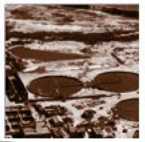
Wastewater Surveillance for COVID-19

Presented by Lan Wiborg
Director of Environmental Services

Administration Committee

September 9, 2020

Keeping up with the COVID-19 Headlines



Scientists are unsure of coronavirus effects at the beach

By ROSANNA XIA

APR 2, 2020 | 07:00 AM
UPDATED 07:18 AM

[redacted] a leading atmospheric chemist at the Scripps Institution of Oceanography, wants to yell out her window at every surfer, runner, and biker she spots along the San Diego coast.

"I wouldn't go in the water if you paid me $1 million right now," she said.

The beach, in her estimation, is one of the most dangerous places to be these days, as

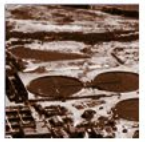
9 days later, in a follow-up article

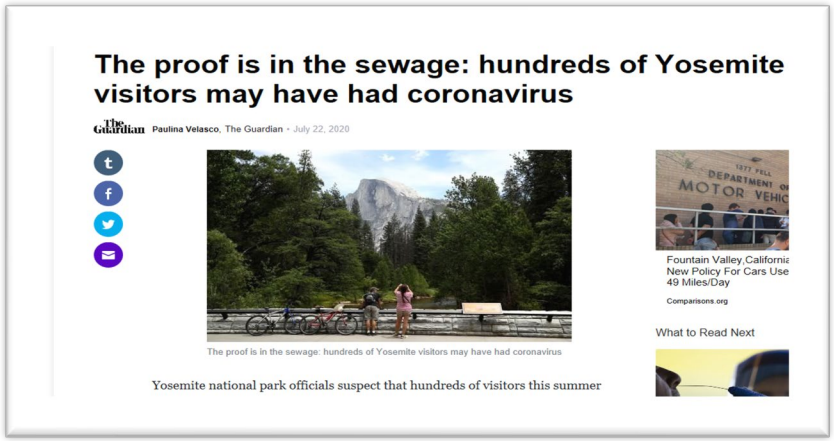
In a Los Angeles Times interview early last week, [redacted] was quoted as saying, "I wouldn't go in the water if you paid me $1 million right now." She posited that SARS-CoV-2, the virus that causes COVID-19, could enter the ocean — through raw or poorly treated sewage — and then get kicked back into the air along the surf zone.

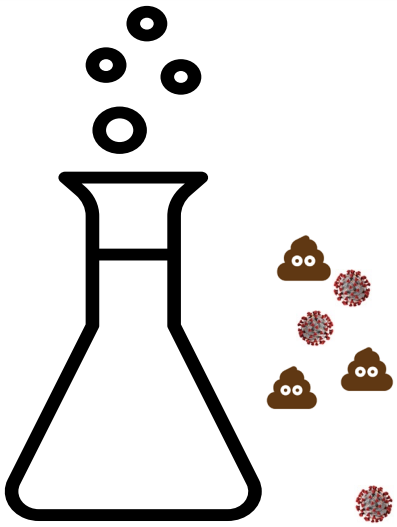
But new research published after the interview has changed her thinking. The research includes an accelerated publication of a study in the journal Nature, which found that the virus did not appear to remain infectious in fecal matter.

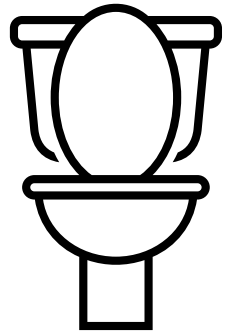
"The main exposure risk to the water recreation community remains sewage pollution and urban runoff into the ocean, which can increase after major storms such

Wastewater Surveillance

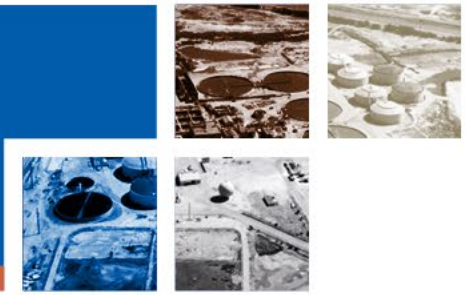




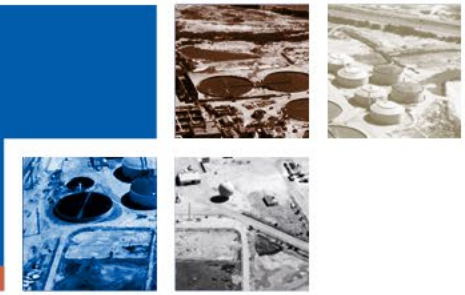


Wastewater and SARS-CoV-2
Questions from Media/Public/Employees



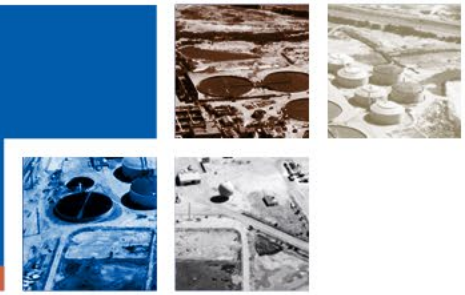
- Is OCSD testing its sewage for SARS-CoV-2? Why?
- When will OCSD receive preliminary results?
- What can OCSD do with these results?
- Sewage surveillance for COVID-19 in OC?

