MEMORANDUM

Date: October 19, 2020

To: The Honorable Chairman and Members
Pima County Board of Supervisors

From: C.H. Huckelberry
County Administrator

Re: COVID-19 Surveillance through Wastewater

I have attached a September 18, 2020 memorandum from Regional Wastewater Reclamation Department (RWRD) Director Jackson Jenkins regarding the processes of wastewater based epidemiology associated with COVID-19. The next logical question is whether wastewater utility workers could be exposed to COVID-19 through wastewater based epidemiology and necessary sampling or in wastewater processing itself. The answer is – there have been no exposures confirmed worldwide COVID-19 infections related to wastewater processing or exposure to wastewater.

The Frequently Asked Questions (FAQs) sheet attached to Mr. Jenkins’ memorandum provides further explanation on this subject.

There have been 130 employees in Pima County’s workforce who have contracted COVID-19 to date. Of those, only 10 are among RWRD employees. We understand these employees contracted COVID-19 through the typical pathway infection path or close contact with an infected individual.

CHH/anc

Attachment

c: Carmine DeBonis, Jr., Deputy County Administrator for Public Works
Francisco García, MD, MPH, Deputy County Administrator & Chief Medical Officer, Health and Community Services
Yves Khawam, PhD, Assistant County Administrator for Public Works
Terry Cullen, MD, MS, Public Health Director, Pima County Health Department
Jackson Jenkins, Director, Regional Wastewater Reclamation
TO: C.H. Huckelberry, County Administrator

FROM: Jackson Jenkins, Director – RWRD

SUBJECT: RWRD COVID-19

Attached please find an update of the COVID-19 Surveillance activity currently in progress with this department and the University of Arizona (WEST) along with a list of Frequently Asked Questions.

If you have any questions, please do not hesitate to let me know.

Attachments

c: Jan Lesher, Chief Deputy County Administrator
   Dr. Francisco Garcia, Deputy County Administrator – Community & Economic Development
   Carmine DeBonis, Jr., Deputy County Administrator – Public Works
   Yves Khawam, PhD, Assistant County Administrator – Public Works
   Jeff Prevatt, PhD, Deputy Director – Treatment
RWRD and UAriZona Fight Back Against COVID-19

1. Wastewater Based Epidemiology

By now you have undoubtedly read how COVID-19 can be detected in sewage, but were you aware that UAriZona researches and RWRD have been doing this for well over a year now? It's true, and three of the world’s leading Coronavirus experts are located at our very own Water Campus West Center. Using a technique called quantitative polymerase chain reaction (qPCR), researches have been collecting Agua Nueva influent twice a week looking for viral RNA and DNA markers in wastewater. Viral diseases like polio have been making a comeback in many developing countries and through the analysis of sewage it is possible to detect the presence of polio virus a full week before signs of community infection. This developing technique is highlighting sewer surveillance wastewater based epidemiology (WBE) as a viable means for early detection of community diseases.

COVID-19 infections colonize nasal passages, respiratory tract, and intestinal tracts and it's this intestinal infection that allows for detection in wastewater and infected individuals tend to shed viral particles up to four weeks even after subsidence of symptoms. This is good news for researchers as it enables for the detection of viral particles from asymptomatic carriers as well as sick people. To date, all illnesses have been traceable to the respiratory shedding of virus particles only which is why frequent cleaning of frequently touched surfaces, washing of hands and wearing face masks are effective for preventing exposure. While COVID-19 genetic markers are identifiable in sewage, there have been no infections reported from fecal/oral contraction anywhere worldwide. WBE can be an effective tool for screening populations and therefore reduce the number of individual COVID-19 screening tests for greater savings.

2. Wastewater Utility Worker Exposure

Another project underway is the evaluation of utility worker safety by evaluating exposure to aerosolized viruses generated during wastewater treatment and sewer maintenance activities. Coronavirus are easily killed by disinfection and typically reduced by more than 95% after primary wastewater treatment but little information is known regarding exposure to aerosolized particles. To address employee exposure and risk assessment, air samples are being collected from wastewater processes with the greatest potential for aerosol creation. Sample locations evaluated for potential employee exposure include Tres Rios headworks, primary skimmers, and oxidation ditches.

A team of researchers also accompany Conveyance crews collecting air samples during routine sewer maintenance activities for evaluating employee exposure to bioaerosols generated during rodding, jetting and vector operation. This important research will help ensure that appropriate protective equipment is provided to ensure the safety for utility workers worldwide.

