

Press Release

## Sewage Surveillance: Detecting SARS-CoV-2 Variants in Wastewater across Ontario

*Ontario Genomics, University of Guelph, University of Ottawa and CHEO announce a game-changing initiative to analyze COVID-19 in wastewater to improve public health response and better understand outbreaks in communities across Ontario.*

June 2, 2021 – [Ontario Genomics](#), [Genome Canada](#), and [Illumina](#) are investing in a first-of-its-kind SARS-CoV-2 wastewater surveillance initiative across Ontario. This cutting-edge project will enhance critical province-wide coordination and viral surveillance and support provincial and national efforts to understand how the virus that causes COVID-19, SARS-CoV-2, is changing over time.

This project is made possible through an investment of over \$338,000 from Genome Canada, Ontario Genomics, and Illumina. The funding supports Ontario-wide research efforts, led by Dr. Lawrence Goodridge, University of Guelph, and co-led by Dr. Rob Delatolla, University of Ottawa. It also harnesses the power of an extensive network that consists of members and collaborators from across Ontario and Canada, including CHEO (a pediatric health-care and research centre in Ottawa), University of Waterloo, University of Windsor, Ryerson University, Health Sciences North Research Institute (HSNRI) among others.

“I am proud of Ontario’s leadership in SARS-CoV-2 surveillance in wastewater. Through a coordinated approach, leveraging the province’s deep genomics resources and capacity, this project will provide early signals of worrisome viral changes and equip public health with evidence for timely decision making,” said **Dr. Bettina Hamelin, President and CEO, Ontario Genomics**. “Our end-to-end view of Ontario’s genomics ecosystem has enabled Ontario Genomics to break down silos and harness genomics expertise in the fight against COVID-19.”

Since the start of the pandemic, many countries have been using wastewater monitoring to identify potential outbreaks before they are detected in people through clinical testing. SARS-CoV-2 can be recognized in human waste up to a week before individuals develop symptoms and in people who remain asymptomatic but may spread the virus. By collecting fecal matter at key wastewater collection sites (for example, long-term care facilities, schools, universities, etc.), we can get an early warning sign at the population level and prevent further spread by local public health interventions.

“Using wastewater surveillance to assist in predicting COVID-19 caseloads in Ontario is an excellent example of how genomics research was adapted in the face of the pandemic. This demonstrates how sustained, long-term investments in genomic research prepare us for the unexpected,” said **Dr. Rob Annan, President and CEO, Genome Canada**. “Genome Canada looks forward to helping leverage this important initiative into national solutions for future pandemic readiness.”

Several jurisdictions in Canada, including Ontario through the Ontario government's [Wastewater Surveillance Initiative](#), have been using a surveillance technology (qRT-PCR) to monitor SARS-CoV-2 levels over time. By leveraging modern genomic techniques (metagenomics), this project will enable researchers to identify known Variants of Concern (VOCs) while also staying ahead of the curve on potential new emerging viral changes that could become concerning. Participation of the research team in the Wastewater Surveillance Initiative and strong partnerships between the research team and public health agencies ensure that the results will be shared in real-time for rapid actioning as necessary.

"Only a small percentage of clinical samples in Ontario are being sequenced to identify VOCs," said **Dr. Lawrence Goodridge**, who holds the **Leung Family Professorship in Food Safety and is the director of the University of Guelph's Canadian Research Institute for Food Safety**. "This timely funding from Ontario Genomics and Genome Canada, and Illumina will allow for surveillance of VOCs in wastewater, increasing our knowledge regarding which VOCs are circulating in the general population."

"We will now have a province-wide proven epidemiological tool to identify signs of viral prevalence ahead of an outbreak," said **Dr. Robert Delatolla, Associate Professor, uOttawa Faculty of Engineering and project co-lead**. "It will prove to be an asset to local public health units in our shared fight against SARS-CoV-2."

"With this investment, public health officials and researchers will be able to better interpret the wealth of public health data that we flush down the toilet every day," said **Dr. Tyson Graber, Research Associate, CHEO Research Institute**. "It's amazing how quickly this scientific field has matured since the beginning of the pandemic; starting from basic research projects in university labs to a surveillance programme used by public health units across Ontario, providing a clearer picture of how COVID-19 is affecting their community. It is a stellar example of how open science and collaboration across disciplines can benefit all Ontarians."