Key Considerations



- Lessons from prior wastewater surveillance efforts
- Obtain expert advice
- Establish current and future use cases
- Sustainable field and laboratory resources
- Criteria for collaboration

Research Partners



State Water Board

- Add-on to DPR-2 project
- Multi-benefit for water reuse agencies
- No existing method

University of Arizona

- Extensive experience with SARS-CoV-1
- Existing method for wastewater matrix

Stanford University

- Innovation grant for method development
- Nationwide recruitment of WWTPs

State Water Board
DPR Research Projects

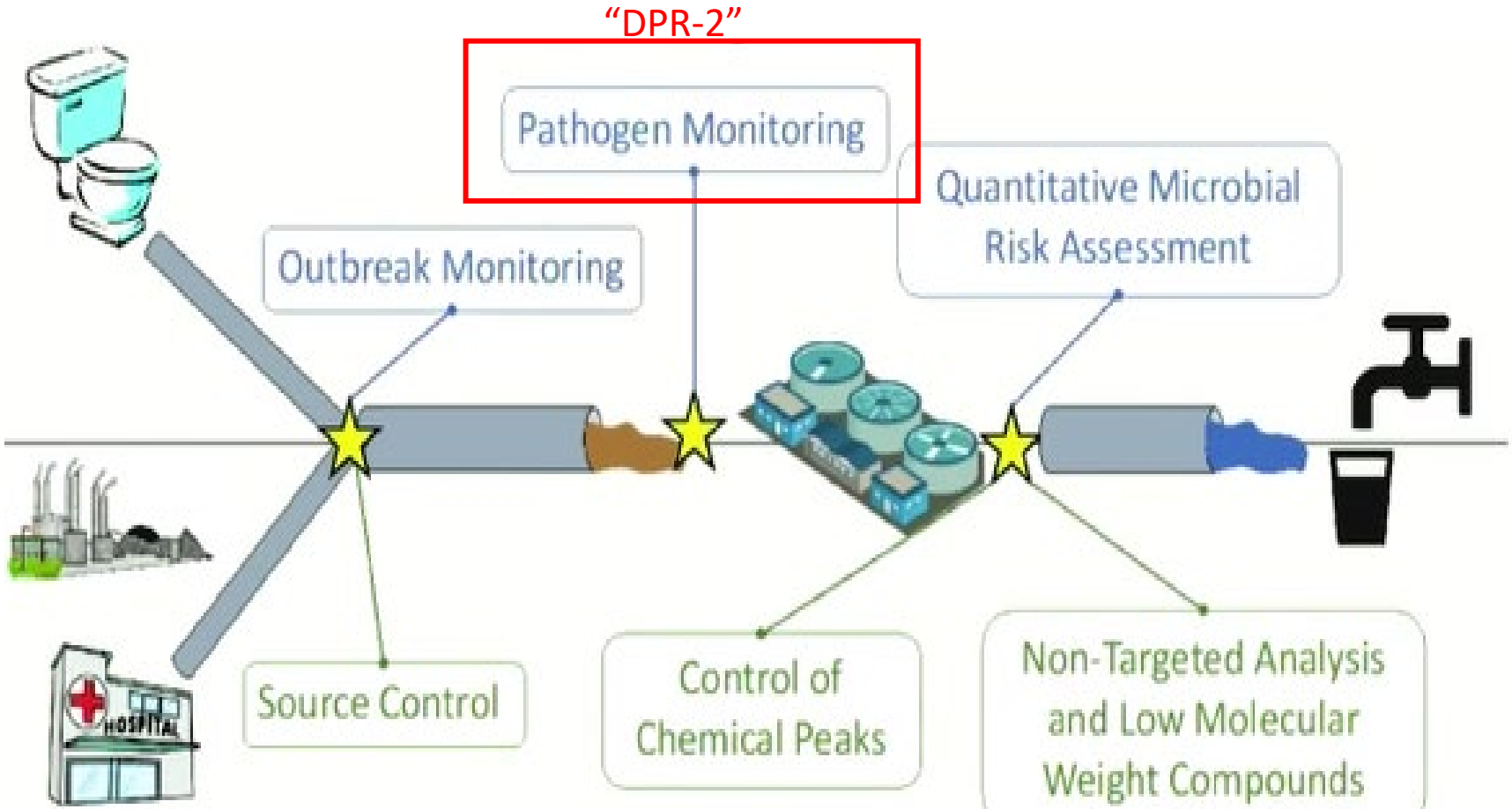
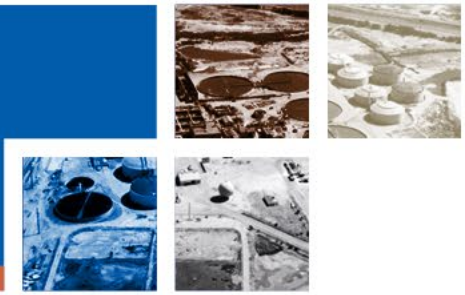


Image Source: B. Pecson/Trussell Technologies, Inc.

