The Math That Got America to Tackle COVID-19 With Extreme Measures

Without swift unprecedented action, more than 2 million Americans could die.

March 19, 2020 By Bob Barnett

The United States is beginning an abrupt and massive experiment to learn whether we can slow the rise of COVID-19, reduce what may be millions of American deaths and prevent the overwhelming of hospitals and the health care system upon which we all depend. These efforts include social distancing for everyone, the state-specific closing of schools, restaurants and bars, turning homes into virtual offices, the self-quarantining of people with suspected COVID-19 symptoms and a rapid ramping up of testing after months of relative inaction.

Thank you, Imperial College London.

The report issued by the university's MRC Centre for Epidemiological Analysis and Modelling of Infectious Diseases, titled "Impact of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand," has been instrumental in dramatically shifting the urgency of actions by the White House and state governments as well as the government of England, according to reporting by The New York Times, The Washington Post, National Public Radio and the Center for Infectious Disease Research and Policy (CIDRP) at the University of Minnesota. For example, it likely influenced the White House's 15-day plan announced Monday, March 16, which included the recommendation, among many others, that people avoid gathering in groups larger than 10.

The report used pandemic data gathered in China, Italy, and South Korea. According to CIDRP, it has been lauded by epidemiologists around the world as the most comprehensive prediction of what the United States could be facing in the coming months.

It predicts that deaths in the United States could reach 2.2 million if no action is taken. Eighty percent of Americans would become infected and 0.9% would die—2.2 million people—including between 4% and 8% of everyone over age 70. By contrast, annual mortality for heart disease, the number one cause of mortality in the United States, is about 650,000 people; for cancer, about 600,000. The report does not model specific effects on people with chronic conditions such as heart disease, diabetes, cancer or HIV, but these groups, as well as people over 60, are at the highest risk for hospitalization and mortality from COVID-19.

The report then models different scenarios that could reduce the likelihood of that disastrous possibility.

- Relatively modest restrictions on social activity nationwide. These could include self-isolation for anyone with a confirmed case and home quarantining for household members as well as social distancing for people over 70. This approach would cut the number of deaths in half and reduce peak health care demand by two thirds, according to NPR. But it still would mean more than 1 million Americans would die, and hospitals' resources would be extraordinarily overwhelmed.
- A nationwide "suppression" approach. This would include isolating symptomatic cases and quarantining their family members but also social distancing for the whole population, closing down all public gatherings and shutting down schools, universities, restaurants, bars and more.

The latter, the suppression approach, could be remarkably successful. If implemented across the entire country, infection rates would actually peak in three weeks and then start to decline. While the report doesn't estimate mortality rates for this approach for the United States, it estimates a decline in the death rate in England from 260,000 cases using the modest approach to 20,000 cases, a more than 10-fold drop.

In short, suppression could work extraordinarily well. As the Imperial College London researchers conclude, "Combining all four interventions (social distancing of the entire population, case isolation, household quarantine and school and university closure) is predicted to have the largest impact, short of a complete lockdown, which additionally prevents people going to work."

That's why many parts of the United States, including the state of California, whose 40 million residents are required to "shelter in place," and New York City, where nearly as draconian restrictions apply, have begun to employ approaches consistent with Imperial College's most optimistic predictions. Indeed, nearly every state has taken action. The report undergirds the White House's recommendations and actions as well.

The only catch? While such radical steps could be effective quickly, they would most likely need to be maintained for the estimated 18 months it might take to develop a safe and effective vaccine. If such an approach were to be relaxed, infection rates would likely start to climb within a month—and such efforts would need to be reinstated. According to Imperial College researcher Neil Ferguson, "It is likely such measures—most notably, large-scale social distancing—will need to be in place for many months, perhaps until a vaccine becomes available. The effects on countries and the world will be profound."

Ironically, Ferguson recently announced via Twitter that he himself has symptoms consistent with the novel coronavirus that causes COVID-19 and is self-quarantining.

To read the Imperial College London report, click here.

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