### Key Facts

- Wastewater surveillance can provide critical information about COVID-19 community spread sooner than individual test results or reports of illness.
- Genomics, the study of DNA for innovation-driven solutions, plays a critical role in developing COVID-19 surveillance, diagnostics, vaccines, and public health responses.
- Variants of Concern or VOCs have mutations that make them more transmissible and/or more likely to cause severe disease with a higher mortality rate.
- Metagenomics enables the detection of all variants of SARS-CoV-2 in a mixed sample, such as that found in wastewater, allowing for population-level surveillance of the variants circulating in a population or community.
- This \$338,000 investment supports the coordination of COVID-19 wastewater surveillance metagenomic resources across nine partner research centres and institutions across Ontario, in addition to the national Public Health Agency of Canada (National Microbiology Laboratory).

- Funding partners include Genome Canada, Ontario Genomics, and Illumina.

### **Additional Quotes**

“Illumina is proud to take part in supporting this effort to empower researchers and public health experts with the sequence data of SARS-CoV-2 genomes. The added detail provided by Illumina-enabled whole genome pathogen sequencing approaches will better inform Ontario’s infectious disease surveillance strategies and prime the network for a longer-term strategy for broader pathogen surveillance.” - **Michael Gallad, Senior Director, Canada and Latin America, Illumina.**

“The University of Guelph is delighted and grateful to Ontario Genomics, Genome Canada, and Illumina for the generous support for this incredibly timely, cutting-edge viral surveillance partnership. This wise investment will reinforce our strong partnership with University of Ottawa and enable Professors Goodridge and Delatolla to conduct vital genomics-based surveillance for viral pathogens, and thereby safeguard public health and improve life.” - **Dr. Malcolm Campbell, vice-president (research), University of Guelph.**

“The University of Ottawa is extremely grateful for this funding from Ontario Genome, Genome Canada, and Illumina, which will allow the expansion of wastewater surveillance across the province. This novel project has shown how strong multi-site research collaborations can have a relevant impact in our communities.” – **Dr. Sylvain Charbonneau, Vice-President, Research, University of Ottawa.**

“This province-wide program to monitor for COVID-19 variants of concern is a testament to the pioneering multidisciplinary scientific work of the team at the CHEO Research Institute and University of Ottawa in partnership with Ottawa Public Health. Together they have made wastewater numbers a commonly reported metric and have helped people predict the prevalence of disease in the community.” - **Dr. Jason Berman, CEO and Scientific Director, CHEO Research Institute.**

### **About Ontario Genomics**

Established in 2000, Ontario Genomics (OG) is a not-for-profit organization leading the application of genomics-based solutions to drive economic growth, improved quality of life and global leadership for Ontario. Ontario Genomics plays a vital role in advancing projects and programs like wastewater surveillance by supporting the development of their proposals, helping them access diverse funding sources, and finding the right industry partners to take this research out of the lab to apply it to the world’s most pressing challenges. Since its inception in 2000, Ontario Genomics has raised more than \$1.27 billion for genomics applied research in Ontario and directly supported more than 9,100 trainees and jobs. We have 110+ active projects, 500+ impactful partnerships and have secured \$1.34 billion in follow-on investments.

### **About the University of Guelph**



One of Canada's top comprehensive and research-intensive universities, the University of Guelph spans urban hubs and rural communities. Established in 1964, the University enjoys a reputation for innovation and excellence dating back more than 150 years to its founding colleges: Ontario Veterinary College, Ontario Agricultural College and Macdonald Institute. Today U of G's seven colleges conduct leading-edge teaching and research in the physical and life sciences, business, arts, social sciences, and agricultural and veterinary sciences. We have nearly 30,000 undergraduate and graduate students at campuses in Guelph, Toronto and Ridgetown and 185,000 alumni in more than 160 countries worldwide. The University of Guelph, and everyone who studies here, explores here, teaches here and works here, is committed to a simple, shared purpose: to Improve Life.

### **About the University of Ottawa**

*A crossroads of cultures and ideas*

The University of Ottawa is home to over 50,000 students, faculty and staff, who live, work and study in both French and English. Our campus is a crossroads of cultures and ideas, where bold minds come together to inspire game-changing ideas. We are one of Canada's top 10 research universities—our professors and researchers explore new approaches to today's challenges. One of a handful of Canadian universities ranked among the top 200 in the world, we attract exceptional thinkers and welcome diverse perspectives from across the globe.

### **About CHEO**

Dedicated to the best life for every child and youth, CHEO is a global leader in pediatric health care and research. Based in Ottawa, CHEO includes a hospital, children's treatment centre, school and research institute, with satellite services located throughout Eastern Ontario. CHEO provides excellence in complex pediatric care, research and education. We are committed to partnering with families and the community to provide exceptional care — where, when and how it's needed. CHEO is a partner of the Kids Come First Health Team, a network of partners working to create a high quality, standardized and coordinated system for pediatric health care that is centred around children, youth and their families. Every year, CHEO helps more than 500,000 children and youth from Eastern Ontario, western Quebec, Nunavut and Northern Ontario.