Memo

Second booster update: COVID-19 Vaccine Technical Advisory Group (CV TAG) recommendations

Date:	22 June 2022 (Updated 26 July 2022)
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For your:	Consideration

Purpose of report

1. To provide the COVID-19 Vaccine Technical Advisory Group's (CV TAG) advice on the science rationale, safety and peak body guidance on use of a second booster dose in:
    a. individuals with underlying health conditions that are likely to increase the individual's risk of adverse outcomes from COVID-19 and/or
    b. those aged over 50 years and/or
    c. extension of eligibility for a second booster dose to healthcare workers.
2. This updated document is being re-issued on 26 July 2022 and provides clarification (particularly around use of a second booster dose in pregnant people) to ensure original intent is clear. Evidence provided and recommendations made on 22 June 2022 remain unchanged.

Background and context

3. On 8 November 2021 Medsafe updated the provisional approval for the Pfizer vaccine to state: *"a booster dose of Comirnaty may be administered intramuscularly at least 6 months after completion of the primary course in individuals aged 18 years of age and older"*.
4. On 17 June 2021 Medsafe further updated the provisional approval for the Pfizer vaccine to include *"A booster dose of Comirnaty may be given at least 6 months after the primary course for people 12 years of age and older"*.
5. Pfizer have not yet applied to Medsafe for approval of any further doses.
6. On 01 February 2022, CV TAG recommended that a booster dose of the COVID-19 vaccine should be given sooner after the primary course to all eligible people aged 18 years and over, including immunocompromised individuals and pregnant persons.

7. The Ministry of Health provided advice to Cabinet and it was agreed that eligibility for a first booster dose would commence from 3 months after the second (or third primary) dose.

8. As cases of COVID-19 climb globally due to outbreaks of the Omicron variant, and evidence has emerged on the waning of protection, some jurisdictions have rolled out second booster doses to populations who remain at highest risk of severe breakthrough disease despite receiving a first booster dose. Defining populations most at-risk of severe breakthrough COVID-19 differs across jurisdictions but includes people with various combinations of comorbidities, age and in a few jurisdictions, healthcare workers.

9. In discussion with the Prime Minister and other Ministers, the Director-General of Health has requested a further update on the science rationale and safety of a second booster dose, in addition to advice provided by international peak bodies around guidance of second booster doses. The Director-General has also asked for advice on consideration of extending eligibility criteria of a second booster dose to anyone over 50, those with underlying health conditions, and healthcare workers.

10. CV TAG previously met on the 01 March and 22 March 2022 to discuss the waning of protection after first booster doses, and the need for second booster doses.

    a. CV TAG noted that:

        i. There is evidence of waning of protection following the first booster dose. Protection also appears to wane faster in some populations, e.g., the elderly. People with other health conditions or comorbidities are at an increased risk of poor outcomes also, and may have a lower immune response to vaccines, though evidence is still emerging on the need for a further dose.

        ii. Booster doses began to be administered from 29 November 2021, and therefore the numbers of people who are now four months from receiving their first booster dose, are steadily increasing in late June as we approach winter.

        iii. The influenza immunisation programme commenced in April, and there is a risk of increased burden on the healthcare system from what increasingly appears to be a record high influenza season from May 2022 with SARS-CoV-2 also circulating. Research from 305,000 people in hospital in the UK with COVID-19 between February 2020 and December 2021 found 6,965 people recorded as having another respiratory infection alongside COVID-19, 227 (3%) of which were influenza. The researchers estimated that people with COVID-19 and influenza combined were 2.4 times more likely to die and four times more likely to end up on a ventilator than if they only had COVID.[1]

        iv. Data on the reactogenicity, safety, immunogenicity, and efficacy of a second Pfizer booster dose is currently limited to three studies from Israel, which studied the immunogenicity and safety among healthcare workers and the elderly. A second booster of the Pfizer vaccine appears to be safe and effective at restoring protection against COVID-19, including Omicron but is a reactogenic vaccine, with 78.6% (95%CI: 71.2-84.8) of people who received a second booster dose reporting a local adverse event, and 42.9% (95%CI: 35-50.7) systemic adverse events. Most of these were mild and resolved quickly.

