

Provincial Wastewater Testing Initiative During COVID-19 Pandemic: A Renewed Tool In The Surveillance Toolbox!

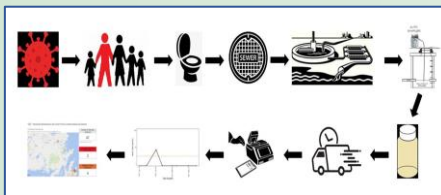
Why?

- Wastewater testing has been used for modern disease surveillance since the **1940s** (samples cultured to detect Polio)
- Recent advances in genetic sequencing and analysis has generated renewed interest in wastewater surveillance as a **relatively low cost, non-invasive means** to detect and manage infectious disease
- Wastewater surveillance is an established method of surveillance in other provinces and countries
- A wastewater surveillance program establishes partnerships within the province and around the country
- Wastewater testing supplements clinical surveillance
- Wastewater surveillance may be used to inform predictive models
- Wastewater surveillance has proven useful as an **Early Warning System** for the detection of SARS-CoV-2 virus and prevalence of variants of concern
- Wastewater surveillance results may be used as a basis for Public Health messaging

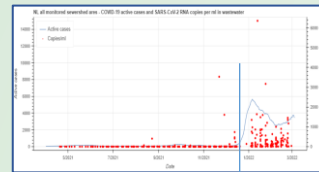
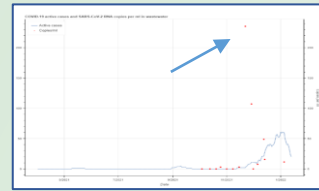
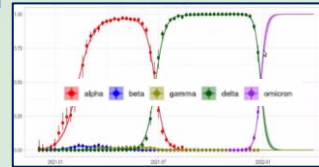


How?

- Sample is collected from the municipal wastewater system, typically from a wastewater treatment plant before any treatment occurs
- Collect either a composite liquid or filter sample
- Sample is shipped to the National Microbiology Laboratory in Winnipeg for analysis
- Sample is prepared and viral RNA is quantified using PCR analysis
- Results as gene copies/mL are sent to Provincial Government employees
- Special assays or gene sequencing undertaken to identify variants
- Results are reported via the Results Dashboard (The Poop Report!)



The Data!

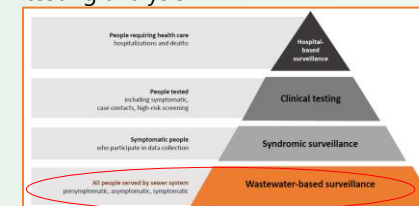


Before Omicron ← → After Omicron

- Detected Variants of Concern in each wave
- Delta virus detected in wastewater in a small town Nov 2021 before clinical cases discovered
- A tale of two pandemics!
- Current established sample sites represent approximately **48%** of the NL population
- Wastewater testing proven useful as “Early Warning” system for detecting COVID-19
- Detects a community COVID-19 prevalence rate as low as **0.01%** (1 virus shedder per 10,000 persons)
- Wastewater data helped show the spread of Omicron throughout NL and that the containment/suppression approach to the pandemic was no longer a viable option
- Detected **2-6 times** more cases than confirmed clinical cases

IPAC Implications and Moving Forward

- The constant monitoring of wastewater in a community will identify COVID-19 in the community that may not otherwise be detected through individual testing
- The early detection of SARS-CoV-2 in wastewater, as part of a comprehensive COVID-19 surveillance system could help identify a new emergence of infection in a community including a possible outbreak
- As wastewater testing surveillance evolves, it may include other pathogens (E.g. AMROs and Influenza)
- Testing sites can include entire communities or targeted sites such as healthcare facilities
- Trends in wastewater testing have become much more important indicators with the ending of public PCR test clinics, the reliance on individual rapid testing and “staying home when sick” model
- The benefits of a wastewater surveillance program with COVID-19 will lay groundwork for a permanent provincial program
- Provincial Public Health Laboratory to increase capacity to include wastewater testing analysis



- No laboratory analysis capacity in NL
- Time to get results ranged from 2-14 days, average ~7 days (Negates the use for outbreak detection)
- COVID-19 levels in wastewater affected by:
 - ✓ Wastewater flows (high infiltration/inflow in NL)
 - ✓ Variation in viral load in those infected: age, variant, vaccination status
 - ✓ Collection method
- Logistical challenges because of sampling locations
- Supply chain issues with supplies (e.g., ran out of filters)

Dashboard on government website:

<https://www.gov.nl.ca/ecc/waterres/wastewater-surveillance-for-covid-19-virus/>

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