Available Data Tools: National Wastewater Surveillance System
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Waterborne Disease Prevention Branch
Division of Foodborne, Waterborne and Environmental Diseases
cdc.gov/coronavirus
NWSS System overview

The National Wastewater Surveillance System (NWSS) is a collaboration between the Centers for Disease Control and Prevention (CDC), the US Department of Health and Human Services (HHS), and agencies throughout the federal government. It involves communities, wastewater treatment plants, and laboratories. Data is submitted to the CDC for analysis and information/data sharing. The website cdc.gov/coronavirus provides more information.

DCIPHER
Participation in NWSS is growing quickly

- Currently, 36 ELC-funded jurisdictions totaling $223M for wastewater surveillance activities
- Additional $34M pending award will increase number of jurisdictions
Data elements

1. Wastewater data – minimum requirement
   - CSV upload
2. Sewershed spatial boundaries
3. Sewershed COVID-19 case data
4. Laboratory protocols
DCIPHER features

- Data Collation and Integration for Public Health Event Response platform
- Unified system for data submission, management, and analysis
  - Merging of multiple data submission flows
  - Integration of disparate data sources: HHS Protect, other DCIPHER surveillance systems
  - Version control
  - Build scheduling
  - Analysis code
  - Dashboards
  - Document repository
  - User access permissions
  - Built-in tools for quality control
  - Collaboration and communication
DCIPHER features: receive and merge multiple data streams
DCIPHER features: exploration and quality control
DCIPHER features: internal dashboard
Analytics: wastewater normalization

- Current approach
  - Flow and population normalization of SARS-CoV-2 RNA concentrations
  - Adjusted by site-specific median RNA recovery

- Standardization (and inter-laboratory comparison) need:
  - Endogenous control
  - Matrix spike recovery control
  - PCR type (RT-qPCR vs RT-dPCR) with common standards
Analytics: overlaying wastewater & cases

- Contextualizes wastewater data
- Date considerations
- Smoothing – data frequency impacts smoothing approach
- Scaling
  - Currently believe shape of curve, not absolute values, is what’s reliable
  - Additive (not just multiplicative) changes matter
Analytics: wastewater trends & alerts

- Trend analysis
  - Sustained trend: 5 measurements
  - Trend: 3 measurements
  - Linear regression
  - Log transform
  - Inverse variance weighting
  - Significance level: 0.05

- Alerts analysis
  - Value higher than expected given 5 previous measurements
  - 1-sided prediction interval
Analytics: wastewater spatial representation

- Metric must be comparable across sites: trends
- Sewershed boundaries used if available
- Sampling location zip code used if not
Analytics: under consideration

- Measure of similarity between SARS-CoV-2 wastewater levels and case rates
- Site-specific measure of relative SARS-CoV-2 level
The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.