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MAGAZINE

When did the spread of the Sars-Cov-2 virus start?

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FBK's Center for Health Emergencies contributed to the new study published in Nature

Community transmission of SARS-CoV-2, understood as the presence of established transmission chains, could have started as early as January 2020 in some areas of Europe and the United States according to a modeling study published in **Nature** to which the **ISI Foundation in Turin** and **Fondazione Bruno Kessler in Trento** have contributed. The analysis shows that the virus was introduced in several areas of Europe and the United States before the end of January 2020 and its spread in the first three months of 2020 was largely undetected, due to the limited ability to identify and test suspicious cases during that time. Only about 1-3% of infections were detected in these areas as of March 2020.

Almost two years after the outbreak of the COVID-19 pandemic, there is still uncertainty about SARS-CoV-2 introduction and community transmission around the world times. In the early stages of the pandemic, some countries limited testing to symptomatic individuals with epidemiological or travel links to China; this, partly due to the high percentage of **asymptomatic infected** individuals that characterizes the epidemiology of SARS-CoV-2, contributed to the undetected transmission of the virus. To improve understanding of the dynamics of the evolution of the COVID-19 pandemic in the **United States** and **Europe**, the authors modeled the plausible introduction and spatial spread of the virus during the first wave of the pandemic in 2020.

The analysis indicates that as of early March 2020, approximately 9 out of 1,000 infections were detected in the **United States** and 35 out of 1,000 infections were detected in **Europe**. Estimates on its introduction vary by country or state; it is likely that the transmission started towards the end of January in **California** and the beginning of February in the **state of New York,** but perhaps up to two weeks earlier in **Italy**. The chance of introduction and transmission events as early as December 2019 cannot be ruled out, although the probability is very low. Both in Europe and in the United States, the introduction of SARS-CoV-2 from China was significant only in the very early phase of the outbreak. As the epidemic evolved, the contribution of domestic introductions became increasingly important, and this fact has helped synchronize the epidemics in the different European countries and in the United States.

The authors suggest that more widespread testing and broader testing criteria could have allowed for early detection and interventions to prevent the spread of SARS-CoV-2. The modeling techniques and approaches used in this study may be useful in informing future response strategies for emerging viruses.

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