GGD Amsterdam

Use of passive samplers as sewage surveillance tool to monitor a hepatitis A outbreak at a school in Amsterdam, the Netherlands

Maarten de Jong
Epidemiologist Public Health Service (GGD) Amsterdam

Sarphati Initiatief
ACADEMISCHE WERKPLAATS PUBLIEKEGEZONDHEID REGIO NOORD-HOLLAND EN FLEVOLAND

PARTNERS4URBANWATER

Rijksinstituut voor Volksgezondheid en Milieu
Ministerie van Volksgezondheid, Welzijn en Sport

Amsterdam UMC
Universitair Medische Centra

KWR

GGD Amsterdam

Hepatitis A Outbreak

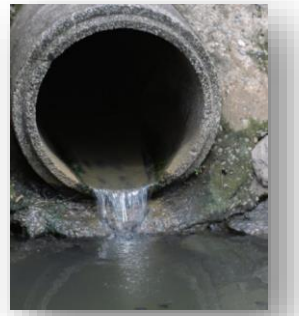
- October 2022: three hepatitis A cases notified to Public Health Service (GGD) Amsterdam
- Not vaccinated and recently returned from hepatitis A endemic country
- All cases attended the same primary school

Why an issue?

- Hepatitis A in children asymptomatic or mild disease
- In unprotected adults may cause severe illness or can even be fatal
- Asymptomatic infections can lead to silent transmission

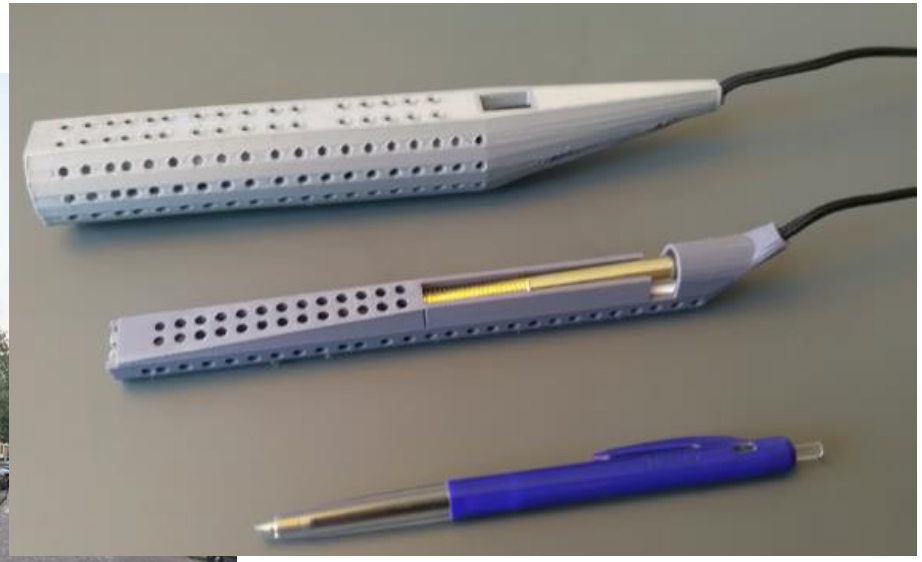
Why sewage surveillance?

- No feces of other children at the school was collected to monitor silent transmission
  - Not standard procedure in outbreak protocol
  - Vaccination campaign was prioritized
  - Communication with school was difficult



