

This is not an ADB material. The views expressed in this document are the views of the author/s and/or their organizations and do not necessarily reflect the views or policies of the Asian Development Bank, or its Board of Governors, or the governments they represent. ADB does not guarantee the accuracy and/or completeness of the material's contents, and accepts no responsibility for any direct or indirect consequence of their use or reliance, whether wholly or partially. Please feel free to contact the authors directly should you have queries.

**Asia Water Forum 2022**

8–11 August 2022 • Online



Focus Area: Universal water supply and sanitation services

## Session Title: Wastewater Epidemiology For ALL

Schedule: 9 August 2022 (Tue) | 3:00 p.m. - 4:30 p.m. (GMT+08)



Arthur Kokolekos

Regional Business Development Manager, APAC

**LUMINULTRA<sup>®</sup>**  
microbial monitoring



**ADB**



# Definitions & Wastewater-Based Epidemiology (WBE)

## SARS-COV-2

- The virus that causes a respiratory disease called coronavirus disease 19 (COVID-19)

## COVID-19

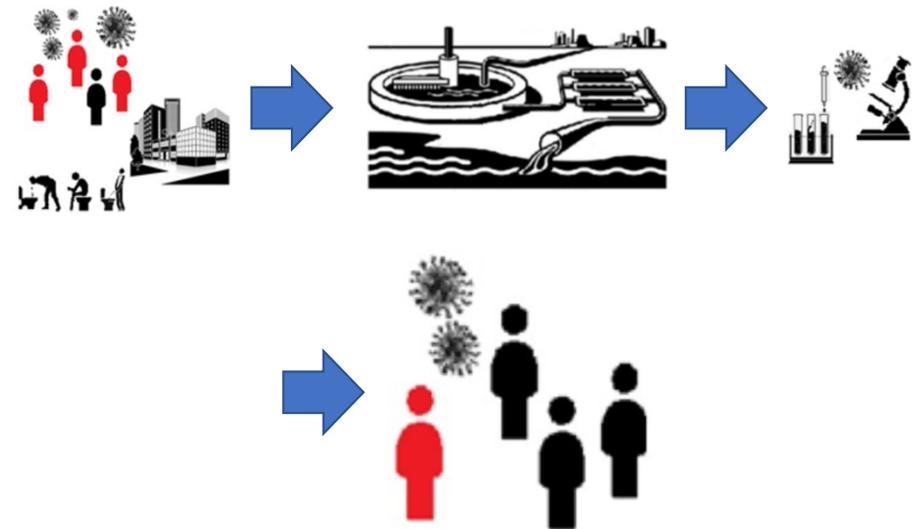
- Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus

## Epidemiology

- Method used to find the causes of health outcomes and diseases in populations. In epidemiology, the patient is the community and individuals are viewed collectively

## Wastewater-Based Epidemiology (WBE)

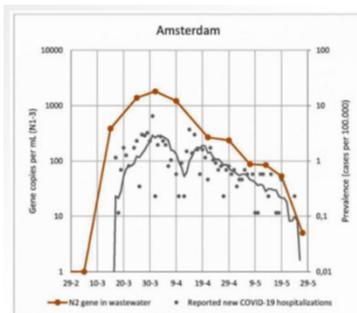
- New approach utilized to give comprehensive health information on communities. The concept is primarily based upon the extraction, detection and then subsequent analysis and interpretation of chemical and/or biological compounds



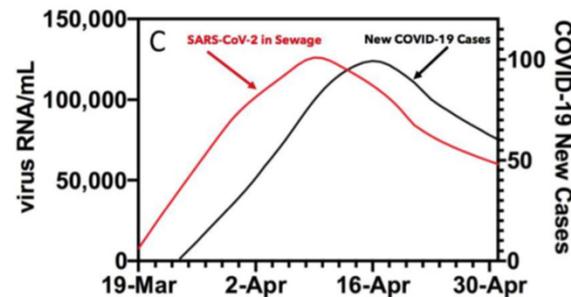


# Why Wastewater Testing for SARS-CoV-2?

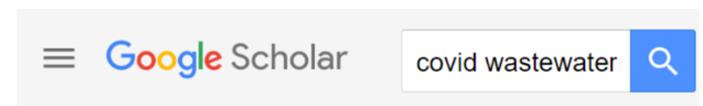
- Now well recognized method of non-invasive detection of SARS-CoV-2
- Tens of 1000's of research papers on this methodology and subject
- Method employs the gold standard PCR methodology for SARS-CoV-2 detection (as in clinical testing), optimized for complex wastewater samples
- Non-invasive “Surveillance” of COVID-19 cases in communities
- VALUE: Data provides authorities and decision makers with early warning before cases emerge in clinical testing results.
  - Wastewater monitoring for SARS-CoV-2 RNA has been shown effective to predict outbreaks of COVID-19 by 2-14 days. \**COVIDPoops19 Summary of Global SARS-CoV-2 Wastewater Monitoring Efforts by UC Merced Researchers*



