COVID-19 Wastewater Monitoring in Michigan

How do we interpret this data?

To view Michigan's COVID-19 wastewater monitoring data, visit the State of Michigan Wastewater **data dashboard**.

By reviewing this document, viewers will learn how to interpret this data and better understand COVID-19 wastewater monitoring and how it can be used.

Detection of N1 and N2 Genes

This project tests wastewater samples for the **N1 and N2 genes** that are present in the SARS-CoV-2 virus. These genes are unique to the SARS-CoV-2 virus, so detection of either gene means the virus is present in the sample.

Testing for the E gene of the SARS-CoV-2 virus was also done during the Fall 2020 pilot project but was discontinued after it was found to be less reliable. Positive E gene detections may be included in the total number of samples with virus detected, but will not be displayed on the graph.
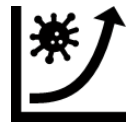
Data Presentation

Viruses can multiply exponentially, which can result in a wide range of values when displaying laboratory results. To remain consistent with current scientific standards for the presentation of microbial wastewater results, it is recommended that wastewater concentration data be presented on a logarithmic (log) scale. Log_{10} has been commonly used in science for hundreds of years because of the ease of calculations. A log scale displays data over a wide range of values in a concise way and allows variations within a potential wide range of results to remain visible.

Therefore, data for N1 and N2 genes for this project will be presented on a **log scale**. This will be shown on the graph's y-axis as "Number of gene copies per 100mL (logarithmic scale)". When viewing data on a log scale, please note that the largest numbers presented could be tens, hundreds, or thousands of times larger than the smallest numbers.

The Detection of N1 and N2 Genes graph, as shown above, provides wastewater surveillance data for that specific sample site. The number of N1 and N2 gene copies per 100 mL (log scale) for each date sampled will be displayed, along with a minimum detection limit. By hovering the cursor over each data point, a popup box with a date interval and the number of N1 and N2 genes detected will appear. The first date shown is the date of sample collection.

M DHHS Michigan Department of Health and Human Services

EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

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Detection Limit

All PCR-based laboratory testing methods have a lower detection limit, which is the lowest value for the test that will result in a positive virus detection. Most tests conducted for this project have a **variable detection limit**, meaning the lower limit changes each time the test is run.

A variable detection limit:
- Occurs due to the fact that the sample volume varies with each test, and the lower detection limit is directly based on the sample volume.
- Is more reflective of the lab method used for this project.
- Does not distort the difference between positive results and non-detect results.

A variable detection limit (light grey line on graph) is not shown as a straight line across at one specific value. Instead, this line fluctuates.
- Any value shown above the detection limit is considered **a positive detection** of SARS-CoV-2 in the wastewater sample.
- When the value for the N1 and N2 genes is the same as the detection limit, this indicates a **non-detect** or **negative** result.

While there are other options for displaying a lower detection limit, including using an average of all limits or the lowest limit for the testing runs displayed, these formats require recalculations each time additional results are added and can distort the value that corresponds to a non-detect result.

Data Interpretation

Results can show the **presence** of infected individuals in the community and **infection trends** over time. A significant increase in the amount of virus detected over time can show that cases may be increasing in a community and should be reviewed with clinical case data.

Trends can be classified by:
- Duration—short-term or sustained
- Direction—increase, decrease, or plateau

If a virus **is detected** in wastewater:
- At least one person in the sampled community is shedding the virus. The average amount or potential range of virus shed by infected or ill individuals is not known at this time.

If a virus **is not detected** in wastewater:
- It could mean there is no virus in the sampled community **OR**
- The concentration of the virus in the sample is below the level that can be detected by the test.

⚠ Caution When Viewing Data

COVID-19 wastewater surveillance is a new field. The science continues to evolve, but there are currently limitations to consider when viewing the data for this project:

- Monitor and observe trends instead of looking at individual data points

- Most data are not yet normalized to account for factors that may affect the amount of virus in samples, such as flow rate and population size

- Cannot compare data across sample sites

- Cannot determine the total number of infected persons in a community or the percent of the population that is infected

- Shedding rate and shedding duration in feces are currently unknown for symptomatic and asymptomatic individuals

- Public health decisions should not be made solely on wastewater data and instead should be used in addition to clinical case data

For More Information:

Visit the [State of Michigan website](#) on COVID-19 wastewater surveillance

Visit the [EGLE website](#) on the MI wastewater pilot project

Visit the [CDC National Wastewater Surveillance System website](#) on wastewater efforts across the country