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New discoveries on the containment of COVID-19 finds travel bans are of limited value

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Travel bans have been key to efforts by many countries to control the spread of COVID-19. But new research aimed at providing a decision support system to Italian policy makers, recently published in the *Journal of the Royal Society Interface*, suggests that reducing individual activity (i.e., social distancing, closure of non-essential business, etc.) is far superior in controlling the dissemination of Sars-CoV-2, the virus that causes COVID-19.

The research, which has implications for the United States and other countries, found that limiting personal mobility through travel restrictions and similar tactics is effective only **in the first phases of the epidemic**, and reduces in proportion to the spread of infection across a population.

In the study, "Modelling and predicting the effect of social distancing and travel restrictions on COVID-19 spreading" the researchers, led by Alessandro Rizzo, visiting professor in the Office of Innovation at NYU Tandon and professor at the Politecnico di Torino, and Maurizio Porfiri Institute Professor of mechanical and aerospace, biomedical and civil and urban engineering at NYU Tandon and a member of the Center for Urban Science and Progress (CUSP), detail a data modeling framework for isolating the differential efficacy of different COVID-19 intervention policies. Since their method benefits from a low computational load (it can easily run on a personal computer), it can be a

valuable decision support system to policy makers, toward the implementation of combined containment actions that can protect citizens' health, while avoiding total closures, with all their economic, social, and psychological consequences.

"While this project was focused specifically on Italy, the results are revelatory for virtually any country relying on travel restrictions to stem the spread of the pandemic. We look forward to using US data to tune the model and give specific answers to combat this delicate phase of the pandemic," said Porfiri.

Added Rizzo, "We are particularly satisfied with this model, as it provides very detailed answers even though it relies only on aggregated sources of data—a further guarantee of people's privacy."

The work includes a realistic representation of demographic data and travel patterns of both commuters and those taking long-distance trips, using only aggregated and publicly available data, without resorting to individual tracking devices. It follows upon a study on the spread of Covid-19 in New Rochelle, New York predicting the diffusion of COVID-19 in medium sized cities and provinces, published as the cover of *Advanced Modeling and Simulations (Wiley)*,

The investigators, including Francesco Parino of Politecnico di Torino and Lorenzo Zino of the University of Groningen, The Netherlands, also found that selective lockdown policies, for example restriction only on the activity of the elderly, seems not to have a great effect on the overall transmission of the epidemic.

Deploying their algorithmic framework to model scenarios in which restrictions are lifted, discovered that restrictions on social activity must be gradually removed to avoid a second wave, while the timing and swiftness of removal of travel restrictions seem not to have a great effect

on the transmission.

In view of the scarce resources and the inherent slowness of vaccination campaigns, the research group is now engaged in the use of the model to assess the effect of different vaccination policies, toward the definition of vaccination rollouts that will aim at providing an optimal outcome in spite of the limited resources in terms of vaccine doses and operators.

More information: Francesco Parino et al, Modelling and predicting the effect of social distancing and travel restrictions on COVID-19 spreading, *Journal of The Royal Society Interface* (2021). DOI: 10.1098/rsif.2020.0875

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