State Water Board: DPR-2



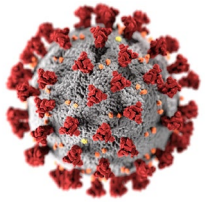
Method Development

Detection and Quantification

DPR Treatment Effectiveness

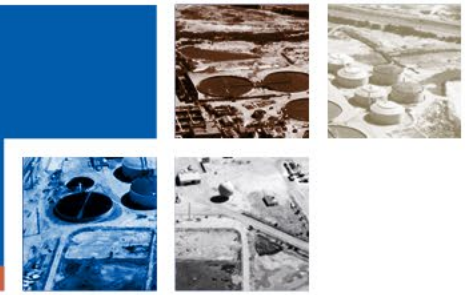
Help to develop Direct Potable Reuse Criteria

- Samples from five major CA POTWs
- Sample collection since November 2019
- Added SARS-CoV-2 to study in April 2020
  - Method optimization
  - Comparability assessment



Crypto (cyst/L)
Giardia (oocyst/L)
Enterovirus culture (MPN/L)
Adenovirus culture (MPN/L)
Enterovirus molecular (GC/L)
Adenovirus molecular (GC/L)
Norovirus GIA molecular (GC/L)
Norovirus GIB molecular (GC/L)
Norovirus GII molecular (GC/L)

DPR-2 Preliminary Data



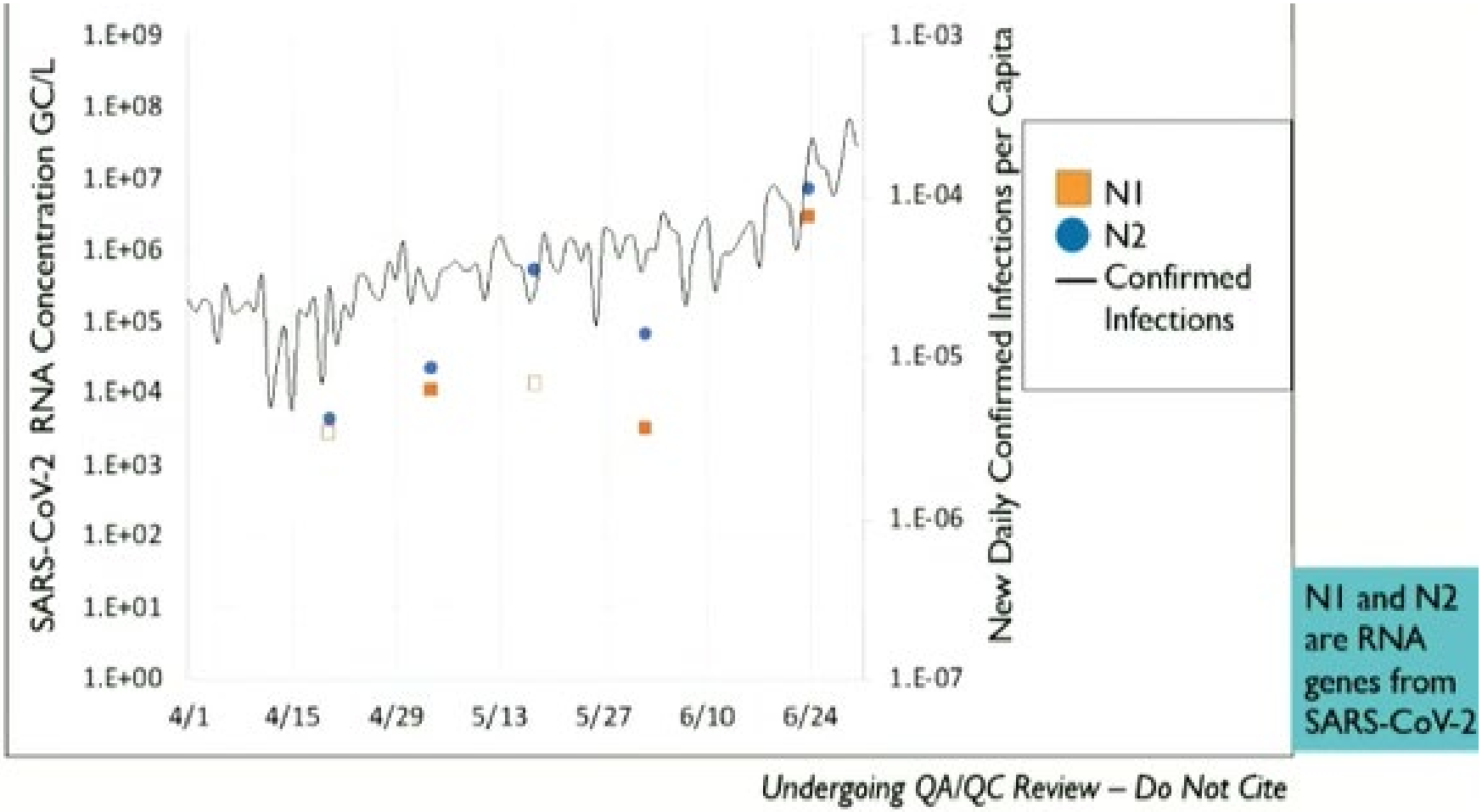


Image Source: B. Pecson/Trussell Technologies, Inc.

University of Arizona

Detection and Quantification

Viability

WW Treatment Effectiveness

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

Graduate students and employees process nasal swabs from coronavirus tests in a lab at the University of Arizona in Tucson on Aug. 24. (Cheney Orr/Bloomberg News)

