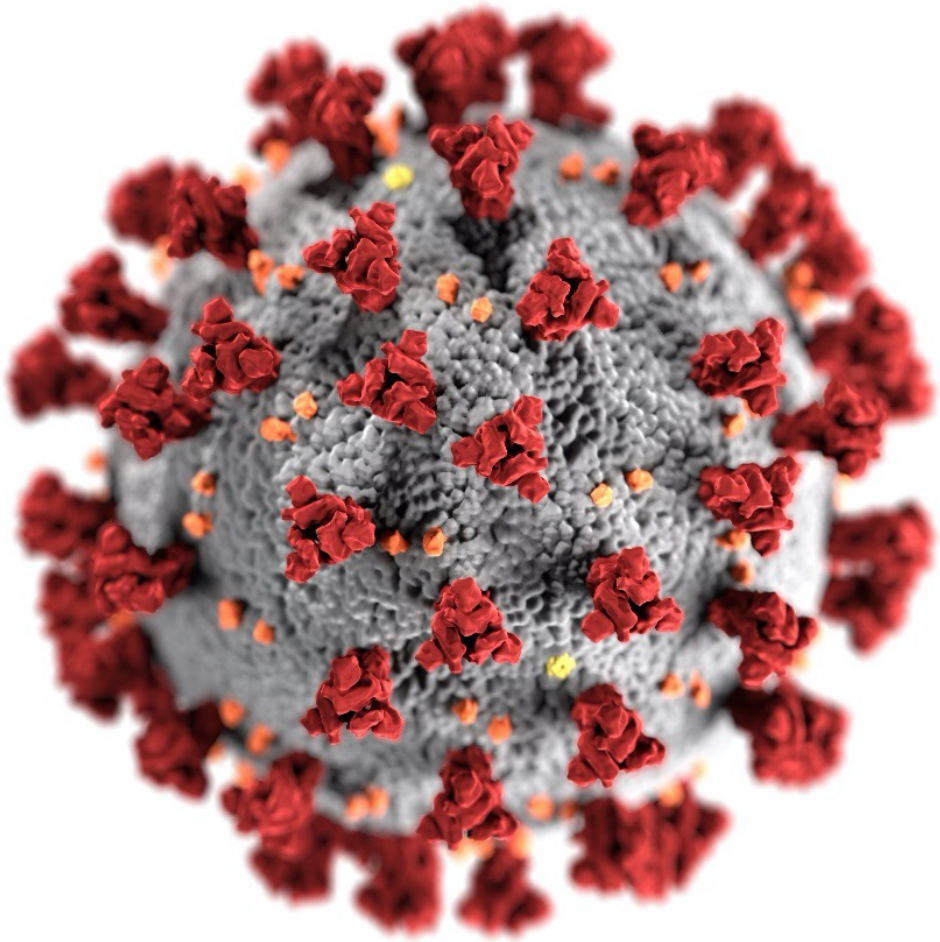
# National Wastewater Surveillance System

## Implementation for COVID-19 and Beyond



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National Wastewater Surveillance System Program Lead
Waterborne Disease Prevention Branch
Division of Foodborne, Waterborne and Environmental Diseases

Standards to Support an Enduring Capability in Wastewater Surveillance for Public Health Workshop
June 14, 2021

