

Strengthening Local Capacity for Wastewater Surveillance

How a Mentorship Program Supported Local Health Departments Responding to COVID-19



Background

Wastewater surveillance is an innovative, non-invasive, and cost-efficient approach to monitor community-level infections and disease trends. Prior to the pandemic, wastewater surveillance was already being utilized to help communities track diseases and health indicators, for example, opioid use and polio. With the onset of the coronavirus disease (COVID-19) pandemic, there has been an increased interest in this surveillance tool and its potential to transform the landscape of localized health data collection.

Access to accurate and timely data remains a key element of COVID-19 response efforts. Wastewater surveillance of SARS-CoV-2 (the causative agent of COVID-19) offers unique benefits as an early warning system, as it can detect changes in infections rates up to 4 to 6 days before they are visible in clinical cases. As many infected individuals may choose to get clinically tested only if they are symptomatic and have access to testing, wastewater surveillance has the potential to produce a holistic and accurate picture of community-level infections. Wastewater surveillance bridges the gaps in data collection resulting from asymptomatic infections, independent health-seeking behavior, and testing access, and provides local leaders with the information necessary to implement protective measures and prevent further spread of infections.

Wastewater surveillance of COVID-19 offers unique benefits as an early warning system, as it can detect changes in infections rates up to 4 to 6 days before they are visible in clinical cases.

As wastewater surveillance becomes a more relevant and efficient monitoring method for health departments across the U.S., additional scientific research and the development of tools, best practices, and resources are needed to support its effective implementation at the local level.



Wastewater Surveillance Mentorship Pilot Program

The National Association of County and City Health Officials (NACCHO) is dedicated to ensuring local health departments (LHDs) are equipped to meet rising public health challenges with technologies such as wastewater surveillance.

In response to the increased interest and subsequent need around this technology, NACCHO, supported by funding from the Centers for Disease Control and Prevention (CDC), launched a pilot mentorship program to support LHDs in building wastewater surveillance capacity for SARS-CoV-2. A local jurisdiction with experience utilizing wastewater surveillance to track diseases was matched with LHDs newly developing wastewater surveillance programs, looking for guidance, tools, and resources, and seeking recommendations to meet their community's needs.

The program:

- » Established a growing network of states, cities, and counties across the United States who are experienced in the implementation of wastewater surveillance to prevent the spread of SARS-CoV-2;
- » Improved NACCHO's and CDC's understanding of the technical assistance needs with building wastewater surveillance capacity during the COVID-19 pandemic;
- » Identified strategies to improve implementation of wastewater surveillance for SARS-CoV-2;
- » Identified resource needs in implementing a wastewater surveillance program;
- » Provided an avenue for LHDs interested in developing or expanding their wastewater surveillance program to share resources, experiences, and lessons; and
- » Strengthened relationships between LHDs and subject matter experts from the CDC.

Participants

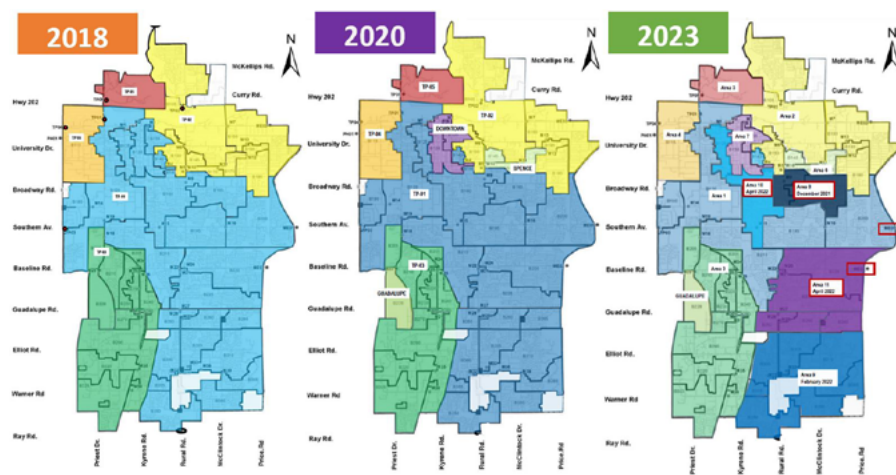
City of Tempe, AZ (Mentor)

tempe.gov/home

As the eighth largest city in Arizona with local public health services falling under the City of Tempe, this City's wastewater surveillance program was uniquely positioned to be a mentor in NACCHO's mentorship program.

At the time of the pilot program's launch, Tempe had been conducting wastewater surveillance for four years. In 2018, they established a wastewater surveillance program

to monitor opioids to better allocate needed resources to each zone. Following the beginning of the COVID-19 pandemic, Tempe pivoted to track the virus through wastewater surveillance. Unlike some jurisdictions, Tempe does not have its own public health department, but leverages city services, like Tempe's Fire Medical Rescue, and strong partnerships, such as with neighboring Maricopa County, the state epidemiologist, and Arizona State University, to meet the city's public health needs. Tempe leveraged its good working relationship with the local government, community, and Arizona State University to establish their wastewater surveillance system and adapt it when faced with new public health challenges. This experience made Tempe well-suited to be a mentor in this program.



