

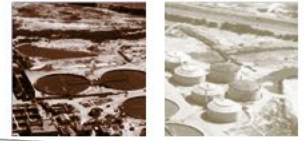
Wastewater Surveillance for COVID-19

Presented by Lan Wiborg
Director of Environmental Services

Operations Committee
September 2, 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

█ 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, █ 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



Department of Public Health & Environment | State Emergency Operations Center

Home Are you sick? > Prepare to protect yourself > Safer at Home & in the Visit, Great Outdoors Protect Our Neighbors
News & media resources > For LPHAs & health care providers

What's poop got to do with it?



The proof is in the sewage: hundreds of Yosemite visitors may have had coronavirus

The Guardian Paulina Veleco, The Guardian · July 22, 2020



The proof is in the sewage: hundreds of Yosemite visitors may have had coronavirus

Yosemite national park officials suspect that hundreds of visitors this summer



Fountain Valley, California
New Policy For Cars Use
49 Miles/Day
Comparisons.org

What to Read Next



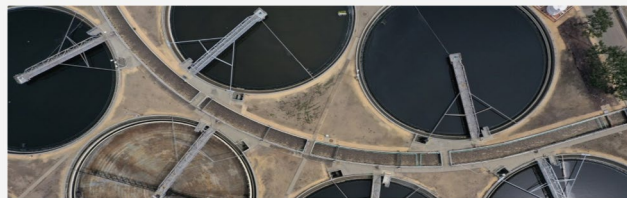
Bloomberg Law

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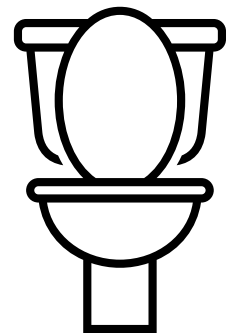
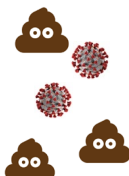
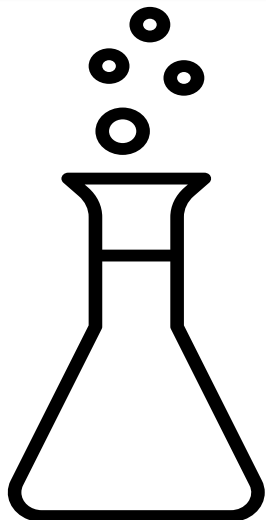
An aerial view of the East Bay Municipal Utility District Wastewater Treatment Plant on April 20, 2020 in Oakland, Calif. Raw sewage could be a new element of states' coronavirus surveillance efforts since the EPA completes its new research pilot project.
Photographer: Justin Sullivan/Getty Images

Sewage Could Become Next Virus Surveillance Method, EPA Says

May 27, 2020, 12:46 PM

Listen

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Wastewater and SARS-CoV-2

Questions from Media/Public/Employees



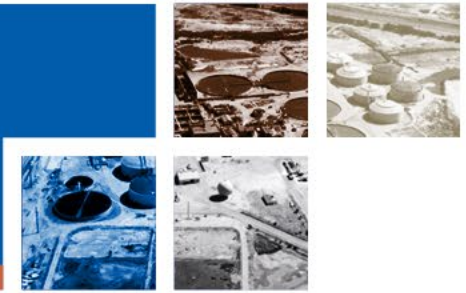
Is OCSD testing its sewage for SARS-CoV-2? Why?

