Everything you need to know about FLU 2021

MINISTRY OF HEALTH
MANATŪ HAUORA

The Immunisation Advisory Centre

Treasure our Whānau

Addressing inequity in influenza immunisation coverage for Māori

The Ministry of Health's 2021 Influenza Immunisation Programme has a key focus on further reducing the inequity in influenza coverage for Māori, particularly those aged 65 and over.

In 2020, DHBs and Māori health providers were funded to establish innovative immunisation services, as part of the Government's initial Māori health response to COVID-19.

These services were established under the umbrella of the Māori Influenza Vaccination Programme and aimed to increase coverage for Māori eligible to receive a funded influenza vaccine, in particular kaumātua over 65 years. There was a 14% increase in influenza immunisation coverage for Māori aged 65 years and older in 2020 compared to 2019 and the equity gap for Māori aged 65 years and older reduced from 12.1% to 8.4%.

The Ministry is funding these services again in 2021. This is in line with *Whakamaua: Māori Health Action Plan 2020-2025*,[1] which aims to make considerable progress in achieving Māori health equity over the next five years.

Albert Tepania
Ngāpuhi, Ngatikahu ki Whangaroa

Matua Albie is one of the kaumātua who feature in the 2021 influenza promotional campaign.

Last November, Matua Albie took part in a kaumātua group discussion about influenza immunisation.

At that event he talked about having his first influenza immunisation in 2020.

In February 2021, he agreed to feature in this year's promotional campaign by having his portrait drawn as part of the concept and also to being filmed in his home for the campaign's online content.

He was recorded talking unscripted in an interview about his life, getting his influenza immunisation last year, and why he will continue to one have each year.

On page 3 of this booklet there is a list of key messages that are relevant every year.

One of those messages is: *Having an influenza immunisation every year can keep older people healthy and active for longer*.

Here are some quotes from Matua Albie that relate to that key message:

"I am a firm believer in that we can only give to our whānau things we've got ourselves. If we're not well, then how can we be able to help our tamariki and our mokopuna in times of need."

"It's just making sure that I'm in good health to make sure I can play those roles of tūpuna. And to play those roles I must have good wairua, good hinengaro, good tinana, and good whānau. It all comes in under the umbrella of whakawhanaungatanga."

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Key reference material

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Influenza and special groups

The list of references is available in a separate document in the *Resources* section on the influenza.org.nz website.

Important information for 2021

Promotional campaign

A revised 2021 promotional campaign aims to reach and resonate with Māori and Asian peoples aged 65 years or older who, in past years, have been less likely to receive an influenza vaccination. The revised campaign is based on audience research conducted to inform communication approaches that aim to raise awareness of influenza vaccination and support increased vaccine uptake. This year sees new branding, media plan and campaign resources. The campaign resources can be viewed at influenza.org.nz/Resources.

This resource is for use by healthcare professionals supporting and/or providing influenza vaccinations in a variety of settings.

Influenza Immunisation Programme goals

- Vaccinate 75% of the population aged 65 years or older against influenza annually
- Improve influenza immunisation coverage for people aged under 65 years with certain medical conditions, and pregnant women
- Improve influenza immunisation uptake for healthcare workers
- Vaccinate at least 80% of healthcare workers against influenza annually

Eligibility for funded influenza vaccination

- Funded influenza vaccinations are available for those who meet PHARMAC's eligibility criteria:
  - Pregnant women (any trimester)
  - People aged 65 years or older
  - People aged under 65 years with certain medical conditions, refer to page 8
  - Children aged 4 years or under who have been hospitalised for respiratory illness or have a history of significant respiratory illness

Start date

The 2021 Influenza Immunisation Programme for people aged 65 years or older starts on 14 April 2021.[2]

The start date for people aged under 65 years will be 17 May 2021.[2]

The Influenza Immunisation Programme runs to 31 December 2021 for all groups.[2]

As in previous years, it is important health care and other frontline workers get immunised against influenza. Occupational health can immunise such workforces from 14 April 2021 if aged 65 years or older, or from 17 May 2021 if aged under 65 years.[2] The Ministry's target is that 80 percent of New Zealand's health care workers are immunised against influenza each year.

