SARS-CoV-2 surveillance in Belgian wastewaters

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In a nutshell

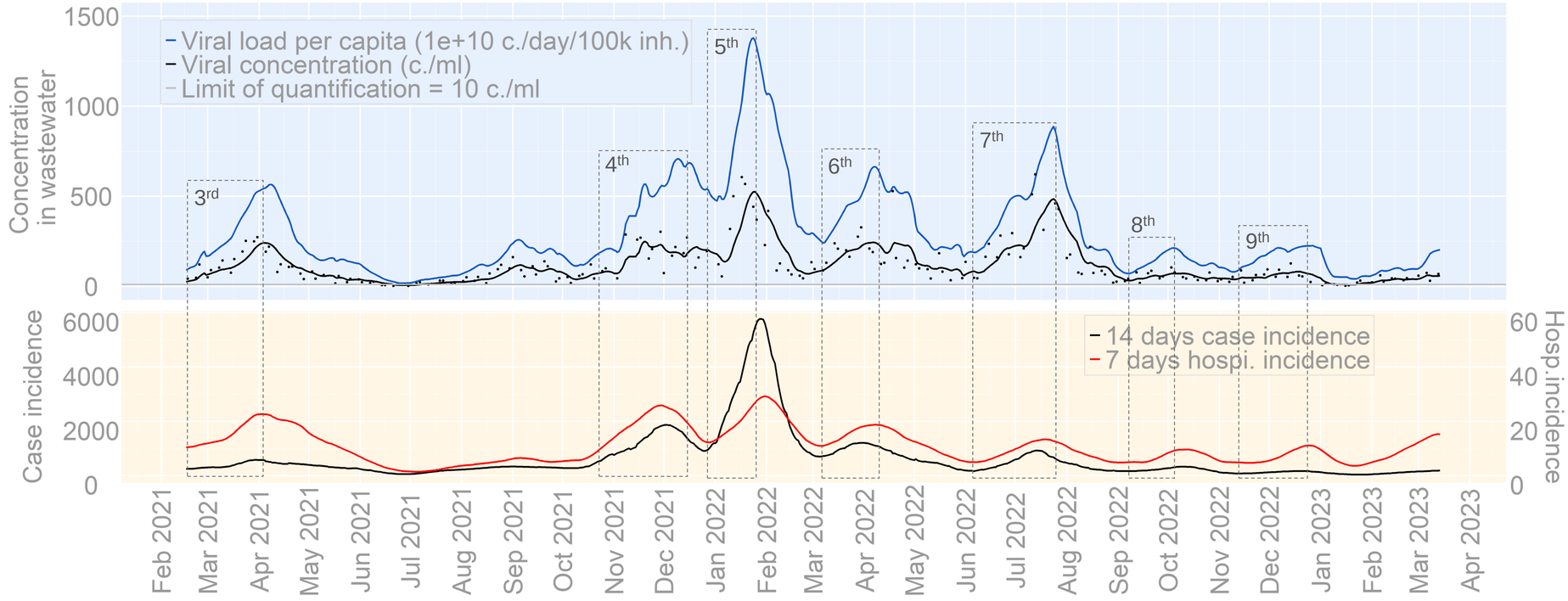
- **45% of the Belgian population is monitored by 42 wastewater treatment plants**
- **Nationally aggregated SARS-CoV-2 concentrations in wastewater correlate with the daily new COVID-19 cases and hospital admissions**
- **Wastewater alerting indicators permitted us to effectively monitor the community-spread of COVID-19**

Introduction

Wastewater-based epidemiology enables the development of cost-effective surveillance programs, compared to individual RT-qPCR tests for monitoring the virus circulation in a large population. In this work, we present the national wastewater-based epidemiology surveillance used by the public health agency to monitor the SARS-CoV-2 circulation in the Belgian population.