<https://www.kwrwater.nl/en/achieve/sewage-monitoring-as-an-early-warning-system-for-corona/>



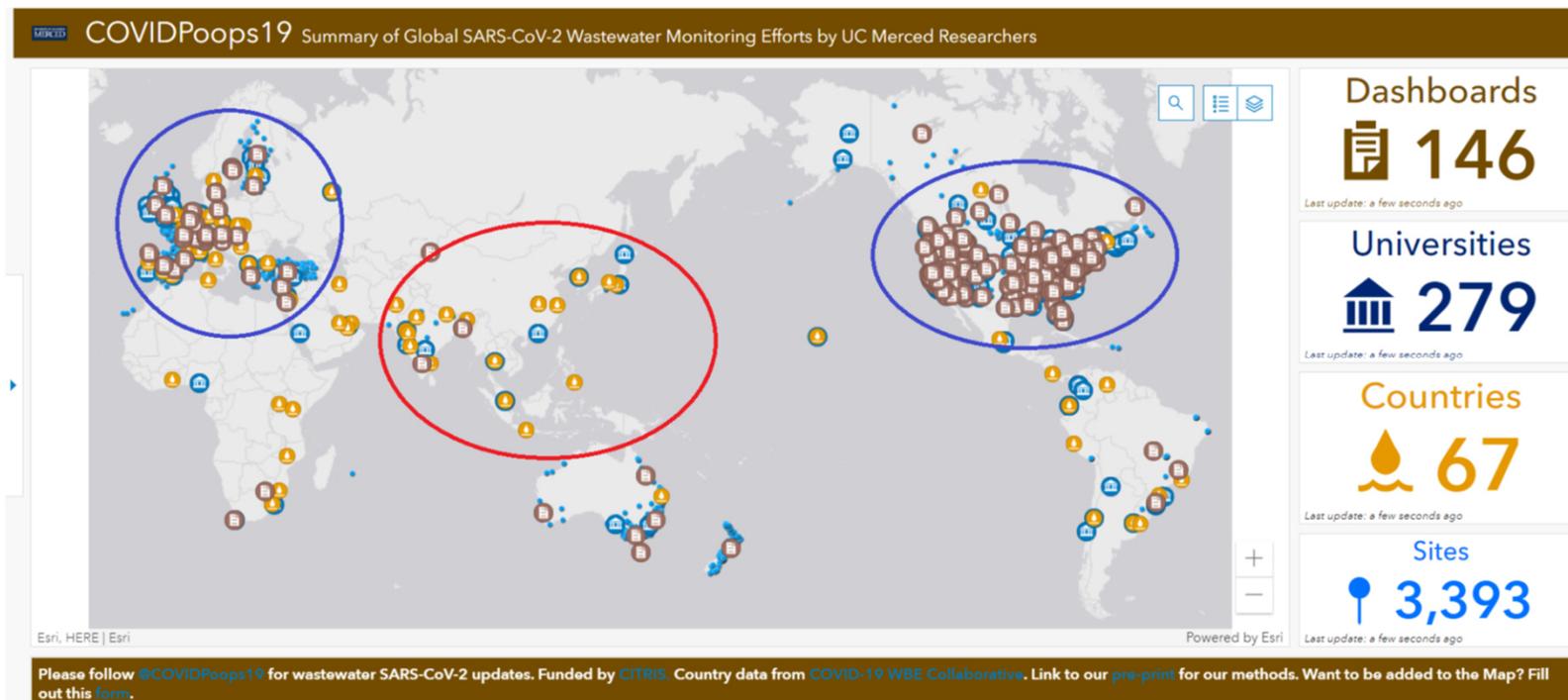
Peccia et al., (2020), medRxiv preprint doi: <https://doi.org/10.1101/2020.05.19.20105999>





# Status SARS-CoV-2 Wastewater Testing in Asia Pacific

- Low adoption in **Asia** region compared with **North America** and **Europe**
- Reference: COVIDPoops19 Summary of Global SARS-CoV-2 Wastewater Monitoring Efforts by UC Merced Researchers provide a global map of SARS-CoV-2 wastewater testing so the public can easily see where testing is happening in their area





## Limitations SARS-CoV-2 Wastewater Testing

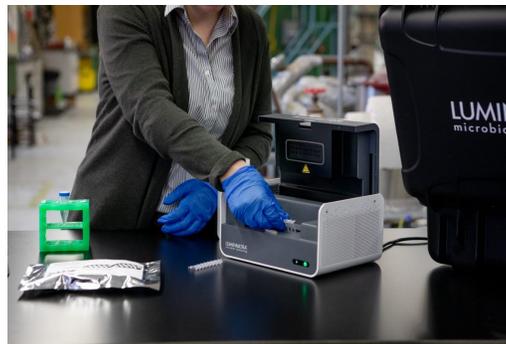
- Very high capital costs for testing equipment plus ancillary equipment to support the testing
- High OPEX costs of test kits and fragmented/stressed supply chain
- Highly trained and skilled users required for testing and result interpretation
- Typically, centralized testing model (Lab)