        v. Some countries have begun rolling out second booster doses, with intervals varying from four to six months after the first booster dose.

vi. The goal of the COVID-19 vaccination programme and offering a second booster dose in New Zealand is to prevent severe disease caused by SARS-CoV-2.

vii. There are a number of equity considerations which are important to consider:

1. Māori and Pacific peoples have been disproportionately affected in the current outbreak.
2. Māori and Pacific peoples are at greater risk of COVID-19 hospitalisation and severe disease, having respectively a 2.5-fold and 3-fold higher odds of being hospitalised compared to non-Māori, and Māori are likely to spend 4.9 days longer in hospital [2, 3].
3. Māori and Pacific peoples are more likely to live in multigenerational families housing in overcrowded conditions, increasing the risk of transmission [4, 5].

viii. Medsafe are yet to approve the use of Pfizer as a second booster dose, and therefore these recommendations require Medsafe approval.

ix. Data is limited on the safety and efficacy of a second booster dose in populations younger than 65 years of age, in healthy individuals, in people with medical or social risk factors, and in pregnant people. Young people (aged under 30) produce a strong immune response to three doses, have a low baseline risk of severe disease and continue to be well protected.

b. CV TAG recommended that:

i. A second booster dose be offered to:

1. People aged 65 years and over
2. Māori and Pacific peoples aged 50 years and over
3. Residents of aged care and disability care facilities
4. Severely immunocompromised people who received a three-dose primary course and a fourth dose as a first booster (noting this is a fifth dose for these people).

ii. In general, the second booster dose should be offered from six months after a first booster dose. However, in the context of high influenza circulation and the need to also maximise influenza vaccine uptake, CV TAG believe it is appropriate to reduce the interval between the first and second booster doses to 4 months and allow COVID-19 vaccines to be given at the same time as the influenza vaccine. In this context, CV TAG also recommends bringing the age range eligibility for the funded influenza vaccine down to align with the age ranges recommended for the COVID-19 second booster vaccines.

iii. A second booster dose, if due, should be postponed for three months after SARS-CoV-2 infection. People can be advised that following infection after the first booster dose, protection is increased but clinical discretion can be applied when considering vaccination prior to 3 months after infection. This may be appropriate for those individuals at highest risk of severe disease from COVID-19 re-infection and impaired immune responses.

iv. The influenza, MMR, HPV, diphtheria/tetanus/pertussis combination vaccine (Boostrix), and other vaccines may be administered before, after, or at the same time as the Pfizer COVID-19 vaccine, without concern for the spacing of the vaccinations. The only exception to this advice is for the live-attenuated shingles vaccine (Zostavax) where a 7-day interval, before or after administering Pfizer COVID-19 vaccine, is advised.

Evidence informing advice

Waning of immunity after a first booster dose

11. Data from the United Kingdom and United States show that vaccine effectiveness (VE) against symptomatic infection and severe disease caused by Omicron wanes over time.

    a. There is significant global data to show that VE against symptomatic infection and severe disease caused by COVID-19 wanes over time. Data from the UKHSA also shows that 2-4 weeks after a booster dose of the Pfizer vaccine, VE against symptomatic COVID-19 caused by Omicron is approximately 65% and moderately retains effectiveness with a VE of 45% from 10-14 weeks after the booster. [2]

    b. A CDC study found the VE for Pfizer against Omicron *hospitalisation* after three doses wanes from 91% (95% CI: 88–93) at ≤2 months to 78% (95% CI: 67–85) at ≥4 months. [6] This trend is broadly in line with the UK Health Security Agency (UKHSA), who found VE after three doses of Pfizer against *hospitalisation* wanes from 85-90% at 2-4 weeks to approximately 75% at 10-14 weeks (~2-3 months). [7]

12. *Pace of waning and at-risk groups:* Several studies evaluating antibody titres have shown that protection does not wane at the same pace for everyone, and appears to wane faster for the elderly, and for some people with other health conditions their immune response to the vaccine is lower. [8-11]

    a. Immunogenicity data suggests that cancer, transplant, and dialysis patients, and those on immunosuppressant therapy, have a reduced response to a first dose of vaccine which can improve with a second dose,[12-19] although the response may still not be optimal, with both reduced antibody and T cell responses. [20-28]

    b. A (non-peer reviewed) study of antibody responses following the second dose of Pfizer has been conducted using data from the UK's national COVID-19 Infection Survey. This study found that antibody responses can last for over a year, though they declined more rapidly in older people, males, and those with underlying health conditions. The greatest antibody half-life was observed among those previously infected by SARS-CoV-2. [29]

