Mix-and-match approach to COVID-19 booster vaccination offers the best protection: study

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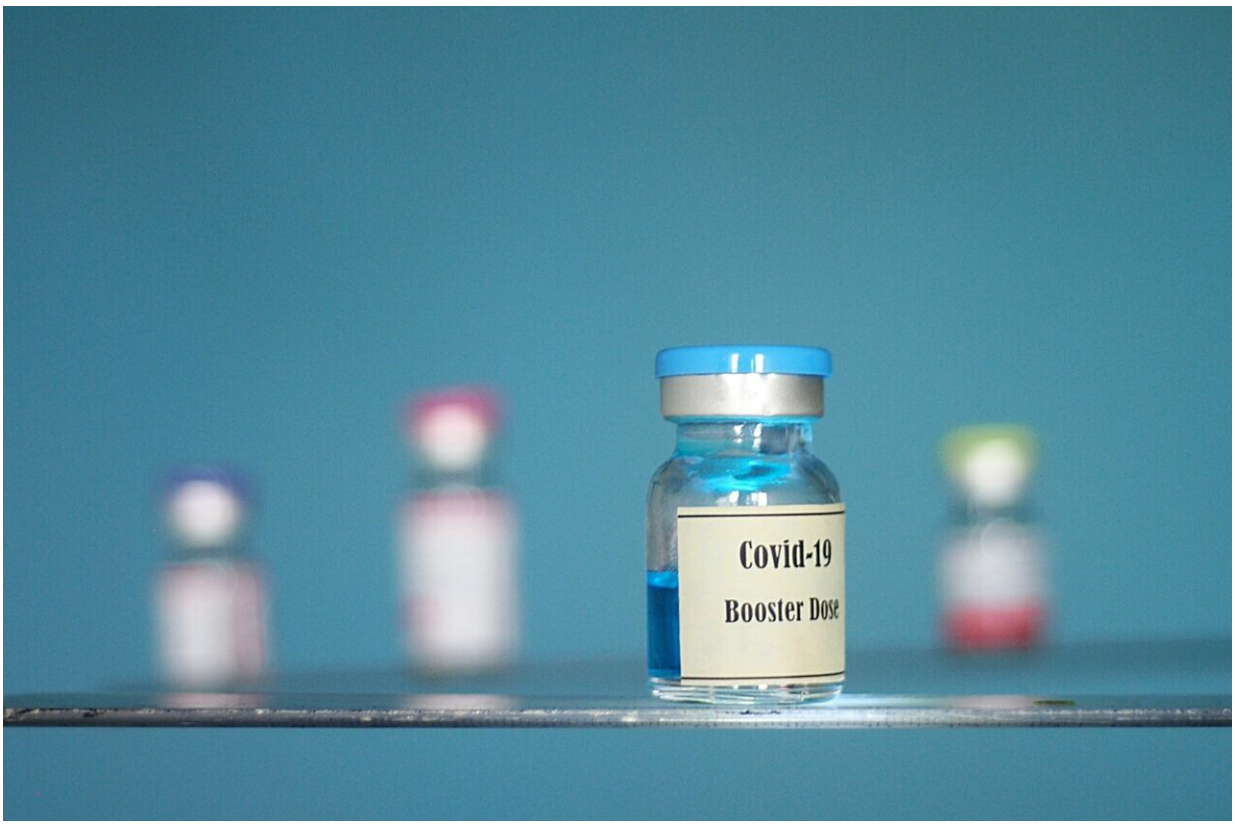

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A new study on Chile's national COVID-19 vaccination program, to be presented at this year's European Congress of Clinical Microbiology &

Infectious Diseases (ECCMID 2022, Lisbon 23-26), and published in *The Lancet Global Health*, shows that giving a different type of vaccine (heterologous) for the third or 'booster' dose than was received for the first two doses, leads to better vaccine performance than using the same (homologous) inactivated SARS-CoV-2 vaccine for all three doses.

The study is by Dr. Rafael Araos, Institute of Science and Innovation in Medicine, Clinica Alemana, Universidad del Desarrollo, Dr. Alejandro Jara, and Dr. Eduardo A Undurraga from Pontificia Universidad Católica de Chile, and colleagues including Dr. Johanna Acevedo from the Chilean Ministry of Health.

