Record of the Immunisation Advisory Committee Meeting held on 9 May 2022

Immunisation Advisory Committee records are published in accordance with the Terms of Reference for the Pharmacology and Therapeutics Advisory Committee (PTAC) Specialist Advisory Committees 2021.

Note that this document is not necessarily a complete record of the Immunisation Advisory **Committee meeting**; only the relevant portions of the meeting record relating to Immunisation Advisory Committee discussions about an Application or Pharmac staff proposal that contain a recommendation are generally published.

The Immunisation Advisory Committee may:

(a) recommend that a pharmaceutical be listed by Pharmac on the Pharmaceutical Schedule and the priority it gives to such a listing;

(b) defer a final recommendation, and give reasons for the deferral (such as the supply of further information) and what is required before further review; or

(c) recommend that Pharmac decline to list a pharmaceutical on the Pharmaceutical Schedule.

Pharmac Advisory Committees make recommendations, including priority, within their therapeutic groups of interest.

The record of this Advisory Committee meeting will be reviewed by PTAC at an upcoming meeting.

Specialist Advisory Committees and PTAC may differ in the advice they provide to Pharmac, including recommendations' priority, due to the committees' different, if complementary, roles, expertise, experience, and perspectives.

Pharmac is not bound to follow the recommendations made below. Applications are prioritised by Pharmac against other funding options and progressed accordingly. The relative priority of any one funding choice is dependent on a number of factors, including (but not limited to) the recommendation of PTAC and/or Specialist Advisory Committees, the mix of other applications being assessed, the amount of funding available, the success of commercial negotiations and/or the availability of clinical data.

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1. Attendance

Present
Stephen Munn (Chair)
Sean Hanna
Karen Hoare
Lance Jennings
Osman Mansoor
Giles Newton-Howes
Edwin (Gary) Reynolds
Michael Tatley
Tony Walls
Elizabeth Wilson
Stuart Dalziel

Apologies
Nikki Turner

2. Summary of recommendations

Pharmaceutical and Indication	Recommendation
• Recombinant zoster vaccine (Shingrix) for people aged 50 to 64 years of age	**high priority**
• Recombinant zoster vaccine (Shingrix) for people of Māori or Pacific ethnicity aged 60 years or over.	**low priority**
• MenACWY vaccine (MenQuadfi) is a suitable vaccine to be listed as a replacement for Menactra	**replacement**
• Adjuvanted Influenza Vaccine (Fluad Quad) for people aged 65 years and over be listed only if cost neutral to unadjuvanted quadrivalent influenza vaccine (QIV)	**cost neutral**
• Influenza vaccine for use in all individuals with no restrictions	**high priority**
• Influenza vaccine for use in children up to 18 years of age and adults 50 years of age and over	**high priority**
• Influenza vaccine that high dose influenza vaccine for people aged 65 years and over be included in the next commercial process for influenza vaccine.	
• Influenza vaccine that adjuvanted influenza vaccine for people aged 65 years and over be included in the next commercial process for influenza vaccine	

3. The role of Specialist Advisory Committees and records of meetings

3.1. This meeting record of the Immunisation Advisory Committee is published in accordance with the Terms of Reference for the Pharmacology and Therapeutics Advisory Committee (PTAC) and Specialist Advisory Committees 2021, available on the Pharmac website at https://pharmac.govt.nz/assets/2021-Specialist-Advisory-Committee-Terms-of-Reference.pdfThe Terms of Reference describe, inter alia, the establishment, activities, considerations, advice, and the publication of such advice of Specialist Advisory Committees and PTAC.

3.2. Conflicts of Interest are described and managed in accordance with section 7.2 of the PTAC Terms of Reference.

3.3. The Immunisation Advisory Committee is a Specialist Advisory Committee of Pharmac. The Immunisation Advisory Committee and PTAC and other Specialist Advisory Committees have complementary roles, expertise, experience, and perspectives. The Immunisation Advisory Committee and other Specialist Advisory Committees may therefore, at times, make recommendations for treatments for Immunisation that differ from PTAC's, including the priority assigned to recommendations, when considering the same evidence. Likewise, PTAC may, at times, make recommendations for treatments for Immunisation that differ from the Immunisation Advisory Committee's, or Specialist Advisory Committees may make recommendations that differ from other Specialist Advisory Committees'.

Pharmac considers the recommendations provided by both the Immunisation Advisory Committee and PTAC and any other relevant Specialist Advisory Committees when assessing applications for treatments for Immunisation.

4. Recombinant varicella zoster vaccine (SHINGRIX) for the prevention of herpes zoster and post-herpetic neuralgia for adults aged 65 years and over

Application

4.1. The Advisory Committee reviewed the application for recombinant varicella zoster virus glycoprotein E vaccine (SHINGRIX) for the prevention of herpes zoster (HZ) and post-herpetic neuralgia (PHN) for adults aged 65 years and over.

4.2. The Advisory Committee took into account, where applicable, Pharmac's relevant decision-making framework when considering this agenda item.

Recommendation

4.3. The Advisory Committee **recommended** that the recombinant varicella zoster vaccine be listed with a **high priority** for people aged 50 to 64 years of age, within the context of vaccines and immunisation.

4.4. The Advisory Committee **recommended** that the recombinant varicella zoster vaccine be listed with a **low priority** for people of Māori or Pacific ethnicity aged 60 years or over.

4.5. The Advisory Committee **noted** that people aged 18 years or over who are immunocompromised and awaiting solid organ and stem cell transplant, and who have had previous exposure to the varicella virus, is a population group that might benefit from this vaccine and would like to consider this further at a future meeting.

4.6. In making these recommendations, the Committee considered:

4.6.1. the evidence for benefit of the recombinant vaccine over the currently funded live attenuated herpes zoster vaccine (Zostavax);

4.6.2. the high health need of patients with complications arising from herpes zoster infection;

4.6.3. that the stand down period between vaccination with live attenuated herpes zoster vaccine and immunosuppression would not be required with the recombinant vaccine;

4.6.4. the lower life expectancy and higher prevalence of complications and incidence of hospitalisation from herpes zoster infection in the Māori and Pacific population.

Discussion

4.7. The Committee noted a supplier funding application for the funding of recombinant varicella zoster vaccine (Shingrix) for the prevention of herpes zoster (HZ) and post-herpetic neuralgia (PHN) for adults aged 65 years and over. The Committee noted that varicella zoster virus (VZV) is a human alpha-herpes virus that causes varicella during primary infection, establishes latency in sensory neurons, and causes HZ when reactivated. The Committee noted that viral reactivation is associated with impaired immunity – either due to immunosenescence, which is a natural age-related decline in immune system function, or an underlying immunodeficiency.

4.8. The Committee noted that during primary infection, VZV particles from skin lesions enter sensory nerves and migrate through primary afferent nerve tissue to become latent in cranial nerve ganglia, dorsal root ganglia and autonomic ganglia along the entire neuroaxis. The Committee noted that while latent VZV is non-infectious, it can reactivate in sensory neurons to form virions which can spread from a single ganglion to neural tissue and the associated dermatome and cause HZ. The Committee noted that some patients with HZ may continue to experience pain for months to years after the resolution of the rash, which is referred to as postherpetic neuralgia (PHN). The Committee noted that herpes zoster ophthalmicus (HZO), a potentially sight-threatening condition, is also a serious complication of HZ infection prevalent in New Zealand clinical practice.

