Surveillance of the SARS-CoV-2 Virus in Wastewater – Position Statement

Vermont Initiative for Biological and Environmental Surveillance (VIBES)

Coronavirus disease 2019 (COVID-19), caused by the novel SARS-CoV-2 virus, continues to present a global challenge for public health officials. Despite the quick development and deployment of reliable COVID-19 tests, limitations in production and distribution have resulted in restricted clinical testing.[1] There remains a need for real- or near-real time tracking of population-level COVID-19 spread in order to provide a timely warning to communities experiencing increased transmission of the virus.

Wastewater surveillance, the process of testing wastewater influent for microorganisms and other contaminants, is being used around the world for detection of the SARS-CoV-2 virus. Researchers have shown strong correlation between wastewater SARS-CoV-2 genetic material (RNA copy number) and COVID-19 clinical cases suggesting that wastewater may be a detection source for fragments of the virus 4- to 7-days earlier than clinical detection.[2] Therefore, using wastewater as a monitoring tool for COVID-19 has significant potential as an early warning system.[2] Wastewater surveillance can also be used to complement clinical surveillance in areas with limited testing capacity or resources[2] and may be a cost-effective way to track the virus circulation and COVID-19 transmission dynamics within communities.[3]

Researchers at Norwich University, St. Michael's College, and the University of Vermont have partnered in a collaborative effort with municipal wastewater officials and state agency representatives across the state to conduct wastewater surveillance for the SARS-CoV-2 virus and develop wastewater-based risk assessment tools for COVID-19 and other environmental health hazards in Vermont. The Vermont Initiative for Biological and Environmental Surveillance (VIBES) is a multidisciplinary group of scientists, engineers, faculty, staff, students, wastewater treatment professionals, and state officials from various Vermont institutions.

It is our position that wastewater surveillance can be a critical tool in informing our understanding of COVID-19 prevalence within a community as well as guide future efforts to prevent transmission of the virus. Based on information from the Water Environment Federation and on the exhaustive testing of drinking water and wastewater effluent, it is highly unlikely that SARS-COV-2 is viable or infectious in potable or fresh water sources.

Clear and consistent messaging regarding wastewater surveillance and epidemiology is paramount to keeping the public informed. The VIBES consortium stands to serve as a resource to state officials and media outlets seeking subject matter experts in wastewater epidemiology and environmental health and engineering.

VIBES Recommendations

- Develop a set of standardized testing methodologies for wastewater surveillance in the state of Vermont including detection and variant sequencing
- Expand the statewide wastewater testing capacity
- Identify key community hotspots through wastewater monitoring
- Develop a comprehensive sampling plan with participation from municipal wastewater treatment plants
- Contribute data and/or findings to the Centers for Disease Control's (CDC's) National Wastewater Surveillance System (NWSS)
- Engage social science research methods to help illuminate the behaviors that lead to increased virus transmission within communities, and identify communication strategies to help support preventive approaches
- Set up a statewide surveillance program for SARS investigation and future targets
- Identify/develop and implement COVID-19-specific disease transmission models including risk characterization and management

VIBES Members

Marie Agan, Norwich Faculty, Chemistry, and UVM graduate student Medical Lab Science
Appala Raju Badireddy, Civil and Environmental Engineering, University of Vermont
Julie Dragon, Vermont Integrative Genomics, UVM
Robert Fischer, Water Quality Superintendent, City of South Burlington
John Handley, Researcher, Analyst, Translational Global Infectious Diseases Research Center, Vermont Integrative Genomics
Karen Hinkle, Associate Provost for Research and Dana Professor of Biology, Norwich University
James Jutras, Water Quality Superintendent, City of Essex Junction
Tara Kulkarni, Faculty, Civil and Environmental Engineering, and Director, Center for Global Resilience and Security, Norwich University
Mark Lubkowitz, Faculty, Biology, St. Michael's College
Amy Polaczyk, Program Manager, Vermont Department of Environmental Conservation Wastewater Management Division, Wastewater Management Program
Bob Protivansky, Chief Operator WWTF, City of Rutland
Scott Tighe, Vermont Integrative Genomics, UVM
Isabelle Tomanelli, Public Health Graduate Student, University of Vermont
Christine Vatovec, Larner College of Medicine, Rubenstein School of Environment & Natural Resources, Gund Institute for Environment, UVM

VIBES Contact

Dr. Karen Hinkle, Associate Provost for Research and Dana Professor of Biology, Norwich University
802-485-2341
khinkle@norwich.edu