By **Jaclyn Peiser**

August 28, 2020 at 5:50 AM EDT

University of Arizona

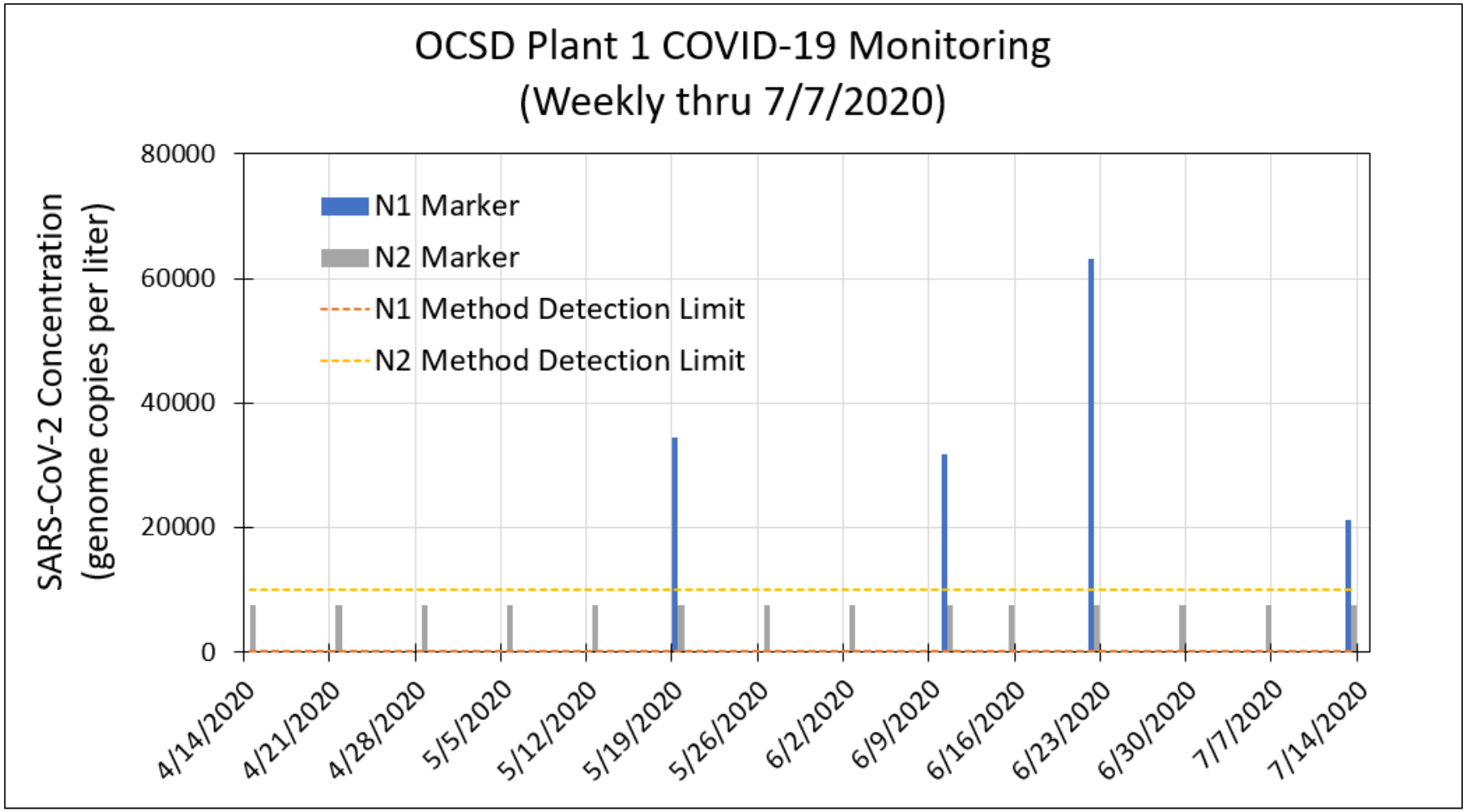
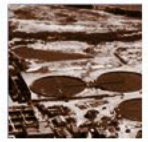


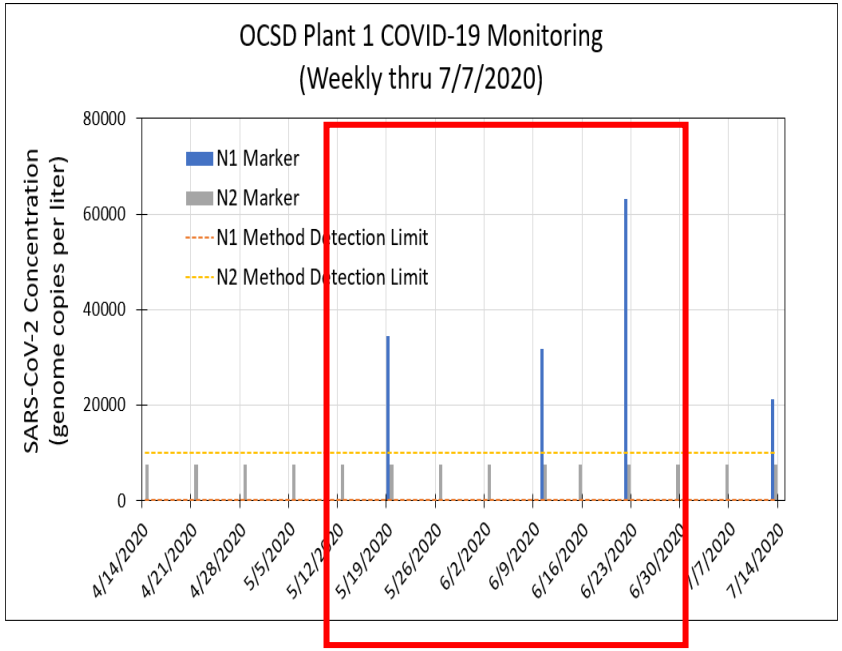
Image Source: University of Arizona/OCSD

