# Third COVID-19 Vaccine May Be Up to 90% Effective

The vaccine from the University of Oxford and AstraZeneca uses a chimpanzee adenovirus vector.

December 8, 2020 By Liz Highleyman

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Update: Findings from the Phase III trial of the University of Oxford/AstraZeneca COVID-19 vaccine were published online in The Lancet on December 8, 2020.

An experimental coronavirus vaccine from the University of Oxford and AstraZeneca demonstrated an average efficacy of 70%, with one dose regimen reaching 90% effectiveness in a late-stage clinical trial, according to an announcement on November 23. No one who received the vaccine developed severe illness or was hospitalized.

The promising news follows announcements earlier this month that vaccine candidates from Pfizer and BioNTech and Moderna and the National Institutes of Health were more than 90% effective in reducing symptomatic COVID-19 in Phase III studies.

> Today marks an important milestone in the fight against #COVID19. Interim data show the #OxfordVaccine is 70.4% effective, & tests on two dose regimens show that it could be 90%, moving us one step closer to supplying it at low cost around the world>> https://t.co/fnHnKSqftT pic.twitter.com/2KYXPxFNz1
>
> — University of Oxford (@UniofOxford) November 23, 2020

The Oxford/AstraZeneca vaccine, dubbed AZD1222 or ChAdOx1 nCoV-19, uses a weakened chimpanzee adenovirus—similar to viruses that cause the common cold—as a vector to deliver genes encoding the SARS-CoV-2 coronavirus spike protein. A vaccine being developed by the Chinese biotech company CanSino Biologics uses a human adenovirus vector. This approach has been widely studied for various diseases, including HIV, but no adenovirus vector vaccines are currently approved for human use.

The findings come from an interim analysis of more than 12,00 Phase II/III trial participants in the United Kingdom (study COV002) and more than 10,000 in Brazil (COV003).

Two vaccine regimens were evaluated: 2,741 people received a half dose followed by a full dose at least one month later, while 8,895 people received two full doses given at least one month apart. Participants who were randomly assigned to the placebo group received a meningococcal conjugate vaccine or saline injections. People with possible COVID-19 symptoms received a confirmatory SARS-CoV-2 PCR test, and weekly swab tests were done to detect infection.

The interim analysis reported 131 cases of symptomatic COVID-19: 30 in vaccine recipients and 101 in placebo recipients. The first regimen reduced the likelihood of developing COVID-19 by 90%, while the second regimen decreased the risk by 62%, yielding an average effectiveness of 70%.

“These findings show that we have an effective vaccine that will save many lives," Andrew Pollard, MBBS, PhD, of the University of Oxford, chief investigator for the U.K. vaccine trial, said in a university press release. “Excitingly, we’ve found that one of our dosing regimens may be around 90% effective, and if this dosing regime is used, more people could be vaccinated with planned vaccine supply.”

The researchers said that there is an early indication that the vaccine could reduce coronavirus transmission based on an observed reduction in asymptomatic infections. Future analyses will determine the duration of protection. Early studies of this vaccine, as well as the Pfizer/BioNTech and Moderna vaccines, showed that they stimulated both antibody production and T-cell immune responses; T-cell responses could persist even if antibody levels wane over time.

Based on Phase I/II study results, the vaccine is effective across all age groups. At the IDWeek meeting in October, Pollard reported that AZD1222 is effective in older adults, who are at greatest risk for severe COVID-19 and tend to mount weaker immune responses than younger people. The Phase II/III trial program also includes studies in India, Japan, Kenya, Russia, South Africa and the United States, which will show whether the vaccine is effective across racial and ethnic groups.

AZD1222 was generally safe and well tolerated with no confirmed serious safety events related to the vaccine. The U.K. trial was put on hold in September after a study participant developed transverse myelitis (a serious condition involving inflammation of the spinal cord), but the event was deemed to be unrelated to the vaccine. The Food and Drug Administration (FDA) will require

that vaccines must have at least two months of safety data to be considered for approval.

The researchers will submit the full analysis of the Phase II/III interim data for independent scientific peer review and publication, according to the press release.

Vaccine Deployment

COVID-19 vaccines have been developed with unprecedented speed. Early in the pandemic, National Institute of Allergy and infectious Disease director Anthony Fauci, MD, predicted that a vaccine could be available in 12 to 18 months, and that projection appears to be on track.

AstraZeneca indicated in a press release that it would submit its data to regulatory authorities around the world and would seek an emergency use listing from the World Health Organization to speed vaccine availability in low-income countries. This vaccine is less expensive than the others, and it will be manufactured in multiple countries including Brazil and India. The Oxford/AstraZeneca partnership has committed to provide the vaccine "on a not-for-profit basis for the duration of the pandemic across the world, and in perpetuity to low- and middle-income countries," according to the University of Oxford statement.

Pfizer and BioNTech have submitted their vaccine data to be reviewed for FDA emergency use authorization; Moderna and the National Institutes of Health indicated that they would also do so soon.

China and Russia are already deploying their COVID-19 vaccines. Earlier this month, the Russian Direct Investment Fund announced that its Sputnik V vaccine is 92% effective.

Rolling out a vaccine to the entire global population is a major logistical undertaking. Production of the frontrunners vaccines is already underway prior to approval, but it will take months before there is an adequate supply. If multiple vaccines are approved, this will happen sooner. Widespread distribution and administration will also present challenges.

The Oxford/AstraZeneca vaccine is stable at about 40 degrees Fahrenheit—the temperature of a standard refrigerator—for at least six months. The Pfizer/BioNTech and Moderna vaccine, which use novel mRNA technology, are more fragile. The Pfizer vaccine requires super-cold storage at minus 94 degrees Fahrenheit. Moderna said its vaccine can be stored for a month at about 40 degrees Fahrenheit.

Public health experts have developed a plan for prioritizing vaccine distribution. If FDA authorization is granted shortly after an advisory committee meeting scheduled for December 10, the first vaccines could be available to health care workers by the end of the year. Other frontline essential workers and people most vulnerable to severe COVID-19—such as older individuals and those with underlying health conditions—are next in line.

Rollout to the general public is expected to begin around April. If 60% to 70% of the population receives a vaccine with 90% to 95% efficacy, the United States could approach herd

immunity—the level at which the virus can no longer easily spread—by next summer, Bob Wachter, MD, chairman of the department of medicine at the University of California at San Francisco, told COVID Health.

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