Funding arrangements

The Ministry encourages health and disability care employers including DHBs to fund influenza immunisation programmes for their workforce.[2]

The Ministry will also be providing funding to support influenza vaccination for health and disability sector employees, self-employed lead maternity carers and carers employed under individualised funding arrangements who:

- are not eligible for a funded vaccination under the eligibility criteria stated in the *Pharmaceutical Schedule*
- have patient/client contact
- have not previously been the recipient of an employer-funded influenza vaccination whilst in their current place of employment (not including one reimbursed by the Ministry of Health in 2020).[2]

The amount claimable will be limited to actual costs incurred for influenza vaccination, as supported by appropriate documentation, to a maximum of $35+GST per person.[2]

Only claims submitted between 14 April and 31 July 2021 will be accepted for payment. A *GST invoice template for influenza reimbursement* is available for download from the Ministry of Health webpage health.govt.nz/our-work/diseases-and-conditions/influenza#funding. Claims should be submitted to influenzaimmunisation@health.govt.nz.

Key messages

Your regular use and support of the following messages will play an essential role in increasing influenza vaccination and lowering infection rates.

- Immunisation is the best protection against influenza. Even if you still catch influenza after immunisation, your symptoms are less likely to be severe.
- Get immunised to stop the spread of influenza around your community. Even if you don't feel sick, you could still be infected with influenza and pass it on to others.
- If you are sick, staying away from others, regular handwashing or use of hand sanitisers and covering your mouth and nose when sneezing or coughing also help reduce the spread of influenza.
- Influenza immunisation is recommended and FREE for people who are most likely to get very sick, be hospitalised or even die if they catch influenza:
  - pregnant women,
  - people aged 65 years or older,
  - people aged under 65 years with diabetes, most heart or lung conditions and some other illnesses, and
  - children aged 4 years or under who have had a stay in hospital for asthma or other breathing problems.
- Having an influenza immunisation every year can keep older people healthy and active for longer.
- Influenza immunisation during pregnancy helps protect the mother and her baby.

Four quadrivalent influenza vaccines for 2021

1. FLUAD® QUAD
   Only approved for use in adults aged 65 years or older.
2. AFLURIA® QUAD
   For children and adults aged 5–64 years.
3. INFLUVAC® TETRA
   For children aged 3–4 years.
4. AFLURIA® QUAD JUNIOR
   For children aged under 3 years, i.e., 6–35 months.

Spacing of the mRNA-CV (COMIRNATY™/ Pfizer-BioNTech COVID-19) vaccination and other vaccines

In view of the absence of data on concomitant delivery, and to minimise confusion with any associated reactions, a gap of two weeks is generally recommended between giving mRNA-CV after any other vaccine. However, based on first principles of how these vaccines work, adverse impacts on immunogenicity or safety are unlikely with a shorter gap, so if it is clinically important to deliver in a shorter time, do not delay.[3]

- If it is not practicable to keep a two-week gap between vaccines, then do not delay.
- If a live vaccine has been administered, wait four weeks before giving a COVID-19 vaccine but if not practicable, then do not delay.
- If a COVID-19 vaccine is administered first, then maintain a two-week gap before any other vaccines.[3]

Note: the second mRNA-CV dose is given at least 21 days after the first dose.[3]

Ordering influenza vaccine

Online ordering is preferred at hcl.co.nz. The online order process is less susceptible to error, has an audit trail and is faster than faxing or emailing orders. Faxed or emailed orders incur a manual order processing fee of $10 per order. The fax order form is on page 11.

Tracking influenza vaccine orders

In 2021, providers are able to track influenza vaccine orders using a tracking number emailed when the order is dispatched.

