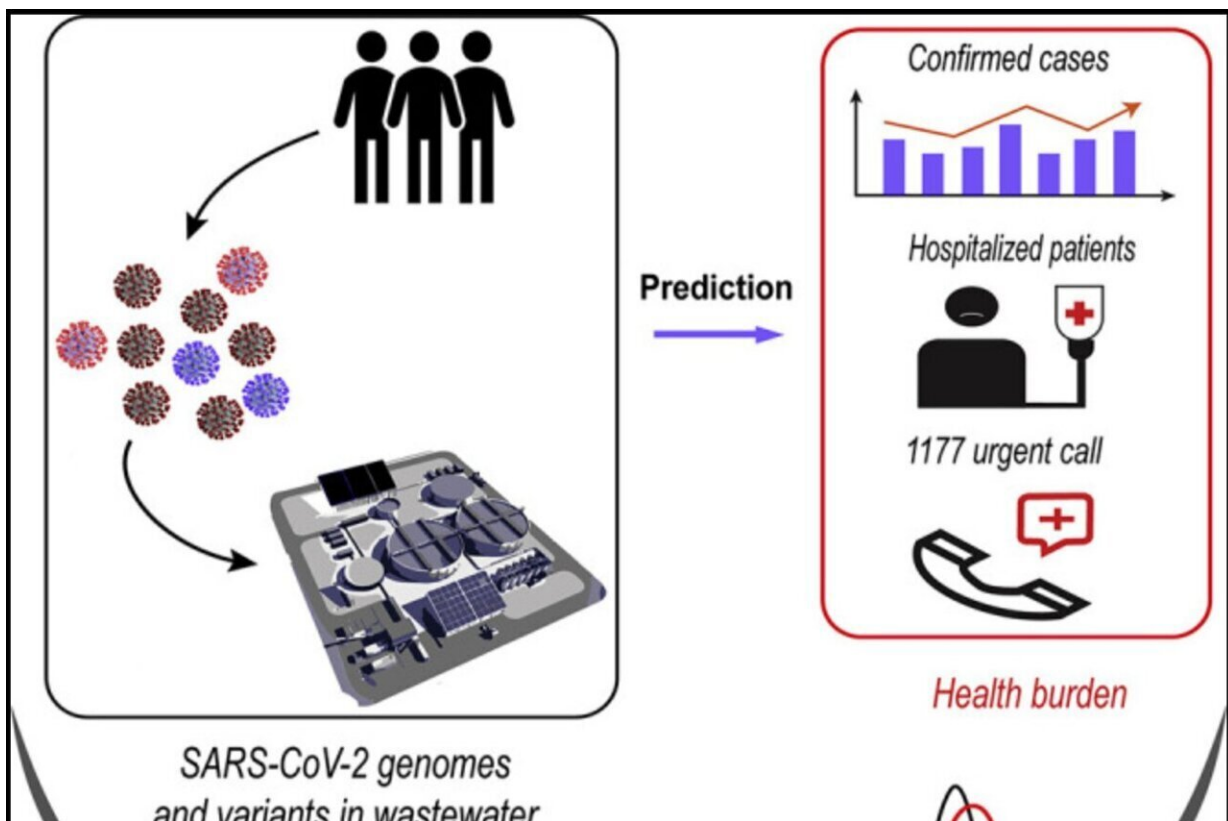


Measuring SARS-CoV-2 RNA in wastewater to predict the development of the pandemic and its burden on the health system

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Graphical abstract. Credit: *iScience* (2022). DOI: 10.1016/j.isci.2022.105000

Monitoring of viruses in wastewater enables the course of a pandemic and its burdens on various parts of the health-care sector to be predicted,

independent from official public testing capacity and scope for infection tracking. This has been established in a study from the University of Gothenburg.

The measurements and analyses of coronavirus levels in the [wastewater](#) of Gothenburg attracted a great deal of attention during the [pandemic](#). The weekly reports have shown both how widespread SARS-CoV-2 infection is in the community and its distribution among variants of the [virus](#).

Beginning in February 2020, the virus measurements taken in the monitoring rapidly became a useful indicator for forecasting load peaks in [health care](#). High concentrations of SARS-CoV-2 in the wastewater were followed by rising numbers of people with COVID-19 needing hospitalization.

The association emerges with striking precision in the study now published in the scientific journal *iScience*. Each of the four pandemic waves in 2020–2022 exhibits a pattern in which, within a couple of weeks after SARS-CoV-2 peaked in the wastewater, a rise in the number of newly admitted hospital patients with COVID-19 ensued.

Increased pressure on 1177 Vårdguiden

The virus peaks in the wastewater were followed not only by heavier burdens on inpatient care, but also by predictable increases in pressure on the 1177 Vårdguiden e-service. One to two weeks after a wastewater virus peak, more calls were coming in about acute breathlessness in adults.

"The study shows that virus monitoring in wastewater can predict how a pandemic is going to develop and its burden on several parts of the health system," says Hao Wang, postdoctoral researcher at Sahlgrenska

Academy's Department of Infectious Diseases, University of Gothenburg, and the study's first author.

The study provides an account of the degree of testing capacity in Sweden during various phases of the pandemic. The scientists say that the [national statistics](#) on the number of confirmed cases did not reflect the actual spread of infection.

However, even when their symptoms were mild, all those infected had the virus in their urine and feces. This enabled detection of the virus in wastewater, in the form of RNA (genetic material). The weekly reports were based on daily samples of wastewater collected by Gryaab, the municipal water treatment company in Gothenburg.

Lasting benefit to community

Heléne Norder, research leader at the University of Gothenburg's Sahlgrenska Academy and the last author of the study, sees the results as proof of how virus surveillance during the pandemic has benefited the community. She also identifies the distinct advantages of the method used.

"The method we use in Gothenburg also enables monitoring of other viruses, which gives us unique scope for quickly spotting ongoing outbreaks. In the area, besides SARS-CoV-2, we've also been able to demonstrate the presence of viruses that spread through food or water and are excreted in the feces. Some of those caused outbreaks—norovirus, the 'winter vomiting bug,' and astrovirus among children, for instance—during the pandemic."

"So during that time, we found changes in the virus levels that were directly relatable to the number of people infected in Gothenburg. Our research group intends to keep analyzing different viruses in the

wastewater as long as we have research funding for it."

The planning also includes further development of the technique to enable its adoption by all the laboratories that wish to carry out continuous virus monitoring. "This might result in monitoring of more [viruses](#) in more regions for rapid identification of future outbreaks and efficient, proactive nationwide surveillance of ongoing ones."

More information: Hao Wang et al, The amount of SARS-CoV-2 RNA in wastewater relates to the development of the pandemic and its burden on the health system, *iScience* (2022). [DOI: 10.1016/j.isci.2022.105000](#)

Provided by University of Gothenburg

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