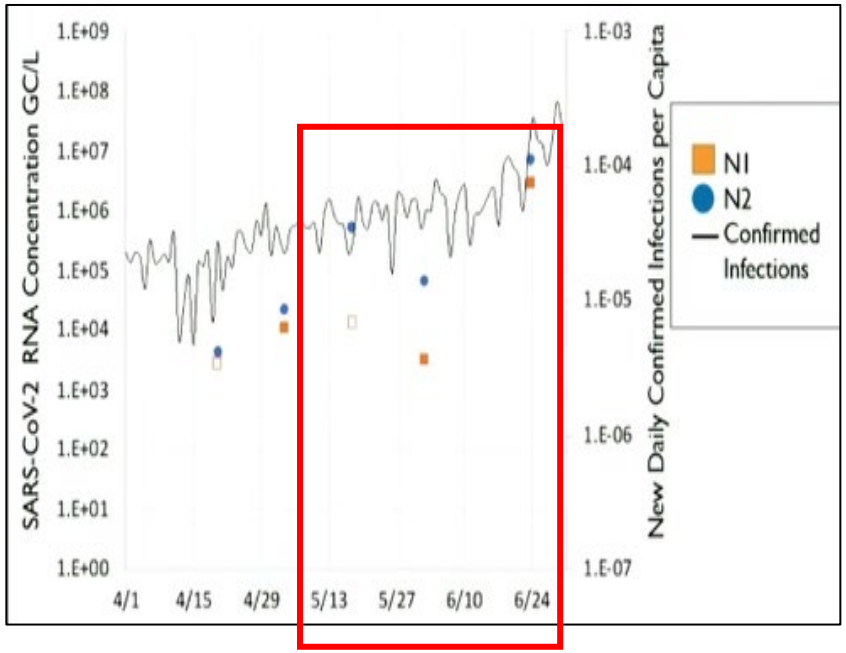
Comparing Results




THE UNIVERSITY OF ARIZONA

CALIFORNIA Water Boards
STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS





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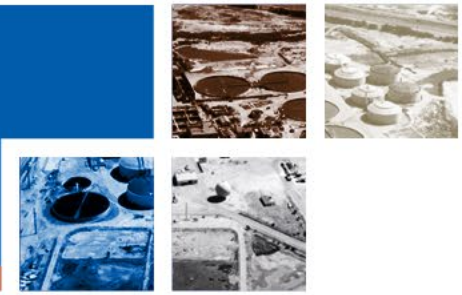
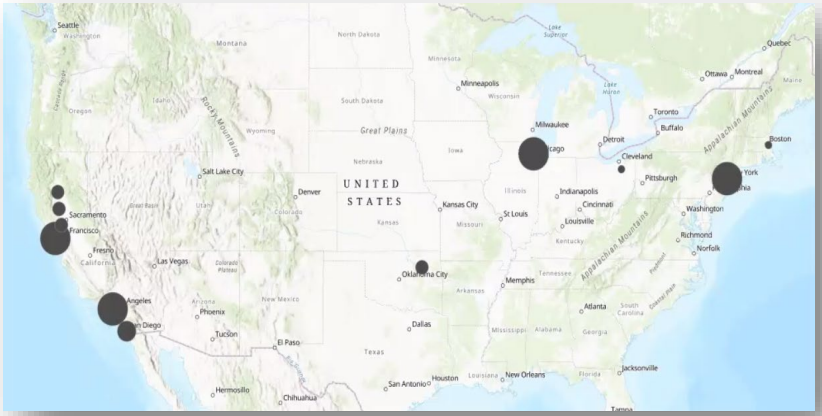


- Method Development
- Detection and Quantification
- Data Management
- Data Modeling

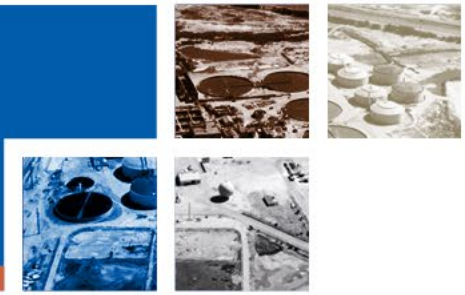


Samples from US WWTPs

- 25 CA WWTPs
- 24 WWTPs outside CA
- Archived 1,700 samples to date
- Analyzed 2 POTWs to date

