

UNIVERSITY OF ARIZONA WATER & ENERGY SUSTAINABLE TECHNOLOGY CENTER (WEST):
SEWAGE SURVEILLANCE FOR CORONAVIRUS

The University of Arizona Water and Energy Sustainable Technology Center (WEST) has the ability to monitor for the incidence of the Coronavirus in sewage. Such monitoring will provide insight into the presence of COVID-19 in a community regardless of whether or not infected individuals show symptoms of the disease. Additionally, monitoring of wastewater will quantify any potential risk of infection to wastewater treatment workers.

With advanced laboratory capabilities and expertise in Coronavirus research, WEST is beginning a program to perform coronavirus sewage surveillance for any interested Wastewater Treatment Plant (WWTP).

In the offered service, composite samples of untreated sewage will be collected as it enters the plant and again after secondary treatment processes. Samples will then be assayed by qPCR for Coronavirus. The U.S. Centers for Disease Control and Prevention has developed a reverse transcription real time polymerase chain reaction assay (RT-qPCR) assay for detection of SARS-CoV-2. Using this method, the data can be used to determine:

- 1) When and if the new coronavirus enters a metropolitan area.
- 2) The concentration that can be expected in the untreated wastewater and potential risk to wastewater treatment workers.
- 3) Removal of the virus by the treatment process.

The molecular method (qPCR) will be used to provide initial presence/absence information on Coronavirus; WEST Center has both the cell culture/cell lines and Coronavirus controls (Coronavirus 229E) to determine viability. If negative, no Coronavirus is present, and no further testing is necessary. If positive, infectivity must be determined via cell culture, and positive cell culture samples confirmed by an additional qPCR test.

RESEARCHERS

Dr. Walter Betancourt: Ph.D., Environmental Virologist with over 15 years of experience in methods for the recovery and molecular detection of human pathogenic viruses in environmental matrices.

Dr. Ian Pepper: Ph.D., Environmental Microbiologist with over 45 years of experience in wastewater treatment, land application of biosolids and fate and transport of microbial pathogens.

Dr. Charles Gerba: Ph.D., Environmental Virologist with over 45 years of experience in risk assessment and survival of viruses in environmental matrices.

COST OF ANALYSIS FOR SEWAGE AND POST SECONDARY TREATMENT (Two samples)

Sample processing and initial qPCR: \$350/sample

Infectivity (viability) assay via cell culture: \$1000/sample

For Positive cell culture samples, confirmatory PCR: \$250/sample

TOTAL COST= \$3200 for both samples

Note that if the initial qPCR is negative, the only cost is \$700 for both samples