Wastewater as an Early Detection System for COVID-19

2020 Pilot Program

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Indiana Finance Authority’s **Pilot Program**

**Goals**
- Data for decision-making
- Utility-led initiative
- University communities
- Understand applications & future applicability

**Structure**
- Financed by Cares Act
- 20 weeks
- Facilitated by contractor
- Final Report
Sewershed Monitoring for SARS-CoV-2

- University of Arizona
- Utah
- Kansas
- Ohio
- New York
- Houston
COVID-19 Risk in Rural NC

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Jackson County, NC
- Population: ~43,000 residents + ~12,000 Western Carolina University (WCU) students
- Low but rising case load (~1% infected), few deaths

Wastewater as a Leading Indicator
- Wastewater: High viral loads on 7/28, then linear decrease
- Confirmed cases: Spike on 8/6, then sustained decrease
- Proxy symptoms: Spike on 8/5, then linear decrease

Wastewater Sampling
- 500 mL samples collected at one of three WWTPs (serving ~14,000 residents + WCU)
- 24-hour timed composites (once/hour) collected Mondays & Tuesdays (7/28 – 8/18)
- Samples very clear, with minimal solids – impacted control recovery?

Wastewater Testing
- qPCR with LOQ = 2200 C/mL at McElroy lab (U of WI-Milwaukee);
- 0.10% - 2.19% recovery of internal control (BCoV)
- High correlation (Pearson r=0.81) between N1 and N2 values
- Mon vs. Tue levels varied by ~50% (3/4 samples >LOQ on Mon vs. 0/4 on Tue)

Other Data: NYT, U of WA, Delphi Research Group, COVID Tracking Project, NEHIS, CDC, RVUF, Google, Census

In collaboration with:
- Tidewater Water and Sewer Authority
- Jackson County Department of Public Health
- University of Wisconsin-Milwaukee

Results: Wastewater data could provide a lead time of 8 to 9 days for changes in SARS-CoV-2 levels.
The Pilot Process

**Plan**
- Enroll Participants
  - WWTPs serving public & private universities with > 1,000 students
- Train Staff
- Complete sample plans
  - Where and how to sample
  - Select locations

**Monitor**
- Send sample kits to utility
- Staff collects at WWTP & subsites
  - WWTPs, Liftstations, and manholes

**Analyze & Report**
- Lab results in 120W platform
- Health Researcher reviews
  - Share results with utilities and program partners
  - Analyze/interpret results
Early Results

Sample Sites

Cold weather in Indiana

Students move in

LOQ
Key Takeaways

Gather meaningful water system data
Encourage & drive community engagement early
Provide a flexible interpretation framework
Identify specific present & future use cases

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