Image Source: A. Boehm/Stanford University

Stanford University



Method Development

- SARS-CoV-2 affinity for solids
- qPCR vs. digital droplet PCR

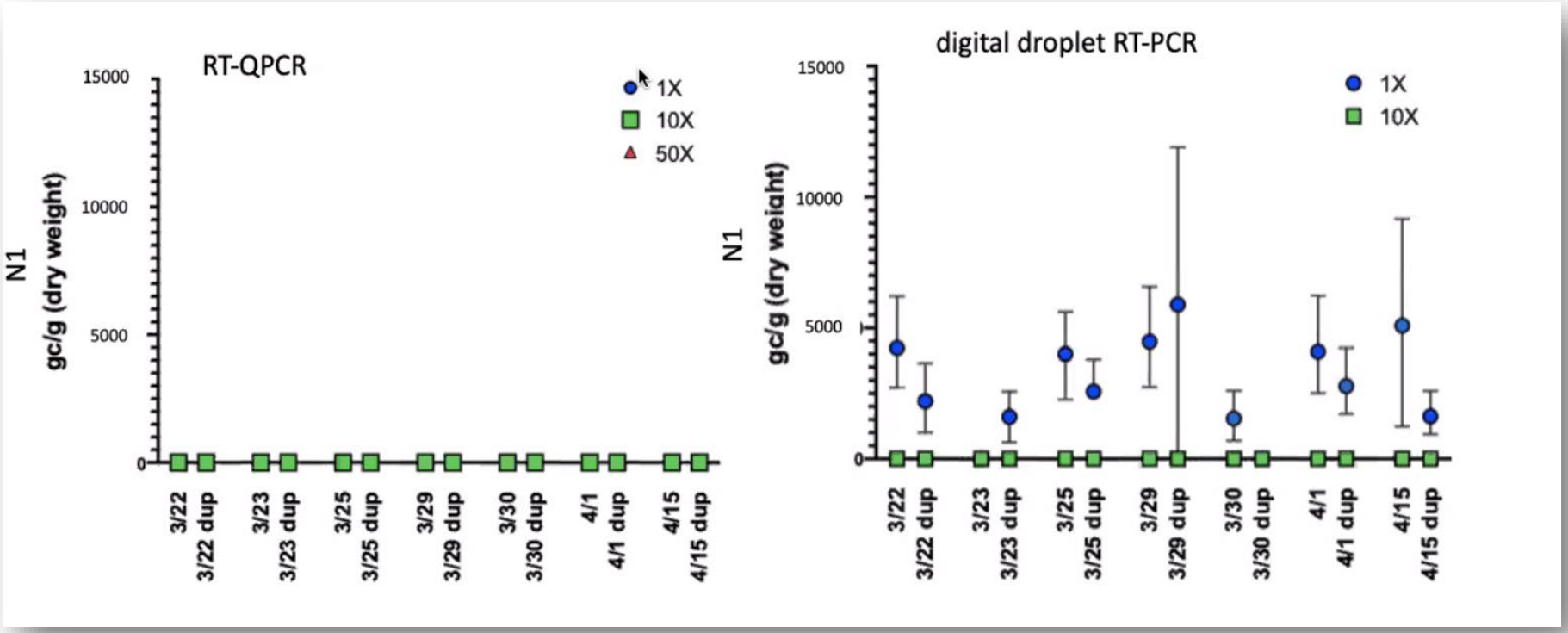


Image Source: A. Boehm/Stanford University

Stanford University

Preliminary Results

- Primary settled solids data
- Tracking with confirmed clinical cases
- Data analysis and modeling in progress

Cannot Use to Predict Prevalence

- Missing key variable – virus shed in feces
- Prediction of COVID-19 unrealistically high

Recommendations

- PH information must guide sampling
- Supply chain issues

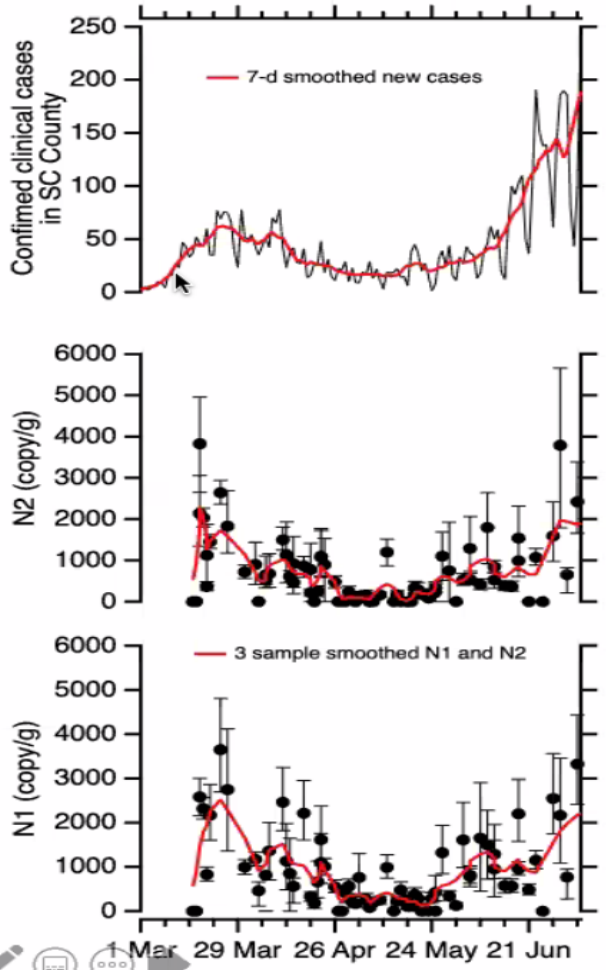
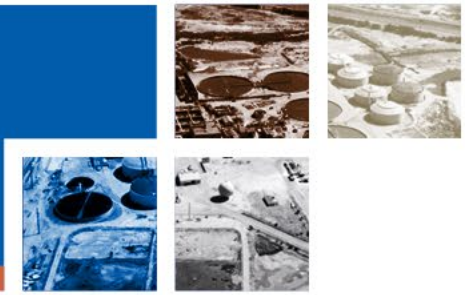


Image Source: A. Boehm/Stanford University

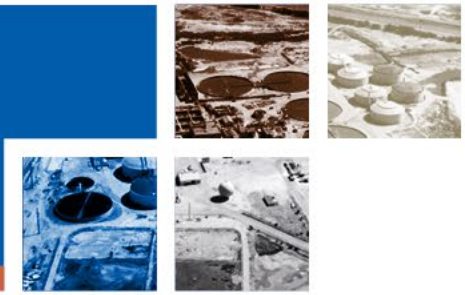
CDC Perspective



- Sewage is an efficient pooled sample of community (or sub-community) infection prevalence
- Captures sub-clinical infections
- Independent of healthcare-seeking behavior and testing access
- Data available within days of shedding onset versus up to 2-week lag for other data
- Data collection at CDC to facilitate national disease surveillance interpretation and public health actions