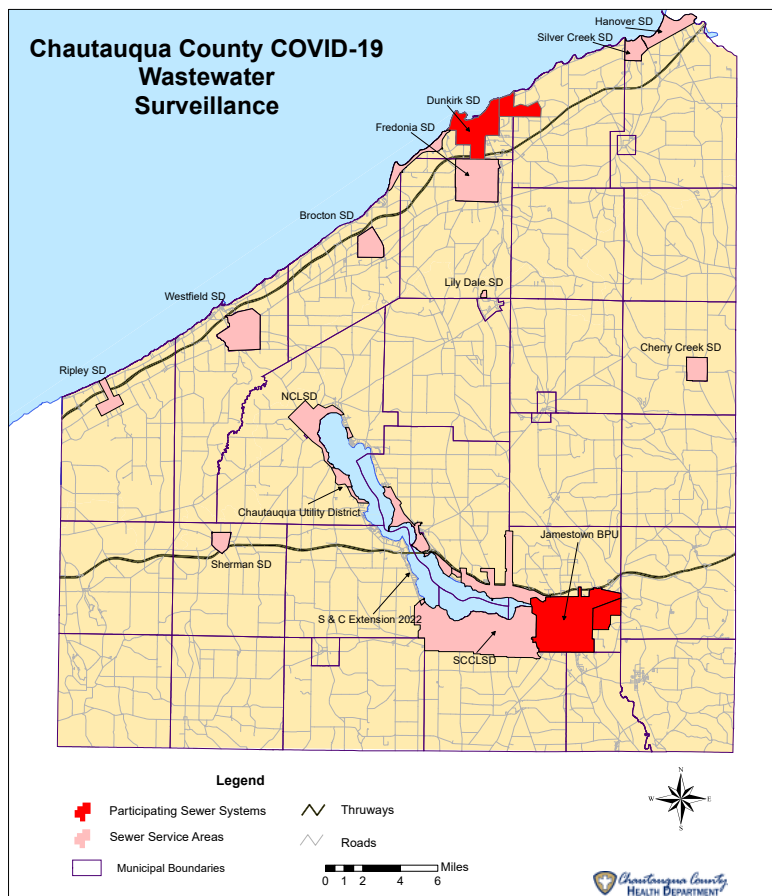
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Chautauqua County Department of Health and Human Services, NY (Mentee)

chqgov.com

Situated on Lake Erie, Chautauqua County encompasses two cities, 27 towns, and 15 villages in southwestern New York. The Chautauqua County Department of Health and Human Services utilizes its good relationships with local governments in the cities of Dunkirk and Jamestown to facilitate the distribution of public health resources and implement successful community initiatives. Chautauqua County participated in the pilot mentorship program as a mentee.

At the beginning of the program, Chautauqua did not have a wastewater surveillance system established, but wanted to utilize this technology as a tool in their community to monitor the status and spread of COVID-19. To achieve this, Chautauqua sought to develop a COVID-19 pilot program at a single facility, with the intent that the pilot could then be extended to other wastewater collection sites and include sampling for other diseases.



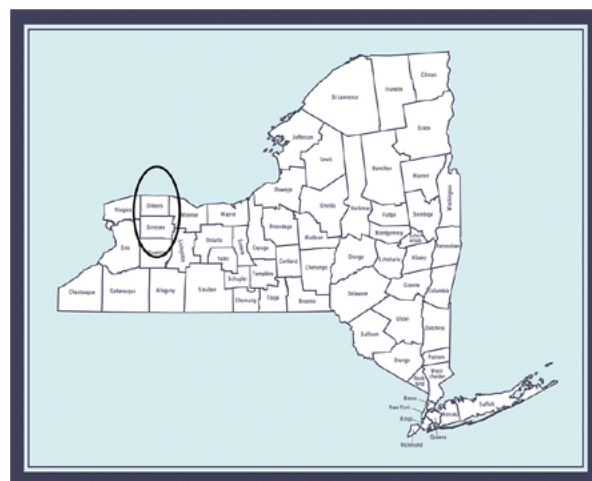
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Genesee & Orleans County Health Departments, NY (Mentee)

gohealthny.org

Both located in the western part of New York between Buffalo and Rochester, Orleans County borders Lake Ontario and Genesee County is directly south of it. Genesee & Orleans County Health Departments have a unique relationship. In 2012, the counties established a cross-jurisdictional partnership, in which health department staff can flow between both counties. This system saved over a million dollars for both tax county bases and allowed the health departments to coordinate staff in response to the COVID-19 pandemic.