This study seeks to assess the overall prevalence of viral laden bioaerosols generated during both wastewater treatment and sewer maintenance operations and evaluate subsequent exposure risks for wastewater utility workers performing these tasks. Equipment consists of high volume air samplers for the collection of bioaerosol dispersion of viruses and low volume air samplers for simulating actual utility worker inhalation of viral particles.

For conveyance utility worker assessments, the high volume air sampling device is staged in the vicinity of an open manhole where routine sewer maintenance activities are performed. Maintenance activities
are scheduled and include rodding, jetting and vectoring functions known to generate bioaerosols. Utility workers are fitted with a low volume air sampler and sample collection times will correspond to the tasks performed.

For wastewater treatment operators, a real time particle analyzer identifies process areas most likely to generate bioaerosols ranging from headworks, course screen and fine screen areas, grit washing, primary sedimentation, scum removal, and biological aeration processes. High volume air samplers and low volume air samplers are used corresponding to established collection intervals to simulate operator rounds and maintenance activities.

High volume air samplers allows for extrapolation of time weighted environmental exposure while low volume air samplers evaluate actual utility worker exposure while performing job duties. Four distinct scenarios are being evaluated;

1) **Bioaerosol Viral Exposure** – 100 lpm sample collection for evaluating total viral exposure resulting from bioaerosols generated during the treatment of wastewater and cleaning of sewer conveyances.

2) **PPE Attenuation Against Viral Exposure** – 100 lpm sample collection repeated using an N95 prefilter for evaluating total viral exposure attenuation provided by standard N95 PPE.

3) **Utility Worker Exposure Risk** – 2-4 lpm sample collection affixed to a worker, or staged within the approximate work area, for evaluating worker inhalation risk.

4) **PPE Attenuation of Utility Worker Exposure Risk** – 2-4 lpm sample collection using an N95 prefilter for evaluating total viral attenuation provided by standard N95 PPE.

3. **University of Arizona Return to Campus**

Shifting focus to maintaining a healthy return to campus, WBE implementation has played an essential role. WEST Center faculty collect and analyze wastewater collected from ten University of Arizona campus locations (with emphasis on dorms) several times per week begin with the fall academic year. WBE helps identify possible hot spots of concern, and any positive results will be used by Residence Life and Campus Health to quickly intervene to slow and stop the spread of COVID-19 infections on campus. Additional sampling locations will be added in the near future.
1. Is it true that COVID-19 has been detected in sewage?
Yes, sewers typically mirror the activities of a community so, if it is present within our community, COVID-19 it will be detected in our sewers.

It should be pointed out, the presence of COVID-19 in the sewer is no indication of infectivity, it is merely the confirmation of presence of genetic material. Because PCR is the technique used to identify COVID-19 RNA signature, there is no way to distinguish whether it is infectious.

2. Can the COVID-19 virus spread through sewerage systems?
It’s extremely unlikely. COVID-19 infection is primarily respiratory in nature and the genetic material detected in untreated wastewater is the result of co-infection within the gastrointestinal tract that tends to shed for 2-4 weeks after symptoms.

Both the CDC and WHO have indicated “There is no evidence to date that COVID-19 virus has been transmitted via sewerage systems, with or without wastewater treatment.”

3. Can wastewater employees be infected by the COVID-19 present in wastewater?
Also extremely unlikely. Wastewater employees are accustomed to adhering to industry practices required for hygiene and PPE for protection against biological pathogens.

The CDC, Water Research Foundation and WateReuse Association have further stated that “No additional COVID-19-specific protections are recommended for workers involved in wastewater management, including those at wastewater treatment facilities.

4. Does wastewater treatment kill COVID-19?
Yes, wastewater treatment plants treat viruses and other pathogens every day. In fact, COVID-19 is an enveloped virus and is extremely susceptible to the disinfection processes used at all RWRD treatment facilities.

5. What has Pima County RWRD done to monitor COVID-19 in the sewers?
Pima County RWRD along with the UAri zona WEST Center have initiated sewerage surveillance to help track the spread of COVID-19. Because many people are asymptomatic, sewer surveillance may help serve as an indicator of the true prevalence of the COVID-19 virus in our community.

6. What is Pima County RWRD doing to protect sewer workers from COVID-19?
Pima County RWRD along with the UArizona WEST Center and College of Health have initiated an additional study to evaluate sewer utility worker exposure to COVID-19 bioaerosols created during the wastewater treatment and sewer maintenance.

Because COVID-19 is primarily respiratory in nature, this study will help determine utility worker exposure and the risks associated with COVID-19 present in bioaerosols. This is an important step towards the protection of utility workers worldwide.