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Immediate Release

Twice as good: combining mask wearing, social distancing suppresses COVID-19 virus spread

While both masks and social distancing help slow the spread of airborne pathogens, a new study shows that viral outbreaks can be prevented if at least 60% of a population complies with both measures.

BROOKLYN, New York, Wednesday, 14, 2021 – Studies show wearing masks and social distancing can contain the spread of the COVID-19 virus, but their combined effectiveness was not precisely known.

Researchers at the [New York University Tandon School of Engineering](#) and Politecnico di Torino in Italy developed a network model to study the effects of these two measures on the spread of airborne diseases like COVID-19. The model shows viral outbreaks can be prevented if at least 60% of a population complies with both measures.

“Neither social distancing nor mask wearing alone are likely sufficient to halt the spread of COVID-19, unless almost the entire population adheres to the single measure,” said [Maurizio Porfiri](#), institute professor of mechanical and aerospace, biomedical, and civil and urban engineering at NYU Tandon. “But if a significant fraction of the population adheres to both measures, viral spreading can be prevented without mass vaccination.”

The research, “How adherence to public health measures shapes epidemic spreading: a temporal network model,” by Porfiri, Brandon Behring, a post-doctoral researcher at NYU Tandon, and [Alessandro Rizzo](#), a visiting professor at NYU Tandon, who is from the Politecnico di Torino, Italy, appears in *Chaos: An Interdisciplinary Journal of Nonlinear Science*.

A network model encompasses nodes, or data points, and edges, or links between nodes. Such models are used in applications ranging from marketing to tracking bird migration. In the researchers’ model,

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based on a susceptible, exposed, infected, or removed (recovered or has died) framework, each node represents a person's health status. The edges represent potential contacts between pairs of individuals.

The model accounts for individuals' variability in their interactions with others, meaning a few highly active nodes are responsible for much of the network's contacts. This mirrors the validated assumption that most people have few interactions, and only a few interact with many others. Scenarios involving social distancing without mask wearing and vice versa were also tested by setting up the measures as separate variables.

The model drew on cell phone mobility data and Facebook surveys obtained from the Institute for Health Metrics and Evaluation at the University of Washington. The data showed people who wear masks are also those who tend to reduce their mobility. Based on this premise, nodes were split into individuals who regularly wear masks and socially distance and those whose behavior remains largely unchanged by an epidemic or pandemic.

Using data collected by *The New York Times* to gauge the model's effectiveness, the researchers analyzed the cumulative cases per capita in all 50 states and the District of Columbia between July 14, 2020, when the Centers for Disease Control and Prevention officially recommended mask-wearing, through December 10.

In addition to showing the effects of combining mask wearing and social distancing, the model shows the critical need of widespread adherence to public health measures.

"U.S. States that have been suffering the most from the largest number of infections last fall were also those where people complied less with public health guidelines, thereby falling well above the epidemic threshold predicted by our model," Porfiri said.

The study, "How adherence to public health measures shapes epidemic spreading: a temporal network model," is available at: <https://aip.scitation.org/doi/10.1063/5.0041993>.

About the New York University Tandon School of Engineering

The NYU Tandon School of Engineering dates to 1854, the founding date for both the New York University School of Civil Engineering and Architecture and the Brooklyn Collegiate and Polytechnic Institute. A January 2014 merger created a comprehensive school of education and research in engineering and applied sciences as part of a global university, with close connections to engineering programs at NYU Abu Dhabi and NYU Shanghai. NYU Tandon is rooted in a vibrant tradition of entrepreneurship, intellectual curiosity, and innovative solutions to humanity's most pressing global challenges. Research at Tandon focuses on vital intersections between communications/IT, cybersecurity, and data science/AI/robotics systems and tools and critical areas of society that they influence, including emerging media, health, sustainability, and urban living. We believe diversity is integral to excellence, and are creating a vibrant, inclusive, and equitable environment for all of our students, faculty and staff. For more information, visit engineering.nyu.edu.

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