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

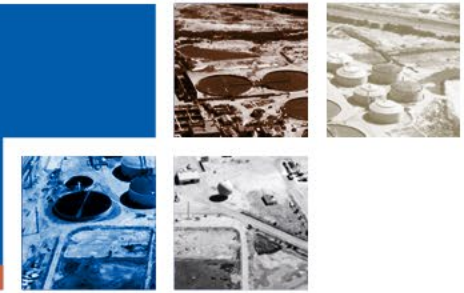
Obtain expert advice

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



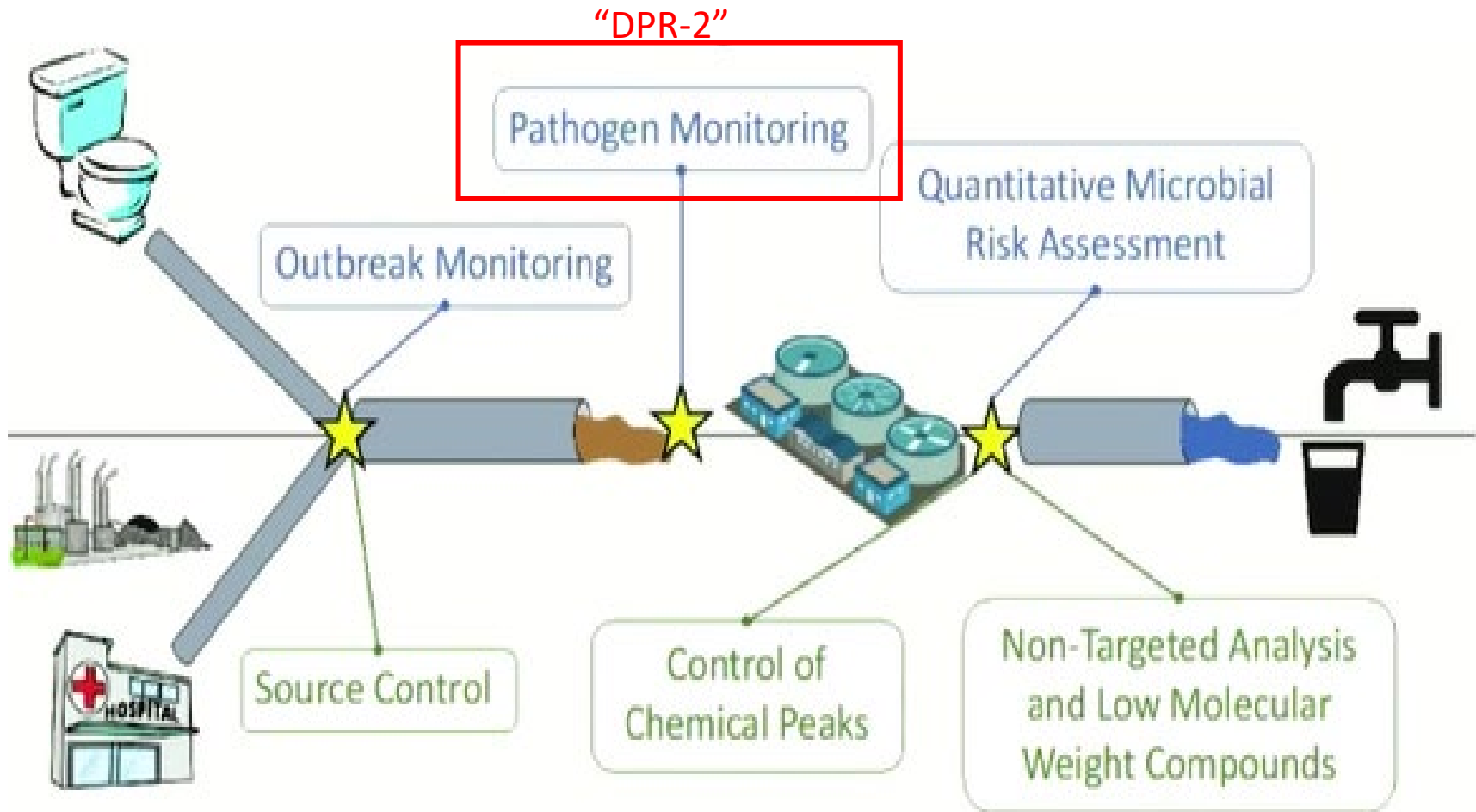
Stanford University

- Innovation grant for method development
- Nationwide recruitment of WWTPs



SOUTHERN CALIFORNIA
COASTAL WATER
RESEARCH PROJECT

State Water Board DPR Research Projects



