Australian Nursing & Midwifery Federation

ANMF COVID-19 RESOURCE

Booster and third dose shots for COVID-19 vaccines

Disclaimer: Evidence is continually emerging regarding the effectiveness and safety of COVID-19 vaccines. There is an increasing volume of strong evidence for safety and effectiveness of the vaccines in standard two-dose form, but relatively less for three-dose regimens.

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Key points

- *The AstraZeneca, Pfizer, and Moderna vaccines are all safe and effective for protecting against COVID-19 infection, illness, hospitalisation, severe illness, and death.*
- *As with other vaccines, effectiveness appears to decrease somewhat over time.*
- *A third dose may be necessary for people with severely compromised immune systems to achieve comparable immunity to others following two doses.*
- *Evidence suggests that while vaccine effectiveness may decrease over time, protection is still greater than not having a vaccine at all. This is particularly relevant for people who may be at higher risk of poor outcomes who have not been vaccinated (e.g. older, underlying/pre-existing conditions)*
- *While risk of severe or critical illness is low amongst fully vaccinated people, older age and pre-existing conditions such as chronic illness, cancer, immunosuppression use, or obesity appear to increase risk of experiencing severe or critical illness and possible risk of death.*
- *There is a small amount of emerging evidence suggesting that a third dose of either Pfizer or Moderna vaccines may offer slightly enhanced and prolonged protection against illness particularly for older people and people at risk of more severe illness.*
- *Some countries are now implementing third-dose booster shots for specific groups who may be at risk of worse outcomes as well as health and aged care workers who received their second dose several months previously.*
- *Achieving higher two-dose coverage should be prioritised before aiming to roll out widespread three-dose schedules particularly in high income countries including Australia.*

Introduction

Several COVID-19 vaccines have been developed to protect people against 'severe acute respiratory syndrome coronavirus 2' (or 'SARS-CoV-2'). Three vaccines are now available for administration in Australia. Two are messenger RNA (mRNA) vaccines (*Pfizer/Comirnaty* and *Moderna/Spikevax* and one is a viral vector vaccine (*AstraZeneca/Vaxzeveria*). One other COVID-19 viral vector vaccine is also approved (Johnson & Johnson/ Janssen) but is not currently planned to become available here. A fifth vaccine (Novavax/Biocelect) is a protein vaccine that is still under evaluation and anticipated to be available in Australia when approved.

COVID-19 vaccination is recommended for all people aged ≥12 years to protect against COVID-19. In Australia, *Moderna/Spikevax* and *Pfizer/Comirnaty* are approved for use for people aged ≥12 years. *AstraZeneca/ Vaxzeveria* is approved for use for people aged ≥18 years, however for people aged under 60 years, *Pfizer/ Comirnaty* is preferentially recommended by the Australian Technical Advisory Group on Immunisation (ATAGI). To support the rollout and uptake of vaccines, the Australian Government Department of Health publishes recommendations and guidance for administration of the vaccines.

Currently, all COVID-19 vaccines in Australia are administered via a two-dose schedule of the same vaccine unless otherwise indicated (e.g. people with a contraindication to a second dose). While ATAGI released a statement about the need for additional doses of COVID-19 vaccines, there are currently no arrangements for the administration of a third 'booster' dose in Australia, however this may be considered by ATAGI in the future based on evaluations of emerging evidence of effectiveness and safety, double dose coverage, availability of vaccines, and status of the pandemic's progress nationally and internationally.[1]

All COVID-19 vaccines approved by the Therapeutic Goods Administration (TGA) for use in Australia are effective in reducing a recipient's risk of becoming infected, sick, hospitalised, severely ill, being admitted to an intensive care unit, dying, and transmitting the virus, including the Delta variant, to others.[2-7] The vaccines however do not completely protect a person from harm or prevent transmission. All current official recommendations regarding infection prevention and control should continue to be observed regardless of vaccine status.