Information and mage Source: A. Kirby/CDC

National Wastewater Surveillance System



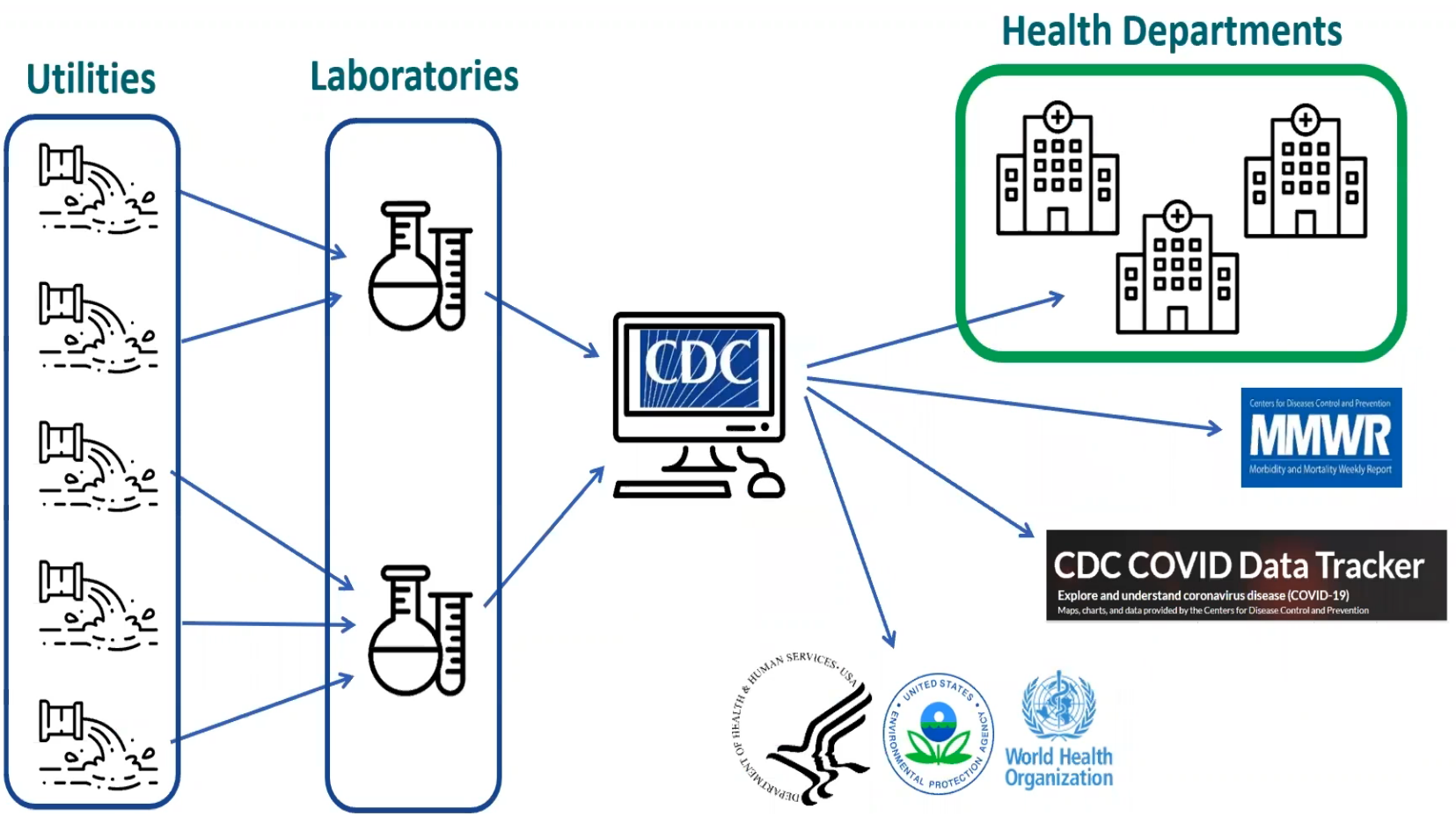
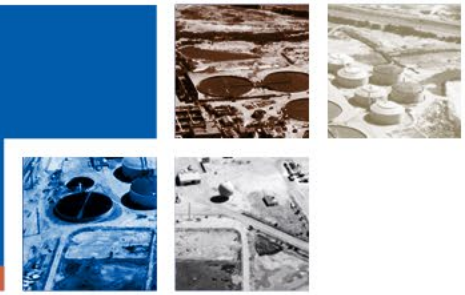