State Water Board: DPR-2



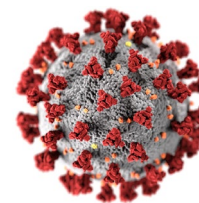
Method
Development

Detection and
Quantification

DPR Treatment
Effectiveness

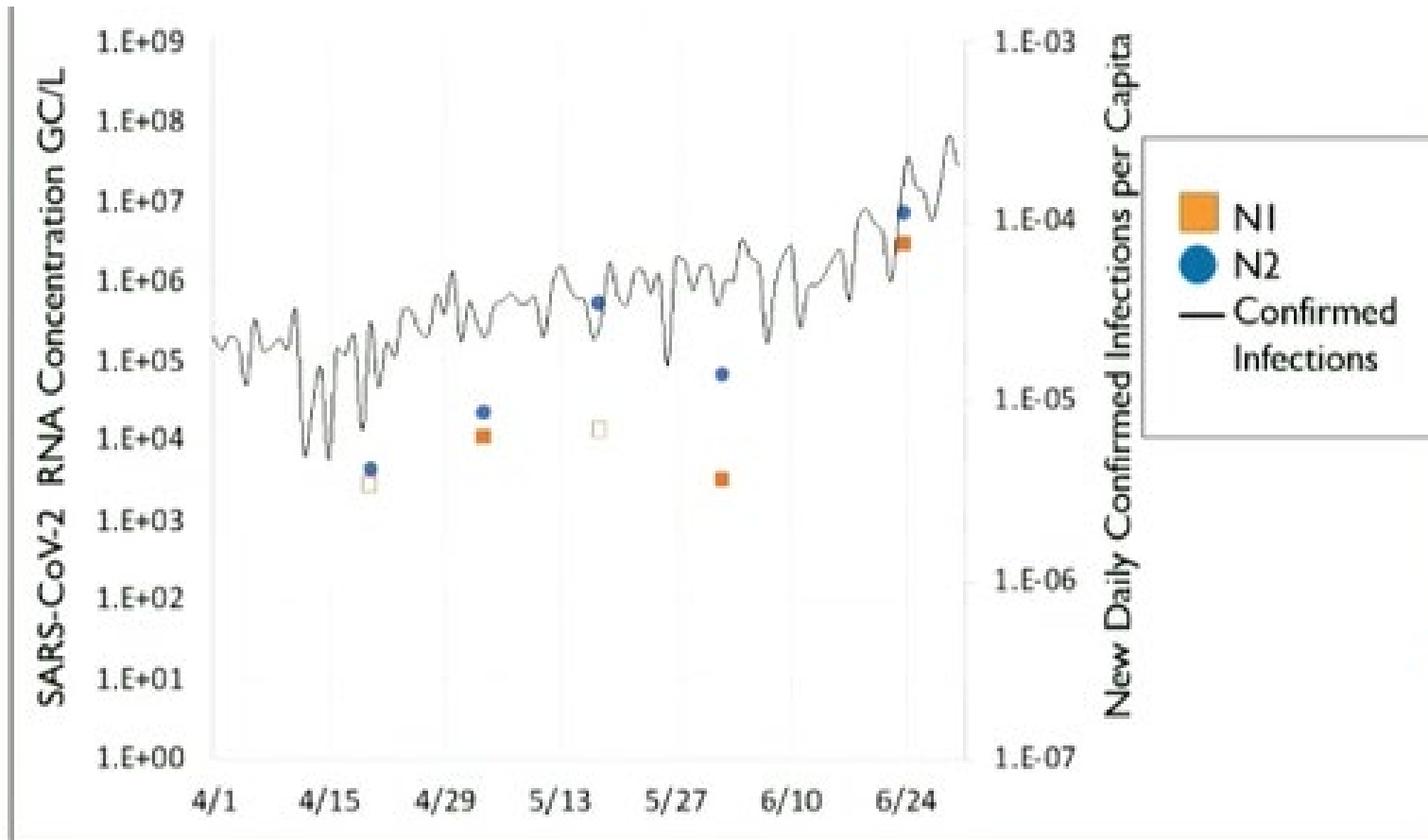
Help to develop Direct Potable Reuse Criteria

- 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



Undergoing QA/QC Review – Do Not Cite

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)