Like Chautauqua, Genesee & Orleans did not have an established wastewater surveillance system when starting the program. They saw wastewater surveillance as an integral part in their COVID-19 response as the disease transitions to becoming endemic. Notably, Genesee & Orleans had the goal of setting up their own digital PCR lab during the mentorship program.



[Click here to download this image](#)

What occurred during the program?

Over the course of the program, the mentees, along with the mentor, the CDC, and NACCHO, participated in several technical assistance (TA) activities to improve their wastewater surveillance programs. Monthly TA calls, presentations from subject matter experts, site visits, and national presentations all supported mentees to develop, troubleshoot, and promote their work.

Additionally, NACCHO included funding for each mentor/mentee to send one representative from each site to the Public Health and Water Conference & Wastewater Disease Surveillance Summit and funding for one representative to attend NACCHO's Preparedness Summit or the NEHA Annual Educational Conference.

What were the results?

Chautauqua established strong relationships with wastewater facilities, local government, and the University of Buffalo for laboratory purposes. By the end of the program, Chautauqua had been conducting weekly sampling for five months and had developed a GIS dashboard to communicate their findings to the public and local healthcare. As they had envisioned when starting this program, Chautauqua's pilot has positioned them to expand wastewater surveillance. Chautauqua continues to sample once weekly, and is exploring more frequent sampling, expanding to other pathogens, and already receiving interest from other local governments to expand their testing area.

Like Chautauqua, by the end of the mentorship program, Genesee & Orleans had fully implemented their wastewater surveillance program. They developed their own digital PCR lab and a website describing the process of wastewater analysis and important data collected at the wastewater treatment facilities, including weekly trend lines for each specific testing site. Genesee & Orleans also sends their data to the New York state dashboard for wastewater surveillance. Through their new wastewater surveillance program, Genesee & Orleans hope to employ the data they collect to drive diagnostic testing and ensure resources are properly allocated. Additionally, they hope to increase frequency of wastewater sampling to two days a week for COVID-19 and begin monitoring new pathogens, such as influenza, monkeypox, RSV, and polio.



Findings

Both mentees and the mentor reported that participation in the mentorship program increased their capacity to implement or strengthen wastewater surveillance in their jurisdiction. Over the course of the program period, both mentees reported an increase in experience in wastewater sampling, laboratory testing and analysis, and communicating findings with the public.

Both saw value in their experience with wastewater surveillance, electing to continue this work and indicating that they felt wastewater-based epidemiology should be a permanent program in their health department.



Considerations for LHDs Looking to Invest in Wastewater Surveillance

- **Understand your locality:** Do research on what a surveillance system would require for your jurisdiction. What challenges do you anticipate facing? What resources do you have at your disposal?
- **Identify key stakeholders:** Establishing a wastewater surveillance system requires collaboration. It is critical to establish partners such as wastewater facilities, local municipalities, and other state and federal organizations. In addition to these partners, identify stakeholders who will facilitate building trust and increasing utility of data. For one participant, their relationship with the local mayor helped encourage support from the public.
- **Create a communications strategy:** Communications about wastewater surveillance should begin before the project starts. Early, frequent, and open communication helps develop understanding of the methods and importance of this surveillance strategy. Having preset lines of communications with the public, state, healthcare providers, and local officials will help the program run efficiently and garner support. Determine communication methods that are appropriate to your community. For example, one participant used town halls to communicate with the public when setting up their program.
- **Keep organized records:** Your wastewater surveillance program will be an iterative process. Document processes early and keep a timeline of implementation to keep track of progress and be prepared to adjust your approach as needed.



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Be very upfront and open with the public and local government. Micro dose them with information frequently instead of dumping knowledge on them all at once after the project has already started. We feel that if the public and local government can be brought on board to a project like this in advance to its start date that it may not face as much criticism during the early stage of implementation.

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- Chautauqua DHHS (Mentee)



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Be prepared to iterate; document processes early; keep high-level history/ timeline of implementation; prepare to learn and adjust; include non-jurisdiction stakeholders.

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- City of Tempe (Mentor)



Helpful Resources

As implementation of wastewater surveillance continues to expand, this easy-to-read infographic can help local health departments understand the workings and how to get involved with implementing this system.

bit.ly/WastewaterSurveillanceInfographic

The mentors and mentees in this report shared their experiences and lessons learned during a NACCHO webinar held in 2022. Catch up with the webinar recording at bit.ly/3KhYjLG and slides at naccho.org/uploads/downloadable-resources/Wastewater_Surveillance_Systems_Webinar.pdf.

For more resources on wastewater surveillance and to submit applications for the next mentorship cohort, please bookmark naccho.org/wash to receive updates.

Acknowledgments

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For questions or comments, contact:

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The mission of the National Association of County and City Health Officials (NACCHO) is to improve the health of communities by strengthening and advocating for local health departments.

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