

CORONAVIRUS DISEASE (COVID-19) PANDEMIC

Wastewater surveillance for SARS-CoV-2

Since November 2020, the South African Collaborative COVID-19 Environmental Surveillance System (SACCESS) network, in partnership with the Water Research Commission, tests for SARS-CoV-2 in wastewater from over 90 wastewater facilities across the nine provinces in South Africa. Water-based epidemiology of SARS-CoV-2 is a valuable tool in areas with limited clinical surveillance and is independent of changes in health-seeking behaviour or testing patterns. SARS-CoV-2 nucleic acid is detectable in water but wastewater is not a source of SARS-CoV-2 transmission.

Grab samples of wastewater from plant influent are concentrated, undergo RNA extraction, and are then tested by polymerase chain reaction (PCR) for SARS-CoV-2. Results are quantified and expressed as genome copies/ml of wastewater sample. To understand the trend of SARS-CoV-2 virus levels in relation to the clinical cases across the epidemiological weeks,

the genome copies are plotted on a graph alongside the clinical cases (Figure 2) for all wastewater plants within a metropolitan city.

An example of results for Ekurhuleni Metropolitan Municipality are shown in Figure 2. Testing for SARS-CoV-2 commenced in epidemiological week 8 (week ending February 26, 2021) for one treatment plant (Vlakplaats), and week 9 for three treatments plants (Daveyton, Hartebeesfontein and Olifantsfontein). In all treatment plants, the peak of SARS-CoV-2 in wastewater levels corresponded with the peak in clinical cases at week 26 (week ending July 2, 2021). However, from week 39 (week ending October 1, 2021) till week 41 (week ending October 15, 2021), the SARS-CoV-2 levels have been steadily declining in Hartebeesfontein and Vlakplaats plants, corresponding to the decrease in clinical cases.

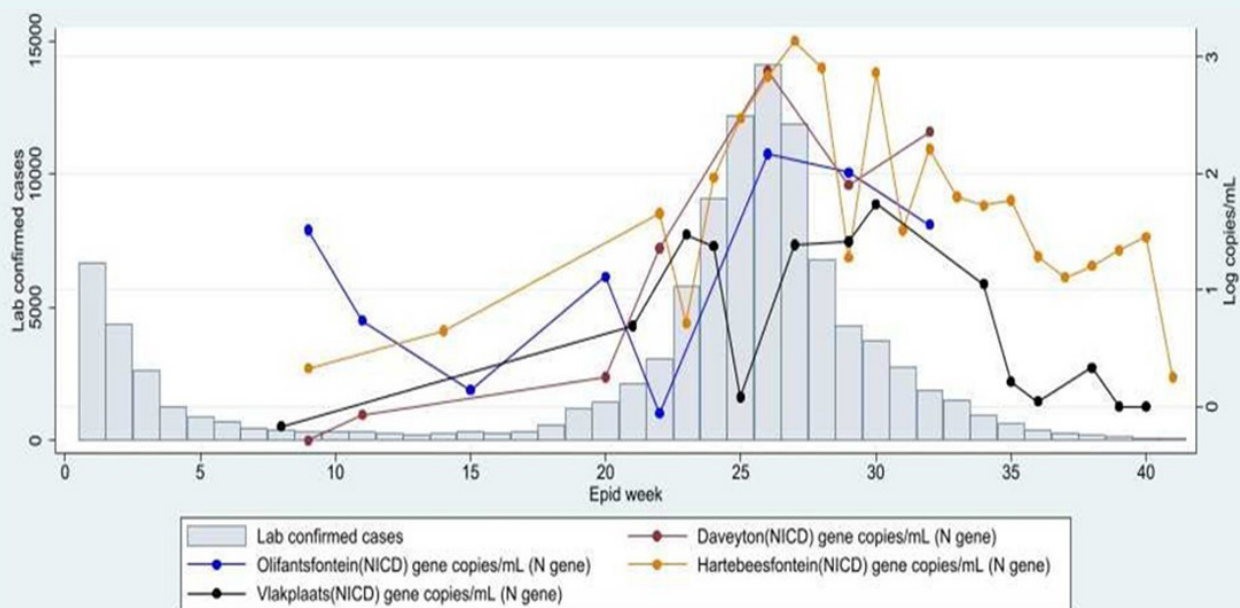


Figure 2. Laboratory confirmed cases of SARS-CoV-2 (bars) and levels of SARS-CoV-2 in log copies/ml of wastewater (coloured lines) for selected wastewater treatment plants (WWTP) in Ekurhuleni Metropolitan Municipality during epidemiological weeks 1-41, 2021. The testing laboratory and quantified SARS-CoV-2 gene are named in brackets after the name of the WWTP