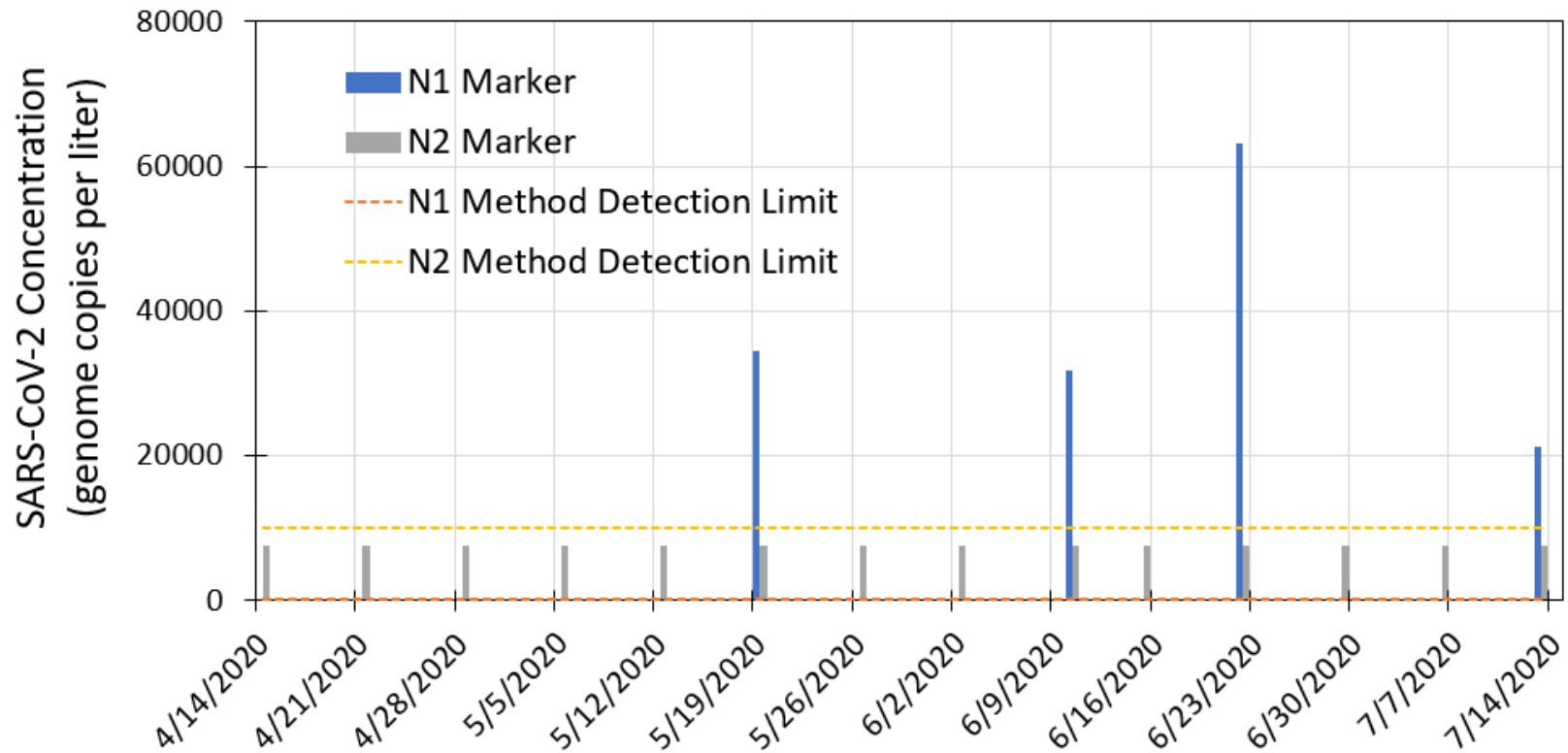
By **Jaclyn Peiser**

August 28, 2020 at 5:50 AM EDT

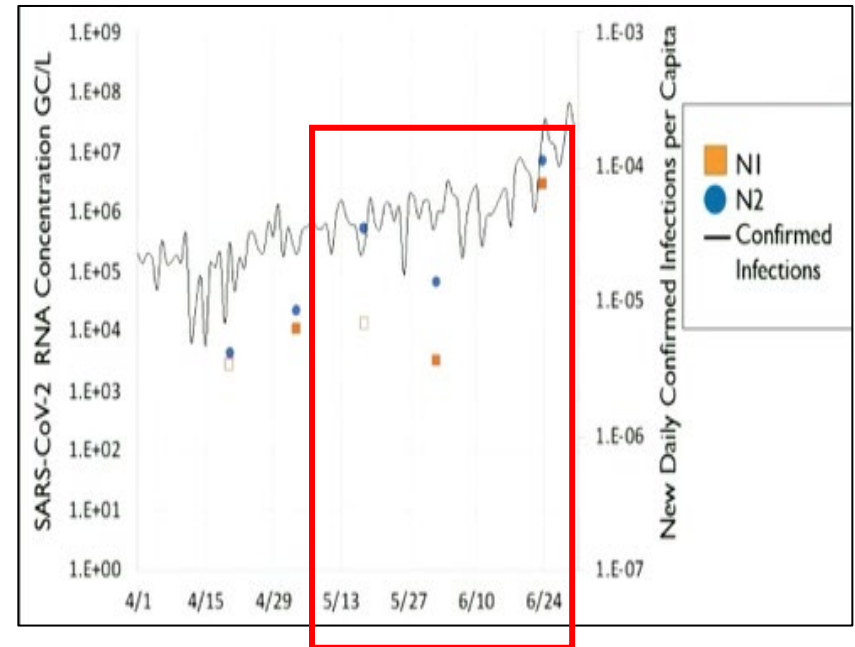
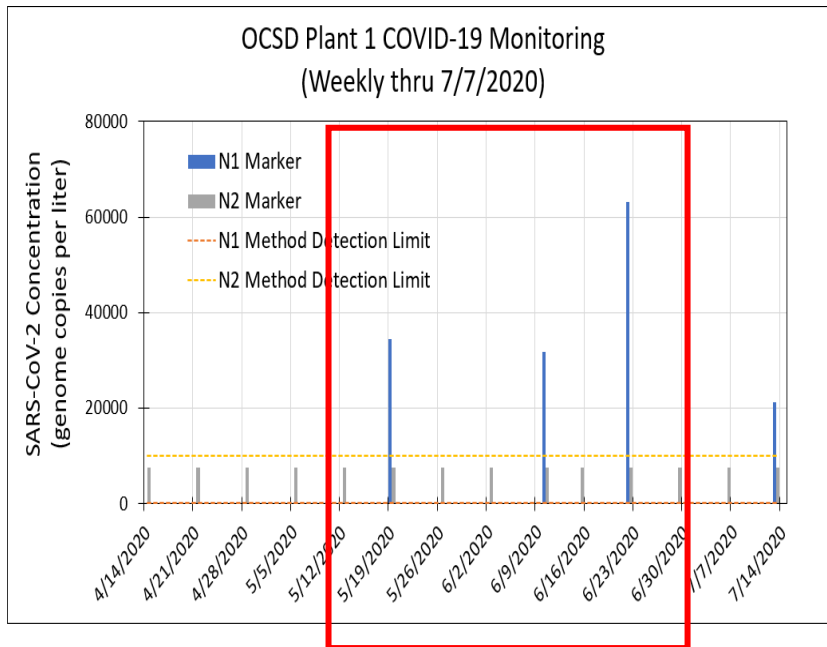
University of Arizona