Safety, reactogenicity and efficacy of a second booster dose

13. Data on the reactogenicity, safety, immunogenicity, and efficacy of a second booster dose are predominantly from studies conducted in Israel, with a small number recently published from the UK.

    a. Another study of Israeli healthcare workers aged 18 years and over evaluated a fourth dose of Pfizer or Moderna administered after three Pfizer doses (a two-dose primary course and a first booster). The study population were 1,050 eligible healthcare workers with no known history of SARS-CoV-2 infection, who received the third dose of Pfizer at least 4 months earlier.[30] Of 1050 eligible, 154 and 120 (274 total) were enrolled to receive Pfizer and Moderna, respectively, and compared to 426 age-matched controls.

Primary endpoints were safety and immunogenicity, and secondary endpoints were vaccine efficacy in preventing SARS-CoV-2 infections and COVID-19 symptomatic disease. 18.3% (95% CI: 11.9-24.2%) of participants that received a Pfizer second booster had breakthrough infection compared with 25.0% (95% CI: 17.3-30.1%) of the control group who had only had three doses. In the majority of cases (65-72%) symptoms were mild (without fever of ≥38°C).[30]

b. A preprint prospective observational study comparing the short-term effects of the first and second Pfizer boosters, was conducted in Israel. A total of 2,019 participants aged from 19 to 89 years, with a median age of 52 years, were issued a smartwatch (to record physiological measurements) and filled in a daily questionnaire on systemic reactions to the vaccine. 30% (615 participants) received a second booster during the study period. Receivers of the second booster experienced a considerable increase in heart rate and heart rate variability-based stress within 48 hrs of administration. However, this was transient and returned to baseline levels after 72 hrs. Comparison to those that received the first booster, revealed no significant difference in physiological measures between the second and first booster. 67.7% of participants that received the second booster, did not report any symptoms which is comparable to the 65.8% after the first booster. The most frequently reported reactions (i.e., fatigue, headache, muscle pain, fever, and cold) were similar after the first and second booster doses. [31]

c. A study conducted in the UK as part of the COV-BOOST trial, evaluated the effect of a fourth dose of the Pfizer vaccine on participants aged 30 years or older. 31 participants had previously received three doses of Pfizer as part of the trial, with a median age of 67.2 years old, before receiving a fourth dose of Pfizer. The median interval between the third and fourth doses was 208 days (29.7 weeks). Anti-spike IgG concentrations increased 11-fold 14 days after the fourth dose, showing a strong antibody response to the fourth vaccine. Furthermore, similar T-cell responses were seen, suggesting that a fourth dose of the Pfizer vaccine provides a substantial boost to both humoral and cellular immunity. [32]

14. *Safety and Reactogenicity:* In the trial of healthcare workers, most adverse events (AEs) were reported as mild and resolved within 2 days post booster dose. No serious AEs or hospital admissions were reported. Active reporting of local AEs were common, and for Pfizer 78.6% (95% CI: 71.2-84.8) of second booster dose recipients reported an adverse event. Among Pfizer second booster dose recipients, more were reported by younger participants: 88% (95%CI: 80.6-95.3) compared with 69.6% (95% CI: 59.4-79.7) in those >60 years of age. Solicited systemic AEs were reported by 42.9% (95% CI: 35-50.7) of Pfizer second booster dose recipients. Systemic adverse events resolved within 2 days. The most common systemic AE reported was fatigue followed by myalgia and headache. Fever was relatively uncommon and usually resolved within 24-36 hours in either group. [30]

15. To date, no safety data have been reported separately (from first booster doses) for second booster doses. The most recent UK government report, with data to May 25th 2022, [33] states "review of third and booster dose reports does not raise any new safety concerns", and, in relation to myocarditis and pericarditis "the reports after booster doses are extremely rare and there is no indication that these events are more serious after boosters". [33] No data about safety of a second booster dose are available yet from the USA. Surveillance data for the first booster dose show "for myocarditis, the findings are consistent with those observed with primary series vaccination, but the risk appears to be lower following the first booster dose compared to dose 2 of primary series". [34]