NATIONAL ™ WASTEWATER SURVEILLANCE SYSTEM

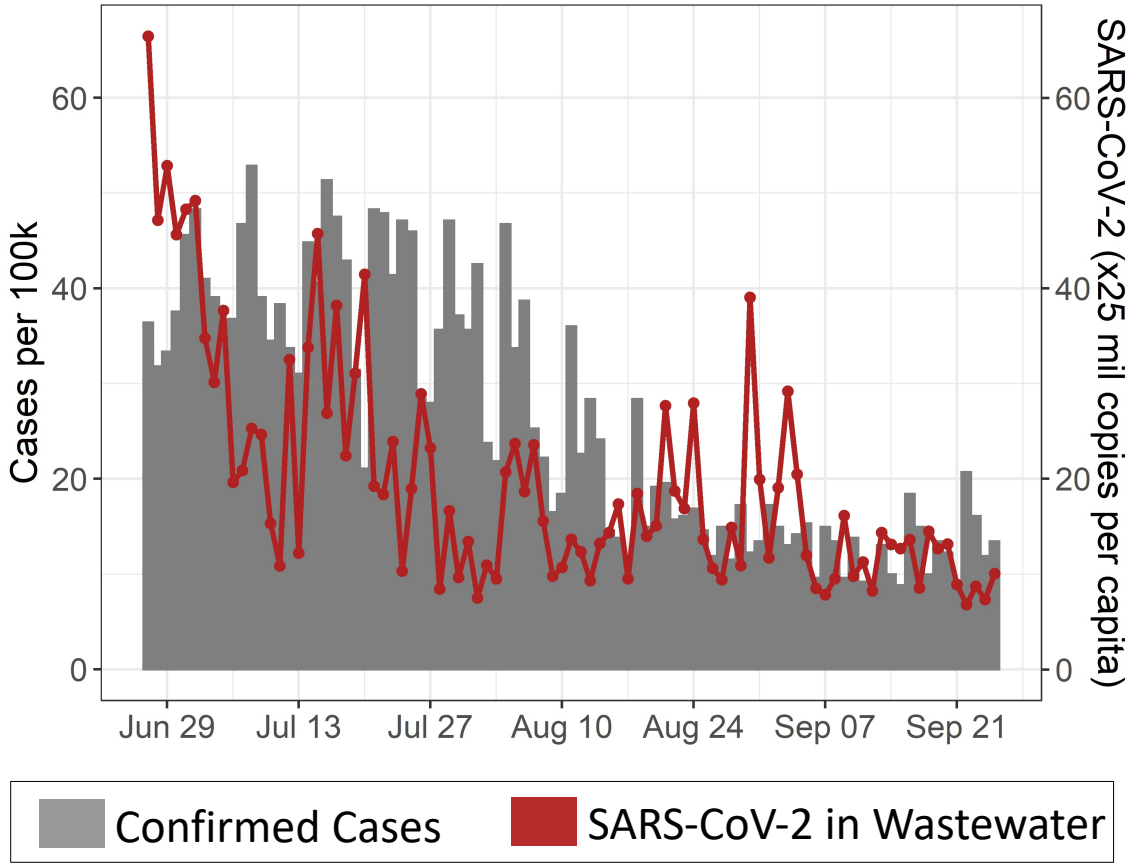
**cdc.gov/coronavirus**

# Wastewater Surveillance | Public Health Toolbox

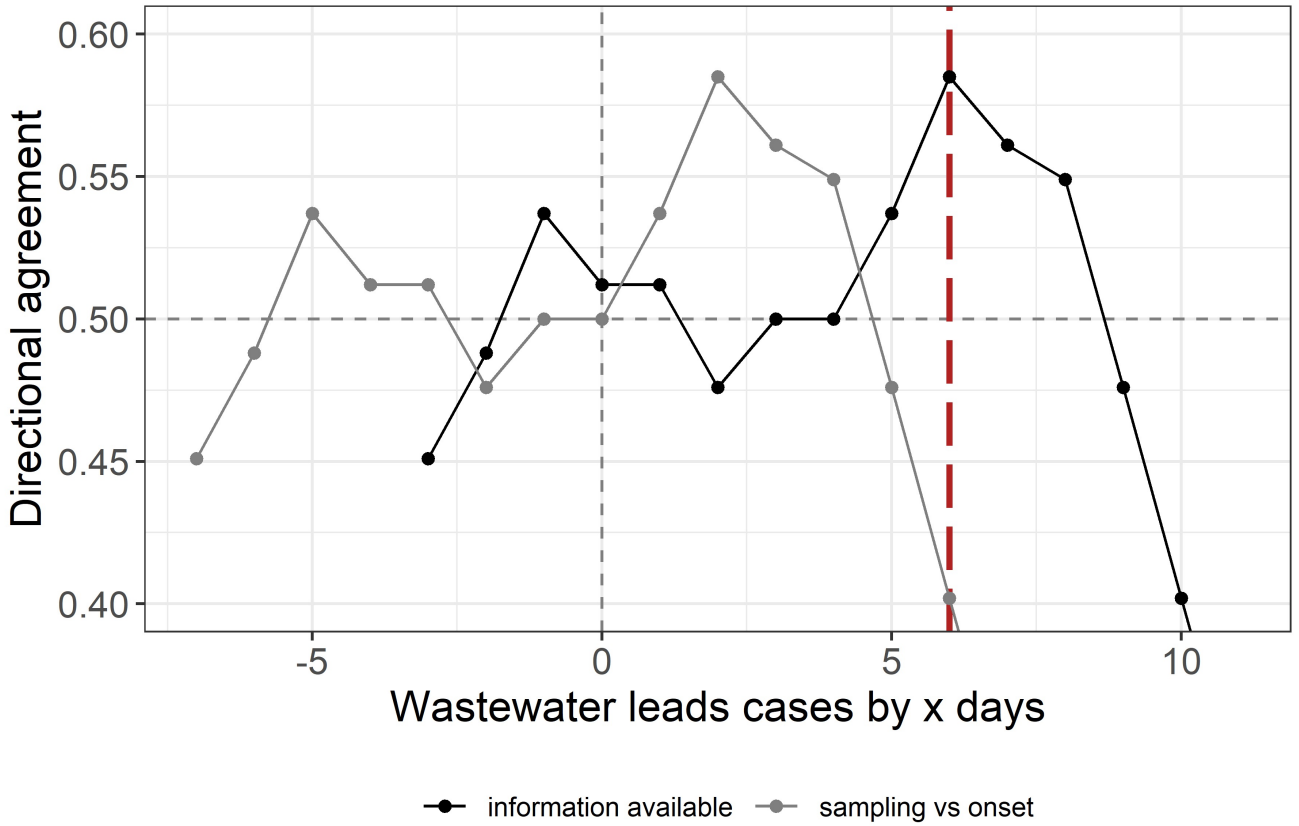
- Captures sub-clinical infections
- Independent of healthcare-seeking behavior and testing access
- Wastewater serves as an efficient pooled sample of community infection levels
- Data available within days of viral shedding onset versus up to 2-week lag for other surveillance data