GGD Amsterdam

Passive samplers around school

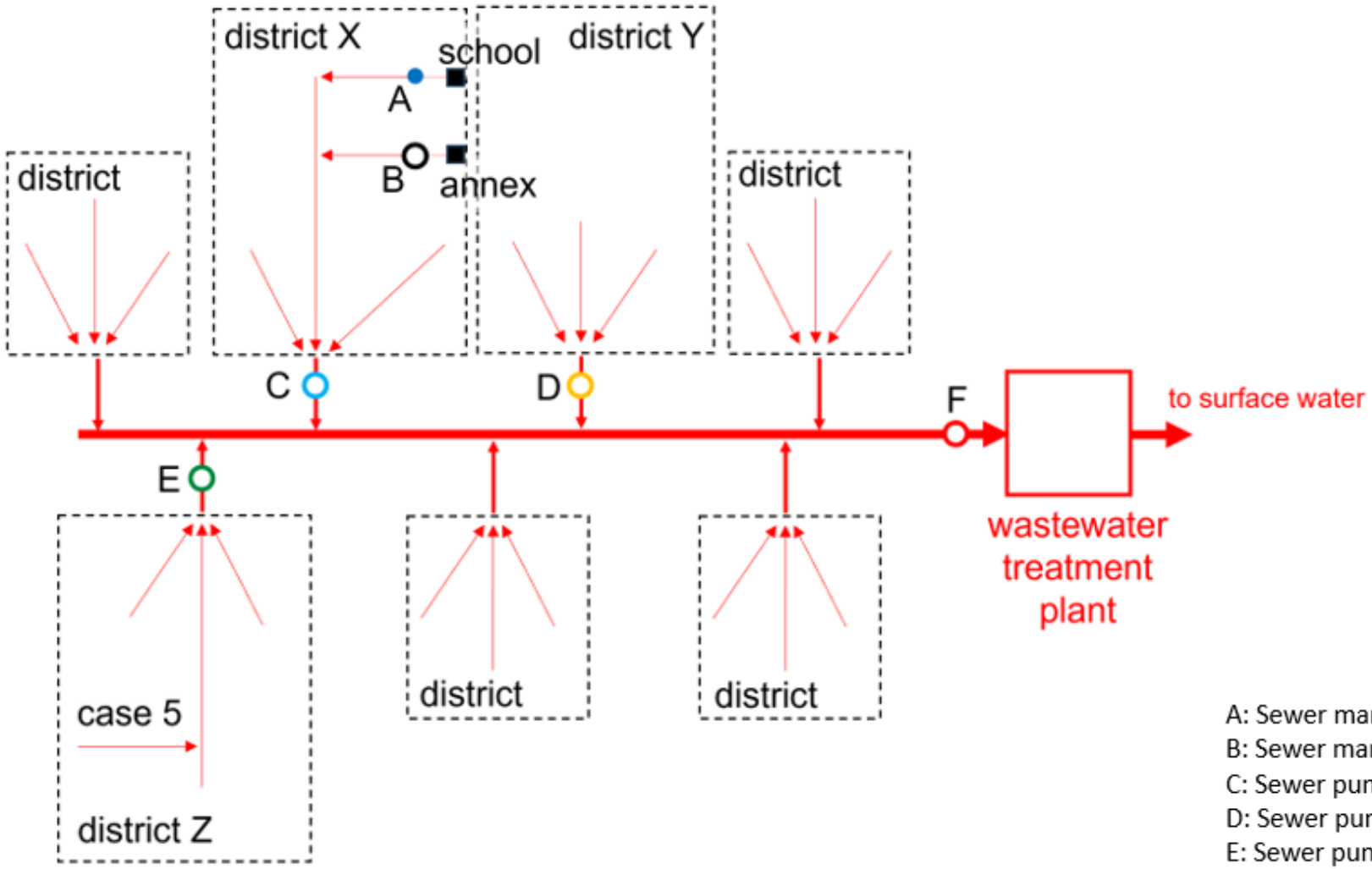


Torpedo passive samplers

with cotton tips

GGD Amsterdam

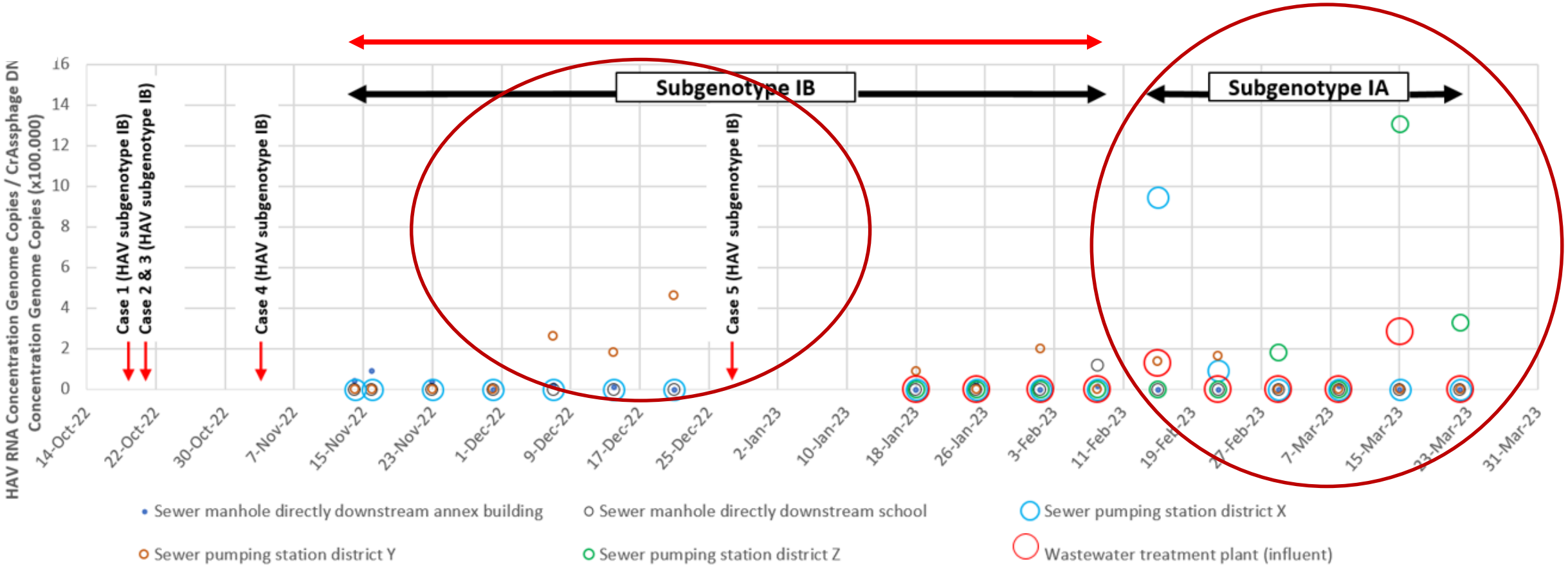
Passive samplers around school



A: Sewer manhole directly downstream school
B: Sewer manhole directly downstream annex building
C: Sewer pumping station district X
D: Sewer pumping station district Y
E: Sewer pumping station district Z
F: Wastewater treatment plant (influent)

GGD Amsterdam

Sewage samples analyses



GGD Amsterdam

Conclusions

First time use of passive samplers to detect hepatitis A in sewage and link to diagnosed cases to monitor outbreak

