Co-Immunity Project & Wastewater-Based Epidemiology

The COVID-19 pandemic is an emerging, rapidly evolving situation and these facts utilize peer-reviewed articles in an attempt answer health-related questions about SARS-CoV-2 and water.

Co-Immunity Project

Co-Immunity is a research project led by the Christina Lee Brown Envirome Institute at the University of Louisville and several partners. The goal of the Co-Immunity Project is to identify and monitor the spread of COVID-19 in Louisville Metro-Jefferson County and to identify the risk factors that predispose susceptible individuals and vulnerable communities to the virus and its acute and long-term health consequences.

Wastewater-based epidemiology (WBE)

Due to limited individual testing, especially of people who may be asymptomatic, we need an alternative and cost-effective approach to track prevalence of COVID-19 that provides early warnings of outbreaks in specific locations. Wastewater-based epidemiology (WBE) has the potential to be such an effective and economical strategy, proving its success through years of tracking polio and stomach and gastrointestinal virus outbreaks across the world.

People infected with SARS-CoV-2 shed the virus in their stool, even when they are asymptomatic. There are four major benefits of using wastewater-based epidemiology (WBE) to track SARS-CoV-2 in wastewater. First, analyzing wastewater for the virus may allow us to **forecast a community's level of infection** up to a week before clinical diagnostic tests, such as nose-swabs. Wastewater testing may also help us understand how the COVID-19 spreads, as repeated sampling over time has the potential to **identify new outbreaks**. Early signals in wastewater can potentially **prompt actions to reduce transmission.** Finally, As the COVID-19 pandemic wanes, it is likely communities will see increased incidence of small, localized, outbreaks. In these instances, WBE could be used as a **pre-screening tool to better target clinical testing** in communities with limited resources.

The Safety of our waterways

As with many other older cities, Louisville's stormwater and wastewater are often routed through the same network of pipes. Therefore, during heavy rain, sewage and stormwater can mix and then be discharged into local waterways. **Waterborne transmission of SARS-CoV-2 has never been demonstrated in humans.**

At present (September 2020), a significant knowledge gaps exist on the potential role of wastewater and water in the transmission of SARS-CoV-2. Survival of SARS-CoV-2 in environmental media, including wastewater and creek, river, and lake water, remains mostly unknown. However, some knowledge has been established. **Based on the type of virus,**

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coronaviruses are generally considered unstable in the environment and are susceptible to UV and oxidants such as chlorine and bleach.

There is no evidence of COVID-19 transmission through wastewater. SARS-CoV-1, a virus similar to the one that causes COVID-19 in humans, is sensitive to both chlorination and UV disinfection. Therefore, researchers predict that SARS-CoV-2 will also be inactivated through the conventional treatment of wastewater. Low virus concentration is expected in water from sinks, washing machines, showers, etc. (greywater) because it often contains detergents, soaps, and other disinfectants which inactivate the SARS-CoV-2 virus.

There is no evidence of COVID-19 transmission through surface water in rivers, creeks, and lakes. There are only two instances of direct detection of SARS-CoVs in aquatic environments. Two studies found SARS-CoV-2 RNA in rivers but did not find the infective virus. We do know that other pathogens such as e-coli are commonly found in rivers, lakes, and streams. Using sensible precautions, such as handwashing after water recreation, our Louisville community can continue to enjoy our abundant and treasured waterways.

References & Suggested Reading

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