# SARS-CoV-2 Wastewater Surveillance Evaluation

**Reported wastewater data associated with reported cases ~6 days in the future.**



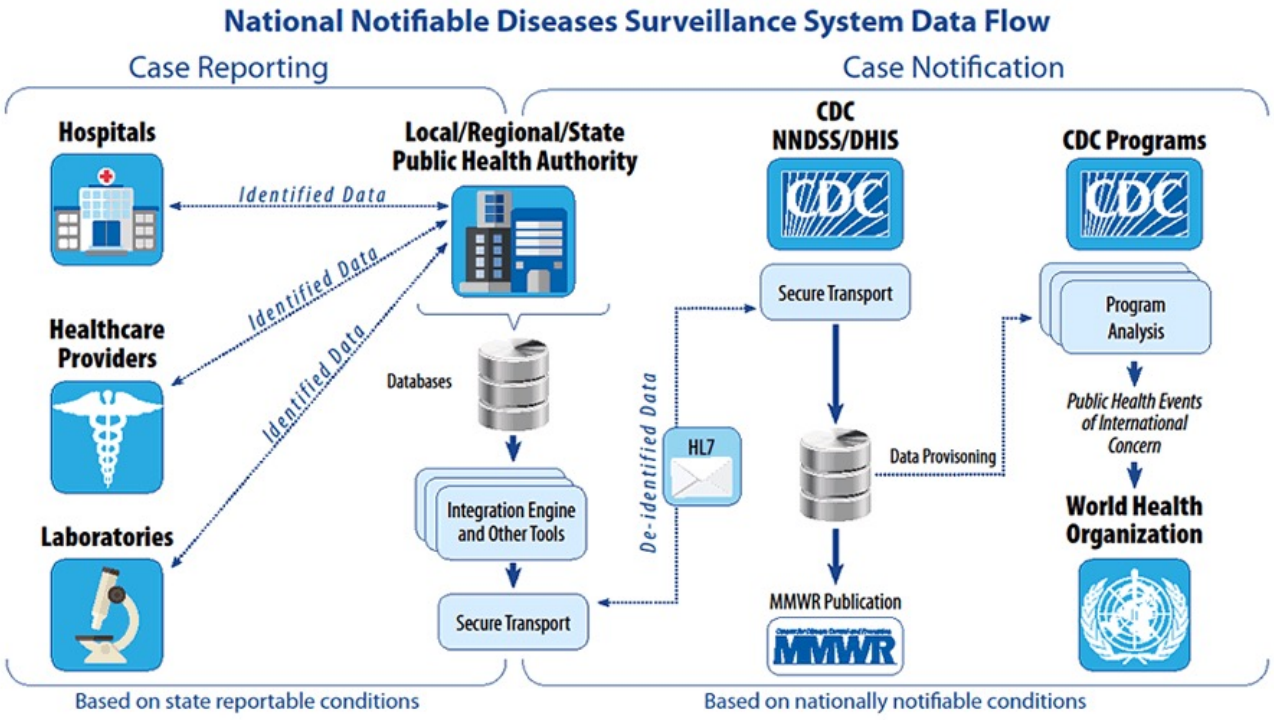

**Timeseries**




**Leading Indicator Analyses**

# National Disease Surveillance | CDC's Role

- Ensure data comparability across jurisdictions
- Analyze data to provide public health interpretation and guidance
- Summarize and make national data available for states and public
- Support inter-health agency communication for public health action



# NATIONAL WASTEWATER SURVEILLANCE SYSTEM (NWSS)

Communities

Wastewater treatment plants

Laboratories

State, tribal, local, and territorial health departments

Data submission


Data analysis

Information/ data sharing

NWSS is a collaboration between Centers for Disease Control and Prevention (CDC), the US Department of Health and Human Services (HHS), and agencies throughout the federal government.

