Environmental surve for COVID-19

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RIVM CDC

Supported by Dutch MOH

WHO CC for Risk Assessment of Pathogens in Food and Water

UU Chair in global changes and environmentally infectious disease

Environmental surveillance – Multipurpose

1) Molecular tracing of contaminated water source that caused infectious disease cases/ outbreaks (e.g. norovirus, hepatitis E virus, *Trichobilharzia)*

2) Water- and foodborne transmission routes e.g. norovirus, *Coxiella burnetii*, rotavirus, enterovirus, *Cryptosporidium* and *Giardia*

3) Retrospective environmental surveillance to origin e.g. norovirus, parechovirus, aichi virus

4) Risk-based monitoring e.g. poliovirus

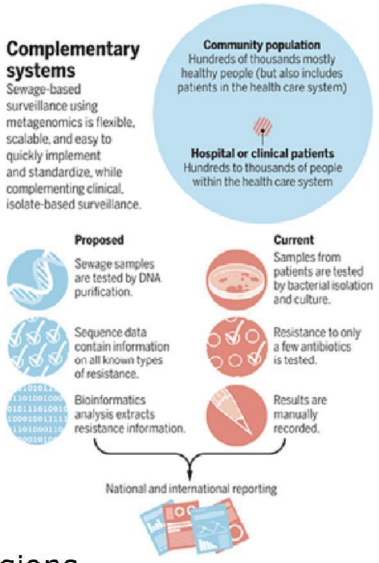
5) Emerging pathogens e.g. *Francisella tularensis,* nontuberculous mycobacteria, antibiotic resistant pathogens

6) Environmental surveillance in addition to pathogen and disease surveillance e.g. poliovirus and measles virus, resistant pathogens

Some lessons learned from AMR surveillance

Lesson 1

Contribution largely from open population since resistant bacteria of concern were detected at Sewage Treatment Plants without discharges from health care facilities. Information complementary to clinical surveillance.



Lesson 2

As shown previously for different viruses e.g. polioviruses, resistant bacteria originated from few people among thousands.

Lesson 3

Global sewage surveillance useful in data-limited regions.

improving sanitation and health potentially limit global AMR burden.

Proofs of principle for SARS-CoV-2 in wastewater

SARS-CoV-2 RNA fragments detected in feces (published beginning of February) approx. 50% samples independent of GI and severity

Virus cultured from stool, failed in other study - tbd

Wastewater sampled at different locations, analysed for SARS-CoV-2

1. In absence of severe cases: in line with the contribution of virus in feces or other excreta from for instance presymptomatic people
2. Near the first notified case: showing wastewater surveillance is a sensitive tool detecting few in 1000s of cases

- Wastewater of importance for COVID-19 surveillance
- But less so for spread of SARS-CoV-2
- Protection for those working with human waste and wastewater needed

SARS-CoV-2 in sewage

1. Testing sewage means you actually test not one person but thousands of infected persons at the same time. This makes it cost-effective and non-invasive.
2. Sewage surveillance should be complementary to COVID-19 and SARS-CoV-2 in people yielding other information e.g. for contact tracing or need for hospitalization.
3. Wastewater surveillance can show trends in virus spread over time within the localized population from symptomatics AND asymptomatics, presymptomatics, postsymptomatics.
4. Especially in countries with limited resources it may aid policy making, especially if performed for multiple pathogens such as poliovirus for which it is already globally used (WHO Global Polio Eradication Initiative) and for antimicrobial resistance in One Heath context (WHO Tricycle project).

Interested? Send email to [redacted](10)(2e)@rivm.nl

POLIO GLOBAL ERADICATION INITIATIVE

Global Tricycle Surveillance
ESBL E.coli