

Study quantifies potential COVID-19 spread from hurricane evacuation

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September 2019, four cyclones line up in the Western Hemisphere. Credit: NASA

With the peak of the hurricane season coming up and COVID-19 abundant in many hurricane-prone areas, the United States is poised to experience the collision of two major disasters. According to a study by scientists at Columbia University and the Union of Concerned Scientists (UCS), a large-scale hurricane evacuation would increase COVID-19 cases in both evacuees' origin and destination counties. But directing evacuees to counties with low COVID-19 transmission rates rather than allowing evacuations to follow historical patterns would minimize the increase, according to the study.

The research is the first to quantify how hurricane [evacuation](#) may affect the number and spatial distribution of COVID-19 cases in the United States. It is awaiting publication in a peer-reviewed journal, but is posted on the medRxiv preprint server for [health sciences](#).

"Directing evacuees to destinations with low virus activity and providing housing opportunities and resources that help maintain social distancing, encourage mask usage, and limiting opportunities for [virus transmission](#) will be essential," said senior author Jeffrey Shaman, a professor at Columbia's Mailman School of Public Health and the Earth Institute, and director of the university's Climate and Health Program.

"Many of the country's most hurricane-prone states have recently experienced some of the highest COVID-19 growth rates in the nation," said coauthor Kristy Dahl, a senior climate scientist at UCS. "In every scenario we analyzed, hurricane evacuations cause an increase in the number of COVID-19 cases. Minimizing that increase depends on getting people to destinations with low virus [transmission](#) rates and

ensuring that those transmission rates stay low even when there's an influx of evacuees."

The researchers built a hypothetical evacuation scenario in which residents of Palm Beach, Broward, Miami-Dade, and Monroe counties fled a Category 3 hurricane. Based on previous studies of evacuation compliance and behavior, the study assumed 2.3 million people would leave the four counties. Post-Hurricane Irma surveys were used to simulate where they would go. That information was then used in a national county-scale model of COVID-19 transmission to determine how many cases would result from the evacuations and where they would occur.

The study assumed that COVID-19 transmission rates in destination counties increased during the evacuation period not at all or by 10 percent or 20 percent, representing the levels of [public health](#) directives that were put in place in the counties and how well they were followed, as well as whether evacuees stayed with friends or family members, or in hotels or shelters.

Under the [worst-case scenario](#) the authors considered, if people followed historic evacuation patterns and virus transmission rates increased by 20 percent in their destination counties, there would be roughly 61,000 additional COVID-19 cases in the origin and destination counties combined.

Under the best-case scenario, if people instead evacuated to communities with low COVID-19 transmission rates and transmission rates did not increase in the [destination](#) counties, there could be as few as 9,100 additional cases resulting from the evacuation.

The scientists said they hope the study will help inform the work of emergency managers and other local decision makers, as well as federal

and state agency staff as the hurricane season progresses.

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