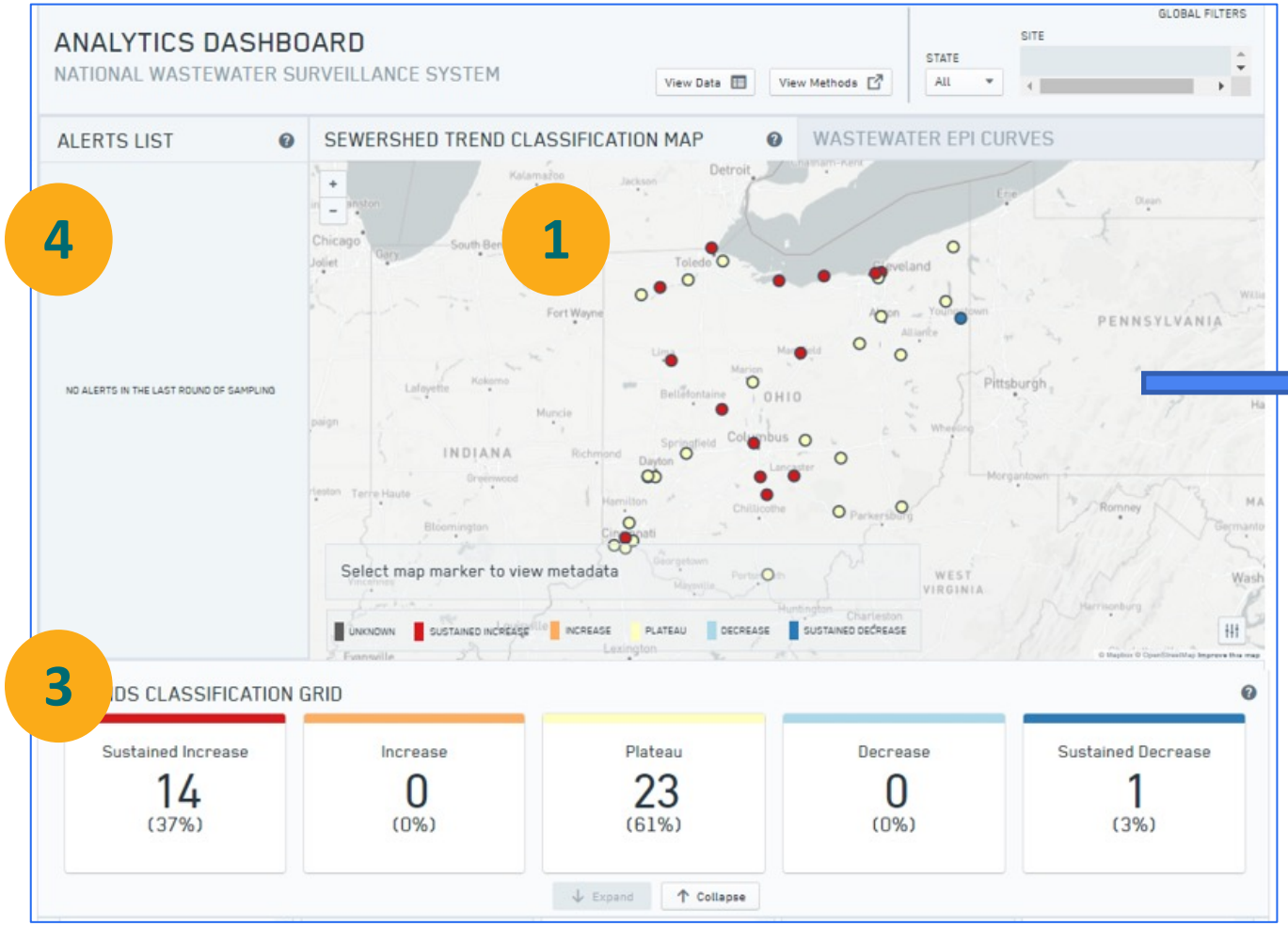

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

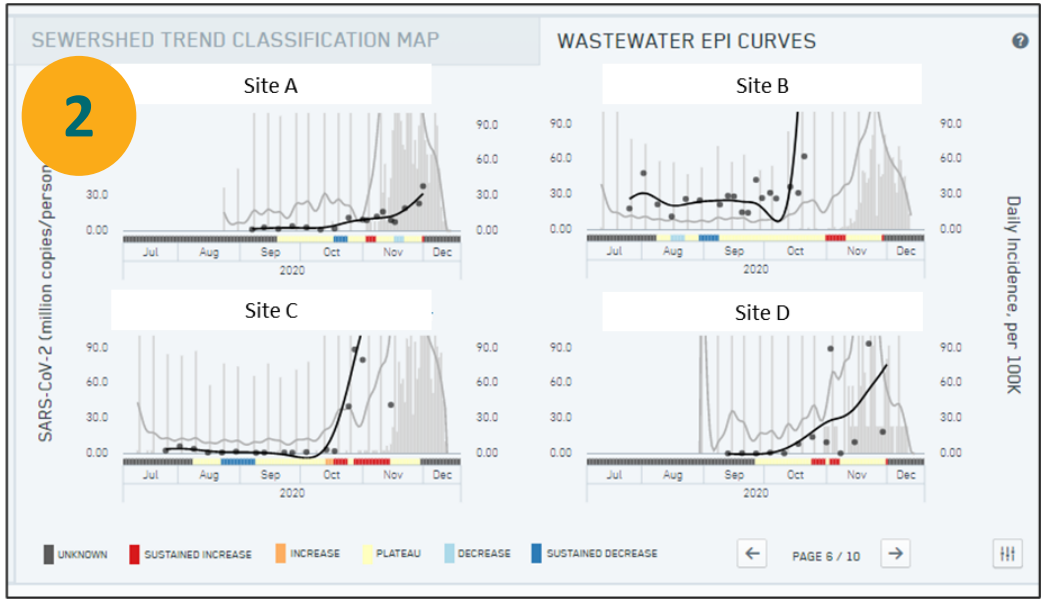
cdc.gov/coronavirus

CS319450-A

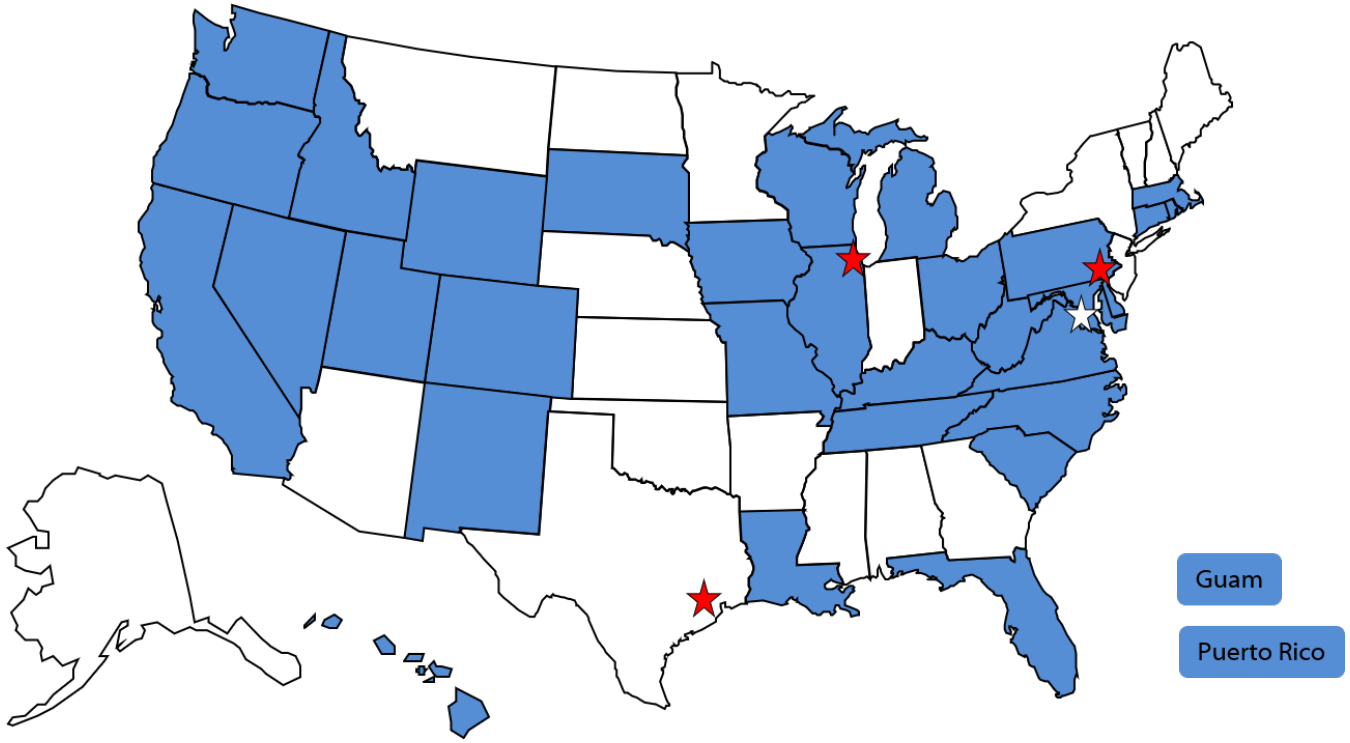
NATIONAL ™ WASTEWATER SURVEILLANCE SYSTEM

