

New tool can detect COVID-19 outbreaks in U.S. counties

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A new machine learning-based online tool developed by researchers at Massachusetts General Hospital (MGH), Harvard Medical School (HMS), Georgia Tech and Boston Medical Center allows for early

detection of COVID-19 outbreaks in different U.S. counties. The COVID-19 Outbreak Detection Tool is updated two-to-three times per week and it predicts how fast an outbreak is spreading within a given county by estimating the doubling time of COVID-19 cases.

To make these predictions, the tool accounts for reported COVID-19 cases and deaths, face mask mandates, social distancing policies, changes in tests performed, rates of positive tests and the Centers for Disease Control and Prevention's Social Vulnerability Index (which assesses the health-related resilience of individual communities when confronted with external stresses, such as natural or human-caused disasters or disease outbreaks).

The tool offers an interactive map and a "data explorer" that allows users to select a specific county to see that county's population, total new cases of COVID-19 in the past week, average daily cases in the past week, and the COVID-19 doubling rate (i.e., how many days it takes for the number of cases to double in a given county).

"While earlier mitigation responses focused on state-level measures—such as a lockdown of an entire state—detecting local outbreaks will allow policy makers to implement measures at the county level—such as closing restaurants in a single county—to effectively contain the pandemic," said Jagpreet Chhatwal, Ph.D., the associate director at the MGH Institute for Technology Assessment and an assistant professor at HMS. "The model is able to detect many of the prior outbreaks within a matter of days."

"For effectively controlling the pandemic, it is critical to detect an outbreak in a timely manner so that the affected area can be isolated and the spread of COVID-19 infections to neighboring areas can be minimized; however, due to several reasons, it may take days or even weeks for humans to manually detect an outbreak. Our data-driven

[machine learning](#)-based solution significantly speeds up and automates that process," said Turgay Ayer, Ph.D., the director of Business Intelligence and Healthcare Analytics at the Center for Health and Humanitarian Systems and an associate professor at Georgia Tech.

Using the COVID-19 Outbreak Tool, the research team verified an outbreak in Johnson county in Iowa last week, which was linked to an [outbreak](#) at the University of Iowa. In addition, the [tool](#) identified several counties where outbreaks could be happening now. These include Harrisonburg County in Virginia, Wheeler County in Georgia, Monroe County in Indiana and Whitman County in Washington, where infections are doubling in less than one week.

More information: The COVID-19 Outbreak Detection Tool: analytics-modeling.shinyapps.io/outbreakdetection/

Provided by Massachusetts General Hospital

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