4.9. The Committee noted that the lifetime risk of HZ is approximately 30%, and that this increases significantly with age. The Committee noted that the overall age-adjusted apparent rate of zoster related primary care consultations in New Zealand was reported as 42.7 per 10,000 person-years (95% CI 41.9 to 43.5; Turner et al. BMJ Open. 2018;8:e021241). The Committee noted that a systematic review of incidence and complications of herpes zoster globally reported that the risk of developing PHN from HZ varied from 5% to more than 30%, and that the risk of HZO ranged from 10% to 15% (Kawai et al. BMJ Open. 2014;4:e004833). The Committee noted that the rate of complications from HZO is high, with 50-90% of patients developing some form of ocular complication if left untreated (Volpi A. Herpes. 2007;14:Suppl2:35-9).

4.10. The Committee noted that in 2018/2019, there were 483 hospitalisations associated with herpes zoster, 60% of which occurred in adults aged 60 years and older (Ministry of Health. Immunisation Handbook 2020). The Committee noted that HZ related mortality rates in Kawai et al. ranged from 0.017 to 0.465 per 100,000 person-years, and that most of these occurred in people aged 60 years or over. The Committee noted that there is no data available regarding HZ related mortality in the Māori and Pacific population in New Zealand. The Committee noted Turner et al. reported a slightly lower incidence of HZ in Māori compared to other ethnicities and that factors such as VZV primary exposure in childhood and socioeconomic factors did not appear to be linked to this lower incidence (Turner et al. BMJ Open. 2018;8:e021241). The Committee considered that reduced access to primary healthcare and underdiagnosis in the Māori population may impact reported incidence rates.

4.11. The Committee noted that newly published research from the US has reported an increased risk of HZ in adults ≥50 years old diagnosed with COVID-19 (Bhavsar et al. Open Forum Infect Dis. 2022;9:ofac118). The Committee noted that the study reported that people aged 50 years and older who had contracted COVID-19 were 15% more likely to develop HZ compared to those who were never diagnosed with COVID-19, and that the risk of HZ was elevated for up to six months after a COVID-19 diagnosis. The Committee also noted that those hospitalised for COVID-19 were reported to be 21% more likely to develop HZ. The Committee noted that as at 22 March 2022, Māori and Pacific people represented 36% of COVID-19 cases in New Zealand (COVID-19: Case demographics. Ministry of Health, 2022), and are 2.5 times more likely to be hospitalised due to COVID-19 (Steyn et al. N Z Med J. 2021;134:28-43).

4.12. The Committee noted that the currently funded vaccination against herpes zoster infection is a live attenuated zoster vaccine, which is funded for people aged 65 years. The Committee noted that live zoster vaccine is contraindicated in individuals who are immunocompromised, specifically those with immunodeficiency due to haematological malignancies, acquired immune deficiency syndrome (AIDS) or clinical manifestations of human immunodeficiency virus (HIV) infection, and in patients receiving immunosuppressive medical therapy. The Committee also noted that the efficacy of the live attenuated zoster vaccine decreases with age, with only ~50% efficacy against HZ in adults ≥60 years, and with even less efficacy in older patients (≥70 years), who are at higher risk for both HZ and PHN (Oxman et al. N Engl J Med. 2005;352:2271-84).

4.13. The Committee noted that Shingrix is an adjuvanted subunit vaccine that contains recombinant VZV glycoprotein E (gE) administered via injection. The Committee noted that by combining the VZV specific antigen (gE) with an adjuvant system (AS01B), Shingrix induces antigen-specific cellular and humoral immune responses in individuals with pre-existing immunity against VZV. The Committee noted that the Medsafe approved dosing schedule for Shingrix consists of two primary doses (given between two and six months apart) for people aged 65 years and over. The Committee noted that Shingrix is Medsafe approved for the prevention of herpes zoster and post-herpetic neuralgia in adults 50 years of age or older.

4.14. The Committee noted the following clinical evidence relating to the efficacy of recombinant herpes zoster vaccines:

4.14.1. Lal et al. N Engl J Med. 2015;372:2087-96 (ZOE-50)

4.14.2. Cunningham et al. N Engl J Med. 2016;375:1019-32 (ZOE-70)

4.14.3. Boutry et al. Clin infect Dis. 2021; ciab629 (ZOE 50/70 extension study)

4.14.4. Sun et al. Clin Infect Dis. 2021;73:949-56

4.14.5. Sun et al. Vaccine. 2021;39:3974-82

4.14.6. Lu et al. Ophthalmology. 2021;128:1299-707

4.14.7. Izurieta et al. Clin Infect Dis. 2021;73:941-8

4.14.8. McGirr et al. Vaccine. 2019;37:2896-909

4.14.9. Godeaux et al. Hum Vaccin Immunother. 2017;13:1051-8

4.14.10. Hastie et al. J Infect Dis. 2021;224:2025-34

4.14.11. Ocran-Appiah et al. Vaccine. 2021;39:6-10

4.14.12. Curran et al. J Am Geriatr Soc. 2021;69:744-52

4.14.13. Curran et al. J Gerontol A Biol Sci Med Sci. 2019;74:1231-38

4.15. The Committee considered that the majority of the studies reviewed were consistent in reporting high levels of vaccine efficacy for the recombinant vaccine, regardless of age, and sustained over time. The Committee also noted that maximum benefit was gained from receiving two doses of Shingrix, and that vaccine effectiveness was above 90% for protection against PHN and other HZ related complications for most age groups.

4.16. The Committee noted that immunogenicity of the recombinant zoster vaccine was sustained over time and apparent at 120 months post vaccination for both humoral and cellular response (Hastie et al. J Infect Dis. 2021;224:2025-34). The Committee also noted that serious adverse events relating to the recombinant zoster vaccine were rare, and that common adverse events include pain, redness and swelling at injection site, fatigue, myalgia, and headache. The Committee considered that the majority of these adverse events were short lived and not clinically significant, and likely due to the adjuvant component (AS01B) of the vaccine.

4.17. The Committee considered that the evidence was of high strength and good quality, and that the recombinant zoster vaccine is likely a more effective vaccine than the currently funded live zoster vaccine. The Committee noted that the duration of benefit of the recombinant zoster vaccine extends to at least eight years post-vaccination, compared to the live vaccine where immunity declines within three-four years. The Committee considered that people who have already been vaccinated with the currently funded herpes zoster vaccine would benefit from being revaccinated with the recombinant herpes zoster vaccine after 3-5 years following previous Zostavax dose, in order to address the waning effect from the live zoster vaccine.

4.18. The Committee noted that the PBAC (Australia) in 2018 did not recommend Shingrix for funding due to uncertainty of clinical benefit and high financial impact. The Committee noted that since the PBAC consideration a supplier funded study by McGirr et al. was published (in 2019) which reported that Shingrix has a significantly greater vaccine effectiveness than Zostavax for people aged 60 years and over.

