

Early government intervention is key to reducing the spread of COVID-19

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Early and strict governmental intervention is a key factor in reducing the spread of COVID-19 cases. That's the conclusion reached by a team of researchers comparing outbreaks of the novel coronavirus between the

Chinese province of Hunan and Italy in a new paper published in *Frontiers in Medicine*.

While Hunan and Italy are similar in population size—about 60-70 million people each—the scope of the epidemic in each location has differed dramatically. At time of publication, Italy has the second-most confirmed deaths after the United States and ranks third in total confirmed infections, according to the Johns Hopkins University Coronavirus Resource Center. There are just over 1,000 confirmed cases in Hunan.

The research team, based in China, used data from the John Hopkins database through April 2 to map infection trends in both Hunan and Italy. They modified a standard mathematical model known as a susceptible-infected-removed (SIR) model to account for the effects of different epidemic prevention measures at different periods in time.

"It should be noted that in actual situations, the speed of transmission can be changed through many interventions, such as personal protective measures, community-level isolation and city blockade," said lead author Dr. Wangping Jia with the Chinese PLA General Hospital in Beijing.

The paper's extended SIR (eSIR) model found that under current measures there could be a total of 3,369 (the mean in a possible range of 840-8,013) infected cases in Hunan, with the endpoint of the epidemic having already occurred around March 3. In contrast, total infected cases in Italy are projected to be 182,051 (the mean in a possible range of 116,114-274,378) with an end date around August 6.

The authors speculated that the disparate trends could be due to a couple of reasons. For instance, Italy may not have implemented [preventive measures](#) soon enough, as the eSIR model demonstrated that taking action earlier in the case of Hunan drastically reduced infection rates.

The authors noted that "from China's experience, various control measures, including the early detection and isolation of individuals with symptoms, traffic restrictions, medical tracking, and entry or exit screening, can well prevent the further spread of COVID-19."

The paper did not specifically address mortality rates because a number of factors can affect these predictions, according to Jia, such as bed capacity of intensive care units, as well as a patient's age, sex and any underlying health conditions such as [cardiovascular disease](#), hypertension and diabetes.

"Accurate patient-specific data are urgent needs for the prediction of the total deaths," he said.

The Italian government recently announced it would begin to ease lockdown measures beginning May 4—three months earlier than the eSIR model advises.

"We think it is too early to ease restrictions starting around May 4," Jia said. "The potential second wave may come if restrictions are eased three months earlier. Italy is not in the end period of the COVID-19 epidemic."

The authors concede that the current study has several limitations. First, due to the limited amount of testing, it's likely the number of infected people in Italy and elsewhere is higher than the official count. The eSIR model does not incorporate the disease's incubation period, which could make it less accurate. And there may be other factors that could throw off the estimate, such as the influence of "super spreaders" of the disease on a population.

Despite these possible shortcomings, Jia said the study makes one point abundantly clear: "We want to emphasize that taking government control

earlier can greatly decrease the number of infected cases by comparing the epidemic trend in Hunan and Italy."

More information: *Frontiers in Medicine*, DOI: [10.3389/fmed.2020.00169](https://doi.org/10.3389/fmed.2020.00169) , www.frontiersin.org/articles/10.3389/fmed.2020.00169/full

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