

COVID-19 vaccine effectiveness to be affected heavily by infrastructure, public attitudes

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The success of a COVID-19 vaccine will depend not only on its efficacy, but will hinge at least as much on how fast and widely it can be

delivered, the severity of the pandemic, and the public's willingness to be immunized, according to a study published in *Health Affairs*. The authors, who include investigator and senior author Rochelle Walensky, MD, MPH, chief of the Division of Infectious Diseases at Massachusetts General Hospital (MGH), demonstrate that far more investment is needed in ensuring that approved COVID-19 vaccines can be produced and distributed efficiently, and that more must be done to promote the public's trust in immunization and willingness to continue practices that slow the spread of the novel coronavirus.

Billions of dollars have been spent on developing COVID-19 vaccines, and preliminary evidence suggests that several candidates appear to be extraordinarily effective. "But there are lots of ways to think about the effectiveness of a [vaccine](#)," says Walensky. She teamed up with A. David Paltiel, Ph.D., a professor of Public Health (Health Policy) at the Yale School of Public Health (YSPH), and several other colleagues to create a mathematical model that assessed how other factors beyond a COVID-19 vaccine's efficacy might influence how well it thwarts the disease. Those factors included:

- How fast and broadly can the vaccine be produced and administered? Some candidate vaccines pose logistical challenges, such as needing to be stored in ultra-cold freezers or requiring two doses, spaced weeks apart.
- What portion of the population is willing to be vaccinated? National surveys suggest that as few as 50% of Americans say they will receive a COVID-19 vaccine.
- The severity of the pandemic when a vaccine is rolled out. The proportion of infections a vaccine is able to avert is directly related to the public's willingness to engage in mitigation behaviors, such as wearing masks and social distancing.

The [mathematical model](#) considered how these factors would influence

the impact of vaccines of varying levels of efficacy. "We found that infrastructure will contribute at least as much to the success of the vaccination program as will the vaccine itself," says Paltiel. "The population benefits of vaccination will decline rapidly in the face of manufacturing or deployment delays, significant vaccine hesitancy, or greater epidemic severity."

To help ensure a vaccination program's success, Walensky says that significantly greater investment is needed in an infrastructure to deliver COVID-19 vaccines. Moreover, powerful public messages and on-the-ground implementation strategies at the local level are also necessary to help overcome skepticism about vaccines, especially in underserved populations.

Likewise, the *Health Affairs* study showed that even a highly effective vaccine will struggle to control COVID-19 if infection rates continue to rise. "If I have a cup of water, I can put out a stove fire. But I can't put out a forest fire, even if that water is 100% potent," says Walensky, emphasizing the public's role in keeping the infection rate low by mask wearing and social distancing. "We'll get out of this faster if you give the vaccine less work to do."

More information: A. David Paltiel et al, Clinical Outcomes Of A COVID-19 Vaccine: Implementation Over Efficacy, *Health Affairs* Published November 19, 2020 [DOI: 10.1377/hlthaff.2020.02054](https://doi.org/10.1377/hlthaff.2020.02054)

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