

#### Wastewater-based epidemiology for SARS-CoV-2 surveillance in South Africa

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Sample collection dates up to 01 September 2021 (epidemiological week 35)

> Centre for Vaccines and Immunology National Institute for Communicable Diseases







NATIONAL INSTITUTE FOR COMMUNICABLE DISEASES Division of the National Health Laboratory Service

# Wastewater-based Epidemiology for COVID-19

Why test wastewater for SARS-CoV-2?



SARS-CoV-2 virus is excreted in stool by persons with active and recovering COVID-19 and can be found in wastewater

SARS-CoV-2 is not transmitted by faeco-oral route. Wastewater with SARS-CoV-2 is **not infectious**  Levels of SARS-CoV-2 in wastewater reflect population changes in case load and geographical distribution of cases

SARS-CoV-2 can be detected in wastewater before clinical cases appear

Increases in SARS-CoV-2 levels will appear before increases in clinical case load

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Monitoring changes in SARS-CoV-2 levels can support public health preparedness and response activities









#### Wastewater-based Epidemiology for COVID-19 How is wastewater tested for SARS-CoV-2?



for SARS-CoV-2 is done

Results are visualised in a graph

SARS-CoV-2 is not transmitted by faeco-oral route. Wastewater with SARS-CoV-2 is not infectious







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#### Wastewater-based Epidemiology for COVID-19 What does wastewater testing for SARS-CoV-2 mean?



Epidemiological metro/subdistrict where the plant weeks

cases in specimens submitted to

NICD from persons in the

is located

Changes in wastewater SARS-CoV-2 results over time for different treatment facilities

# Wastewater-based Epidemiology for COVID-19

How can we use wastewater testing for strengthening public health

responses





- What should we do if levels go from negative to positive?
  - Inform public
  - Strengthen health promotion messages regarding NPIs and vaccination
  - Strengthen testing in affected areas

- What should we do if levels are increasing?
  - Inform public
    - Identify where NPIs are not being adhered to and target these areas for strengthened health promotion messages regarding NPIs and vaccination
    - Strengthen testing in affected areas
  - Prepare hospitals for overflow

- What should we do if levels are decreasing?
  - Inform and congratulate public
  - Reinforce public health messaging regarding NPIs
  - Strengthen vaccination to ensure population is protected for the next wave

- What should we do if levels go from positive to negative?
  - Inform public
  - Redirect resources from NPIs to vaccination to ensure population is protected for the next wave





# **Results: Gauteng**



Changes in SARS-Cov-2 viral load (data points and coloured lines) in in-flowing untreated wastewater from plants in City of Tshwane, compared with <u>laboratory-confirmed cases</u> resident in City of Tshwane (grey bars), by epidemiological week, 2021









# **Results: Gauteng**



Changes in SARS-Cov-2 viral load (data points and coloured lines) in in-flowing untreated wastewater from plants in City of Johannesburg, compared with <u>laboratory-confirmed cases</u> resident in City of Johannesburg (grey bars), by epidemiological week, 2021









# **Results: Gauteng**



Changes in SARS-Cov-2 viral load (data points and coloured lines) in in-flowing untreated wastewater from plants in Ekurhuleni, compared with <u>laboratory-confirmed cases</u> resident in Ekurhuleni (grey bars), by epidemiological week, 2021









### **Results: KwaZulu-Natal**



Changes in SARS-Cov-2 viral load (data points and coloured lines) in in-flowing untreated wastewater from plants in eThekwini, compared with <u>laboratory-confirmed cases resident in eThekwini</u> (grey bars), by epidemiological week, 2021







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### **Results: Free State**



Changes in SARS-Cov-2 viral load (data points and coloured lines) in in-flowing untreated wastewater from plants in Mangaung, compared with <u>laboratory-confirmed cases in Mangaung</u> (grey bars), by epidemiological week, 2021









# **Results: Eastern Cape**



Changes in SARS-Cov-2 viral load (data points and coloured lines) in in-flowing untreated wastewater from plants in Nelson Mandela Metro, compared with <u>laboratory-confirmed cases</u> <u>resident in Nelson Mandela</u> <u>Metro</u> (grey bars), by epidemiological week, 2021









#### **Results: Eastern Cape**



Changes in SARS-Cov-2 viral load (data points and coloured lines) in in-flowing untreated wastewater from plants in Buffalo City Metro, compared with <u>laboratory-confirmed cases resident in Buffalo City</u> (grey bars), by epidemiological week, 2021









#### **Results: Western Cape**



Changes in SARS-Cov-2 viral load (data points and coloured lines) in in-flowing untreated wastewater from plants in Western Cape Province, compared <u>with laboratory-confirmed cases resident in City of Cape Town</u> (grey bars), by epidemiological week, 2021