16. There is particularly limited safety data on second boosters for those under the age of 30, with most safety and reactogenicity studies focusing on older age groups [32, 35]. It is also important to note that a smaller proportion of this age group are eligible for a second booster (given older populations worldwide have been prioritised for first booster uptake). Safety concerns remain high for those under the age of 30, given higher rates of myocarditis and pericarditis for younger age groups following the first and second Pfizer dose. [36, 37]

17. *Effectiveness:* Almost all studies report second booster doses as VE relative to a first booster dose only. Effectiveness of a second booster dose can therefore be interpreted as "there are x% fewer cases of infection/symptomatic infection/severe disease (as applicable) in those who received a second booster dose than in those who continued without this additional dose". All studies were conducted in the Omicron variant dominant period, and therefore reflect effectiveness against the Omicron variant.

18. Relative vaccine effectiveness of a second booster dose (relative to continuing with only a single booster dose) is substantial and sustained (within the period where data available) against severe disease, but less substantial and shorter lived against infection. For clarity, any relative VE value above 0% indicates increased protection in those who received a second booster dose compared to those who continued without this additional dose.

    a. Severe disease

        i. Severe disease (e.g., oxygen saturation of <94%) with or without hospitalisation: Weekly estimates of relative VE between 58% and 77% from 2-6 weeks after second booster dose with no signs of waning by the 6th week. Adjusted rate of severe disease in the fourth week after the fourth dose was 1.6 cases per 100,000 person-days (95% CI: 1.2-2.0) compared to 5.5 (95% CI: 5.2-2.9) in the three-dose group. [38]

        ii. Hospitalisation: Relative VE 68% in first month (1-4 weeks after vaccination) which correlated to a risk reduction of 180.1 (95% CI: 142.8-211.9) hospitalisation events per 100,000 persons. [39] Second and third studies (which included deaths and hospitalisations) estimated relative VE at 78% 1-3 weeks after the second booster and at 87% 7-10 weeks after, [40] and 40% (time since second booster unclear). [41]

        iii. Death: Relative VE 76% in first month which correlated to a risk reduction of 23.4 (95% CI: 11.8-34.6) COVID-19-related deaths per 100,000 persons. [39]

        iv. Mechanical ventilation or death among those already hospitalised with COVID-19: Relative VE 49%. [42]

    b. Symptomatic infection

        i. Relative VE 43-55% in first month (approximately 1-4 weeks after vaccination) in 2 studies. [30, 39] Another study estimated relative at VE 31% (time since second booster unclear). [41]

    c. Infection

        i. Relative VE 30-45% in first month (7-30 days after vaccination) in 2 studies. [30, 39] Another study estimated relative at VE 19% (time since second booster unclear). [41]

        ii. Weekly estimates of relative VE between 33-50% in the period 2-6 weeks after the second booster, declining to 10% by 8 weeks in one study. [38] Another study

estimated relative VE at 55-65% in the 2-6 weeks after the second booster with a decline to 22% by 10 weeks. [43]

19. *Limitations:* More data is required to understand the relative effectiveness of a second booster against infection and severe disease, as the sample sizes for many of these studies are small. Despite this, the second booster dose could be beneficial for people at higher risk of severe illness, particularly during periods of surge and rising infections, while emphasising the urgency of next generation development. [44]

20. *Equity considerations:* In addition to equity considerations outlined above (Para 8a vii), it is important to take into account the following factors for targeting younger age groups (those aged 50+) for Māori and Pacific populations:

    a. While New Zealand in general has an ageing population, the age structures for Māori and Pacific peoples are relatively young. Māori and Pacific peoples on average have a much lower life expectancy, compared to the rest of the New Zealand population. The average life expectancy at birth was 73.4 years for Māori males in 2017–2019, compared to 80.9 years for non-Māori males. [45]

    b. Māori and Pacific peoples face disproportionately higher levels of co-morbidities, and that these conditions have emerged at earlier ages, affecting both quality and quantity of life. [46]

    c. These disparities include, higher prevalence of conditions linked to exacerbating the impact of COVID-19, such as chronic pulmonary, liver or renal disease. [46]

    d. Lower access to healthcare, also results in many Māori and Pacific peoples with co-morbidities remaining undiagnosed.

