Scientists test safest way driver, passengers can avoid COVID spread

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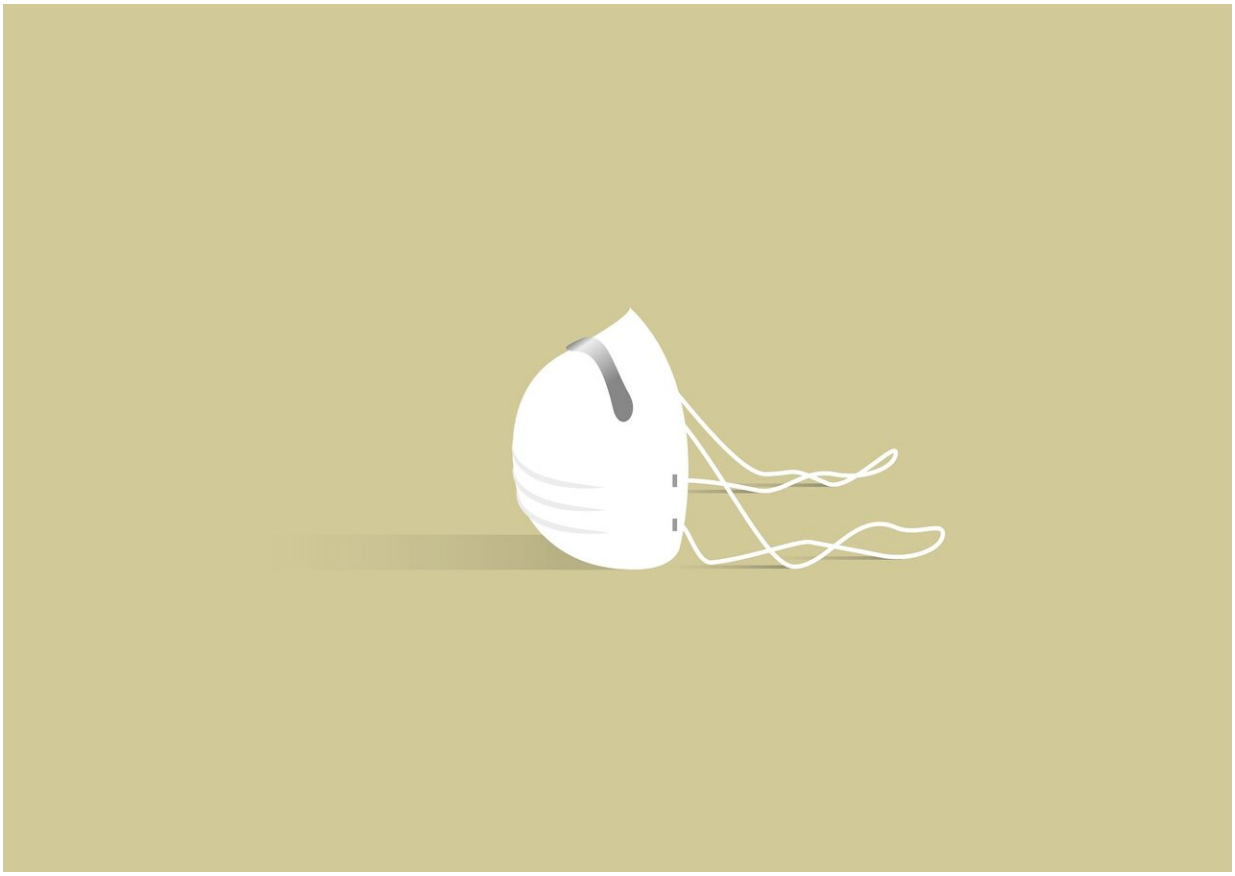

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Traveling in a car with another person during the pandemic? Certain key steps might cut the odds of coronavirus spread during the trip,

researchers say.

One big move that helps: Drive with all four windows down and have the passenger sit in the rear seat on the opposite side from the driver, the new study found.

This helps create "an air flow pattern that travels across the cabin, farthest from the occupants, [which] can potentially reduce the transmission risk," explained a team led by Varghese Mathai, of the department of physics at the University of Massachusetts in Amherst, Mass.

But one expert on viral transmission says another precaution—wearing a mask—may still be necessary.

Especially in cold or wet weather, "having all windows down may not be feasible for a variety of reasons, so when individuals are traveling in a car, face coverings should be worn to minimize risk," said Dr. Amesh Adalja, who wasn't involved in the new report. He's senior scholar at the Johns Hopkins Center for Health Security, in Baltimore.

But if the driving weather *is* conducive, having all the windows down creates two distinct air flows in the car, according to experiments conducted by Mathai's team. These two air flows are separated in the middle of the vehicle and move air from the rear to the front of the car, according to the report published online Dec. 4 in the journal *Science Advances*.

Computer simulations showed that this airflow configuration was the most effective at reducing the transmission of simulated infectious droplets between the two occupants in such a risky, enclosed environment.

The researchers also tested scenarios with all four windows up and with different numbers of windows open. Having all the windows up was the riskiest scenario, since the new coronavirus is most contagious in small enclosed spaces.

Having three windows open was better than having two open, but *which* window was closed made a significant difference.

In scenarios with either an infected driver or an infected passenger, closing only the window closest to the non-infected person provided the greatest protection, second only to having all four windows open.

The researchers noted that their computational fluid dynamics simulations used a sedan similar to the body shape of a Toyota Prius, so may not accurately predict airflow patterns in other vehicles such as trucks, minivans, and cars with an open sunroof.

The simulations may not have shown how airflow and how long virus particles may linger when there are strong crosswinds or other very windy conditions, the authors noted in a journal news release.

Even so, "these results will have a strong bearing on infection mitigation measures for the hundreds of millions of people driving in passenger cars and taxis worldwide, and potentially yield to safer and lower-risk approaches to personal transportation," Mathai and colleagues concluded.

For his part, Adalja stressed that whenever "people are in an enclosed space together, there is a heightened risk of transmission." However, "trying to mimic the outdoor situation, in which infectious droplets are whisked away quickly, has a lot of biological plausibility" as a means of cutting down on coronavirus transmission, he added.

More information: Varghese Mathai et al, Airflows inside passenger cars and implications for airborne disease transmission, *Science Advances* (2020). DOI: 10.1126/sciadv.abe0166