The study assesses the effectiveness of CoronaVac (Sinovac Biotech), AZD1222 (Oxford-AstraZeneca), or BNT162b2 (Pfizer-BioNTech) vaccine boosters in individuals who had completed a primary two-dose immunization schedule with CoronaVac, an inactivated SARS-CoV-2 vaccine which accounts for about half the COVID-19 vaccine doses delivered globally, compared with no vaccination. The study assessed the nationwide vaccination program in Chile, where the two-dose Coronavac schedule was by far the most commonly given.

Individuals administered vaccines from Feb 2, 2021 to the prespecified trial end date of Nov 10, 2021 were evaluated; the team excluded individuals with a probable or confirmed SARS-CoV-2 infection (RT-PCR or antigen test) on or before Feb 2, 2021, and individuals who had received at least one dose of any COVID-19 vaccine before Feb 2, 2021. They estimated the vaccine effectiveness of booster doses against laboratory-confirmed symptomatic COVID-19 (symptomatic COVID-19) cases and COVID-19 outcomes (hospitalization, admission to the intensive care unit [ICU], and death).

A total of 11 174 257 individuals were eligible for this study, among whom 4 127 546 completed a primary immunization schedule (two

doses) with CoronaVac and received a booster dose during the study period. 1 921 340 (46·5%) participants received a heterologous AZD1222 booster, 2 019 260 (48·9%) received a heterologous BNT162b2 booster, and 186 946 (4·5%) received a homologous booster with CoronaVac.

The authors calculated an adjusted vaccine effectiveness (using statistical modeling) in preventing symptomatic COVID-19 of 79% for a two-dose schedule plus CoronaVac booster, 97% for a BNT162b2 booster, and 93% for an AZD1222 booster. The adjusted vaccine effectiveness against COVID-19-related hospitalization, ICU admission, and death was 86%, 92%, and 87% for a CoronaVac booster, 96%, 96%, and 97% for a Pfizer-BioNTech booster, and 98%, 99% and 98% for an Astra Zeneca booster.

The authors explain that booster programs were initiated in various countries due to emerging evidence of waning immunity from two dose schedules. Boosters are also important because evidence suggests that inactivated vaccines like Coronavac offer lower protection than the new mRNA technology vaccines from Pfizer -BioNTech and Moderna. Delta was the predominant circulating variant in Chile during the study period.

They conclude: "Our results suggest that a third dose of Coronavac or using a different booster vaccine such as Pfrizer-BioNTech or Astra Zeneca vaccines in those that had previously had two doses of Coronavac provides a high level of protection against COVID-19, including severe disease and death…However, receiving a different vaccine for the booster dose results in higher vaccine effectiveness than a third dose of Coronavac for all outcomes, providing additional support for a mix-and-match approach."

The authors further explain that this is one of the first studies to examine the effectiveness of booster shots for inactivated SARS-CoV-2 vaccines.

A recent study in Brazil showed that homologous and heterologous booster vaccines (BNT162b2 and AZD1222) following a CoronoVac primary vaccination schedule were safe and immunogenic. Similarly, a phase 1-2 study in the U.S. with mRNA-1273, Ad26.COV2.S, and BNT162b2 boosters found that heterologous boosters where on average more immunogenic than homologous boosters.

The UK's Cov-Boost study (a phase 2 trial) showed that various vaccines are safe and immunogenic when given as boosters following a primary two-dose schedule of AZD1222 and BNT162b2, with the highest antibody levels achieved by mRNA boosters.

And prior studies have examined the immunogenicity of a heterologous two-dose regimen of ChAdOx1 followed by an mRNA vaccine, and found mix-and-match strategies were more immunogenic and offered more protection against COVID-19 than two-dose homologous strategies for that vaccine combination.

In Chile, the government has now advised that heterologous boosters should be use as the first option; however, people can and have received a homologous booster as an alternative.

More information: Effectiveness of homologous and heterologous booster doses for an inactivated SARS-CoV-2 vaccine: a large-scale prospective cohort study, *The Lancet Global Health* (2022).

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https://medicalxpress.com/news/2022-04-mix-and-match-approach-covid-booster-vaccination.html