Utah Division of Water Quality. "Monitoring virus in Utah's sewage systems offers a tool for early detection of rising infections, monitoring community infection trends, and confirmation of low infection rates. We hope that monitoring the sewage can help in prioritizing limited state resources such as mobile testing."

The virus is shed in feces by infected individuals, including those that are asymptomatic. Virus concentrations in the sewage can be measured by collecting a sample at the inlet of sewage treatment plants. The pilot program sampled sewage entering ten treatment plants in Utah. These plants were selected for the pilot study to capture data from different types and sizes of communities across Utah. Samples were collected from mid-April through May 2020.

Virus concentrations were coupled with wastewater flow and service area populations to estimate viral concentrations in units of SARS-CoV-2 copies per 100,000 people in the sampled area per day. This metric provides an indicator of changes in community infection rates in each treatment plant's service area.

Key Findings

- Virus was not detected in the effluent — the water discharged to natural bodies of water — leaving the sewage treatment plants.
- Virus was found in the influent — the water entering a sewage plant — of all ten sewage treatment plants that participated in the study and in 64% of 171 samples collected.
- In late May, large increases of virus were measured in the influent to the Logan and Hyrum sewage treatment plants. This trend mirrors the increase in active case counts reported for Cache Valley.
- Highest concentrations of virus were found in urban areas.
- Tourist communities showed higher concentrations per capita of virus than other areas of similar density and size.
- Monitoring for the SARS-CoV-2 virus in Utah's sewage systems offers a tool for: early detection of rising infections, monitoring overall community infection trends, and confirmation of low infection rates.

Sample collection was conducted voluntarily by plant operators at the following participating facilities: Central Valley Water Reclamation Facility, Hyrum City Wastewater Treatment Plant, Logan City Wastewater Treatment Plant, Moab Wastewater Treatment Plant, Orem Water Reclamation Facility, Price River Water Improvement District, Salt Lake City Water Reclamation Facility, Snyderville Basin Wastewater Reclamation District, Timpanogos Special Service District, and Tremonton Wastewater Treatment Plant.

With the completion of the pilot project, the State of Utah is committed to expanding and operationalizing this tool in the ongoing response to the COVID-19 pandemic. To see the results of the pilot program and its key findings visit wastewatervirus.utah.gov.

About DEQ

Established in 1991, the Utah Department of Environmental Quality's (DEQ) mission is to safeguard and improve Utah's air, land and water through balanced regulation. DEQ implements state and federal environmental laws and works with individuals, community groups and businesses to protect the quality of Utah's air, land and water. For more information, visit www.deq.utah.gov, follow DEQ on Facebook (utahdeq) and Twitter (UtahDEQ).