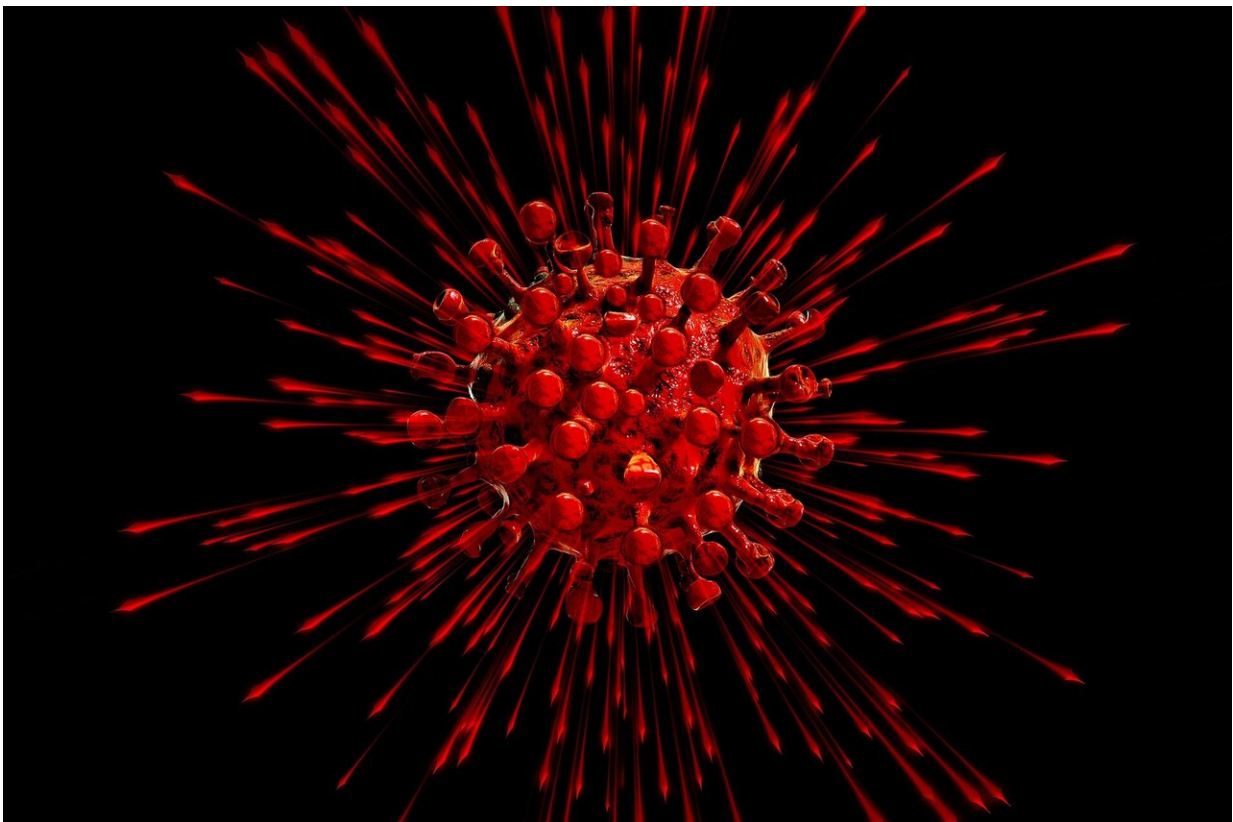


New epidemic model indicates COVID-19 here to stay, likely to cause 235,000 U.S. deaths by October

June 24 2020, by Amanda Bowman



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Professors in Texas Tech University's Department of Mechanical Engineering through the Edward E. Whitacre Jr. College of Engineering

have developed a new epidemiological model for predicting COVID-19 spread (which can be applied to any jurisdiction) and have made predictions for six representative U.S. states: California, Louisiana, New Jersey, New York, Texas and Washington.

Fazle Hussain, the President's Endowed Distinguished Chair in Engineering, Science & Medicine, Zeina Khan, a research assistant professor of [mechanical engineering](#), and Frank Van Bussel, a postdoctoral researcher, recently submitted their paper, "A Predictive Model for COVID-19 Spread Applied to Six US States," to *Nature Medicine*.

"Our goal was to combine our expertise in bioengineering and computer modeling to develop a comprehensive model for predicting COVID-19, including the most important and relevant parameters, and to compute and interpret the results in terms of relevant parameters," Hussain said.

This model incorporates a number of parameters of significant relevance to pandemics, particularly COVID-19, and is capable of making predictions of such parameters and their interdependence.

"We decided to create a new model of this coronavirus in order to predict a larger range of parameters that prior models don't," Khan said. "One major feature is the asymptomatic spreaders—people who don't know they are sick, wander into society and spread the virus. Another feature is the lockdown that we all have experienced. We decided to start from that perspective and build a new model. This kind of model is described as a compartment model, where society is divided into conceptual compartments."

The compartments used in the [model](#) include: susceptible, undetected infected, detected infected, detected recovered, social distancing, undetected recovery/death, and detected deaths.

"The susceptible population is the majority of the population of a region or country at the onset of the disease," Khan explained. "There's a small number of what we call 'unknown infected,' because they're not sick enough to realize and go for testing, be hospitalized or stay home. There's a small number of those who start the spread of the infection. Then, as people's symptoms progress, or as a result of randomized testing, they become detected infected. These detected infected people either go on to recover, which puts them in a new compartment, or they die, and that's another compartment."

Hussain said other aspects also play a pivotal role in who may or may not be more susceptible to contract COVID-19.

"Factors such as culture, food habits, [political systems](#), [skin color](#) and latitude are variables," he said. "For example, with China's political system, if they are ordered to stay six feet away from one another tomorrow, everyone would comply. Latitude is a major factor because of how much sunshine a person is exposed to."

The paper makes some bold predictions, including:

- In continued lockdown, COVID-19 infections will persist for at least two years.
- Infections, however, will rapidly rise (by an order of magnitude) if lockdown is lifted—peaking after two months—recurring yearly, similar to influenza.
- Repeated lockdowns and releases do not avoid an endemic infection, even following a White House release guideline of 14 days of declining cases, or even a stricter 28 days.
- Earlier lockdowns would have cut COVID-19 deaths in New York, but, surprisingly, not in Texas.
- Infections could be curtailed by stringent measures like strict lockdown compliance, face masks, social distancing, contact

tracing and isolation, etc.

The reason why earlier lockdown would have saved tens of thousands of lives in the state of New York but wouldn't have made much of a difference in Texas is because of how well New York complied with [lockdown](#) measures, Khan said.

The most telling aspect of their paper is the numbers. According to their predictions, by Oct. 1, there could potentially be 3 million COVID-19 cases, and 235,000 total deaths in the U.S.

More information: Khan et al., A Predictive Model for COVID-19 Spread Applied to Six US States. arXiv:2006.05955 [q-bio.PE].
arxiv.org/abs/2006.05955

Provided by Texas Tech University

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