Surveillance of Pathogens in Wastewater

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Wastewater Surveillance and Epidemiology

- Wastewater surveillance
  - Sampling and analysis of wastewater to monitor occurrence of diseases and other substances
  - Adapted globally to track severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in 2020
- DSHS piloted a 2-year wastewater surveillance project from March 2021 to July 2023

- Project Aim: to determine the usefulness of wastewater sampling as a surveillance method and warning system for COVID-19 cases in the selected facilities
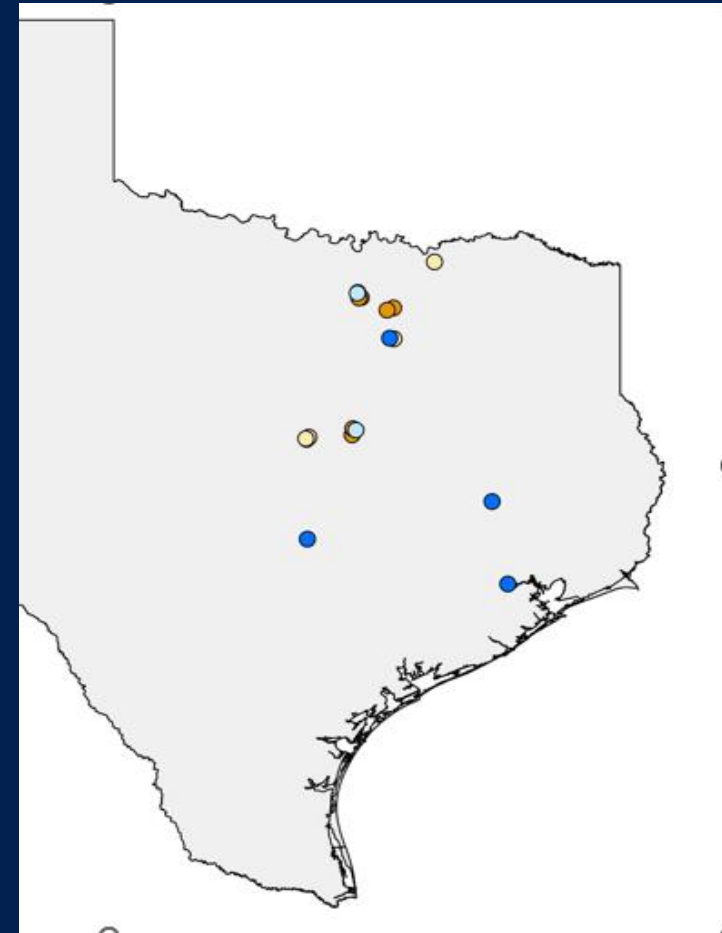

https://www.waco-texas.com/Departments/Water-Utility-Services

Wastewater Surveillance and Epidemiology

- Wastewater surveillance is ideal for SARS-CoV-2:
  - virus excreted in fecal matter in large amounts
  - potentially large proportion of asymptomatic individuals
  - surveillance can provide actionable information to inform public health response

- DSHS pilot project participating facilities:
  - correctional facilities ⚪
  - long-term care facilities 🟠
  - university dorms (3 HBCUs) 🔵
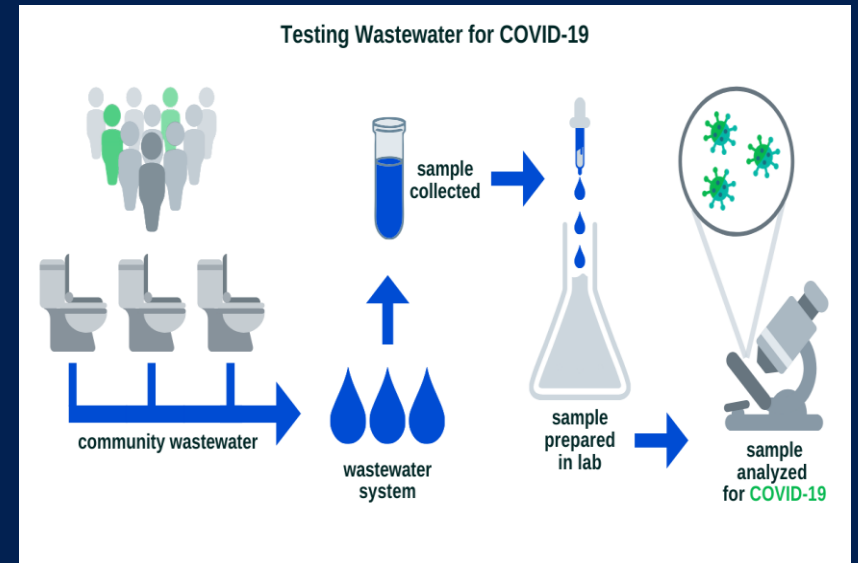 - municipal wastewater treatment facilities 🔵

https://covic.lji.org/about/sars-cov-2-info/

DSHS Wastewater Surveillance Pilot Project

- Weekly wastewater samples collected from participating facilities

- Genetic material of SARS-CoV-2 (and its variants of concern) isolated and quantified

- Results provided to participating facilities weekly to help inform public health actions