Ordering needles for influenza vaccines

The 2021 FLUAD QUAD and AFLURIA QUAD vaccines are supplied without needles. Needles need to be purchased separately, they are available from EBOS Healthcare or pharmacy wholesalers. Seqirus has ordered adequate supplies of needles to support the 2021 Influenza Immunisation Programme.

Ordering printed influenza resources

The following three resources are ordered from HealthEd (healthed.govt.nz).

- *After your child is immunised* (HE1504),
- *After your immunisation* (HE2505) for teenagers and adults, and
- *Immunise during pregnancy* (HE2503) also available in Chinese Simplified, Chinese Traditional, Hindi, Māori, Samoan and Tongan

Online ordering for other Influenza Immunisation Programme resources is available through the *Resources* page on influenza.org.nz.

Pharmacist vaccinators

Many community pharmacies provide influenza vaccination to children and adults aged 13 years or older. Some community pharmacies also provide funded influenza vaccination to:

- pregnant women, and
- eligible people aged 13 or older.

Recording influenza vaccination on the National Immunisation Register (NIR)

All influenza vaccinations should be recorded on the NIR. This provides invaluable information for planning the programme to protect our population. For more information, please refer to page 12.

Pharmacist vaccinators use the NIR web application *ImmuniseNow* to check the vaccinees' immunisation history and record influenza vaccinations on the NIR. If the person is already registered on the NIR, a notification will be sent to their general practice advising that an influenza vaccination has been given by a pharmacist.

Influenza coverage reports by District Health Board, Primary Health Organisation, age, ethnicity and deprivation are available for providers, including general practice, with access to the Business Objects NIR *Datamart* or *Qlik Sense*.

Influenza disease

Influenza is caused by different strains of influenza viruses. Symptoms may vary with age, immune status and health of the individual, and include fever, sore throat, muscle aches, headache, cough and severe fatigue. The fever and body aches can last 3–5 days and the cough and fatigue may last for 2 or more weeks.[4]

During seasonal increases, most influenza diagnoses are based on symptoms. The definitive diagnosis of influenza can only be made in the laboratory, usually from PCR testing of secretions from a nasopharyngeal swab. Samples should be collected within the first 4 days of illness.[5]

Influenza can be difficult to diagnose based on clinical symptoms alone because influenza symptoms can be similar to those caused by other infectious agents including *Neisseria meningitidis*,[6*] respiratory syncytial virus (RSV), rhinovirus and parainfluenza viruses.[4]

** For more information go to influenza.org.nz/meningococcal-disease*

A meta-analysis of influenza disease found that approximately 20% of children and 10% of adults who did not receive an influenza vaccination were infected annually; around half of those infected were asymptomatic.[7]

Transmission

The influenza virus is transmitted among people by direct contact, touching contaminated objects or by the inhalation of aerosols containing the virus. Influenza virus can be aerosolised without sneezing or coughing. Sneezing is more likely to contribute to contaminated surfaces and objects.[8]

Symptomatic and asymptomatic influenza cases can transmit the virus and infect others at home, in the community, at work and in healthcare institutions. Healthy adults with influenza are infectious for up to 5 days, and children for up to 2 weeks.[4]

Not everyone with influenza has symptoms or feels unwell. However, asymptomatic individuals can still transmit the virus to others.[4,8-10]

The Southern Hemisphere Influenza and Vaccine Effectiveness Research and Surveillance (SHIVERS) study, based in Auckland, identified around one in four people were infected with influenza during the 2015 influenza season. Data showed that four out of five children and adults (80%) with influenza did not have symptoms.[11]

In an earlier study following the 2009 New Zealand influenza season, almost one quarter of adults who reported that they had not had influenza in 2009 had serological evidence of prior infection (21% [95% confidence interval 13–30%]). Conversely, almost one quarter of adults who reported having had influenza during 2009 had no serological evidence of prior infection (23% [95% confidence interval 12–35%]).[12]