Image Source: A. Kirby/CDC

CDC's Role in NWSS



- 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

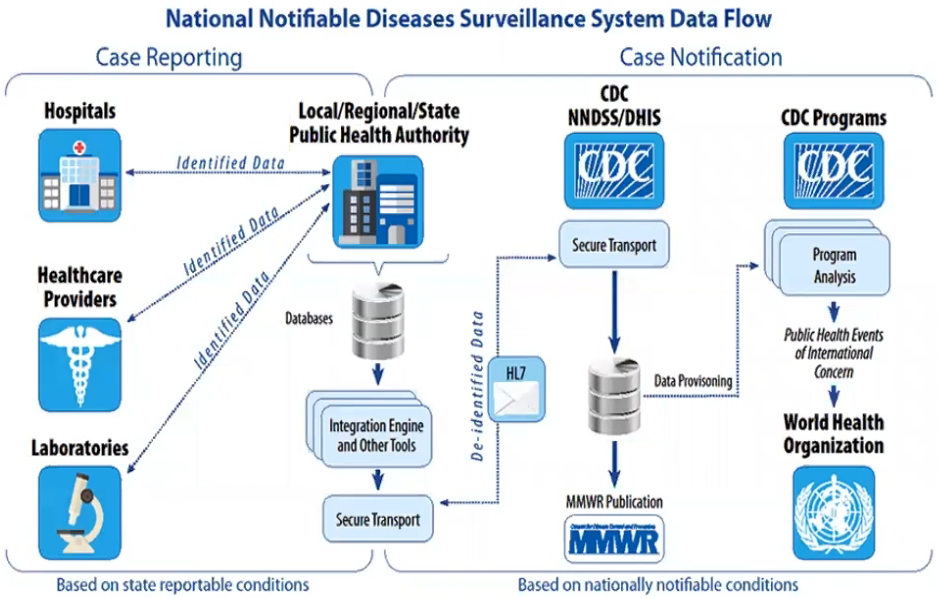
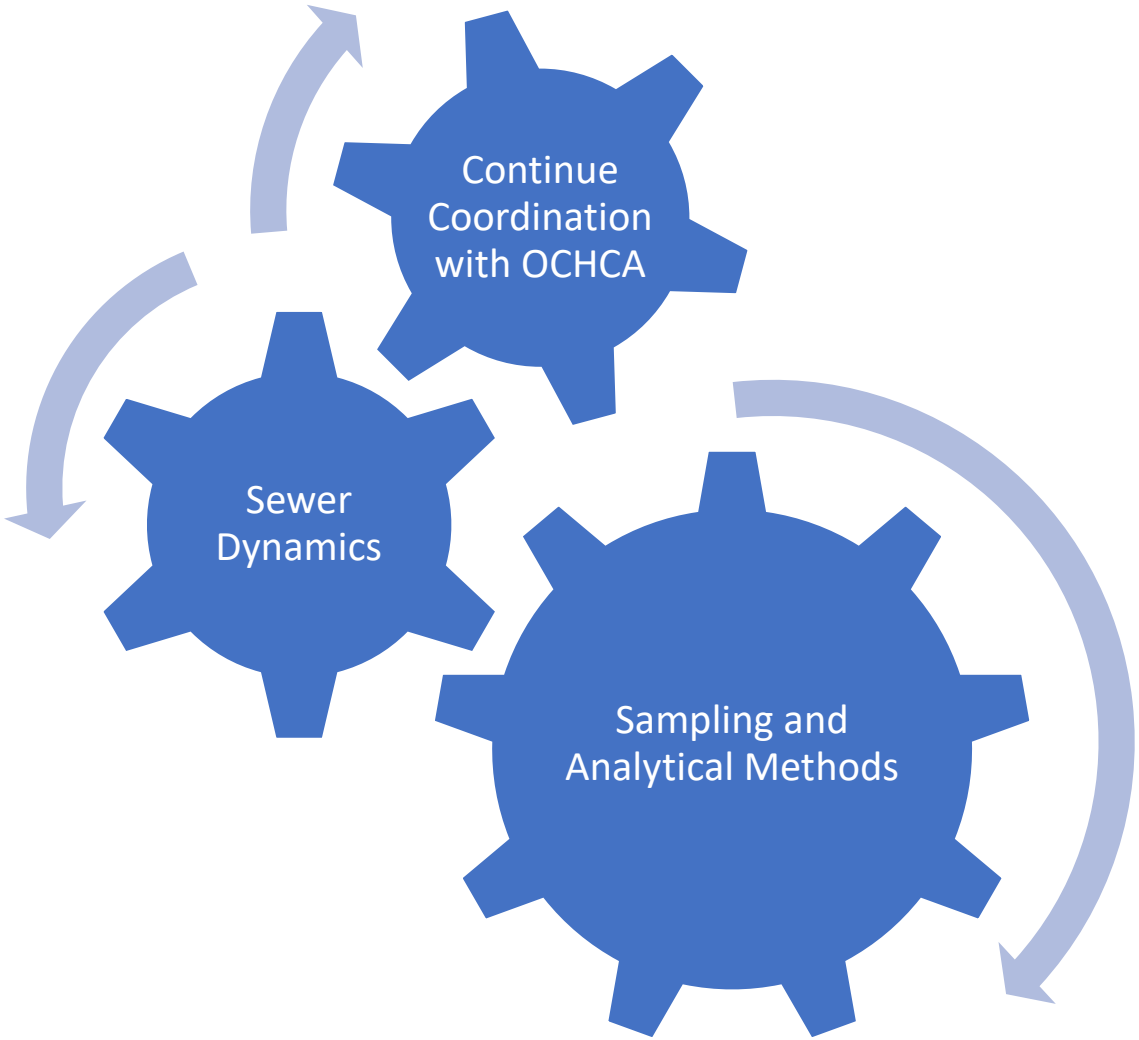


Image Source: A. Kirby/CDC

Next Steps


Continue Coordination with OCHCA
Sewer Dynamics
Sampling and Analytical Methods

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Professor, Environmental Science
University of Arizona

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Assoc. Research Professor, Env. Science
University of Arizona

Greg Kester, PE
Director of Renewable Resources Programs
CA Assoc. of Sanitation Agencies

OCSD

James Herberg, PE
General Manager

Ron Coss, MSPH, MPA, BCES
Laboratory, Monitoring, and Compliance Manager

Sam Choi, PhD
Environmental Supervisor

Roya Sohanaki, PE
Engineering Manager

Jennifer Cabral, MPA
Administrative Services Manager

Regional Advisors

Haruna (Hana) Feldman, PhD, MPH
Group Program Manager
Data & Performance Analytics Unit
Chief Administrative Office
County of San Diego

Alissa Dratch, MPH
Epidemiologist
Communicable Disease Control
Orange County Health Care Agency

Questions?