

Shasta County Wastewater Surveillance Monthly Report

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Welcome to the Shasta County Wastewater Surveillance Monthly Report, a pioneering initiative aimed at safeguarding public health through proactive pathogen detection. Commencing on June 15, 2023, our comprehensive surveillance program has been diligently monitoring the Clear Creek utility for the presence of various infectious agents. This crucial endeavor underscores our unwavering commitment to early identification and effective management of potential health risks within our community.

One of the compelling motivations behind instituting wastewater surveillance in our rural area is the absence of robust existing systems for routine monitoring of infectious diseases that can significantly impact vulnerable populations. Diseases such as influenza in the elderly and RSV in very young children, along with emerging threats, can potentially lead to dire consequences. Through wastewater surveillance, we seek to complement our public health and medical response mechanisms: by enhancing our routine system of alerting the medical community, we empower them to request testing and treatment appropriately, while also facilitating measures to safeguard themselves against occupational risks and practice effective infection control, especially in congregate settings.

A pertinent case in point is the recent emergence of Monkeypox. Through proactive alert systems, California has been able to curtail the spread of this disease by promptly notifying those at risk, identifying cases, providing timely treatment, and instigating preventative measures. These measures encompass individual education, isolation protocols, and targeted vaccination strategies. Wastewater surveillance has proven invaluable, offering insights that enable us to predict trends far earlier than traditional human surveillance methods.

Our vigilant surveillance targets in Shasta County have a spectrum of pathogens, including Norovirus, Influenza A, Influenza B, RSV, SarsCoV-2, hMPV, and even the emerging concern of Monkeypox. The historical significance of wastewater monitoring in public health is evident, with its past contributions to the surveillance and containment of poliovirus serving as a testament to its importance.

Wastewater surveillance has once again taken center stage, this time in the context of an array of infectious agents. While this approach provides valuable insights into the prevalence of these pathogens, it is essential to acknowledge that it alone cannot offer a comprehensive picture of the total number of infected individuals within our community.

It is important to note that this wastewater surveillance initiative excludes homes relying on septic-based systems. Nonetheless, this report symbolizes a significant leap forward in our ongoing commitment to proactive public health management. It reinforces our collective responsibility to ensure the well-being of every Shasta County resident.

Material and Methods: Three composited samples were collected from Clear Creek Wastewater Utility per week (MWT schedule) and then shipped to Verily Lab for testing and analysis.

Results: Norovirus illness is sometimes called "food poisoning" or the "stomach flu", but it is not related to influenza (flu) viruses. Norovirus spreads very easily from person to person and can survive for weeks on surfaces and objects. It can spread quickly in closed and crowded spaces, such as hospitals, schools, camps, and cruise ships. Norovirus can also contaminate food, especially if the food is washed or grown in contaminated water, or if it is prepared by someone who is infected with Norovirus. Some people may get severely dehydrated, especially young children, the elderly, and people with other illnesses. Each year, norovirus causes 56,000 to 71,000 hospitalizations and 570 to 800 deaths, mostly in young children and the elderly.

Norovirus is an enteric virus that is currently present in Shasta County. Its presence had a peak on June 15th and since then has been plateauing. We continue to monitor the presence of Norovirus in Shasta County to promote early identification and effective management of potential health risks within our community.

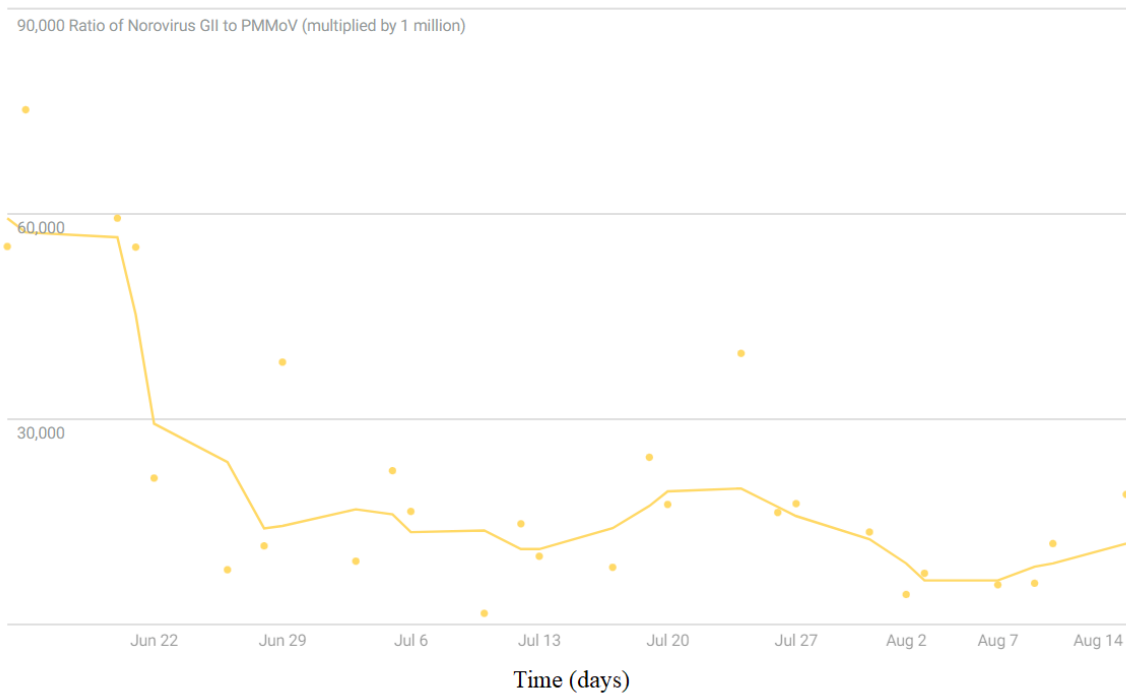


Figure 1. The ratio of Norovirus GII to Pepper Mild Mottle Virus (PMMoV) Normalized from June 15th to August 14th showing a peak on June 15th and plateauing afterward.