During 2019, hospital-based surveillance for severe acute respiratory infections in Auckland identified that infants aged under 1 year had the highest severe acute influenza respiratory infection hospitalisation rate of all age groups. There were 326 cases per 100,000 people in infants aged under 1 year compared with 216 cases/100,000 for adults aged 80 years or older, 98 cases/100,000 for children aged 1–4 years, and 77 cases/100,000 for adults aged 65–79 years. Māori and Pacific peoples had higher hospitalisation rates for severe acute influenza respiratory infection than Asian, European and other ethnicities at 46 cases and 88 cases per 100,000 people respectively.[13]

During 2020, the patterns of influenza-like illness, severe acute respiratory infections, and confirmed influenza illnesses substantially different to previous years in New Zealand.[14] These changes could have been associated with the increased focus on regular hand washing, use of cough a sneeze etiquette, social distancing and border restrictions to reduce the risk of COVID-19 infection.[15]

It is not known if the risks of influenza-like illness, severe acute respiratory infection or confirmed influenza during 2021 will be similar to those seen over the years leading up to 2020, similar to those seen in 2020, or something different that has not been observed in New Zealand before.

Continue to reduce the spread of influenza:

- Cover your mouth and nose when you sneeze or cough.
- Wash and dry your hands often.
- Stay away from others if you are sick.

Should healthcare workers be vaccinated?

Yes. The World Health Organization strongly recommends healthcare workers as a priority group for influenza vaccination, not only for their own protection and ability to maintain services but also to reduce the spread of influenza to vulnerable patients including pregnant women.[16]

The Ministry of Health recommends annual influenza vaccination of healthcare workers because influenza is a significant public health issue in New Zealand. Healthcare workers are twice as likely to acquire influenza than non-healthcare workers, and healthcare workers can transmit influenza without knowing they are infected.[17]

A meta-analysis of studies of influenza A (H1N1) infection in 2009 showed that healthcare workers were twice as likely to have influenza than non-healthcare workers.[18] In general, around 10% of adults who do not receive an influenza vaccination catch influenza annually and approximately half of these cases are asymptomatic.

Influenza does not always cause symptoms or make a person feel unwell.[4,8-10] Data from the Southern Hemisphere Influenza and Vaccine Effectiveness Research and Surveillance (SHIVERS) study, based in Auckland, suggest that four out of five children and adults (80%) with influenza did not have symptoms.[1] In an earlier study following the 2009 influenza season in New Zealand, almost one quarter of the adults who reported that they had not had influenza in 2009 had serological evidence of prior infection (21% [95% confidence interval 13–30%]).[12]

Healthcare workers have a duty of care to protect vulnerable patients from the serious health threat of influenza illness. Studies demonstrate that annual influenza vaccination for healthcare workers is likely to reduce illness among the patients they care for.[19-21] Relying on patients being vaccinated is not enough as vulnerable people may have a poor immune response to their vaccination or may not have been vaccinated this year.

Influenza vaccination coverage rates for District Health Board (DHB) based healthcare workers increased to 77% in 2020, the highest coverage to date.[22] The Ministry of Health goal is at least 80% of all healthcare workers vaccinated against influenza annually. The 2020 *Workforce Influenza Immunisation Coverage Rates by District Health Boards* report is available on the Ministry of Health website health.govt.nz/our-work/preventative-health-wellness/immunisation/influenza.

When should people be vaccinated?

It is possible to come in contact with influenza viruses all year round. However, the likelihood of influenza viruses circulating in the community significantly increases during winter.

For most people, the best time to be vaccinated against influenza is before the start of the winter season. It can take up to 2 weeks for the vaccine to provide the best influenza protection. However, influenza vaccinations can be given when influenza virus activity has been identified as protective antibody levels have been observed to develop rapidly from 4 days after vaccination.[23,24]

It is recommended that women who become pregnant after winter and have not received the current influenza vaccination, are offered influenza vaccination up to and including 31 December.

Why is influenza vaccination needed every year?

