# Frequently Asked Questions
# New Mexico Wastewater Surveillance System

***Last updated on March 29, 2021***

1. **How does wastewater surveillance help monitor for COVID-19?**

   Wastewater (i.e., sewage) includes water from facility use (e.g., sinks, showers, toilets) that contains human fecal matter. Symptomatic and asymptomatic individuals who are infected with SARS-CoV-2—the virus that causes COVID-19—shed the virus in their feces. Scientists have developed testing technologies that can detect the genetic material from SARS-CoV-2 in wastewater samples. Wastewater measurements of SARS-CoV-2 over time provide New Mexico with information on changes in COVID-19 spread throughout facilities where wastewater samples are collected.

2. **How does wastewater surveillance help us slow the spread of COVID-19 in our communities?**

   Wastewater surveillance helps public health officials detect SARS-CoV-2 earlier than they would using other testing methods, such as nasal swabs. This approach is currently being used worldwide to detect the presence of COVID-19 and to monitor trends within a sewer shed (e.g., a community wastewater treatment plant) or at a targeted site (e.g., a facility/building). When COVID-19 is detected early, the state sends testing resources to areas or facilities where outbreaks are imminent.

3. **Where are samples collected?**

   In December 2020, the New Mexico Environment Department (NMED) launched the New Mexico Wastewater Surveillance System (NMWSS) to monitor wastewater for SARS-CoV-2 in congregate settings, such as prisons or youth shelters. Samples are collected at one or more locations within a facility to capture the COVID-19 status of staff and residents. Depending on the facility, samples are collected at pumping stations, cleanouts, and/or manholes. Participation is voluntary.

4. **How are samples collected?**

   Whenever possible, NMED collects 24-hour composite samples. For these samples, wastewater is collected at regular 15-minute intervals over 24 hours by an automatic sampling device and combined into a single composite for laboratory analysis. At some locations, NMED is not able to collect a composite sample due to security concerns, lack of electrical hookups, or insufficient sewage flow. When this is the case, NMED collects “grab” samples, which represent a single point in time. Grab samples are collected by pumping a single, small volume sample over a short period of time when wastewater flows are expected to contain primarily sewage, such as the early morning. Composite samples provide more reliable estimates of average SARS-CoV-2 levels than grab samples.

5. **How are samples analyzed?**

   NMED ships wastewater samples to a commercial laboratory for analysis of SARS-CoV-2 using a nucleic acid-based polymerase chain reaction (PCR) assay for gene markers that are unique to the virus, which are the N1 and N2 genes. The N1 and N2 gene markers have been identified by the Centers for Disease Control and Prevention (CDC) as suitable targets for identifying SARS-CoV-2. This quantification procedure is similar to the method used to measure the virus in individual clinical tests.

6. **What do the graphs on the dashboard tell us?**

   The line graphs shown on the dashboard present the amount of virus measured in wastewater samples collected at each facility over time. These graphs illustrate the trends of viral load in wastewater at each facility. Results are reported individually as the number of virus copies per liter of wastewater (virus copies/L), where one copy represents one virus particle. An increase in SARS-CoV-2 levels may appear as a "bump" or "spike" on one of the graphs. Substantial increases may indicate that cases are increasing in the facility population. NMED generally looks for order of magnitude (i.e., 10-fold) increases to gauge the significance of the results.

   Note that for many sewage samples, the number of N1 copies tends to exceed the number of N2 copies. For that reason, NMED only presents results for the N1 gene on its dashboard. Results for the N2 gene can be found in the downloadable Excel file.

7. **How do I interpret the scale of the vertical axis in the graphs?**

   The line graphs are plotted on a logarithmic scale (log scale) ranging from 100 copies/L to 10,000,000 or more copies/L. Moving up the graph, each tick mark or line on the vertical axis represents a 10-fold increase. For example, the first tick mark represents 100 copies/L, the second tick mark represents 1,000 copies/L, and the third tick mark represents 10,000 copies/L. Because SARS-CoV-2 levels can range from the hundreds of virus copies/L to the millions of virus copies/L, the log scale is most appropriate for evaluating trends in these types of data.