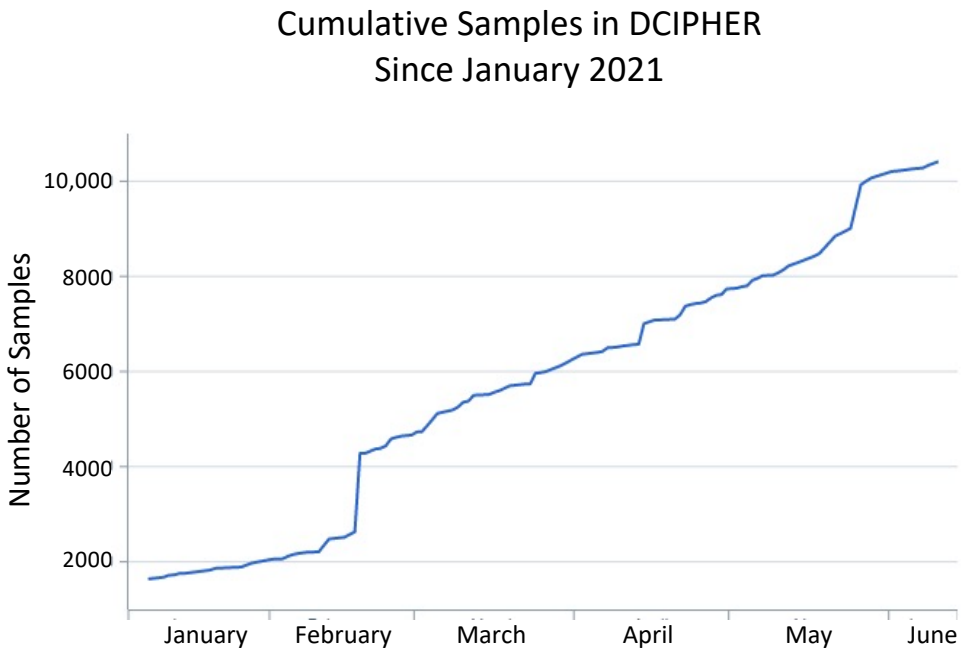
# NWSS DCIPHER Results Dashboard



# Participation in NWSS is growing quickly




- Currently, 36 ELC-funded jurisdictions totaling $223M for wastewater surveillance activities
- Additional $34M pending award