4.19. The Committee considered that there would be a significant unmet health need in New Zealand, especially for older age groups at risk of HZ and HZ-related complications increases with age if zoster vaccine was no longer available. The Committee also considered that Shingrix would be an appropriate alternative to Zostavax in the event of discontinuation or following a commercial process. The Committee considered that it would be appropriate to schedule vaccination with Shingrix in the same way as the currently funded live zoster vaccine (ie for people aged 65 years). The Committee considered, however, that the burden of disease with shingles starts increasing from 50 years of age, and that it would be appropriate to consider funding the recombinant vaccine for people 50 years of age and older. The Committee noted that there is no evidence relating to durability of response after ten years and considered that it was uncertain if re-vaccination would be needed after this time.

4.20. Members considered that, if Shingrix were funded in New Zealand, that it would be appropriate to allow Māori and Pacific people to access the vaccine at an earlier age.

The Committee noted that Māori and Pacific people have a lower life expectancy than non-Māori and non-Pacific people and considered that the age for access to Shingrix could be lowered relative to their reduced life-expectancy at the age of vaccination, where Māori males and females aged 50 years have 5.7 and 6.2 fewer expected number of years of life remaining at age 50 compared with non-Māori males and females respectively (calculated from New Zealand period life tables: 2017–2019). The Committee noted that Shingrix doses can be given alongside Tdap or influenza vaccinations to reduce the number of vaccination appointments and cost to patients. The Committee also noted that the shelf life of Shingrix is three years, compared with 18 months for Zostavax, and Shingrix does not have any immunodeficiency contraindications.

4.21. The Committee noted that there would be a benefit to funding the recombinant vaccine from 18 years of age for people who are immunocompromised and awaiting solid organ and stem cell transplants, who currently have a stand-down period following vaccination with the live zoster vaccine.

4.22. The Committee considered that funding the recombinant herpes zoster vaccine would reduce the health system impact of HZ related complications such as PHN and HZO and may lessen some of the extra impacts due to COVID-19 infection. The Committee considered that there would also be a benefit to family and whānau of patients with HZ in that there would be a decreased caregiver burden. The Committee considered that vaccination with recombinant zoster vaccine would not create any significant changes in health-sector expenditure other than for direct treatment costs.

4.23. The Advisory Committee considered that the table below summarises its interpretation of the most appropriate PICO (population, intervention, comparator, outcomes) information for recombinant varicella zoster vaccine (Shingrix) if it were to be funded in New Zealand for people aged 65 years and over, or from 50 years of age. This PICO captures key clinical aspects of the proposal and may be used to frame any future economic assessment by Pharmac staff. This PICO is based on the Advisory Committee's assessment at this time and may differ from that requested by the applicant. The PICO may change based on new information, additional clinical advice, or further analysis by Pharmac staff.

Population	People aged 65 years of age and a re-vaccination program for people over 65 years of age who received the Zostavax vaccine 5 years ago.	People aged 50 years of age with a two-year catch-up programme for people aged between 51 and 64 years of age.	People aged 18 to 49 years who are immunocompromised - (haematological malignancies, AIDS or clinical manifestations of HIV infection, and patients receiving immunosuppressive medical therapy)
Intervention	Two doses of recombinant varicella zoster vaccine (SHINGRIX) spaced 2-6 months apart + BSC for HZ infection (valaciclovir+ capsaicin cream for PHN)		
Comparator(s)	No vaccination + BSC for HZ infection (valaciclovir + capsaicin for PHN)		
Outcome(s)	Reduced incidence of herpes zoster episodes Reduced incidence of postherpetic neuralgia Health sector savings from reduced inpatient and outpatient events Improved health related quality of life		
Table definitions: **P**opulation: The target population for the pharmaceutical, including any population defining characteristics (eg line of therapy, disease subgroup) **I**ntervention: Details of the intervention pharmaceutical (dose, frequency, treatment duration/conditions for treatment cessation).			

Comparator: Details the therapy(s) that the patient population would receive currently (status quo – including best supportive care; dose, frequency, treatment duration/conditions for treatment cessation).

Outcomes: Details the key therapeutic outcome(s), including therapeutic intent, outcome definitions, timeframes to achieve outcome(s), and source of outcome data.

5. Meningococcal group A, C, W-135 and Y conjugate vaccine (MenQuadfi)

Application

5.1. The Advisory Committee reviewed the application for Meningococcal group A, C, W-135, and Y conjugate vaccine (MenQuadfi).

5.2. The Advisory Committee took into account, where applicable, Pharmac's relevant decision-making framework when considering this agenda item.

Recommendation

5.3. The Advisory Committee **recommended** that MenQuadfi is a suitable vaccine to be listed as a replacement for Menactra within the context of vaccines and immunisation, subject to the same funding criteria as those for Menactra, which are currently:

Meningococcal (groups A, C, Y and W-135) conjugate vaccine
Either:
1. Any of the following:
    a. Up to three doses and a booster every four years for patients pre- and post-splenectomy and for patients with functional or anatomic asplenia, HIV, complement deficiency (acquired or inherited), or pre or post solid organ transplant; or
    b. One dose for close contacts of meningococcal cases of any group; or
    c. One dose for person who has previously had meningococcal disease of any group; or
    d. A maximum of two doses for bone marrow transplant patients; or
    e. A maximum of two doses for person pre- and post-immunosuppression; or
2. Both:
    a. Person is aged between 13 and 25 years, inclusive; and
    b. Either:
        i. One dose for individuals who are entering within the next three months, or in their first year of living in boarding school hostels, tertiary education halls of residence, military barracks, or prisons; or
        ii. One dose for individuals who are currently living in boarding school hostels, tertiary education halls of residence, military barracks, or prisons, from 1 December 2019 to 30 November 2021.

Note: children under seven years of age require two doses 8 weeks apart, a booster dose three years after the primary series and then five yearly.
*Immunosuppression due to steroid or other immunosuppressive therapy must be for a period of greater than 28 days.

5.4. In making this recommendation, the Advisory Committee considered:

- The high health need for people with invasive meningococcal disease (IMD), particularly regarding the decreased health-related quality of life (HRQoL) and poor health outcomes experienced by individuals with this condition, and the severe impact on family/whanau.

- The disproportionate impact of meningococcal disease on Māori, Pacific peoples, and people living in deprived areas.

- The high quality, strong evidence that MenQuadfi is non-inferior and has a similar safety profile to the currently funded alternative, Menactra.

Discussion

Māori impact statement

5.5. The Committee noted that the incidence of IMD is disproportionally higher in Māori than other populations in New Zealand. The Committee noted that in 2013, comparative incidence rates per 100,000 persons per year in Māori vs non-Māori were 3.4 vs. 1.5 in all age groups, 32.3 vs. 18.4 in infants <1 year of age, and 15.7 vs. 5.2 in children 1-4 years of age respectively (Lopez et al. Institute of Environmental Science and Research Ltd. 2014).

Background

5.6. The Committee noted that the supplier has advised that it is ceasing manufacture of Menactra meningococcal ACWY vaccine globally. The Committee noted that the supplier is proposing to supply MenQuadfi as a substitute vaccine.

Discussion

5.7. The Committee noted that the course of infection with *Neisseria meningitidis* (an obligate, Gram-negative, diplococcus, bacterial human pathogen) is often rapid, where patients can develop IMD within just a few hours, which can lead to meningitis, septicaemia, and death. The Committee noted that there are 12 serogroups of N. meningitidis, with serogroups A, B, C, Y, and W being the most common causes of clinically relevant disease, with significant regional and temporal fluctuations in prevalence (Pace et al. Vaccine, 2012;30:B3-9; Pelton. 2016;59:S3-11).