21. Although the initial Omicron peak has passed, New Zealand is currently experiencing a 'long tail' of COVID-19, with risk of COVID-19 infection remaining high. Among potential reasons for this, it is possible that individuals that have previously reduced their social contact due to being at a higher risk of severe COVID-19 may be increasing their level of social contact due to a sense of lower risk and the peak having already occurred. Additionally, a combination of waning immunity (due to being in excess of 3 months since prior booster), and multiple variants circulating with higher immune escape and infectivity (i.e. BA.2.12.1, BA.4 and BA.5) could contribute to a potential further peak due to these variants.

International recommendations from peak bodies and rollout of second booster doses

22. Given the potential for waning immunity following a first booster, particularly against severe disease (as measured by hospitalisation), some countries have begun recommending the administration of a second booster dose to elderly populations or individuals at increased risk of severe disease or exposure.

    a. *Australia:* The Australian Technical Advisory Group on Immunisation (ATAGI) issued recommendations about second booster doses on 25 March 2022. ATAGI recommended an additional booster dose of COVID-19 vaccine to increase vaccine protection before winter for selected population groups who are at greatest risk of severe illness from COVID-19 and who have received their primary vaccination and first booster dose (link). These groups are:

        i. Adults aged 65 years and older

        ii. Residents of aged care or disability care facilities

iii. People aged 16 years and older with severe immunocompromise (as defined in the ATAGI statement on the use of a 3rd primary dose of COVID-19 vaccine in individuals who are severely immunocompromised)

iv. Aboriginal and Torres Strait Islander people aged 50 years and older.

b. After continuing to review evidence on the need for other population groups, ATAGI recommended on 25 May 2022, a second booster dose for people at higher risk of severe illness from COVID-19, who have already had their first booster dose 4 months ago. (link)

c. The second booster is **additionally recommended** for people aged 16-64 of increased risk who have:

i. A medical condition that increases the risk of severe breakthrough COVID-19 illness (see **Table 1** in appendix for expanded groups)

ii. People with disability with significant or complex health needs or multiple comorbidities which increases risk of poor outcomes from COVID-19.

d. The following groups are currently **not recommended** to receive an additional booster dose:

i. Healthy people aged 16 to 64 years, who do not have a risk factor for severe COVID-19, as their risk of severe illness after their first booster dose is likely to remain very low.

ii. People from occupational groups, such as healthcare workers, who do not have any other comorbidity that increases their risk of severe COVID-19

iii. People who are pregnant without any other comorbidity that increases their risk of severe COVID-19.

e. *Australia*: Victorian Premier Daniel Andrews has signalled his intention to push the federal government to supply a fourth dose for all healthcare workers in hospitals across Victoria, following a recent spate of COVID-19 outbreaks in hospitals by infected staff. (link)

f. *Israel***:** In January 2022, Israel began administering a fourth dose of the Pfizer vaccine to people aged over 60 years and at-risk populations who had received a third dose at least 4 months earlier. An Israeli hospital is also conducting a trial of the second booster dose in healthcare workers. (link) Early data from Israel's rollout of a second booster dose is presented below. On 22 January 2022, Israel's vaccine advisory committee recommended that those aged 18 and over be offered a fourth vaccine dose at least five months after their third dose or after recovering from the disease. (link). Israel's Ministry of Health has since approved use of a fourth dose in healthcare workers and those who are at high risk of exposure to COVID-19 in their line of work. (link)

g. *UK***:** The Joint Committee on Vaccination and Immunisation (JCVI) has advised an additional spring booster dose be given for the most vulnerable individuals in the population. (link) As a precaution, a further booster dose is advised 6 months after the last vaccine dose for adults aged 75 years and over, older residents in a care home, and individuals aged 12 years and over who are immunosuppressed.

