Prioritizing who gets vaccinated for COVID-19 saves lives: study

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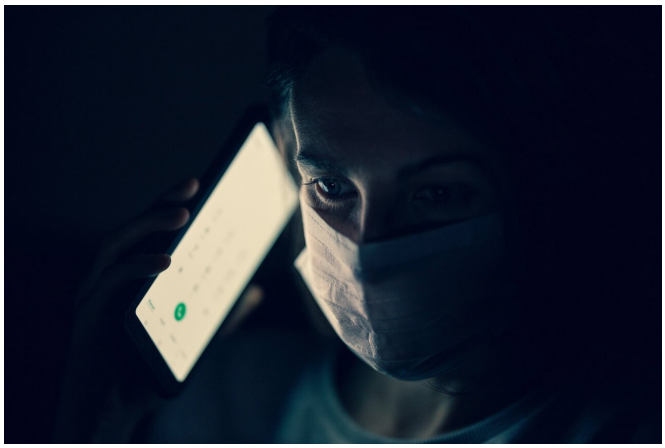

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Waiting for your turn can be frustrating, especially when it comes to COVID-19 vaccinations. But prioritizing who receives the limited supply of vaccines available saves lives and reduces spread of infection, according to a study published today in the journal *PNAS* from the University of California, Davis.

While there is mostly universal agreement that older people should be prioritized, debates are currently underway about prioritizing a variety of other groups. Still others argue against targeting at all.

"Prioritization has benefits because people differ in at least two key ways—their risk of infection and the likelihood of serious consequences from infection," said senior author Michael Springborn, a UC Davis professor in the Department Environmental Studies and an economist focused on environmental risk, including infectious disease. "We know that front-line essential workers have less capacity to socially distance and thus an elevated risk, while seniors are more seriously impacted by infection. Accounting for this substantially increases the benefits of vaccination."

For the study, the researchers modeled COVID-19 transmission rates and the optimal allocation of an initially limited vaccine supply in the U.S. under a variety of scenarios. They found that deaths, years of life lost and infections were between 17 to 44 percent lower when vaccinations targeted vulnerable populations—particularly seniors and essential workers—rather than an alternative approach where everyone is equally likely to be vaccinated.

"We also found that in regions where there was a faster increase in infections, and where there is less masking and social distancing occurring, targeting was even more important in avoiding those outcomes," said lead author Jack Buckner, a Ph.D. candidate in the UC Davis Graduate Group in Ecology.

Essential considerations

Building on the standard approach in modeling analyses to account for age groups, the study is the first to include front-line essential workers as their own category. In doing so, the researchers identified that such workers should be a vaccination priority along with or shortly after seniors. Policies that target based on both age and essential worker status substantially outperformed those that consider age only.

Prioritizing essential workers versus seniors depends on the conditions. For instance, when there is a good supply of effective vaccines and the outbreak is relatively under control, targeting essential workers first to help reduce overall spread can be ideal. But if vaccine supply is limited and cases and deaths are surging, targeting seniors and the most vulnerable directly may be the better strategy.

Previous studies have assumed that a given

prioritization strategy remains constant over time. This study uniquely allows for prioritization to evolve as conditions change, such as when more people in certain groups become vaccinated.

"There is a substantial value to prioritization, at least for the first few months of the vaccine rollout," Springborn said.

"Once a large proportion of the most vulnerable people or the most likely to be exposed have been vaccinated, it becomes less important who gets it," said Buckner.

Still much to learn

The authors say that while the scientific community and public have learned a lot about SARS-CoV-2, the virus that causes COVID-19, there are still many uncertainties to address. This includes how well vaccines impede transmission, how much individuals will relax their protective measures as vaccinations progress, and how durable immunity will be given the rise of new variants.

The authors took a general approach that is adaptable for future disease outbreaks.

"The analytic approach put forward in this study to assess the optimal dynamic allocation of vaccines adds to the methodological toolkit with applications beyond the COVID-19 pandemic," said study author Gerardo Chowell, a professor of epidemiology and biostatistics at Georgia State University.

More information: Jack H. Buckner et al, Dynamic prioritization of COVID-19 vaccines when social distancing is limited for essential workers, *Proceedings of the National Academy of Sciences* (2021). DOI: 10.1073/pnas.2025786118

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