5.8. The Committee noted that meningococcal cases had been steadily increasing from 75 in 2016, to 139 in 2019, before a decrease to 35 cases in 2020, 44 in 2021, and 4 so far in 2022 up to 15 February. The Committee noted that public health measures in place to manage COVID-19 have likely had a role in reducing the number of cases. The Committee noted that children also had the highest notification rates of meningococcal disease, which predominantly consisted of group B cases. The Committee noted that in recent years the proportion of group W cases had been growing from 7% of total cases in 2016 to 26% in 2019, and that this trend reversed in 2020 and 2021 with group B cases making up a greater percentage of total cases (51% in 2020 and 67% in 2021). The Committee considered that as borders reopen and societal behaviour returns to baseline, meningococcal epidemiology is expected to follow trends observed prior to the Covid-19 pandemic. The Committee considered that it is likely that New Zealand would continue to see peaks of cases of infection with meningococcal C and W strains.

5.9. The Committee considered there would be a high unmet need if meningococcal ACWY vaccine was discontinued. The Committee considered it would be important to continue to have a funded meningococcal ACWY vaccine. The Committee noted that IMD has the highest fatality rate of any vaccine-preventable disease (except for rabies), with a case-fatality rate of up to 10% in developed countries (Research Review. 2019). The Committee noted that approximately 10-30% of children and adolescents who survive the acute disease phase develop debilitating permanent sequelae, such as limb deformity or amputation, scarring, deafness, and neurologic deficits (Stein-Zamir et al. Pediatr Infect Dis J. 2014;33:777-9; Viner et al. Lancet Neurol. 2012;11:774-83). The Committee noted that even IMD survivors without sequelae experience a long-term adverse impact on HRQoL, affecting self-esteem, physical, mental, and psychosocial health, and HRQoL was worse in those with cognitive and behavioural sequelae (Olbrich et al. Infect Dis Ther. 2018;7:421-38).

5.10. The Committee noted that IMD also negatively affects the HRQoL of patients' family/whānau and close caregiver network, both in the short- and long-term (Olbrich et al. Infect Dis Ther. 2018;7:421-38; Shears et al. Pediatr Crit Care Med. 2005;6:39-43; Judge et al. Intensive Care Med. 2002;25:648-50). The Committee noted that family members of IMD survivors have long-term impacts on their health, particularly affecting the likelihood of family members reporting anxiety and depression (Hareth et al. Health Econ. 2016;25:1529-44).

5.11. The Committee noted that the health outcomes observed in Māori are also reflected in Pacific peoples. The Committee noted that, standardising for age, children living in the most deprived areas had more than seven times the rate of meningococcal disease as children living in the least deprived areas (standardised rate ratio 7.8, 95% CI 3.6 to 17.0) (Environment Health Intelligence NZ. 2020). The Committee noted that other known risk factors for IMD incidence and poor outcomes include young age, a weak immune system (eg due to HIV, chemotherapy, splenectomy or bone marrow or solid organ transplant), living in shared accommodation (eg prisons, boarding schools or hostels) or overcrowded housing, and exposure to tobacco smoke, all of which are likely experiencing some level of health disparity compared to the broader overall population.

5.12. The Committee noted that the continued funding of meningococcal ACWY vaccine aligns with several of the government health priorities, including child wellbeing and prevention via immunisation against infectious diseases. The Committee noted that vaccination against meningococcal disease also aligns with Pharmac's equity priorities, noting the disproportionate representation of meningococcal disease in Māori, Pacific peoples, and people living in high socioeconomic deprivation. The Committee noted that infectious disease is also listed as a priority condition, which includes immunisation to prevent infectious diseases.

5.13. The Committee noted that Pharmac currently funds several meningococcal vaccines, each with varying eligibility criteria; these include Menactra (MenACWY-DT, meningococcal groups A, C, Y and W-135 conjugate vaccine), Bexsero (meningococcal B multicomponent vaccine), and Neisvac-C (meningococcal C conjugate vaccine).

5.14. The Committee noted that it has also previously considered applications for widened access to meningococcal ACWY vaccine for inclusion in the childhood immunisation schedule, adolescents in close living situations and all people from 5 to 21 years of age. The Committee noted it has recommended funding for these groups with a high priority.

5.15. The Committee noted that MenQuadfi is not currently Medsafe approved, however that the supplier has lodged an application with Medsafe for the requested indication. The Committee noted that the MenQuadfi application to Medsafe is for a single dose primary vaccination of individuals aged 12 months or older with no upper age limit, and for single dose booster vaccination of adolescents and adults who have previously been primed with meningococcal vaccine at least four years prior. The Committee noted that Menactra, by contrast, is recommended for primary vaccination, as a two-dose series in children 9 to 23 months old, or as a single dose in individuals 2 to 55 years old, and as a booster vaccination in accordance with national recommendations.

5.16. The Committee considered that eligible infants aged 9 to 11 months would receive NeisVac-C if MenQuadfi replaced Menactra, until MedQuadfi was approved for use from 9 months of age. The Committee noted that clinical trials of MenQuadfi from six weeks of age are ongoing to support a future indication as primary vaccination from six

weeks of age. The Committee also considered that Pharmac should encourage the supplier to seek Medsafe approval for use in infants <9 months as soon as possible.

5.17. The Committee noted that MenQuadfi is administered as a 0.5 mL single dose injection by the intramuscular route, with each dose containing 10.0 µg of meningococcal polysaccharide from each of the groups A, C, Y, and W-135. The Committee noted that each polysaccharide is individually conjugated to tetanus toxoid protein prepared from cultures of *Clostridium tetani* (approximately 55 µg per dose), compared to Menactra which is conjugated to diphtheria toxoid (approximately 48 µg per dose).

5.18. The Committee considered the proposed funding criteria to be appropriate in targeting the intended patient population. The Committee considered MenQuadfi and Menactra could be given as booster doses regardless of which vaccine was used for the primary series, so individuals who had received a primary series with Menactra would be able to receive a booster with MenQuadfi.

5.19. The Committee noted that the key evidence for MenQuadfi comes from three clinical trials:

5.19.1. The Committee noted that MET43 is a Phase III, modified double-blind, randomised, parallel group, active-controlled, multi-centre trial which compared the efficacy of MenQuadfi to Menactra in 3344 healthy, meningococcal vaccine-naïve, adolescents and adults aged 10-55 years. The Committee noted that exclusion criteria included pregnancy/lactation, recent vaccination, and history of or high risk for meningococcal disease. The Committee noted that after 6 months, the proportion of participants achieving seroresponse (measured by hSBA) in the MenQuadfi group was non-inferior to Menactra (A: 74% vs 55%; C: 89% vs 48%; W: 80% vs 61%; Y: 91% vs 73%, respectively). The Committee noted that proportion of adverse events (AEs) were also similar in MenQuadfi and Menactra study groups, with the most common AEs being injection site pain (38.8% vs 38.3%), myalgia (32.0% vs 31.2%), headache (27.9% vs 27.8%), and dizziness within 30 minutes of vaccination (0.3% vs 0.2%) (Dhingra et al. Vaccine. 2020;38:5194-01).