- Variants identified by next generation sequencing

Testing Wastewater for COVID-19
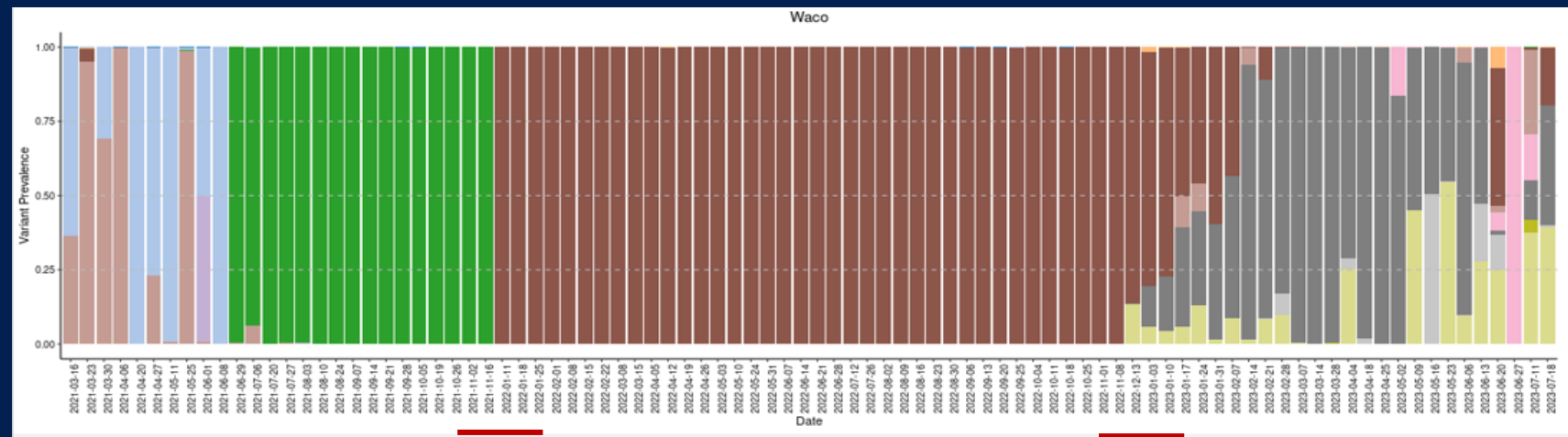
community wastewater → wastewater system → sample collected → sample prepared in lab → sample analyzed for COVID-19

Wastewater Sampling Results

June 2021

Jan 2021

Dec 2022

Conclusion & Limitations

- Correlations between
  - viral concentrations in wastewater and active cases, especially before the omicron variant
  - viral concentrations in wastewater and hospitalization
- Community-level SARS-CoV-2 surveillance can complement existing COVID-19 surveillance efforts
  - An efficient, non-invasive community sample
  - Provides data for communities where timely COVID-19 clinical testing is underused or unavailable
  - Implemented in many communities and at many levels
- Limitations
  - No standard method for sampling, testing, analyzing wastewater
  - Can't reliably estimate COVID prevalence from wastewater levels

TEXAS
Health and Human Services

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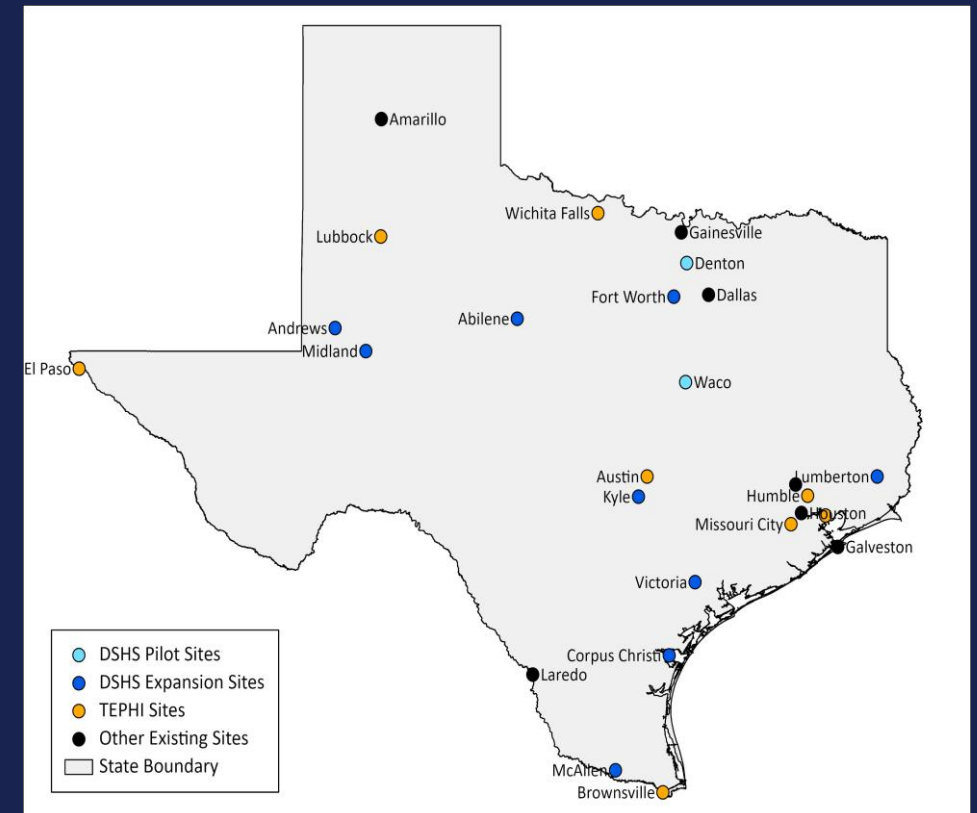Health Services

Project Successes & Next Steps

- **Successes**
  - Detection of the virus in wastewater
  - Public health actions taken following increased viral detections in wastewater
  - Increased partnerships and improved communications
  - Investment in infrastructure and capacity building
- **Next Steps**
  - Expand collection sites
  - Analyze more organism types
    - Mpox, respiratory syncytial virus (RSV), influenza A/B virus, norovirus
  - Include genetic sequencing
  - Implement a network approach

Thank you