Annual influenza vaccination is required for two important reasons:

- Protection from the previous vaccination lessens over time.
- The circulating influenza viruses can change and the strains in the vaccine usually change each year in response to the changing virus pattern.

For 2021, of the four influenza strains included in the quadrivalent vaccines, the first two listed below are new.[25]

- A/Victoria/2570/2019 (H1N1)pdm09-like virus
- A/Hong Kong/2671/2019 (H3N2)-like virus
- B/Washington/02/2019-like virus
- B/Phuket/3073/2013-like virus

New Zealand immunisation strategy

Who should be vaccinated?

Influenza continues to be a major threat to public health worldwide because of its ability to spread rapidly through populations. Influenza vaccination can be offered to individuals aged 6 months or older.

Influenza vaccination is funded for certain groups of people who are considered to be at greater risk of complications from influenza. Additional preventative strategies are important to reduce their risk of exposure to influenza. The vaccination is also recommended, although not funded, for those who are in close contact with individuals who are more vulnerable or at high risk of complications and who may also be less able to mount a strong immune response to vaccination. Frontline healthcare workers are usually funded by their employer.

Funded vaccines for 2021

FLUAD QUAD
FLUAD QUAD is the funded vaccine for eligible adults aged 65 years or older.

AFLURIA QUAD
AFLURIA QUAD is the funded vaccine for eligible children and adults aged 5–64 years.

INFLUVAC TETRA
INFLUVAC TETRA is the funded vaccine for eligible children aged 3–4 years.

AFLURIA QUAD JUNIOR
AFLURIA QUAD JUNIOR is the funded vaccine for eligible children aged under 3 years, i.e., 6–35 months.

Note: FLUAD QUAD, AFLURIA QUAD, INFLUVAC TETRA and AFLURIA QUAD JUNIOR are prescription medicines. For full prescribing information, please refer to the data sheets at medsafe.govt.nz or influenza.org.nz.

Eligibility for funded influenza vaccine

All children aged under 18 years who meet the influenza vaccination eligibility criteria can receive funded influenza vaccination regardless of their immigration and citizenship status, and providers can claim the Immunisation Subsidy for administering the vaccine.[26]

Adults aged 18 years or older who meet the PHARMAC influenza vaccination eligibility criteria must also be eligible to receive publicly funded health and disability services in New Zealand to receive funded influenza vaccination.[26] For more information, please refer to the *Health and Disability Services Eligibility Direction 2011* for eligibility criteria (available at health.govt.nz/new-zealand-health-system/eligibility-publicly-funded-health-services/eligibility-direction).

Women aged 18 years or older who are pregnant and not eligible to receive publicly funded health and disability services in New Zealand are recommended to receive influenza vaccination. However, they are not eligible to receive funded vaccination, even if they are receiving funded primary maternity services under the *Section 88 Primary Maternity Services Notice 2007*[27] (available at health.govt.nz/publication/primary-maternity-services-notice-2007).

For vaccination eligibility queries contact:

The Immunisation Advisory Centre (IMAC)
The University of Auckland

Phone: **0800 IMMUNE (0800 466 863)**

Email: **0800immune@auckland.ac.nz**

Also refer to page 8 of the *New Zealand Pharmaceutical Schedule* on the PHARMAC website (pharmac.govt.nz/pharmaceutical-schedule/).

Eligible conditions for funded influenza vaccination

Funded influenza vaccine is available each year for people who meet the following criteria set by PHARMAC:*