# NWSS Communities of Practice

## Health Departments

Host: CDC

106 participants from 21 jurisdictions

- Peer-to-peer learning
- Data coordination, submission, & interpretation
- Public health action

## Laboratories

Host: Association of Public Health Laboratories

37 participating labs in 27 jurisdictions

- Best Practices and Lab Startup Guides
- Corporate pricing agreements
- Workflow pilot projects

## Utilities

Host: Water Environment Federation

517 registered facilities in 44 jurisdictions

- Discussion board at nwbe.org
- NWSS workshop at WEFTEC in October
- Autosampler program

# Successful Use of Wastewater Data for Response

State and local jurisdictions have used wastewater data to inform response decisions:

- ✓ Independent confirmation of true increases or decreases in cases
- ✓ Distribution, siting of test capacity
- ✓ Surveillance data in communities where clinical testing is limited or not available
- ✓ Near-term forecasting of cases or hospital utilization
- ✓ Monitoring the impact of home testing

# Targeted Use Cases | Potential early warning

## Building-level applications:

- Long-term care facilities
- University dormitories
- Correctional facilities

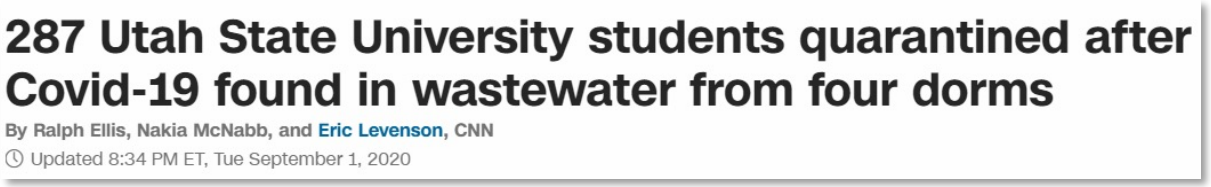
## Potential benefits:

- Early warning for new cases
- More efficient
- Cheaper for routine surveillance


Morning Mix

The University of Arizona says it caught a dorm's covid-19 outbreak before it started. Its secret weapon: Poop.

The Washington Post


287 Utah State University students quarantined after Covid-19 found in wastewater from four dorms

By Ralph Ellis, Nakia McNabb, and Eric Levenson, CNN

Updated 8:34 PM ET, Tue September 1, 2020

CNN


CSU orders mandatory COVID-19 testing after dorm wastewater shows possible spike

Jacy Marmaduke Fort Collins Coloradoan

Published 4:06 p.m. MT Sep. 4, 2020

Coloradoan

# NWSS | Facility-Level Surveillance

**Long Term Care Facilities**

- Internal method evaluation study initiating early 2021
- Contract with University of Kentucky to evaluate impact of plumbing design and sampling strategy at LTCFs

**Prisons**

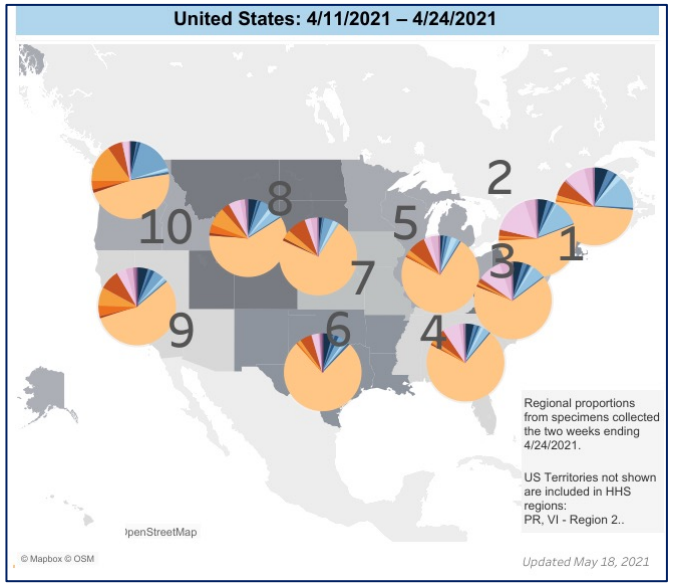
- At least 4 states include prisons in their current surveillance network
- Evaluation project of on-site wastewater testing for correctional facilities through December 2021. Coordinated by Water Environment Federation

**Universities**

- ~30 universities
- Providing TA to universities
- Webinar to facilitate information sharing between universities

# SARS-CoV-2 Variant Tracking in Wastewater

- Interpretation is limited by
  - fragmented genomes present in wastewater
  - unknown method sensitivity
  - potential variation in shedding dynamics between variants