5.19.2. The Committee noted that MET56 is a phase III, modified double-blind, randomised, parallel group, active-controlled, multicentre trial which compared the efficacy of MenQuadfi to Menactra in 810 healthy adolescents and adults aged ≥15 years who had documented evidence of receiving one dose of an MCV4 vaccine (MCV4-DT or MCV4-CRM) at age 10 years or older, 4-10 years previously. The Committee noted that exclusion criteria included previous booster vaccination, recent vaccination, and history of or high risk for meningococcal disease. The Committee noted that after 6 months, the proportion of participants achieving seroresponse (measured by hSBA) in the MenQuadfi group was non-inferior to Menactra at day 30 post-booster vaccination (A: 92.2% [95% CI 89.0, 94.7] vs 87.1% [83.4, 90.3]; C: 97.1% [94.9, 98.6] vs 91.8% [88.6, 94.3]; W: 98.2% [96.3, 99.3] vs 90.7% [87.4, 93.4]; Y: 97.4% [95.3, 98.7] vs 95.6% [93.1, 97.4], respectively). The Committee noted that proportion of AEs were also similar in MenQuadfi and Menactra study groups, with the most common AEs being injection site reaction (44.7% vs 48.8%), headache (37.9% vs 33.3%), and myalgia (36.7% vs 38.8%) (Áñez et al. Hum Vaccin Immunother. 2020;16:1292-8).

5.19.3. The Committee noted that MEQ0068 is a phase III, modified double-blind, randomised, parallel-group, active-controlled, multi-centre study comparing the efficacy of MenQuadfi to Menactra in 359 children (2-9 years of age), adolescents (10-17 years of age) and adults (18-55 years of age) in Japan. The Committee noted that exclusion criteria included recent vaccination and history of or high risk for meningococcal

disease. The Committee noted that after the study duration of 170 days, the proportion of participants achieving seroresponse (measured by hSBA) in the MenQuadfi group was non-inferior to Menactra (A: 85.6% [79.5, 90.5] vs 65.4% [57.9, 72.3]; C: 96.6% [92.6, 98.7] vs 62.6% [55.0, 69.7]; W: 87.4% [81.5, 91.9] vs 49.5% [41.6, 56.7]; Y: 97.7% [94.2, 99.4] vs 63.5% [56.0, 70.6]). The Committee noted that proportion of AEs were also similar in MenQuadfi and Menactra study groups and included solicited injection site reaction (44.1% vs 38.3%), solicited systemic reaction (36.3% vs 26.1%), and unsolicited AEs (8.4% vs 6.1%) (MEQ00068 Clinical Study Report provided with application).

5.20. The Committee considered the evidence provided is of high quality, good strength, and demonstrates that MenQuadfi is non-inferior to Menactra with a similar safety profile. The Committee considered that there is a paucity of evidence regarding use of MenQuadfi in high-risk groups, as well as a lack of long-term efficacy data, however that it is reasonable to assume this vaccine will perform similarly to Menactra. The Committee considered that there appears to be some blunting of the meningococcal response following DTaP and PCV13 vaccination in children with functional or anatomic asplenia or HIV infection. The Committee noted that Menactra is currently given before or at the same time as DTaP and considered that MenQuadfi should be managed in the same way as Menactra. The Committee also considered there to be no matching concerns with antigens contained in MenQuadfi and circulating Men ACWY groups in New Zealand that may impact efficacy.

5.21. The Committee considered that if MenQuadfi replaced Menactra, there is unlikely to be a significant impact to the health system. The Committee noted that MenQuadfi may provide an opportunity to reduce the number of vaccine doses required by some children currently eligible for Menactra under criterion 1 of the eligibility criteria due to the differences in recommended dosage and administration schedules, which may have a small impact on costs to the health system. The Committee noted that MenQuadfi has a longer shelf life (36 months) than Menactra (24 months), which may reduce the potential for wastage.

5.22. The Advisory Committee considered that the table below summarises its interpretation of the most appropriate PICO (population, intervention, comparator, outcomes) information for the MenQuadfi vaccine if it were to be funded in New Zealand. This PICO captures key clinical aspects of the proposal and may be used to frame any future economic assessment by Pharmac staff. This PICO is based on the Advisory Committee's assessment at this time and may differ from that requested by the applicant. The PICO may change based on new information, additional clinical advice, or further analysis by Pharmac staff.

Population	a. Pre- and post-splenectomy patients and patients with asplenia, HIV, complement deficiency, or pre- and post-solid organ transplant b. Close contacts of meningococcal cases of any group c. People who have previously had meningococcal disease d. Bone marrow transplant patients e. Pre- and post-immunosuppression patients f. People between 13 and 25 years of age within 3 months of entering or in the first year of living in boarding school hostels, tertiary education halls of residence, military barracks, prisons
Intervention	Dose(s) of MenQuadfi administered as a 0.5 mL single dose injection via the intramuscular route. 1 dose: b, c, and f 2 doses: d and e 3 doses: a

Comparator(s) (NZ context)	No vaccination + best supportive care
Outcome(s)	Reduced mortality Reduced long term sequalae Improved health related quality of life Health sector savings from sequelae management Health sector costs from vaccine administration

Table definitions:

Population: The target population for the pharmaceutical, including any population defining characteristics (eg line of therapy, disease subgroup)

Intervention: Details of the intervention pharmaceutical (dose, frequency, treatment duration/conditions for treatment cessation).

Comparator: Details the therapy(s) that the patient population would receive currently (status quo – including best supportive care; dose, frequency, treatment duration/conditions for treatment cessation).

Outcomes: Details the key therapeutic outcome(s), including therapeutic intent, outcome definitions, timeframes to achieve outcome(s), and source of outcome data.

6. Adjuvanted inactivated quadrivalent influenza vaccine (aQIV) for use in people aged 65 years and over

Application

6.1. The Advisory Committee reviewed the resubmission for the previously reviewed application for adjuvanted inactivated quadrivalent influenza vaccine (aQIV) in the use in people aged 65 years and over

6.2. The Advisory Committee took into account, where applicable, Pharmac's relevant decision-making framework when considering this agenda item.

Recommendation

6.3. The Advisory Committee **recommended** that the adjuvanted inactivated quadrivalent influenza vaccine (aQIV) for people aged 65 years and over be listed only if cost neutral to unadjuvanted quadrivalent influenza vaccine (QIV) within the context of vaccines and immunisation.

6.4. The Advisory Committee did not consider that the additional information in the resubmission from the supplier was of sufficient strength or quality to warrant a change to the Committee's previous cost neutral recommendation.

6.5. The Committee considered that aQIV should be included in Pharmac's upcoming commercial process for vaccines.

Discussion

6.6. The Committee noted that the highest proportion of influenza infections resulting in hospitalisation and death is seen in adults aged 65 years and over, who have decreased immune function due to their age (immunosenescence) and may have other conditions (including diabetes, heart disease, and respiratory conditions), which increase the risk of complications from influenza. The Committee noted that from 1994 to 2008, the rate of hospitalisations attributable to influenza in the 65-79 years age group was 149.9 per 100,000 (Khieu et al. Vaccine 2015;33:4087-92). The Committee noted that the estimated proportion of influenza-associated deaths during the same time period for those aged 65 years and over was 85%, and that the influenza-attributable death rate per 100,000 was higher for more deprived areas (NZDep 9 &

10) compared with least deprived areas (RR 1.8, 95% CI 1.3-2.4; Khieu et al. J infect. 2017;75:225-33). The Committee noted that the hospitalisation and mortality rates modelled by Khieu et al. are consistent with ESR's influenza surveillance intelligence.