1. People 65 years of age or older; or
2. People under 65 years of age who:
   - have any of the following cardiovascular diseases:
     - ischaemic heart disease, or
     - congestive heart failure, or
     - rheumatic heart disease, or
     - congenital heart disease, or
     - cerebrovascular disease; or
   - have either of the following chronic respiratory diseases:
     - asthma, if on a regular preventative therapy, or
     - other chronic respiratory disease with impaired lung function;[a] or
   - have diabetes; or
   - have chronic renal disease; or
   - have any cancer, excluding basal and squamous skin cancers if not invasive; or
   - have any of the following other conditions:
     - autoimmune disease,[b] or
     - immune suppression or immune deficiency, or
     - HIV, or
     - transplant recipient, or
     - neuromuscular or CNS disease/disorder,[c] or
     - haemoglobinopathy,[d] or
     - children on long-term aspirin, or
     - a cochlear implant, or
     - error of metabolism at risk of major metabolic decompensation, or
     - pre- or post-splenectomy, or
     - Down syndrome, or
   - pregnant women (any trimester); or
3. Children aged 4 years or under who have been hospitalised for respiratory illness or have a history of significant respiratory illness.

Unless meeting the criteria set out above, the following conditions are excluded from funding:

- asthma not requiring regular preventative therapy
- hypertension and/or dyslipidaemia without evidence of end-organ disease

**New Zealand Pharmaceutical Schedule.*[28]

Spacing of the mRNA-CV (COMIRNATY™/ Pfizer-BioNTech COVID-19) vaccination and other vaccines

In view of the absence of data on concomitant delivery, and to minimise confusion with any associated reactions, a gap of two weeks is generally recommended between giving mRNA-CV after any other vaccine. However, based on first principles of how these vaccines work, adverse impacts on immunogenicity or safety are unlikely with a shorter gap, so if it is clinically important to deliver in a shorter time, do not delay.[3]

- If it is not practicable to keep a two-week gap between vaccines, then do not delay.
- If a live vaccine has been administered, wait four weeks before giving a COVID-19 vaccine but if not practicable, then do not delay.
- If a COVID-19 vaccine is administered first, then maintain a two-week gap before any other vaccines.[3]

Note: the second mRNA-CV dose is given at least 21 days after the first dose.[3]

a. Chronic respiratory diseases include chronic bronchitis, chronic obstructive pulmonary disease, cystic fibrosis, emphysema.

b. Autoimmune diseases may include coeliac disease, Crohn's disease, Grave's disease, Hashimoto's thyroiditis, lupus, rheumatoid arthritis. Immune suppression or immune deficiency includes disease modifying anti-rheumatic drugs (DMARDS) or targeted biologic therapies.

c. Neuromuscular and CNS diseases/disorders include cerebral palsy, congenital myopathy, epilepsy, hydrocephaly, motor neurone disease, multiple sclerosis, muscular dystrophy, myasthenia gravis, Parkinson's disease, spinal cord injury.

d. Haemoglobinopathies include sickle cell anaemia, thalassemia.

For vaccination eligibility queries call 0800 IMMUNE (0800 466 863)

Vaccine ordering, delivery and storage

Ordering vaccine

Influenza vaccine ordering is handled by Healthcare Logistics (HCL).

- Online ordering via hcl.co.nz is the preferred option and does not incur a manual order processing fee.
- Faxed orders can be sent to 0508 408 358. The fax order form is available on page 11 and through the *Resources* section on influenza.org.nz. For enquiries email Flu@healthcarelogistics.co.nz or phone 0508 425 358.

Note: The 2021 FLUAD QUAD and AFLURIA QUAD vaccines are supplied without needles.

Ordering needles

IInfluenza vaccine needles need to be purchased separately, they are available from EBOS Healthcare or pharmacy wholesalers. Seqirus has ordered adequate supplies of needles to support the Influenza Immunisation Programme.

- There are different needles for FLUAD QUAD and AFLURIA QUAD.
- The order codes are described in the table below, it is important to use the correct code for the needles you want to order.
- Due to the demand for needles, please allow up to 48 hours for dispatch.

