Face masks critical in preventing spread of COVID-19

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A study by a team of researchers led by a Texas A&M University professor has found that not wearing a face mask dramatically increases a person's chances of being infected by the COVID-19 virus.

Renyi Zhang, Texas A&M Distinguished Professor of Atmospheric Sciences and the Harold J. Haynes Chair in the College of Geosciences, and colleagues from the University of Texas, the University of California-San Diego and the California Institute of Technology have had their work published in the current issue of *PNAS* (*Proceedings of the National Academy of Sciences*).

The team examined the chances of COVID-19 infection and how the virus is easily passed from person to person. From trends and mitigation procedures in China, Italy and New York City, the researchers found that using a face mask reduced the number of infections by more than 78,000 in Italy from April 6-May 9 and by over 66,000 in New York City from April 17-May 9.

"Our results clearly show that airborne transmission via respiratory aerosols represents the dominant route for the spread of COVID-19," Zhang said. "By analyzing the pandemic trends without face-covering using the statistical method and by projecting the trend, we calculated that over 66,000 infections were prevented by using a face mask in little over a month in New York City. We conclude that wearing a face mask in public corresponds to the most effective means to prevent inter-human transmission.

"This inexpensive practice, in conjunction with social distancing and other procedures, is the most likely opportunity to stop the COVID-19 pandemic. Our work also highlights that sound science is essential in decision-making for the current and future public health pandemics."

One of the paper's co-authors, Mario Molina, is a professor at the University of California-San Diego and a co-recipient of the 1995 Nobel Prize in Chemistry for his role in understanding the threat to the Earth's ozone layer of man-made halocarbon gases.

"Our study establishes very clearly that using a face mask is not only useful to prevent infected coughing droplets from reaching uninfected persons, but is also crucial for these uninfected persons to avoid breathing the minute atmospheric particles (aerosols) that infected people emit when talking and that can remain in the atmosphere tens of minutes and can travel tens of feet," Molina said.

Zhang said that many people in China have worn face masks for years, mainly because of the bad air quality of the country.

"So people there are sort of used to this," he said. "Mandated face-covering helped China in containing the COVID-19 outbreak."

Zhang said the results should send a clear message to people worldwide—wearing a face mask is essential in fighting the virus.

"Our work suggests that the failure in containing the propagation of COVID-19 pandemic worldwide is largely attributed to the unrecognized importance of airborne virus transmission," he said. "Social-distancing and washing our hands must continue, but that's not sufficient enough protection. Wearing a face mask as well as practicing good hand hygiene and social distancing will greatly reduce the chances of anyone contracting the COVID-19 virus."

More information: Renyi Zhang et al, Identifying airborne transmission as the dominant route for the spread of COVID-19, *Proceedings of the National Academy of Sciences* (2020). DOI: 10.1073/pnas.2009637117

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