

# Study finds raw wastewater 'leading indicator' of future COVID-19 outbreaks

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A global team of researchers has found that future COVID-19 outbreaks, variants, hospitalizations and ICU admissions can be reliably predicted by detecting and quantifying the amount of SARS-CoV-2

RNA in raw wastewater.

The scientists analyzed daily wastewater samples from one of the largest wastewater treatment plants in the world which services the population of the Athens, Greece, metropolitan area (about 3.7 million people) in order to develop important epidemiological information about the COVID-19 pandemic.

The researchers created computational models to predict increases in hospital and ICU admission rates as much as nine days in advance of a spike. This wastewater-based [epidemiological study](#) provides tools for early warning and prediction of COVID-19 outbreaks and increased hospital admissions. The study was accepted for publication in the journal of *Science of the Total Environment*.

"Wastewater surveillance has become a primary method for understanding COVID-19 levels in [local communities](#) during the pandemic," said Vasilis Vasiliou, a study collaborator and the Susan Dwight Bliss Professor of Epidemiology at the Yale School of Public Health.

Since [asymptomatic patients](#) can transmit the virus in their excrement, testing wastewater can catch the cases that may not have been recorded otherwise—and do it without using invasive nose swabs. "Wastewater-based epidemiology can be used extensively to monitor the health status of a population and support health authorities," said Nikolaos Thomaidis, the study's lead author and professor of analytical chemistry at the National and Kapodistrian University of Athens.

While the study extensively analyzed [wastewater](#) and pandemic clinical data from a large city over an extended period of time (more than 6 months), additional research is needed to gauge how well the developed predictive tools can work in different settings and on various timescales.

Nevertheless, the study findings are expected to help epidemiologists better understand the state of outbreaks in a community and facilitate the more effective mobilization of resources to help those affected by the coronavirus.

Jordan Peccia, a study co-author and the Thomas E. Golden Professor Environmental Engineering at Yale, said the models developed and validated in this study provide an excellent [early warning](#) tool for hospitals to predict and then prepare for COVID-19 admissions.

The study authors are researchers from the National and Kapodistrian University of Athens, Greece, European University of Cyprus, University of Colorado, Yale School of Public Health, and Yale Department of Chemical and Environmental Engineering.

"Collaborations like this that bring together researchers with multidisciplinary expertise from different scientific fields are crucial to protect [public health](#) from pandemics and other [health](#) threats," said co-author Meletios-Athanasios Dimopoulos, rector of National and Kapodistrian University of Athens.

Provided by Yale University

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