6.7. The Committee noted that Māori and Pacific people are more likely to be hospitalised from severe acute respiratory illness (SARI) compared with non-Māori and non-Pacific populations and are also more likely to have to be treated in ICU due to SARI, though Māori rates of ICU admission from confirmed influenza are lower than for non-Māori. The Committee noted that in addition, Māori and Pacific people are less likely to visit a GP than Asian, non-Māori and non-Pacific people with influenza-like illness (ILI) symptoms which may contribute to increased severity in complications from influenza in the Māori and Pacific population (ESR 2019 Influenza Surveillance intelligence dashboard).

6.8. The Committee noted that influenza vaccination data from the Ministry of Health reported that the overall vaccination coverage for people aged 65 years and over in 2021 was 63.8%, with only 50% of the Māori population aged 65 years and over receiving vaccinations. The Committee noted that coverage has remained static for many years and considered that there is a significant need to improve coverage to high-risk elderly patients in New Zealand.

6.9. The Committee noted that the funded influenza vaccine in New Zealand for 2022 is a non-adjuvanted QIV, which offers protection against strains H1N1, H3N2, B/Victoria and B/Yamagata.

6.10. The Committee noted that an application for aQIV for use in people aged 65 years and over was reviewed by PTAC at its August 2020 meeting, where it was recommended it be declined. The Committee noted that PTAC considered there to be uncertainty surrounding the magnitude of benefit of aQIV over QIV based on indirect comparisons of efficacy data. The Committee recalled that it had subsequently reviewed the application in September 2020 where it was recommended for listing only if cost neutral to unadjuvanted quadrivalent influenza vaccine (QIV). The Committee recalled that it had considered that the evidence of benefit of aQIV over QIV at that time to be low.

6.11. The Committee noted that the supplier had provided updated evidence in a resubmission for aQIV for use in people aged 65 and over. The Committee noted that the evidence for aQIV from the supplier in the previous application, as well as the current application, was in the form of indirect comparisons with aTIV as the comparator, and that there were no head-to-head randomised controlled trials comparing aQIV to QIV.

6.12. The Committee noted that the appropriate comparator for aQIV in New Zealand is QIV, but because there are no head-to-head trials of aQIV compared with a QIV, the supplier had instead provided an indirect comparison using Fluad aTIV as the common comparator, providing indirect signals of nominal superiority over TIVs and non-inferiority with aQIV. The Committee recalled that it had considered in 2020 that the absence of a head-to-head comparison of QIV with aQIV was a substantial limitation with the application. The Committee noted that the resubmission from the supplier included updated evidence for the same indirect comparison model.

6.13. The Committee noted that the one randomised controlled trial included in the resubmission was one that had been previously assessed: the V118_20 study: a phase III multi-centre, double-blind, randomised clinical trial that compared aTIV to aQIV using haemagglutination inhibition (HI) as a surrogate endpoint (Essink et al.

Vaccine. 2020;38:242-50). The Committee noted that the trial reported non-inferiority of aQIV compared with aTIV for geometric mean titre and seroconversion rates, and that reactogenicity profiles were generally comparable. The Committee noted that aQIV demonstrated immunogenicity against two B lineages, compared with aTIV which only includes one B lineage. However, the Committee noted that the evidence presented in the study was only for immunogenicity, and that the data was primarily for immunogenicity rather than vaccine effectiveness, so considered that the evidence for clinical benefit of aQIV over aTIV was limited.

6.14. The Committee also noted the previously assessed publication by Mannino et al., a prospective, non-experimental cohort study (n=107,661, 170,988 person-years) in a community setting (excluding residents of aged-care facilities) comparing aTIV with unadjuvanted TIV in northern Italy (Mannino et al. Am J Epidemiol. 2012;176:527-33). The Committee noted that the primary endpoint was the incidence of hospitalisation for influenza or pneumonia across three consecutive influenza seasons, which were assessed over three time periods around peak influenza incidence (narrow, i.e. those weeks adjacent to peak influenza occurrence with > 1 case per 1000 person-weeks; intermediate, i.e. those weeks adjacent to peak influenza occurrence with > 0.5 cases per 1000 person-weeks; broad, the entire influenza season).

6.15. The Committee noted the following additional studies supporting the superiority of aTIV versus QIV:

6.15.1. Boikos al. Clin Infet Dis. 2021;73:816-23

6.15.2. Boikos et al. Vaccines (Basel) 2021;9:862

6.15.3. Pelton et al. Vaccines (Basel). 2020;8:446

6.15.4. Izurieta et al. J Infect Dis. 2020;222:278-87

6.15.5. McConeghy et al. Clin Infect Dis. 2021;73:e4237-43

6.15.6. Coccio et al. Vaccines (Basel). 2020;8:344

6.15.7. Izurieta et al. J Infect Dis. 2019;220:1255-64

6.15.8. Izurieta et al. Clin Infect Dis. 2021;73:e4251-9

6.16. The Committee noted a systematic review and meta-analysis (Coleman et al. Influenza Other Respir Viruses. 2021;15:813-23) examining the effectiveness of seasonal MF59-adjuvanted trivalent/quadrivalent influenza vaccine (aTIV/aQIV) relative to no vaccination or vaccination with standard or high-dose egg-based influenza vaccines among people ≥65 years old. The Committee noted that this systematic review was funded by the supplier. The Committee noted that the relative vaccine effectiveness for included studies ranged from −11.9% to 33% comparing aTIV to TIV with the pooled relative vaccine efficacy estimate showing a benefit of aTIV relative to TIV at 13.9% (95% CI 4.2 to 23.5) but with considerable heterogeneity ($I^2 = 95.9\%$, $p < 0.01$). The Committee noted that Izurieta et al. (2019) was the only study which reported a negative relative vaccine effectiveness and considered that this was due to Medicare outpatients alone being included in the study.

6.17. The Committee noted that Coleman et al. also reported that the relative vaccine effectiveness of aTIV compared to QIV for the prevention of influenza-related medical encounters ranged from −6.6% to 36.3% with a pooled estimate of 13.7% (95% CI 3.1

to 24.2; I2 = 98.8%, p < 0.01), supporting a possible clinical benefit of aTIV over QIV. The Committee noted that Coleman et al. also reported a pooled estimate of vaccine effectiveness reporting no difference between an aTIV compared to a high dose TIV (hdTIV). The Committee noted that relative vaccine effectiveness comparing aTIV to hdTIV for reducing any medical encounters due to influenza and/or pneumonia ranged from -14.9% to 16.6% across five studies in the Coleman et al. meta-analysis and considered that this reinforces the effectiveness of an aTIV versus a standard TIV. The Committee considered that as hdTIV was superior to a standard dose TIV, and an aTIV is non-inferior to hdTIV, then by extension aTIV is superior to standard dose TIV.

6.18. The Committee noted that aQIV contains MF58C.1 squalene as the adjuvant which is safe and generally well tolerated. The Committee also noted that the use of adjuvant in seasonal influenza vaccines has been shown to enhance the immunogenicity of the vaccines, enhancing the immune response against influenza antigens, in the elderly population in whom the response to non-adjuvanted QIV is lower and short-lived. The Committee noted that MF59-adjuvanted influenza vaccines have been shown to boost IFN-γ+ T cells and CD4+ T cell helper activity. The Committee noted that the aQIV has a slightly shorter shelf life than QIV (12 months versus 15 months, respectively).