# Overcoming Limitations by LuminUltra Technologies

- Low capital cost for testing equipment plus little ancillary equipment required to support the testing
- Low test kit cost, all complete (99%) supply straight out of the box
- Options for OPEX model supply to reduce up front capital expenditure
- Less skill requirements to perform testing
- Software to simplify testing and result interpretation
- Portability of test equipment allowing mobile and decentralized testing model
- Same equipment suitable for other microbial testing (Legionella, E.coli & more) maximizing ROI





# SARS-CoV-2 Wastewater Surveillance Case Uses

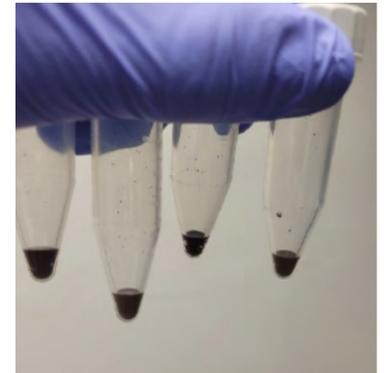
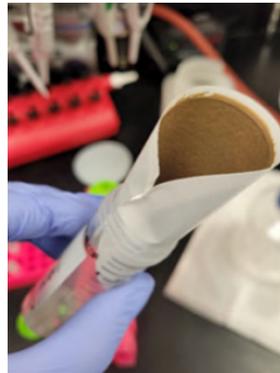
- Small Communities
- Neighborhoods in larger cities
- University dorms / housing
- Hospitals
- Aircraft & Airports
- Cruise Ships
- Mining Camps





## Continued Innovation

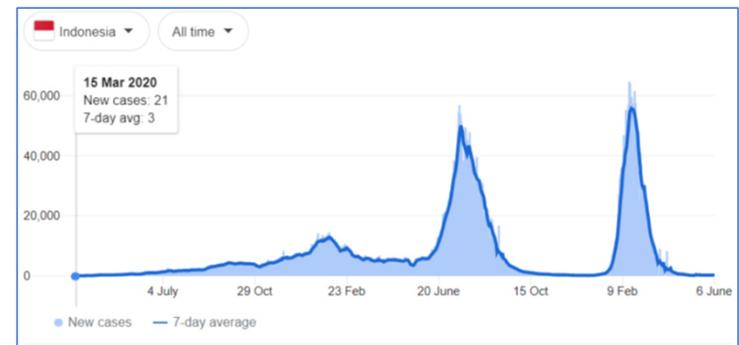
- SARS-CoV-2 surveillance testing in wastewater commercialized at LuminUltra in October 2020
- Research & Development continues to improve and further simplify testing for users
  - Test reagent improvements to eliminate need for refrigerated storage & ancillary equipment
  - Improved sensitivity, lowering limit of detection
  - Considerably lower cost (capital and operational) and improved viral SARS-CoV-2 rNA capture through simple innovative passive sampling





# Lessons Learnt

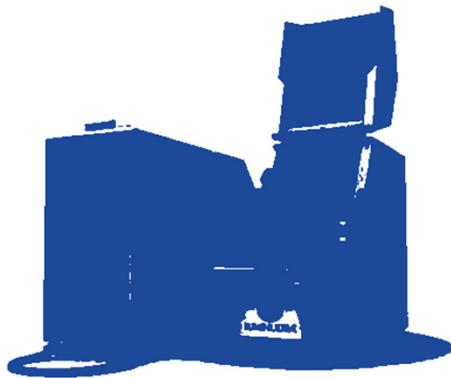
- Do something or do nothing
- Focus: Sampling
- Focus: SOP
- Strategic Surveillance
- WBE: Just one piece of the puzzle
- Biggest Value! When cases are low





## The Future... and Final Message!

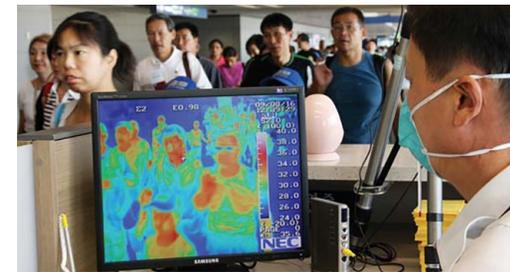
- **AUTOMATION!** SARS-CoV-2 wastewater testing to minimize and ultimately eliminate requirement for human intervention. Noting! A medium to longer term solution.



Automation for the FUTURE!



SARS-CoV-2 Wastewater based epidemiology is your smoke alarm warning before the fire takes hold



2002–2004 outbreak of SARS  
Thermal cameras in airports still employed today





## Thank You... Questions?

[www.luminultra.com](http://www.luminultra.com)

<https://www.luminultra.com/covid-19-testing/wastewater-testing/>

Email: [arthur.kokolekos@luminultra.com](mailto:arthur.kokolekos@luminultra.com)

**LUMINULTRA**<sup>®</sup>  
microbial monitoring



## Rapid on-site COVID-19 wastewater testing solutions

A game-changer for early detection



©LuminUltra Technologies Limited