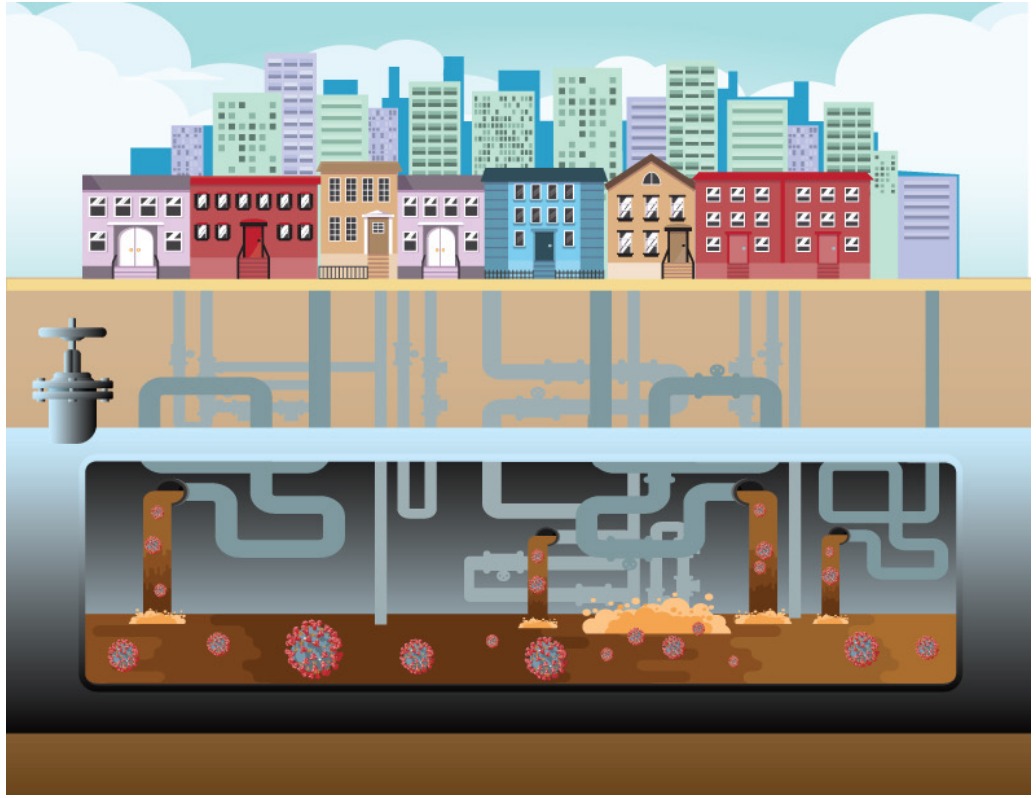



- Wastewater sequencing may be useful for variant **detection** and **tracking** but unlikely to be useful for variant discovery
- Pursuing multiple avenues to secure wastewater sequence data for evaluation
- Working with NCBI to establish database and preliminary analysis pipeline for wastewater SARS-CoV-2 sequence data

# NWSS| Challenges

- Decentralized wastewater systems will not be captured
  - ~25% of US residences are not connected to sewer
  - Onsite treatment increasingly common at correctional facilities, universities
- Appropriate interpretation of data in low incidence settings
  - Negative results do not indicate absence of cases
- Barriers to implementation and sustainability
  - Hesitance to implement a “pilot” program
  - Building testing capacity in public health labs