6.19. The Committee considered that the strength and quality of evidence for aQIV over the currently funded QIV is of low strength and quality and considered that there was significant uncertainty arising from indirect comparisons. The Committee also considered, however, that biological plausibility for benefit from an adjuvanted vaccine is high and noted that although the treatment effect seen was minimal, it still favoured aQIV. The Committee therefore considered that aQIV is likely superior in preventing hospitalisations for influenza and pneumonia and non-inferior in terms of safety in people aged 65 years and older, compared to QIV. The Committee considered that the strength of the data in the submission lies in the number of studies, the general agreement between these studies of the superiority of aQIV and the number of patients (millions) per influenza seasons covered. The Committee also considered that the small difference in reported vaccine effectiveness between aTIV and hdTIV provides some substantiation for the indirect comparator methodology.

6.20. The Committee considered that funding of aQIV may lead to a reduction in approximately 115 influenza-related hospitalisations per year. The Committee considered that a highly material parameter when assessing cost-effectiveness for aQIV would be the impact on influenza-related mortality. The Committee considered that any significant mortality benefit with aQIV was not demonstrated in the supplier's resubmission, and reiterated that extrapolating a mortality benefit from any time period in the Mannino et al study was inappropriate (Mannino et al. Am J Epidemiol. 2012;176:527-33). The Committee considered that the most useful data to determine rates of influenza-related mortality for New Zealand comes from Khieu et al. (2017), however, considered that this data is now out of date.

6.21. The Committee considered that a decrease in influenza-related hospitalisations would be beneficial for the health system especially during upswings in case numbers of COVID-19, where hospital resources would be stretched. The Committee also considered that some of the increased cost of aQIV would be offset if the coverage of influenza vaccines was significantly improved for at-risk population groups and the elderly.

6.22. The Advisory Committee considered that the table below summarises its interpretation of the most appropriate PICO (population, intervention, comparator, outcomes) information for aQIV if it were to be funded in New Zealand for people aged 65 and over. This PICO captures key clinical aspects of the proposal and may be used to

frame any future economic assessment by Pharmac staff. This PICO is based on the Advisory Committee's assessment at this time and may differ from that requested by the applicant. The PICO may change based on new information, additional clinical advice, or further analysis by Pharmac staff.

Population	All persons aged ≥ 65 years of age
Intervention	Annual, single dose of aQIV. Contained within each 0.5mL dose is 15 mcg haemagglutinin for each AH1N1 and A/H3N2 strain, in addition to two B lineages. The adjuvant component is MF59C.1 squalene.
Comparator(s)	Non-adjuvanted QIV (Afluria Quad).
Outcome(s)	Reduced hospitalisations for pneumonia and influenza Reduced outpatient GP presentations
Table definitions: **P**opulation: The target population for the pharmaceutical, including any population defining characteristics (eg line of therapy, disease subgroup) **I**ntervention: Details of the intervention pharmaceutical (dose, frequency, treatment duration/conditions for treatment cessation). **C**omparator: Details the therapy(s) that the patient population would receive currently (status quo – including best supportive care; dose, frequency, treatment duration/conditions for treatment cessation). **O**utcomes: Details the key therapeutic outcome(s), including therapeutic intent, outcome definitions, timeframes to achieve outcome(s), and source of outcome data.	

7. Influenza vaccine widened access options

Application

7.1. The Advisory Committee reviewed the application for influenza vaccine widened access options.

7.2. The Advisory Committee took into account, where applicable, Pharmac's relevant decision-making framework when considering this agenda item.

Recommendation

7.3. The Advisory Committee **recommended**, within the context of vaccines and immunisation, that influenza vaccine for use in all individuals with no restrictions be listed with a **high priority**.

7.4. In making this recommendation, the Advisory Committee considered:

- The high health need of people with influenza and the severe impact on family/whānau.
- The disproportionate impact of influenza on Māori, Pacific peoples, and people living in deprived areas.
- The high-strength evidence that influenza vaccination improves health outcomes by reducing transmission, hospitalisation, and death.

7.5. The Advisory Committee **recommended**, within the context of vaccines and immunisation, that influenza vaccine for use in children up to 18 years of age and adults 50 years of age and over be listed with a **high priority**.

7.6. In making this recommendation, the Advisory Committee considered:

- The high health need for people with influenza and the severe impact on family/whānau.
- The disproportionate impact of influenza on Māori, Pacific peoples, and people living in deprived areas.
- The high-strength evidence that influenza vaccination improves health outcomes by reducing transmission, hospitalisation, and death.

7.7. The Advisory Committee **recommended**, within the context of vaccines and immunisation, that high dose influenza vaccine for people aged 65 years and over be included in the next commercial process for influenza vaccine.

7.8. The Advisory Committee **recommended**, within the context of vaccines and immunisation, that adjuvanted influenza vaccine for people aged 65 years and over be included in the next commercial process for influenza vaccine.

Discussion

Māori impact

7.9. The Committee noted that influenza disproportionately affects Māori health outcomes, which may be in part due to lower rates of immunisation in the Māori population.

Background

7.10. The Committee noted that Pharmac staff sought clinical advice from Immunisation Advisory Committee members in late February 2022 on several options for widened access that have since been discussed with the Ministry of Health during the 2022 influenza season, including widened access for Māori and Pacific peoples aged 55 to 64 years, children aged 6 months to 5 years, and eligible people and their whānau who live in the same dwelling (also known as “whānau approach” or “ring protection”).

7.11. The Committee considered that, at that time, the preferred option of most members was open access (“universal coverage”) for all ages, or some priority groups such as school age children or children from 6 months to 5 years of age. The Committee noted that, while open access was a preferred option, most members were supportive of widened access for Māori and Pacific peoples from an earlier age. The Committee noted that it was also suggested by members that Pharmac consider extending this down to 50 years age, as this is when immune response starts to wane due to ageing.

7.12. The Committee noted that the eligibility criteria for influenza vaccine were widened from 1 April 2022 to include Māori and Pacific peoples who are 55 to 64 years of age, for the duration of the 2022 calendar year, which was intended to reduce the impact of influenza to at-risk populations during the COVID-19 pandemic. The Committee noted that other options for widened access considered by Committee members in February 2022 were also evaluated, but this option was progressed taking into account the planned vaccine supply, particularly the constrained paediatric vaccine supply which meant it would not be possible to widen access to children under 3 years of age.

Discussion

7.13. The Committee noted that influenza is a viral infection that is associated with high morbidity and mortality due to the effects and complications of acute respiratory illness in young children, the elderly, pregnant women, and people with a range of underlying medical conditions. The Committee noted that healthy children and adults can also be at risk of serious illness following influenza infection.

7.14. The Committee noted that the highest proportion of influenza infections resulting in hospitalisation and death is seen in adults aged 65 years and over, who have decreased immune function due to their age (immunosenescence) and may have other conditions (including diabetes, heart disease, and respiratory conditions), which increase the risk of complications from influenza.