OCSD Plant 1 COVID-19 Monitoring
(Weekly thru 7/7/2020)



Comparing Results



Stanford University

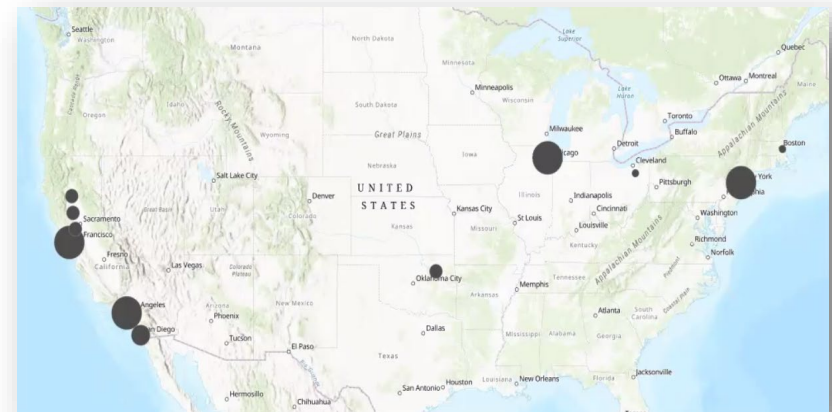


Method
Development

Detection and
Quantification

Data
Management

Data Modeling



Samples from US WWTPs

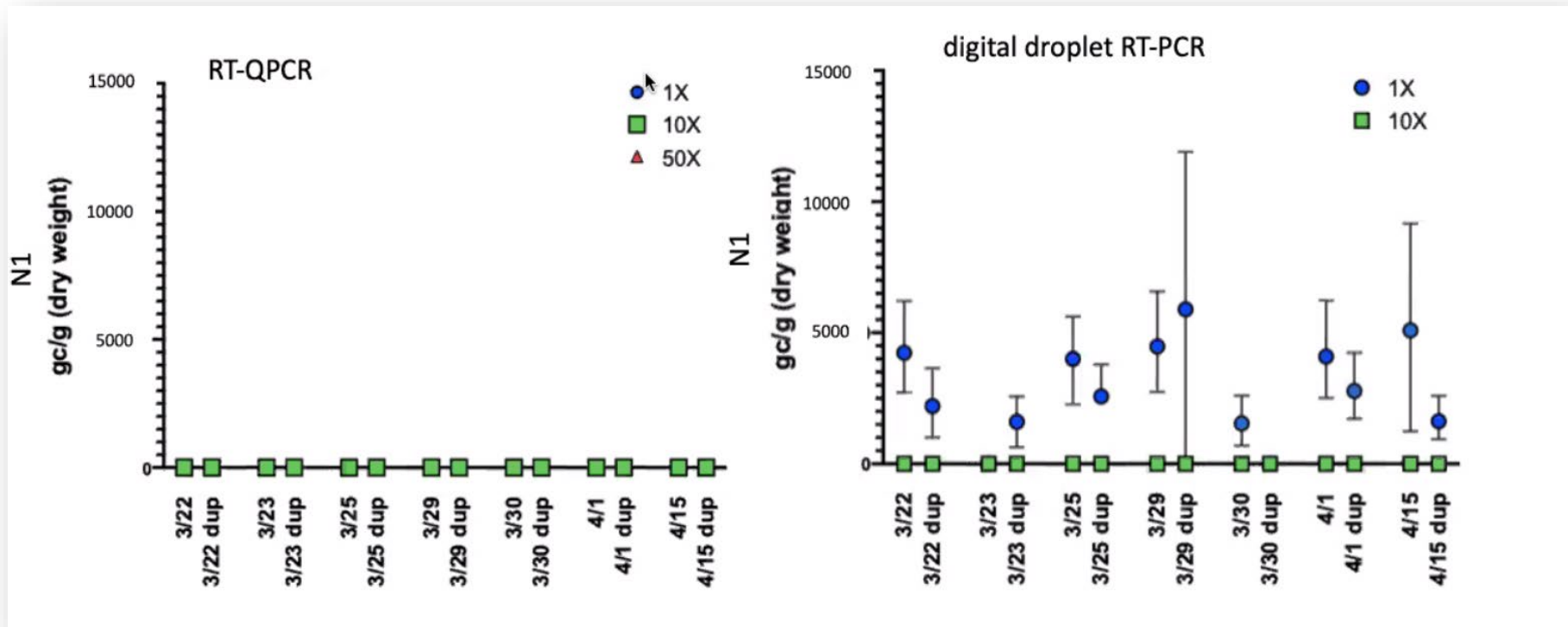
- 25 CA WWTPs
- 24 WWTPs outside CA
- Archived 1,700 samples to date
- Analyzed 2 POTWs to date