COVID-19 (coronavirus disease 2019) is a disease caused by a virus named SARS-CoV-2. It can be very contagious and spreads quickly. Over one million people have died from COVID-19 in the United States. COVID-19 most often causes respiratory symptoms that can feel much like a cold, the flu, or pneumonia. Some people including those with minor or no symptoms will develop Post-COVID Conditions – also called “Long COVID.” Some people are more likely than others to get very sick if they get COVID-19. This includes people who are older, are immunocompromised, have certain disabilities, or have underlying health conditions.

There are four types of influenza viruses: A, B, C, and D. Influenza A and B viruses cause seasonal epidemics of disease in people (known as flu season) almost every winter in the United States. Influenza A viruses are the only influenza viruses known to cause flu pandemics (i.e., global epidemics of flu disease).

Respiratory syncytial (sin-SISH-uhl) virus, or RSV, is a common respiratory virus that usually causes mild, cold-like symptoms. Most people recover in a week or two, but RSV can be serious. Infants and older adults are more likely to develop severe RSV and need hospitalization.

Human metapneumovirus (hMPV) can cause upper and lower respiratory disease in people of all ages, especially among young children, older adults, and people with weakened immune systems.

In all the samples tested, we have seen the presence of SARS-CoV-2, which has increased since August 9th. On August 14th we noticed for the first time the presence of hMPV and Influenza A, while in lower numbers than SARS-CoV-2. hMPV was also observed on June 15th.

Precisely identifying the spectrum of respiratory viruses circulating within our community provides a granular understanding of at-risk populations for each disease. In the case of Influenza, A and B, the elderly and individuals with underlying health conditions are particularly susceptible to severe complications. RSV, on the other hand, poses a heightened risk to very young children and the elderly, while SarsCoV-2, responsible for COVID-19, has demonstrated a propensity to impact individuals of all ages, with a greater severity observed in older adults and those with pre-existing health concerns. Additionally, hMPV can lead to severe illness, primarily affecting the very young and the elderly. Armed with this intricate knowledge, our response strategies can be tailored to prioritize preventive measures, healthcare access, and targeted outreach, ensuring the safeguarding of these vulnerable populations against the diverse array of respiratory viruses.

2,850 Ratio of virus to PMMoV (multiplied by 1 million)

Aug 14, 2023

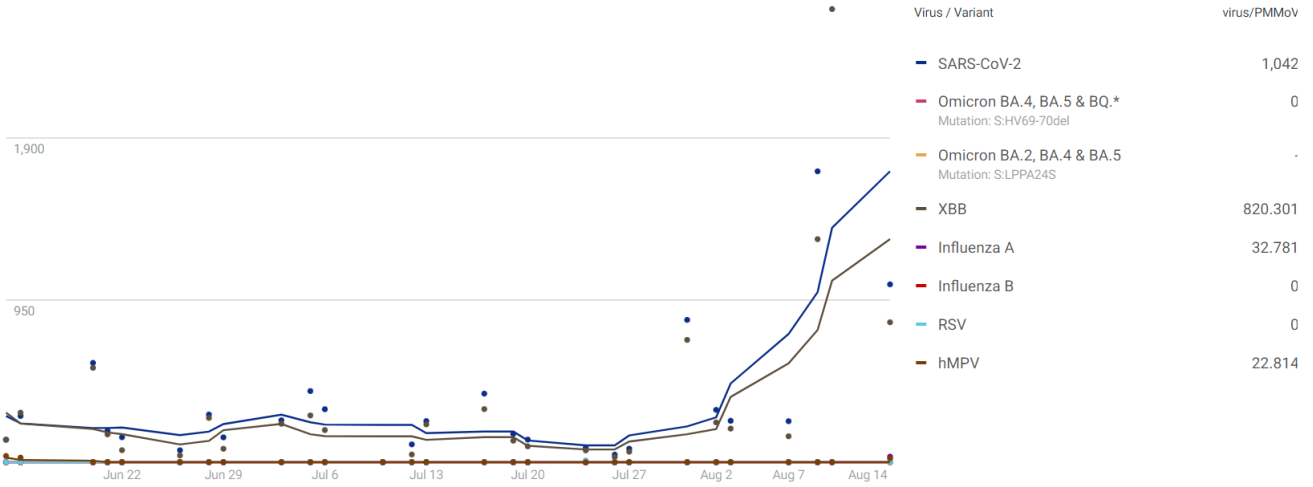


Figure 2. The ratio of respiratory viruses to Pepper Mild Mottle Virus (PMMoV) multiplied by one million from June 15th to August 14 2023 from composite samples collected at Clear Creek wastewater utility. Showing an increase of SARS-CoV-2 starting on August 9th, followed by the appearance of Influenza A and hMPV on August 14th.