

# Why focusing COVID vaccination efforts on least advantaged populations benefits everyone

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The risk of getting COVID isn't the same for everyone. In a new study, UChicago scientists used real-world data to build a better model to target the virus—one that accounts for demographic and mobility differences among communities. Credit: Shutterstock.com

When vaccine access is prioritized for the most disadvantaged communities, it improves both social utility and equity—even when such populations have strong vaccine hesitancy.

Researchers led by James Evans, the Max Palevsky Professor of Sociology and director of the Knowledge Lab, make the case for using behavioral data and demographics to more accurately predict the curve of COVID-19 cases in a metro area, and then to fund vaccination efforts at a much higher level for certain groups.

"The classic epidemiological model has a very strong assumption about homogeneous population mixing," said Fengli Xu, a postdoctoral scholar and first author of the study recently published in *Nature Human Behaviour*. "It assumes that every person in that city or in that area has an equal opportunity to meet each other and spread the virus. That's a strong assumption you make

without the knowledge of more detailed social interaction."

The research team instead designed a model that explicitly accounts for both demographic and mobility differences among communities, along with their association with diverse COVID risks, which were then calibrated with large-scale data.

The introduction of real-world data of [human mobility](#) on a neighborhood level, along with the demographic structure of each neighborhood, allowed the team to better understand how different subpopulations mix. For example, it's crucial to understand that [low-income families](#) are worse off in this COVID scenario because they have to sustain their level of mobility to maintain their incomes, exposing them to more risk. And if they're more mobile, they're more likely to spread the virus as well—making them a key group to vaccinate (versus many white collar workers who stay home).

The study produced two key findings. First, it underscores the importance of using a smart model with even a small amount of human movement behavior, which dramatically improves the ability to target those disadvantaged persons for whom vaccination is the most beneficial for everybody. Right now, the CDC has a social vulnerability index that they use in some regions to prioritize vaccines, but it fails to capture behavioral data and differential likelihoods to spread and be exposed to COVID.

The researchers also note that their own smart model used coarse behavioral data—dispelling concerns that the government would need to use private movement information. "In this era of big data," Xu said, "there are many very good data sources that can be used without much concern of privacy or other issues to significantly improve social utility and equity."

The second major takeaway is that the authors argue for a large increase in spending on vaccine campaign spending for vulnerable populations. That includes both for outreach and for the risk that vaccinations could go to waste as the uptake may not be as swift among populations with greater vaccine-hesitancy, some with historical good reason.

But more funding among these populations—who move about and mix with others in the community—goes a very long way to keep everyone safe.

"It's better for everybody if [this [population](#)] is disproportionately vaccinated," Evans said. "The advantage is persistent even if the vaccine hesitancy of the most disadvantaged populations is five times that of the better off populations. This is far more than even the most progressive programs currently in place."

**More information:** Lin Chen et al, Strategic COVID-19 vaccine distribution can simultaneously elevate social utility and equity, *Nature Human Behaviour* (2022). [DOI: 10.1038/s41562-022-01429-0](#)

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