Stanford University



Method Development

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



Stanford University



Preliminary Results

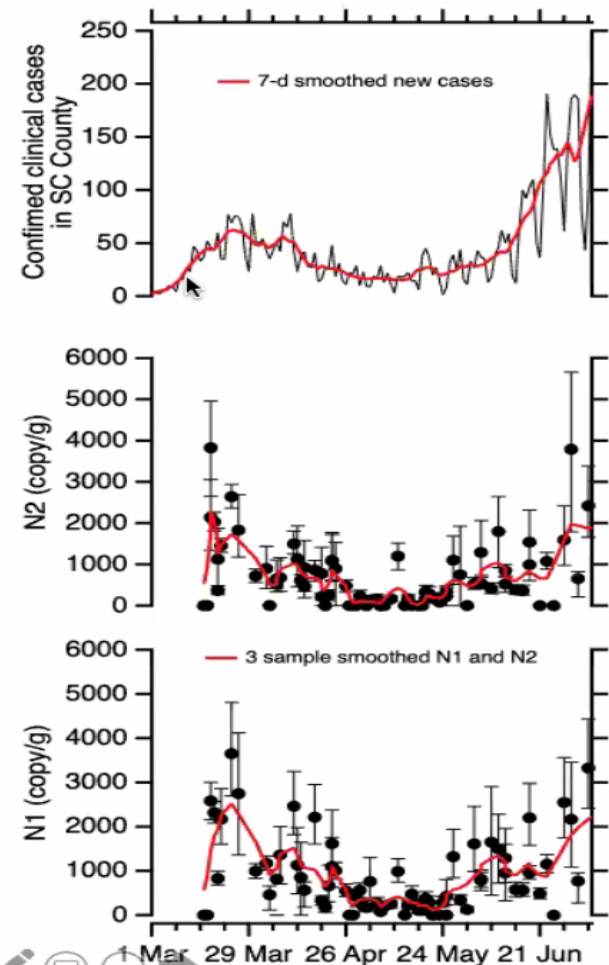
- Primary settled solids data
- Tracking with confirmed clinical cases
- Data analysis and modeling in progress

Cannot Use to Predict Prevalence

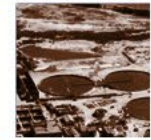
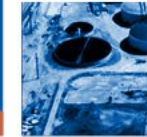
- Missing key variable – virus shed in feces
- Prediction of COVID-19 unrealistically high

