

Study shows where money is best spent to fight a pandemic

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Credit: Florida Atlantic University

In deciding on how to combat pandemics like COVID-19, the total amount a government is willing to invest is critical. Countries with few budgetary and economic constraints should invest heavily in prevention

measures, while investing in treatment appears to be the better strategy if money is limited, according to a research team that includes three professors at Florida Atlantic University.

The study, published in the journal *Risk Analysis*, identifies optimal investment against a pandemic by minimizing the risks based on an economic model. The researchers say COVID-19 underscores the need for a better understanding of how contacts through human networks affect the spread of infectious diseases.

"A very large investment is always needed in order for prevention to be effective," said C. Derrick Huang, Ph.D., an associate professor in FAU's College of Business and the lead author of the study.

Policymakers can choose to make large, long-term investments in early detection, testing and contact tracing systems to spread out the total spending requirements. That is what Asian countries such as South Korea and Taiwan did, and judging by the case and death count they have succeeded in fighting COVID-19, according to the professors.

But without long-term [investment](#) in [public health](#) and [emergency response](#), as in the case of the United States, governments would have to take severe measures such as lockdowns at the onset of the pandemic to prevent it from spreading. As the number of COVID-19 cases spiked in the U.S. last spring, federal and state governments ordered the closing of non-essential businesses and urged citizens to stay at home, putting millions of people out of work and sending the U.S. economy into a recession.

"To make these drastic prevention measures successful, however, large economic investments have to be made to bail out businesses, subsidize lost wages, provide relief for lost tax revenues, and so on," Huang said. "Either way, over time or as an immediate response, prevention is only

effective if the government is willing to make [large investments](#)."

Also working on the study were Milad Baghersad, Ph.D., and Ravi Behara, Ph.D., of FAU and Christopher Zobel, Ph.D., of Virginia Tech.

The study also notes that the nature of human contact is an important consideration in prevention. Rather than shutting down the whole economy, closing the potential super-spreader events and hot spots may be enough to effectively stop the transmission, the researchers said.

However, when funds are in short supply, disease prevention is difficult in densely populated or highly connected regions. In those cases, investing in treatment such as boosting hospital capacity can be more effective.

"Our results are consistent with existing studies and can be used to properly interpret what happened in past pandemics as well as shed light on future and ongoing events such as COVID-19," the study states.

More information: C. Derrick Huang et al. Optimal Investment in Prevention and Recovery for Mitigating Epidemic Risks, *Risk Analysis* (2021). [DOI: 10.1111/risa.13707](https://doi.org/10.1111/risa.13707)

Provided by Florida Atlantic University

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