

## Early detection tools for SARS-CoV-2 in municipal wastewater

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Since the novel coronavirus (SARS-CoV-2) was identified in late 2019, it has spread worldwide, infecting over 106 million individuals and resulting in over 2.3 million deaths, with numbers continuing to grow. Although the respiratory route is the primary transmission pathway of concern, SARS-CoV-2 has been detected in stool of infected individuals as well as in individuals where the illness has resolved, and the virus is no longer detectable in respiratory specimens. Accordingly, feces of COVID-19 infected patients may serve as a source of contamination or infection as well as a potential mechanism for community surveillance, including for asymptomatic carriers. Environmental surveillance of SARS-CoV-2 in municipal sewage could act as an early warning system of outbreaks as well as identify high-risk communities (e.g. campus residents, correctional institutions), providing vital monitoring and predictive tools for early intervention in future waves of the COVID-19 outbreak. Community surveillance initiatives worldwide have already begun to demonstrate the ability to detect SARS-CoV-2 in raw sewage, even in low prevalence settings, and suggests that the quantification of the virus in wastewater provides the ability to monitor the prevalence of COVID-19 infections in the community. However, wastewater sample preparation and analysis methods require further development and validation. This presentation will review the work and progress of others in this field, with a special focus on research groups in Canada. It will discuss the work in progress at Queen's to establish a laboratory at the Beaty Water Research Centre for validated testing of sewage water samples for SARS-CoV-2 as a first step in Kingston Ontario to establishing sentinel surveillance system for COVID-19, which can also be applied to inevitable future viral outbreaks across Canada.