Methods

- 42 WWTPs covering 45% of the Belgian population analysed 2x/week
- Analytical method: RT-qPCR for the quantification of N1, N2, E gene fragments
- Spearman correlation coefficient computed with R (version 4.1.0)
- Three wastewater-based indicators were developed:
  - The « High Circulation » indicator is positive in areas where the viral load exceeds 50% of the maximal load obtained during a wave of reference, currently the 9th wave.
  - The « Fast Increase » indicator is positive in areas where the slope of the viral load exceeds 70%.
  - The « Increasing Trend » indicator highlights the areas where the viral load has increased for more than 6 consecutive days.



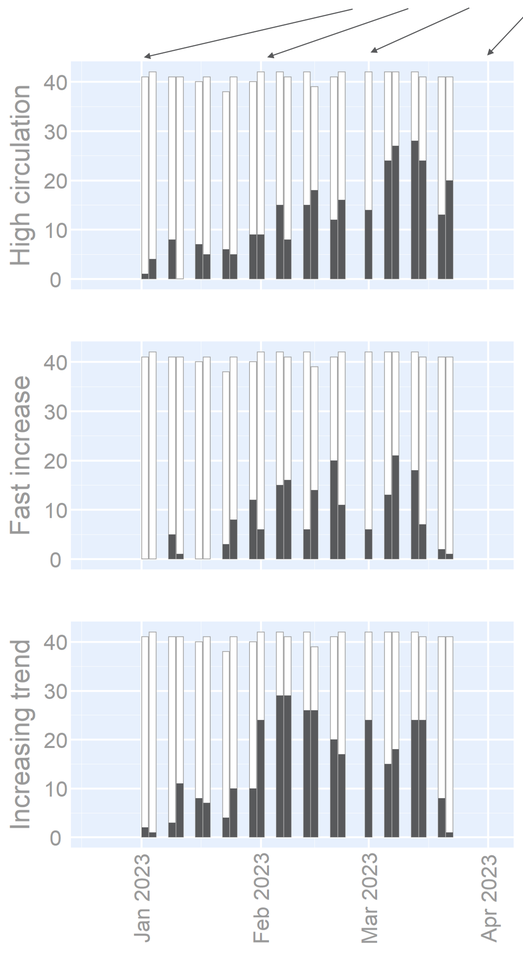
Wave	WW vs. Cases*	WW vs. Hospi.*
3rd	0.74	0.85
4th	0.74	0.42
5th	0.77	0.40
6th	0.51	0.11[a]
7th	0.51	0.56
8th	0.65	-0.01[a]
9th	0.59	0.50

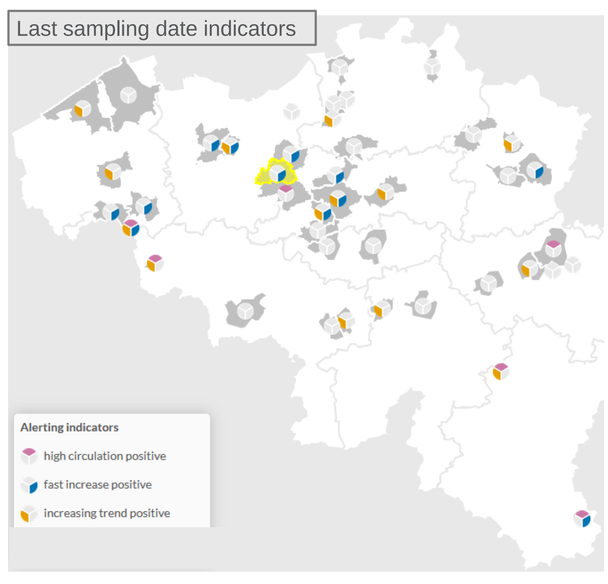
* Spearman correlation coefficient
[a] $p > 0.05$

Results

The nationally aggregated SARS-CoV-2 concentration in wastewater, corrected for rain impact and population size, correlates well during most of the observed waves with the daily new COVID-19 cases and hospital admissions.

The wastewater-based indicators permitted to effectively monitor the evolution of the waves and were considered complementary and valuable information to conventional epidemiological indicators in the weekly wastewater reports communicated to the National Risk Assessment Group.





Weekly waste-water report available:

REFERENCES

SARS-CoV-2 Surveillance in Belgian wastewater, Janssens et al., 2022, MDPI viruses

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