# NWSS | Beyond COVID



**Flexible** surveillance platform for **multiple** health targets

Potential additional targets

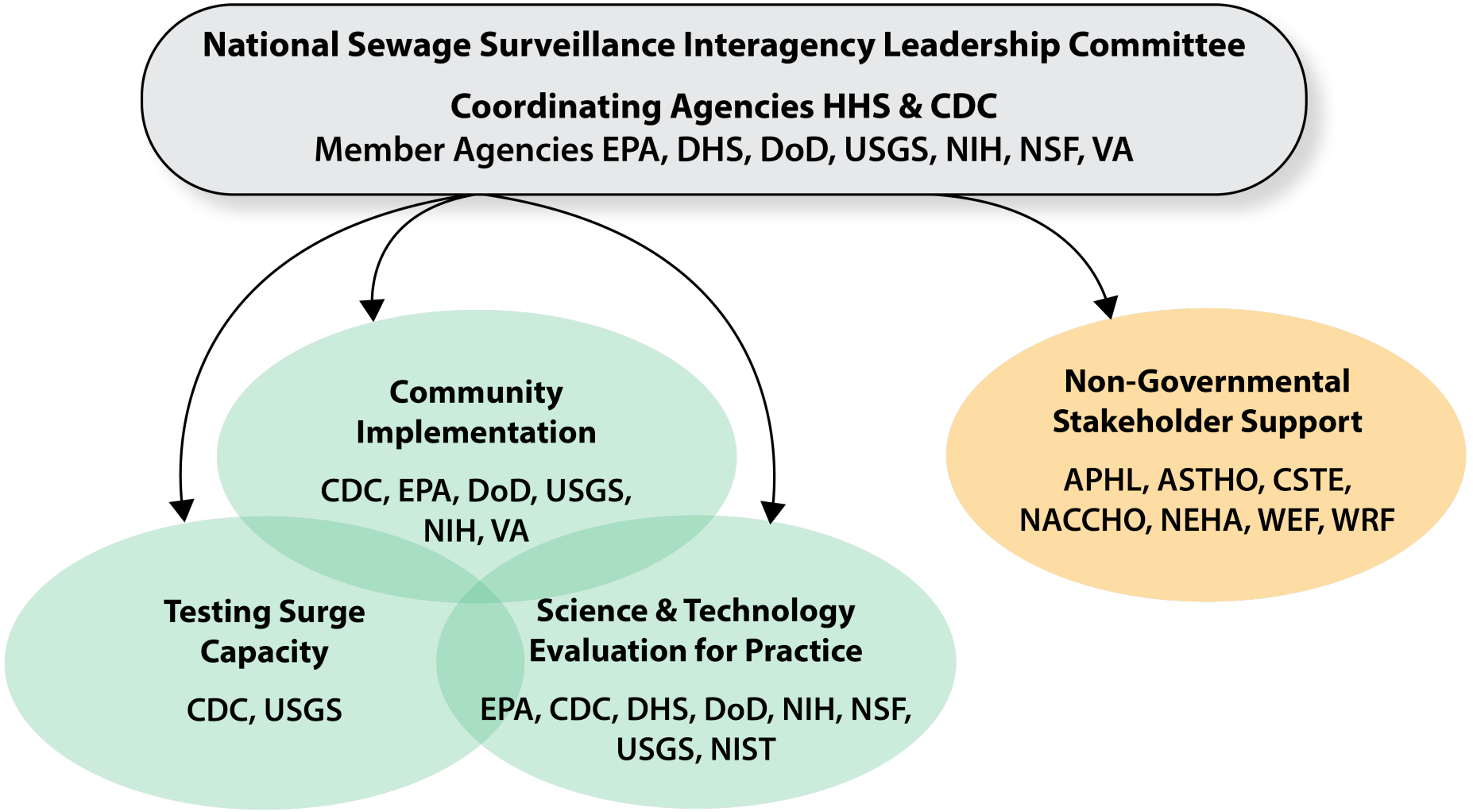
- Antibiotic resistance
- Foodborne infections
- Emerging infections

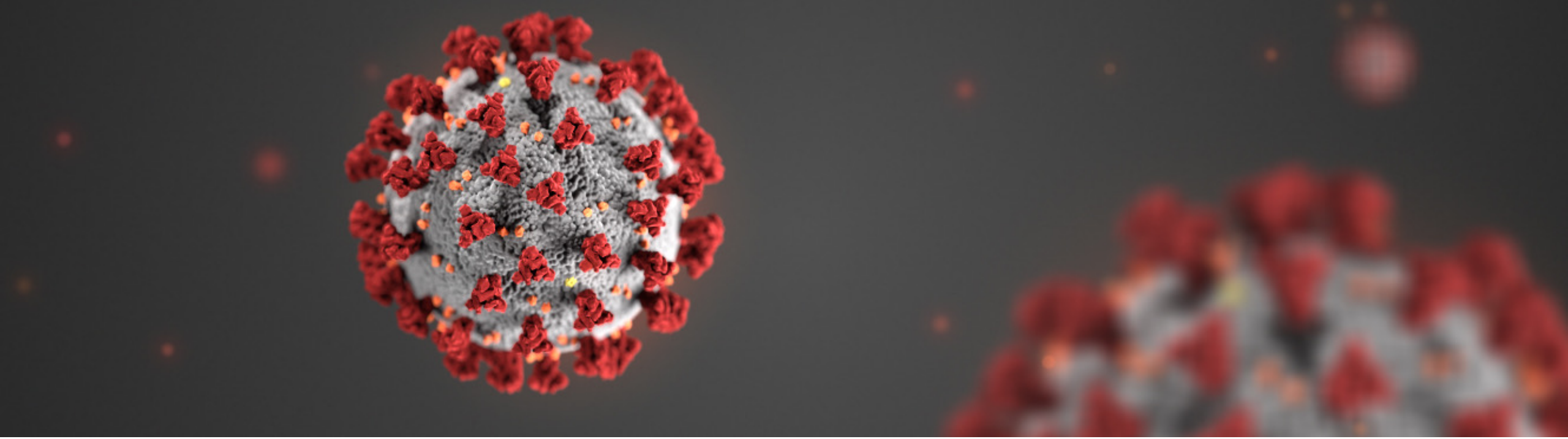
# NWSS | Beyond COVID

Nimble structure to **rapidly adapt** to changing public health needs

| | | | |
|---|---|---|---|
|  | **Emergency Response**<br>Local or regional activations in the wake of natural disasters to detect outbreaks |  | **Emerging Infections**<br>Short-term activations to assess the prevalence and distribution of emerging threats |
|  | **Pandemic Preparedness**<br>Rapid activation and increased sampling frequency to detect pandemic spread into communities to target mitigation efforts |  | **Bioterrorism**<br>Rapid local or regional activation with increased sampling frequency to detect and track bioterrorism threats |

# Federal Partnering Framework for Wastewater Surveillance





For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

Contact the NWSS team at
NWSS@cdc.gov

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.