

Wastewater Data to Action: A Framework for Informing Local Public Health



TEXAS
Health and Human
Services

Texas Department of State
Health Services

Victoria Salinas, MPH, CPH¹; Layla Lustri, MPH¹; Audrey Robertson, MSPH¹; Laura Langan, PhD²; Bryan Brooks, PhD³; Heidi Bojes, PhD¹

Texas Department of State Health Services, Environmental Epidemiology & Disease Registries Section, Wastewater Epidemiology & Surveillance Program

dshs.texas.gov

Background

Local public health departments have a critical role in protecting and promoting the health of their communities. The adoption of wastewater-based epidemiology (WBE) offers local public health departments a non-invasive, anonymous approach to monitoring pathogen trends. However, comprehensive and structured guidance to interpret WBE data is not readily available for pathogens beyond SARS-CoV-2, limiting the utility of WBE data for public health insight and action at the local level.

Purpose

To provide local health departments a structured approach to translating wastewater-based epidemiology data for public health insight and action.

Target Pathogens

- Influenza viruses [A, A(H5N1), B]
- Measles virus [Wildtype D8]
- Monkeypox virus [NVO, Clade II]
- Norovirus [GI, GII]
- RSV [A, B]
- SARS-CoV-2 [N1/N2, Omicron]

Interdisciplinary Collaboration

- Ensure the data to action plan is practical and effective by collaborating with:
- Wastewater-based epidemiologists
 - Target pathogen subject matter experts
 - Epidemiologists
 - Physicians
 - Local public health departments

Wastewater Sampling and Analysis Methods

Two **24-hour composite samples** of influent wastewater are collected weekly at each site's headworks (Monday-Tuesday/Tuesday-Wednesday).

Reverse transcription quantitative polymerase chain reaction (**RT-qPCR**) is conducted to detect and quantify molecular targets.

To facilitate comparison across sites, WBE data is normalized using sewershed population and is reported as gene copies per liter per 1,000 population (**gc/L/1,000**).

Next Steps

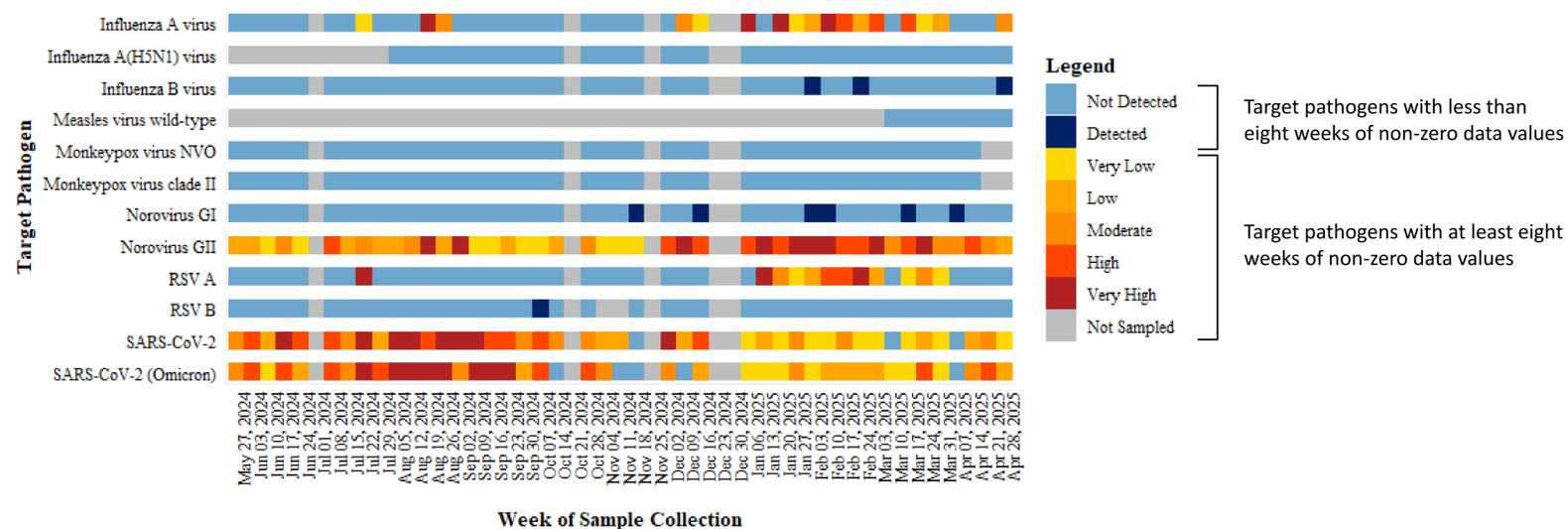
1. Aid participating local health departments in tailoring the wastewater data to action guidance document to their community.
2. Evaluate impact of wastewater data to action guidance document on local public health decision-making.

Data to Action Framework

Baseline Determination

Baselines are evaluated weekly and are calculated as the 10th percentile of non-zero values for target pathogens with at least eight weeks of non-zero data values.

Risk Threshold Assessment



Communication and Response Strategies

Actions to Consider for Seasonal Influenza Viruses

Very Low	Low	Moderate	High	Very High
Prepare a prevention and response plan that includes vaccines and testing.	Continue monitoring public health surveillance systems.	Remind higher risk facilities (e.g., childcare centers, schools, long term care facilities, prisons) of infection control measures.	Community outreach (e.g., K-12 text or email alerts, media outreach, social media outreach, etc.). Host vaccine and testing centers.	Consider a Health Alert to notify healthcare providers.
If suspected cases exist, encourage healthcare providers to coordinate with local health departments on clinical sample submission. Implement a prevention and response plan as applicable based on level of detection.				
As one moves to higher levels of detection, actions at lower levels may be considered or continue to be implemented as appropriate.				

Contact the DSHS influenza team (flutexas@dshs.texas.gov) and your appropriate [Public Health Region](#) for assistance with local public health response efforts.

Actions to Consider for Measles Virus (Wild-Type)

No Recent Detection	Detection	Persistent Detection
Prepare a prevention and response plan that includes vaccines, testing, and public health follow-up. Continue monitoring public health surveillance systems.	Contact the DSHS Vaccine Preventable Disease team (VPDTexas@dshs.texas.gov) and your appropriate Public Health Region for assistance. Community outreach (e.g., K-12 text or email alerts, media outreach, social media outreach, etc.). Offer measles education and vaccines during public health activities. Include measles prevention and postexposure prophylaxis in discussions with healthcare providers. Consider a Health Alert notifying healthcare providers – include a recommendation to consider measles in providers' differential diagnoses.	Host vaccine and testing centers. Expand approval processes to increase testing and case identification. Remind higher risk facilities (e.g., childcare centers, schools, long term care facilities, prisons) of infection control measures. Provide infection control education to healthcare facilities and providers. Consider targeted awareness and vaccination campaigns.
If suspected cases exist, encourage healthcare providers to coordinate with local health departments on clinical sample submission and public health follow-up. Implement a prevention and response plan as applicable based on level of detection.		
As one moves to higher levels of detection, actions at lower levels may be considered or continue to be implemented as appropriate.		

Contact the DSHS Vaccine-Preventable Disease Team (vpdtexas@dshs.texas.gov) and your appropriate [Public Health Region](#) for assistance with local public health response efforts.

Target pathogens that are emerging may be classified as:

- **No recent detection:** Target pathogen was not detected in any samples in the past four weeks.
- **Detection:** Target pathogen was detected in one or two samples in the past four weeks.
- **Persistent detection:** Target pathogen was detected in more than two samples in the past four weeks.