8. **What does the "current level of concern" shown below each graph tell us?**

   The "current level of concern" gauge provides a qualitative indicator of the SARS-CoV-2 level reported for the most recent wastewater sample. Level of concern is defined as follows:

   - Non-detect to <5,000 copies/L = No/minimal impact.
   - 5,000 copies/L to <10,000 copies/L = Low.
   - 10,000 copies/L to <100,000 copies/L = Moderate.
   - 100,000 copies/L to <1,000,000 copies/L = High.
   - 1,000,000 copies/L or more = Very high.

9. **What does the "current trend" shown below each graph tell us?**

   The "current trend" gauge is based on the three most recently collected wastewater samples. Increasing and decreasing trends are flagged when there is an order of magnitude (i.e., 10-fold) change in measurements over those three samples. For example, if wastewater levels were reported at 4,000 copies/L, 13,000 copies/L, and 60,000 copies/L, the trend would be defined as "increasing." Conversely, if wastewater levels were reported at 13,000 copies/L, 60,000 copies/L, and 25,000 copies/L, this field would say "no trend."

   Substantial increases in wastewater measurements may indicate that cases are increasing in the facility population. Order of magnitude increases, rather than smaller increases, are likely indicative of changes. Decreases in the number of viral gene copies in wastewater typically lag behind decreases in cases in a facility; this is because infected individuals can continue to shed the virus in feces for 20 to 30 days after they are no longer infected.

10. **Can I compare the results from one facility to another?**

    NMED does not recommend comparing the number of virus copies/L across facilities. The flow of wastewater and characteristics that may influence virus levels in wastewater are not the same across facilities. It is better to use data from a single location to see trends over time.

**11. How often is the data dashboard updated?**

Samples are collected by local engineering firms twice weekly. NMED updates the data dashboard on an ongoing basis as new results are received from the laboratory. Data are typically posted to the dashboard within three to four days of when the wastewater samples are collected.

**12. How are the data collected through the NMWSS being used?**

Wastewater data are used to help detect and track the spread of COVID-19 in congregate settings, as well as to inform public health decisions to limit the spread of COVID-19. If SARS-CoV-2 is detected in wastewater, the NMWSS team works with the facility to evaluate trends in wastewater results and existing testing of individuals at the facility to determine appropriate public health interventions. For example, if SARS-CoV-2 had not been previously detected and a substantial rise in virus levels is observed, additional individual testing may be initiated to quickly identify individuals with COVID-19. In other circumstances, the results can lead to a review of existing COVID-19 safety practices to ensure that staff and clients are being protected to the greatest extent possible.

**13. What are some of the important limitations of SARS-CoV-2 wastewater monitoring?**

Wastewater surveillance for SARS-CoV-2 is a developing field, and as such, there are several knowledge gaps that limit data interpretation. Although greater levels of SARS-CoV-2 in wastewater suggest more infections, researchers are still investigating the extent to which individuals shed the virus over the course of their infection and the extent to which the virus deteriorates in wastewater with time, temperature, and other factors. More data on SARS-CoV-2 in the feces of infected individuals are needed to understand the relationship between SARS-CoV-2 measurements in wastewater and the number of infected individuals in a facility. Other site-specific factors that challenge data interpretation include the timing of grab sample collection (e.g., morning vs. afternoon), variability in sewage flow and fecal load, and mobility of the population contributing to the wastewater.

Given these limitations, it is currently more appropriate to monitor and observe the trends of viral gene copies detected in wastewater over time than to use those data to predict the exact number of infected individuals in a facility. SARS-CoV-2 measurements should always be considered along with other COVID-19-related data to inform public health.

**14. How are staff and residents' privacy respected?**

Because wastewater surveillance does not involve collecting any personally identifiable samples or data, staff and resident privacy at participating facilities is protected.

**15. Where can I go to learn more about national wastewater surveillance efforts?**

For more information on this public health tool, read about the CDC's National Wastewater Surveillance System here.

**16. Who do I contact if I have more questions?**

Contact NMED Director of Strategic Initiatives Justin Garoutte, MPH, at Justin.Garoutte2@state.nm.us with any questions you may have.