

# Virus already in Italy by December, sewers show

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Image of the ultrastructural morphology exhibited by the 2019 Novel Coronavirus (2019-nCoV). Credit: CDC

The coronavirus was present in two large Italian cities in December, more than two months before the first case was detected, a national health institute study of waste water has found.

That suggests the virus appeared in Italy around the same time it was first reported in China.

Researchers discovered genetic traces of SARS-CoV-2—as the virus is officially known—in samples of waste water collected in Milan and Turin at the end of last year, and Bologna in January, the ISS institute said in a statement seen by AFP on Friday.

Italy's first known native case was discovered mid-February.

The results "help to understand the start of the circulation of the virus in Italy," the ISS said.

They also "confirm the by-now consolidated international evidence" as to the strategic function of sewer samples as an early detection tool, it added.

The results feed into an effort by scientists around the world to trace the virus's family tree.

Chinese scientists have said the virus likely emerged in a market that sold wildlife in the central city of Wuhan in December, but Beijing officials have recently suggested that it may have originated elsewhere.

And some studies and reports have suggested that the virus might have been present in China before December.

## **Before the pandemic hit**

Italy was the first European country to be hit by the virus and the first in the world to impose a nationwide lockdown. The first known case, other than a couple of visiting Chinese tourists, was a patient in the town of Codogno in the Lombardy region.

On February 21 the government ordered Codogno shuttered, followed by nine other towns across Lombardy and Veneto.

By early March it had extended the shutdown across the country and has now recorded more than 34,500 deaths.

ISS water quality expert Giuseppina La Rosa and her team examined 40 waste water samples from October 2019 to February 2020.

The results, confirmed in two different laboratories by two different methods, showed the presence of SARS-CoV-2 in samples taken in Milan and Turin on December 18, 2019 and in Bologna on January 29, 2020.

Samples from October and November 2019 were negative, showing the virus had yet to arrive, La Rosa said.

The data was in line with results obtained from retrospective analysis of samples of patients hospitalised in France, which found positive SARS-CoV-2 cases dating back to the end of December, the institute said.

It also pointed to a recent Spanish study that found genetic traces in waste water samples collected in mid-January in Barcelona, some 40 days before the first indigenous case was discovered.

The presence of the virus in the Italian waste water did not

"automatically imply that the main transmission chains that led to the development of the epidemic in our country originated from these very first cases," La Rosa said.

## **Early detection system**

Since the beginning of the epidemic, researchers across the world have been tracing the spread of the coronavirus through waste water and sewage, finding genetic traces from Brisbane to Paris and Amsterdam.

Given the large number of coronavirus cases that have few or no symptoms, waste water testing is seen as a potential way to signal the presence of the virus even before the first cases are clinically confirmed in areas untouched by the epidemic—or where it has ebbed.

The ISS said it had urged the health ministry to coordinate the collection of samples regularly in sewers and at the entrance to purification plants "as a tool to detect and monitor the circulation of the virus in different territories at an early stage".

It is launching a pilot study on priority sites identified in tourist resorts in July, and expects to setup a nationwide surveillance network of waste water by the autumn.

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