

Why older adults must go to the front of the vaccine line

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Vaccinating older adults for COVID-19 first will save substantially more U.S. lives than prioritizing other age groups, and the slower the vaccine rollout and more widespread the virus, the more critical it is to bring

them to the front of the line.

That's one key takeaway from a new University of Colorado Boulder paper, published today in the journal *Science*, which uses mathematical modeling to make projections about how different distribution strategies would play out in countries around the globe.

The research has already informed policy recommendations by the Centers for Disease Control and the World Health Organization to prioritize older adults after medical workers.

Now, as policymakers decide how and whether to carry out that advice, the paper—which includes an interactive tool—presents the numbers behind the tough decision.

"Common sense would suggest you want to protect the older, most vulnerable people in the population first. But common sense also suggests you want to first protect front-line essential workers (like grocery store clerks and teachers) who are at higher risk of exposure," said senior author Daniel Larremore, a computational biologist in the Department of Computer Science and CU Boulder's BioFrontiers Institute. "When common sense leads you in two different directions, math can help you decide."

For the study, Larremore and lead author Kate Bubar, a graduate student in the Department of Applied Mathematics, teamed up with colleagues at the Harvard T.H. Chan School of Public Health and the University of Chicago.

They drew on demographic information from different countries, as well as up-to-date data on how many people have already tested positive for COVID-19, how quickly the virus is spreading, how fast vaccines are rolling out and their estimated efficacy.

Then they modeled what would happen in five different scenarios in which a different group got vaccinated first: Children and teenagers; adults ages 20 to 49; adults 20 or older; or adults 60 or older (considering that about 30% of those eligible might decline). In the fifth scenario, anyone who wanted a [vaccine](#) got one while supplies lasted.

Results from the United States, Belgium, Brazil, China, India, Poland, South Africa, Spain and Zimbabwe are included in the paper, with more countries included in the online tool.

Different strategies worked better or worse, depending on local circumstances, but a few key findings jumped out.

In most scenarios, across countries, prioritizing adults 60+ saved the most lives.

"Age is the strongest predictor of vulnerability," said Larremore, noting that while pre-existing conditions like asthma boost risk of severe illness or death, age boosts vulnerability more. "You have an exponentially higher likelihood of dying from COVID-19 as you get older."

The authors also note that, while the vaccines being distributed now are believed to have about a 90 to 95% chance of protecting against severe disease, researchers don't yet know how well they block infection and transmission. If they don't block it well and asymptomatic spreaders abound, it again makes the most sense to vaccinate [older adults](#). If nothing else, they'll be personally protected against grave disease.

Only in scenarios where the virus is under control and the vaccine is known to block infection and transmission well does it make sense to move younger adults to the front of the line. That is not the situation in the United States right now.

"For essential workers who might be frustrated that they are not first, we hope this study offers some clarity," said Bubar. "We realize it is a big sacrifice for them to make but our study shows it will save lives."

So will a faster rollout, they found.

For instance, all other things being equal, if the rollout speed was to be doubled from current rates under current transmission conditions, COVID-19 mortality could be reduced by about 23%, or 65,000 lives, over the next three months.

The paper also suggests that in some situations where COVID has already infected large swaths of the population and vaccine is in short supply, it might make sense to ask younger adults who have already tested positive to step to the back of the line.

"Our research suggests that prioritizing people who have not yet had COVID could allow hard-hit communities to stretch those first doses further and possibly get to some of the herd immunity effects sooner," said Larremore.

The authors stress that vaccines alone are not the only tactic for helping win the race against COVID.

"To allow the vaccine to get to folks before the virus does, we need to not only roll out the vaccine quickly and get it to the most [vulnerable people](#). We have to also keep our foot on the virus brake with masks, distancing and smart policies," said Larremore.

More information: Kate M. Bubar et al, Model-informed COVID-19 vaccine prioritization strategies by age and serostatus, *Science* (2021). [DOI: 10.1126/science.abe6959](https://doi.org/10.1126/science.abe6959)

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