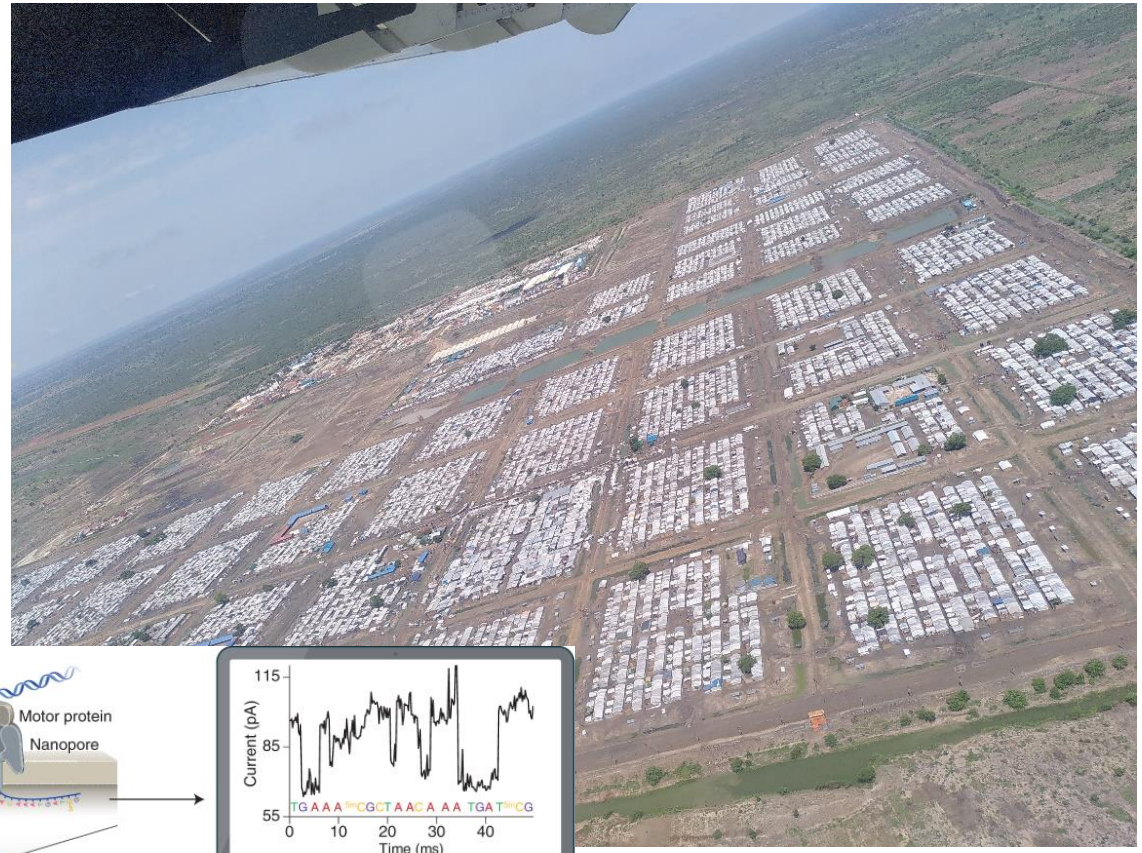
- It detects unnoticed viral infections and hepatitis A strain disappeared from sewage: outbreak measures effective
- When obtaining feces to monitor silent transmission is a challenge, employment of passive samplers is a solution
  - Not only for hepatitis A outbreaks, also potentially other infectious diseases
- Future studies around hepatitis A and other infectious disease outbreaks should:
  - Collect feces AND deploy passive samplers for validation and incorporation in outbreak protocols
  - Assess whether concentrations detected in sewage indicate the number of infected individuals

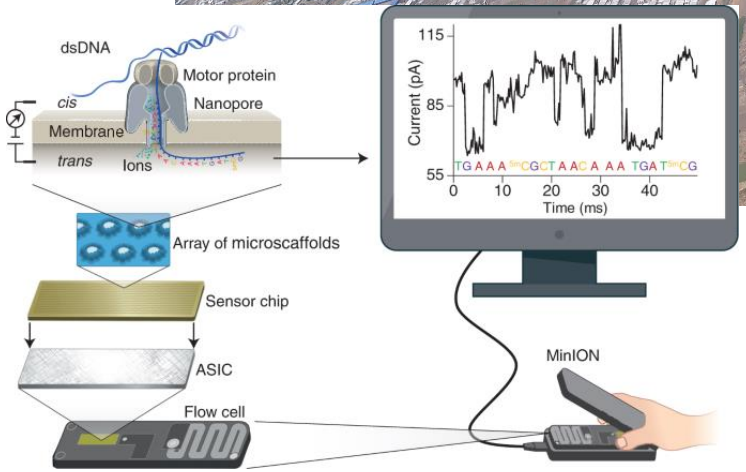
Passive sampler-based sewage monitoring is a promising tool to guide public health response during hepatitis A and other (asymptomatic) outbreaks

GGD Amsterdam

Future plans

- Employment passive samplers in low-resource settings
- Doctors without Borders
- E.g. refugee camps
- Combining passive samplers with portable on-demand diagnostic tools
  - Sewage sample analysis with Nanopore MinIon technology





GGD Amsterdam

Thank you for your attention

Questions or interested about local and on-demand sewage monitoring for infectious disease outbreak control?

Contact me: maadjong@ggd.amsterdam.nl
or find me on LinkedIn: Maarten de Jong