7.15. The Committee noted that the highest disease burden in people under 65 years of age from influenza hospitalisation is in the <1 year (244.5 per 100,000), 1 to 4 years (161.1 per 100,000), 20 to 34 years (52.3 per 100,000), and 50 to 64 years (53.2 per 100,000) age groups. The Committee noted that from 1994 to 2008, the rate of hospitalisations attributable to influenza in the 65 to 79 years age group was 149.9 per 100,000. The Committee noted that the hospitalisation rate in each of these age groups is likely to be amplified for Māori and Pacific peoples relative to non-Māori, given the relative risk of hospitalisation for Māori (1.38) and Pacific peoples (1.43) across all age groups (Khieu et al. Vaccine 2015;33:4087-92). The Committee noted that the influenza-attributable death rate per 100,000 was higher for more materially deprived areas (NZDep 9&10) compared with least deprived areas (RR 1.8, 95% CI 1.3-2.4; Khieu et al. J infect. 2017;75:225-33).

7.16. The Committee noted that influenza vaccination data from the Ministry of Health reported that the overall vaccination coverage in 2019 was 65% for people aged 65 years and over, 30% for pregnant women, and 3% for children aged 0 to 4 years. The Committee considered that the current model of funding high risk groups does not necessarily translate into high coverage in these groups.

7.17. The Committee noted that Māori and Pacific peoples are more likely to be hospitalised from severe acute respiratory illness (SARI) compared with non-Māori and non-Pacific populations and are also more likely to have to be treated in ICU due to SARI, though Māori rates of ICU admission from confirmed influenza are lower than for non-Māori. The Committee noted that in addition, Māori and Pacific peoples are less likely to visit a GP than Asian, non-Māori and non-Pacific peoples with influenza-like illness symptoms, which may contribute to increased severity in complications from influenza in the Māori and Pacific population (ESR 2019 Influenza Surveillance intelligence dashboard).

7.18. The Committee noted that influenza hospitalisation rates were 58.1 per 100,000 for the European population compared with 80.0 and 83.0 per 100,000 for Māori and Pacific peoples, respectively (Khieu et al. Vaccine 2015;33:4087-92). The Committee noted that in 2017, the same authors reported that when standardising for age, the mortality rate attributable to influenza in the Māori population was statistically significantly higher than European/Other populations with 21.1 per 100,000 compared with 4.5 per 100,000 for European/Other. The Committee noted that Pacific peoples also experienced a statistically significantly higher rate of influenza attributable mortality compared with European/Other with a rate of 6.8 per 100,000 (Khieu et al. J Infect. 2017;75:225-33).

7.19. The Committee noted that Māori aged 65 years and over are less likely to receive their annual influenza vaccination than non-Māori. The Committee noted that coverage measured through the National Immunisation Register suggests that only 50.0% of this

group were able to access influenza vaccination in 2021; uptake in this age group for the overall population was 63.8%. By contrast, it was noted that Pacific peoples aged 65 years and over are more likely to receive their annual vaccination compared to Māori aged 65 years and over; claims data submitted to the Ministry of Health suggests that 62.4% of this group were vaccinated in 2021.

7.20. The Committee noted that this funding application aligns with several of the government health priorities, including child wellbeing and prevention via immunisation against infectious diseases. The Committee noted that vaccination against influenza also aligns with Pharmac's equity priorities, noting the disproportionate impact of influenza in Māori, Pacific peoples, and people living in high socioeconomic deprivation. The Committee noted that infectious disease is also listed as a priority condition, which includes immunisation to prevent infectious diseases.

7.21. The Committee noted that the Immunisation Advisory Centre (IMAC) provided a brief review of the evidence to provide insight into potential further immunisation strategies that could be implemented to reduce the spread of influenza and impact of severe influenza in New Zealand. The Committee noted that this review proposed various vaccination strategies that address the protection of high-risk individuals (direct protection), or reduction of community spread (indirect protection).

7.22. The Committee noted the following studies from the IMAC review that assess the efficacy of vaccinating high-risk individuals. The Committee noted that this strategy considers individual protection, broadening eligible risk groups, expanding age groups for Māori and Pacific peoples, consideration of additional groups funded in other jurisdictions, and ring-fencing high-risk groups to reinforce protection.

7.22.1. Bleser et al. PLoS ONE 2020;15(6): e0234466

7.22.2. De Oliveira Bernardo et al. Hum Vaccin Immunother. 2020;16(3):630-5

7.22.3. Jefferson et al. Cochrane Database Syst Rev. 2018;(2):CD004879

7.22.4. Jarvis et al. Vaccine. 2020;38(7):1601-13

7.22.5. Ministry of Health; Health status indicators; updated 02 August 2018

7.22.6. Byrnes et al. J Paediatr Child Health. 2010;46(9):521-6

7.22.7. Prasad et al. Pediatr Infect Dis J. 2020;39:e176-85

7.22.8. Ferdinands et al. Vaccine. 2021;39:3678-95

7.23. The Committee noted the following studies from the IMAC review that assess the efficacy of vaccinating to reduce community spread. The Committee noted that this strategy considers full universal vaccination, universal vaccination of school-aged children, and direct and indirect protection within households.

7.23.1. Yin et al. Clin Infect Dis. 2017;65:719-28

7.23.2. Sugaya. Expert Rev Vaccines. 2014;13:1536-70

7.23.3. Backer et al. Epidemics. 2019;26:95-103

7.23.4. Davis et al. Paediatrics. 2008;122(1):e260-e65

7.23.5. Roseman et al. Isr J Health Policy Res. 2021;10:38

7.23.6. Pereira et al. Clin Med (Lond). 2017;17:484-9

7.23.7. Amodio et al. J Hosp Infect. 2014;86:182-7

7.24. The Committee considered that influenza vaccination funding models need to be tailored to service delivery. The Committee considered that universal funding of the influenza vaccine for all ages would be the most equitable approach to increase uptake and reduce hospitalisation and death due to influenza. The Committee considered that the cost of universal funding for all ages would be high and therefore considered that a more cost-effective option would be targeting universal funded access to children up to 18 years of age and people 50 years of age and older, in addition to the currently funded groups between 18 and 50 years of age.

7.25. The Committee noted that the standard dose inactivated influenza vaccines are an intramuscular injection, which is suitable to be given to most individuals, including young children, the elderly, pregnant women, and immunocompromised people. The Committee noted that the adjuvanted and high-dose inactivated influenza vaccines are also intramuscular injections indicated for people 65 years of age or older.

7.26. The Committee noted that live attenuated influenza vaccine (LAIV) is a nasal spray presentation approved in some funding settings overseas for children and adolescents from 2 years of age and adults up to 49 years of age. The Committee noted that there is insufficient data around the use of LAIV in adults aged 50-64 years of age, and it is contraindicated in immunosuppressed individuals. The Committee considered that while the intranasal presentation would be more acceptable to parents/caregivers for a primary school-based programme, possibly leading to increased uptake in children of vaccination compared to injectable vaccines, an injectable vaccine would still be acceptable. The Committee noted, however, that the introduction of a school or pre-school-based programme would have significant resource implications for DHBs (now Te Whatu Ora – Health New Zealand) to implement each year, and significant financial implications for the Ministry of Health funding immunisation claims. The Committee also noted that LAIV are not Medsafe approved for use in New Zealand and Pharmac has not received any funding applications to date. The Committee considered that if LAIV were to become available in New Zealand, it would provide a significant suitability benefit for children in terms of delivery and management of vaccination in the community.