Recommendations

- PH information must guide sampling
- Supply chain issues



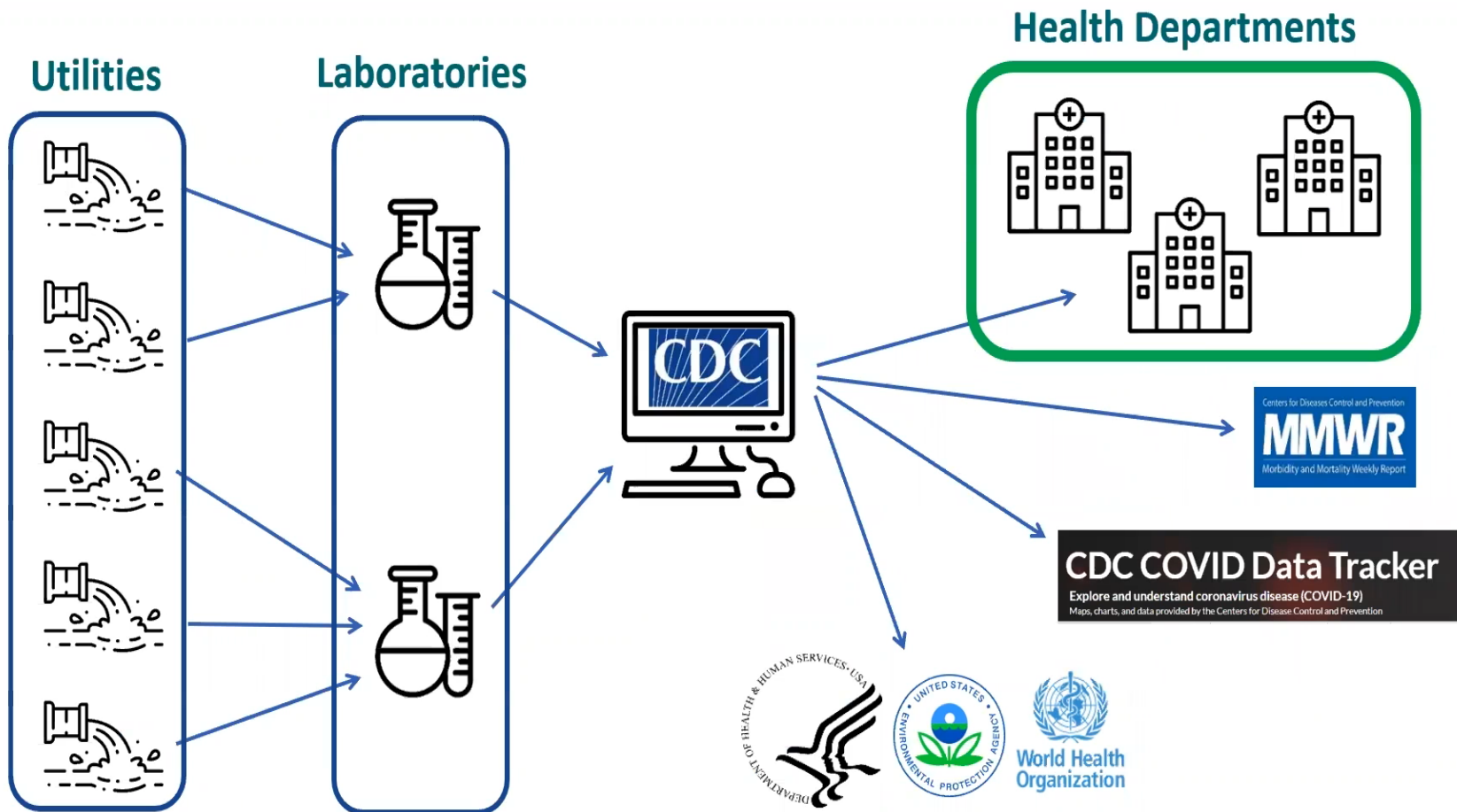
CDC Perspective



- 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

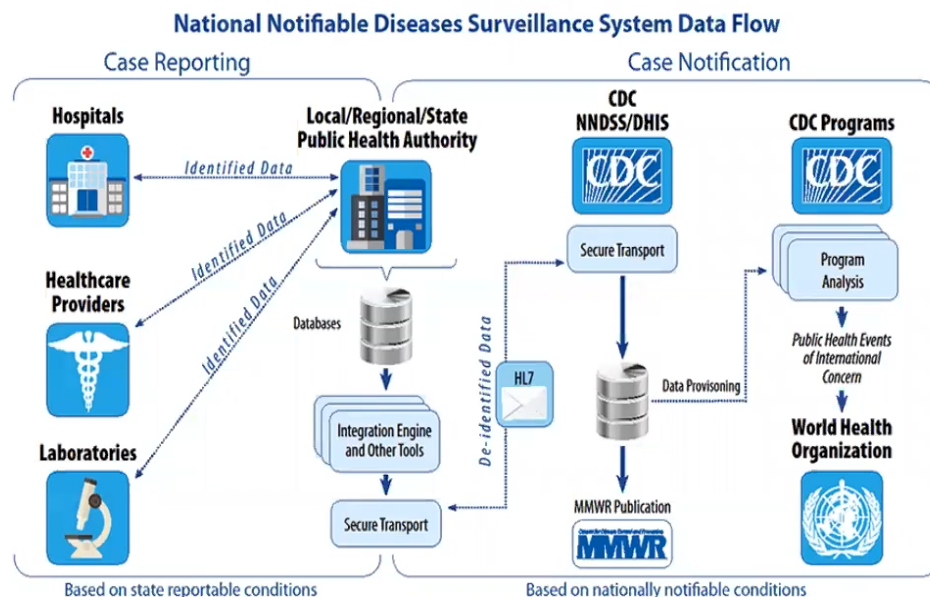