As with many other vaccines, the effectiveness of COVID-19 vaccines appears to wane over time.[5,8,9] Some countries including Germany, Israel, Turkey, China, Uruguay, Cambodia, Thailand, United Kingdom, the United Arab Emirates, Russia, and the United States have begun offering booster shots.[10,11] In most cases, booster doses are only being offered to older people or people who are at high risk of exposure and worse outcomes such as those with preexisting conditions, severely compromised immune systems, older people, and health and aged care workers and nursing home residents.[11] For Example, in Israel a third dose of *Pfizer* is approved for people aged 60 and older and who have received a second dose at least five months previously.[12] In the United States, a *Pfizer* booster is recommended for people aged 65 and older.[13] In Turkey and Uruguay booster doses of *Pfizer* are being offered to people who initially received one of China's Sinovac or Sinopharm vaccines.[11] In Thailand and Cambodia *AstraZeneca* is recommended as the third dose.[11] Most of the limited number of studies so far examine the effectiveness of a third dose of mRNA vaccine,[12,13] however some evidence does suggest that a third dose of *AstraZeneca* may confer improved immune responses to infection.[14]

Because only a few countries have begun administering a third dose to certain population groups, participant numbers in studies of safety and effectiveness vary widely from around 20 to over a million. From a study in Israel with 1,137,804 participants, a booster dose of the *Pfizer* vaccine was found to significantly reduce the risk of confirmed COVID-19 infection and the likelihood of experiencing severe illness at least 12 days following the third dose.[12] In a study from the United States with 23 participants, a third dose of *Pfizer* was administered resulting in a similar degree of mild to moderate local reactions and systemic effects as following dose 2 and evidence of prolonged and improved immunity.[13] Despite the possibility of waning effectiveness and vaccine 'breakthrough' infections (infection at least 14 days after the second vaccine dose), vaccination still effectively protects most recipients from severe or critical illness.[15] Older people and those with pre-existing conditions such as chronic disease, obesity, or suppressed or compromised immune systems appear more likely to experience severe or critical illness after two doses.[15] In a United Kingdom study examining a third dose of *AstraZeneca*, 75 people who had received a second dose with an interval of eight to 16 weeks were investigated, revealing that 28 days after a third dose antibody levels against SARS-CoV-2 alpha, beta, and delta variants were higher than following the second dose.[14]

While emerging evidence suggests that a third dose does confer greater protection from infection and severe illness than two doses,[12,13,14] due to access and availability limitations there are concerns that redistributing doses for boosters could divert these doses from administration for people's first or second doses, leaving them vulnerable.[16] This is particularly concerning in terms of global equity as wealthier nations moving towards a three dose schedule may compromise low and middle income nations from accessing one or two doses for their people. A further issue with this is that countries or regions where fewer people can be vaccinated may become areas where COVID-19 persists for longer resulting in prolonging the pandemic further.

Despite the emerging evidence of the safety effectiveness of third dose booster shots, some warn of implementing widespread booster administration until after more robust and extensive evidence is gathered and analysed.[17] At this stage, the benefits of third dose booster shots do not appear to outweigh the benefits of providing initial protection via one or two doses. This means that because of the very well-established effectiveness of the vaccines' two dose regime, ATAGI has recommended that the primary focus in Australia should be on getting as many people vaccinated with their first and second doses as a priority.[1] Once this has been achieved to an agreed level, consideration could move to offering a third dose for at risk populations when more evidence has emerged and vaccine access and availability has improved.[1]

Australia should also explore options to better assist neighbouring countries with poorer access and vaccine coverage, as improving vaccine uptake in less well-resourced countries will also help to lessen the duration and severity of the pandemic and risk to Australia from international outbreaks.

With increased availability and access to vaccines, as the pandemic and vaccine roll out progresses in Australia and internationally, and as new evidence emerges regarding the safety and effectiveness of third dose, booster shots may be considered in Australia particularly for those at highest risk of worse outcomes as well as frontline health and aged care staff who are also at high risk due to increased exposure.[1]

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