h. *Ireland*: Media reports have mentioned that the National Immunisation Advisory Committee (NIAC) is currently considering a second booster for those aged 65 and under, after advising in April that people aged over 65 and those who are immunocompromised should get their second booster dose. (link)

i. *US*: Pfizer applied for authorisation to the US FDA on 15 March 2022 for adults 65 years and over, (link) and the US FDA has been reviewing data to authorise a second booster dose of vaccines from Pfizer and Moderna. (link) On 29 March 2022, the FDA authorised second boosters for peopled aged 50 and over, and immunocompromised people. (link)

j. *Europe:* According to a joint statement released by the European Medicines Agency and the European Center for Disease Prevention and Control, people over the age of 80 should receive a fourth booster dose of mRNA vaccine due to their weakened immune system, decreased response to vaccination, and increased risk of serious disease. (link)

k. *Spain:* Spain will offer a fourth dose of a COVID-19 vaccine to its entire population, most likely at the end of the year, Health Minister Carolina Darias said on June 16th 2022. (link)

l. *Chile*: Media reports have stated that from 7 February 2022, eligibility for a fourth dose will be extended to people aged over 55 years who had a third vaccine dose at least 6 months prior. (link) The fourth vaccine regimen has not been specified.

m. *Colombia:* Colombia's vaccine advisory committee recommended a second Covid-19 booster dose for people aged 12-49, but only under medical order. The second booster shot, or a fourth vaccine dose, is currently available for immunocompromised people, those with transplants and comorbidity, as well as seniors over 50 years old. (link)

n. *Hungary*: In January 2022, Hungary made a fourth COVID-19 vaccine shot available to people who ask for it, after a consultation with a doctor, to combat growing Omicron infections. (link)

o. *South Korea*: In February 2022, populations that are at increased risk of severe disease (the elderly and immunocompromised) or at increased risk of exposure (healthcare workers) became eligible for a fourth dose, however authorities are not currently considering expanding it more widely. (link)

p. *South Africa*: On 03 June 2022 the national health department announced that from 07 June 2022 all people over the age of 50 years are eligible to receive a second booster dose of Pfizer. (link)

Recommendations

23. CV TAG met on 21 June 2022 to update and further discuss their recommendations for second booster doses.

24. CV TAG noted:

    a. There is an increasing need for second boosters, given waning immunity from the first booster.

b. There is limited data to date on the safety profile of the second booster, particularly among younger people.

c. The safety profile of the second booster appears similar to the safety profile of the first booster, providing no indication that there would be a different response, albeit based on relatively limited data to date.

d. In consideration of risk-benefit of the second booster, and limited safety data, there is not sufficient evidence to make a broad recommendation for a second booster, at this time, to young people without comorbidities (particularly those aged under 30 years).

e. It is recognised that COVID-19 infection during pregnancy can have severe outcomes for parent and baby. COVID-19 vaccines have consistently been found to be effective in pregnancy and reduce the chance of severe illness, ICU admission and death from COVID-19 illness.[47] Millions of COVID-19 vaccine doses have been given during pregnancy with no pregnancy-specific safety concerns being identified. [47]

f. There are limited data on the second booster in healthy pregnant people because the studies and roll-out thus far have prioritised older people. However, additional safety concerns after a second booster dose are not expected. Moreover, because a second booster is given at least 6 months after the first (and at least 9 months after completion of a primary course), a second booster dose would be either the first or second dose during the pregnancy. There is substantial worldwide experience with 1 or 2 doses of COVID-19 vaccines during pregnancy, as 2-dose primary courses were administered to pregnant people in initial vaccine roll-out. As noted above, no pregnancy-specific safety concerns have been identified (including for the foetus) when the pregnant person receives 2 doses during one pregnancy.

g. Data on increased benefits from healthcare workers receiving a second booster remains marginal. There is no evidence within the available New Zealand data to suggest healthcare workers (particularly if young and without comorbidities) have a higher risk of acquiring and transmitting infection at their place of work.

h. In consideration of the updated ATAGI advice and limited international evidence, CVTAG does not currently make a specific recommendation related to healthcare workers who do not otherwise meet the criteria stated below. Further recommendations for this group may be made in the future.

i. When compared to other COVID-19 vaccines, there are more data available for the Comirnaty (Pfizer) vaccine, especially in relation to safety, and effectiveness of second boosters.

j. Given the limited safety and effectiveness data, particularly for younger populations, CV TAG would not support any further mandates with regards to second boosters.