National Wastewater Surveillance System

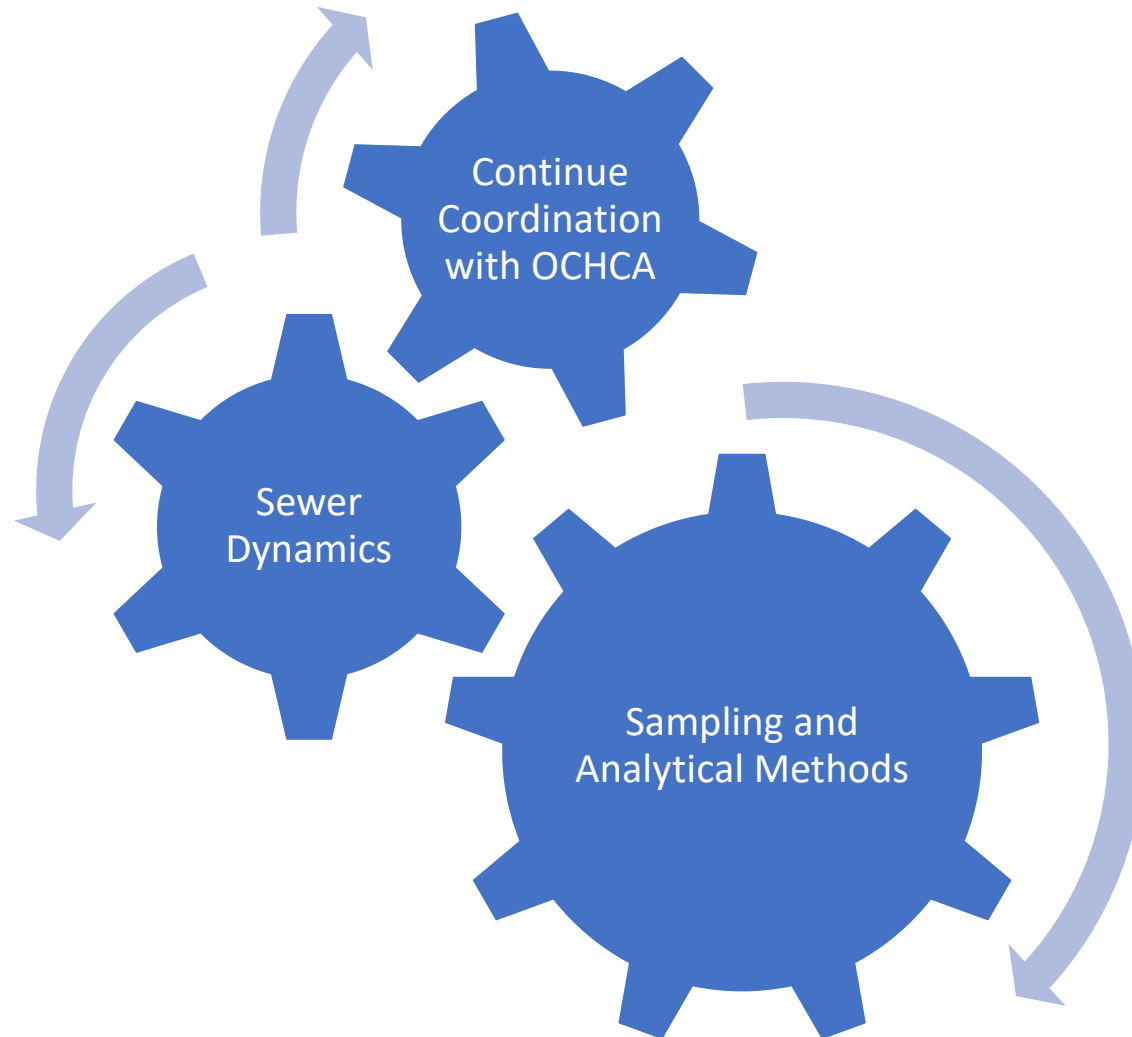


CDC's Role in NWSS

- 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



Next Steps



Acknowledgements



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Questions?