25. CV TAG recommended:

a. Maximising efforts to ensure that at-risk populations receive their first booster dose, as this remains the priority, as advised on 1 April 2022.

b. In accordance with ATAGI recommendations, and previously issued advice, a second booster dose be offered to:

- People aged 65 years and over
- Māori and Pacific peoples aged 50 years and over

- Residents of aged care and disability care facilities aged 16 years and over
- Severely immunocompromised people (people aged 12 years and older) who were eligible for and received a three-dose primary course, with the first booster as a fourth dose (noting this is a fifth dose for this group).

c. That additional groups recommended to receive a second booster include people aged 16 years or older, who have:
    - A medical condition that increases the risk of severe breakthrough COVID-19 illness (see **Table 1** in appendix for expanded groups)
    - Disabled people with significant or complex health needs, or multiple comorbidities which increases the risk of poor outcomes from COVID-19.

d. A second booster is recommended for younger people (including those who are pregnant) who fall within the eligibility criteria above. Those who don't meet the eligibility criteria currently remain well protected from severe disease with their first booster, and a second booster is not yet needed.

e. In line with recommendation made by CVTAG in the memo dated 1st April 2022 ("Fourth dose (second booster): COVID-19 Vaccine Technical Advisory Group (CV TAG) recommendations"), the second booster dose should be offered from six months after a first booster dose.

f. The recommendations outlined above apply to all COVID-19 vaccines currently approved in New Zealand and in use within the National Immunisation Programme i.e. Comirnaty (Pfizer), Nuvaxovid (Novavax) and Vaxzevria (AstraZeneca). All recommendations are subject to the conditions in which they have been approved by Medsafe, and therefore for younger age groups may only receive a second booster from a vaccine for which the primary course has already been approved. CV TAG will continue to monitor all relevant information and will update their recommendations as further evidence becomes available.

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acting on behalf of

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Chief Science Advisor and

Chair of the COVID-19 Vaccine Technical Advisory Group

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Appendix

Table 1: ATAGI - Additional groups recommended for a winter booster dose as of 25 May 2022

People in these groups are likely to have an ongoing increased risk of severe COVID-19 even after primary vaccination. These examples are not exhaustive, and providers may include individuals with conditions similar to those listed below, based on clinical judgment

Category	**Examples**
Immunocompromising conditions	
Cancer	Non-haematological cancer including those diagnosed within the past 5 years or on chemotherapy, radiotherapy, immunotherapy or targeted anti-cancer therapy (active treatment or recently completed) or with advanced disease regardless of treatment. Survivors of childhood cancer.
Chronic inflammatory conditions requiring medical treatment with disease modifying anti-rheumatic drugs (DMARDs) or immune-suppressive or immunomodulatory therapies.	Systemic lupus erythematosus, rheumatoid arthritis, Crohn's disease, ulcerative colitis, and similar who are being treated.
Chronic lung disease	Chronic obstructive pulmonary disease, cystic fibrosis, interstitial lung disease and severe asthma (defined as requiring frequent hospital visits or the use of multiple medications).
Chronic liver disease	Cirrhosis, autoimmune hepatitis, non-alcoholic fatty liver disease, alcoholic liver disease.
Severe chronic kidney disease (stage 4 or 5)	
Chronic neurological disease	Stroke, neurodegenerative disease (e.g dementia, motor neurone disease, Parkinson's disease), myasthenia gravis, multiple sclerosis, cerebral palsy, myopathies, paralytic syndromes, epilepsy.
Diabetes mellitus requiring medication	
Chronic cardiac disease	Ischaemic heart disease, valvular heart disease, congestive cardiac failure, cardiomyopathies, poorly controlled hypertension, pulmonary hypertension, complex congenital heart disease.
People with disability with significant or complex health needs or multiple comorbidities which increase risk of poor outcome from COVID-19	Particularly those with trisomy 21 (Down Syndrome) or complex multi-system disorders.
Severe obesity with BMI ≥ 40 kg/m^2	
Severe underweight with BMI < 16.5 kg/m^2	