Influenza vaccine	Pharmacode	EBOS order code	Description	Pack size
FLUAD QUAD	2605627	21122020	BD, Hypodermic needle 24g x 1" (purple)	100 needles per box
AFLURIA QUAD	2605619	21122019	BD, Hypodermic needle 25g x 5/8" (orange)	100 needles per box

Cost of the influenza vaccines

The FLUAD QUAD, AFLURIA QUAD, INFLUVAC TETRA and AFLURIA QUAD JUNIOR vaccines cost $9.00 (excl. GST) per dose. For people eligible for funded influenza vaccine, refer to page 8, the vaccine is free (i.e., no vaccine cost and no administration service cost to the person). General practices and pharmacies can claim for the cost of the vaccine and the Immunisation Subsidy for administration of a funded influenza vaccine to an eligible individual via the usual Sector Services process.

The 2021 Immunisation Subsidy is:

- General practices: $22.57 (excl. GST)
- Community pharmacies: $20.66 (excl. GST)

Note: Claims can only be made when the vaccine is given during the funded Influenza Immunisation Programme.

Cost of needles

The price to purchase needles for FLUAD QUAD and AFLURIA QUAD is $4.60 (excl. GST) per box of 100 needles.

Order and delivery charges

- Faxed or emailed orders incur a manual order processing fee of $10 per order. This fee can be avoided by ordering online.
- Orders for FLUAD QUAD and/or AFLURIA QUAD that are less than the minimum quantity of described in the table below will incur a $25 small order delivery fee.
- Orders for INFLUVAC TETRA and/or AFLURIA QUAD JUNIOR will incur a $25 small order delivery fee if they are not added to a FLUAD QUAD or AFLURIA QUAD order that meets the minimum quantity.

Minimum order requirements for FLUAD QUAD and AFLURIA QUAD

The FLUAD QUAD and AFLURIA QUAD minimum order quantities for 2021 are as follows:

MARCH–MAY	60 doses
JUNE–JULY	30 doses
AUGUST	20 doses
SEPTEMBER ONWARDS	10 doses

INFLUVAC TETRA and AFLURIA QUAD JUNIOR do not have minimum order quantities. However, a $25 small order fee will apply if they are not included with a FLUAD QUAD or AFLURIA QUAD order that meets the minimum quantity.

Polystyrene chilly bins

To reduce wastage when ordering, please consider your expected usage. You will be asked to order in full chilly bin quantities for initial orders of FLUAD QUAD:

- North Island: the small bin holds 6 packs (i.e., 60 doses), the medium bin holds 10 packs (i.e., 100 doses), the large bin holds 20 packs (i.e., 200 doses), and the extra-large bin holds 30 packs (i.e., 300 doses, this bin is only for North Island customers).
- South Island: the small bin holds 6 packs (i.e., 60 doses), the medium bin holds 8 packs (i.e., 80 doses), and the large bin holds 20 packs (i.e., 200 doses).

Vaccine availability at the start of the season

FLUAD QUAD is scheduled for distribution slightly earlier than AFLURIA QUAD, INFLUVAC TETRA and AFLURIA QUAD JUNIOR.

Only order FLUAD QUAD if you are vaccinating adults aged 65 years or older. FLUAD QUAD orders will be dispatched after Easter.

Only order INFLUVAC TETRA if you are vaccinating children aged 3 4 years. AFLURIA QUAD, INFLUVAC TETRA and AFLURIA QUAD JUNIOR orders will be dispatched in time for the under 65 years Programme start date of 17 May 2021.

Please do not organise clinics before your vaccine stock and needles have arrived.

Influenza vaccine stock damaged in transit

Influenza vaccine damaged in transit may be returned to Healthcare Logistics for destruction. Please contact Healthcare Logistics on 0508 425 358 before returning them.

Refund for unused/expired funded influenza vaccine

Please ensure you continue to have influenza vaccine stock available until 31 December for those who are eligible for influenza vaccination.

One refund will be available for a total of 10 doses of unused FLUAD QUAD and/or 10 doses of unused AFLURIA QUAD and/or one dose of unused INFLUVAC TETRA and/or one dose of unused AFLURIA QUAD JUNIOR from any one account. To be eligible for a refund, the unused stock must be returned prior to 31 January 2022. Contact Healthcare Logistics on 0508 425 358 to request a Return Authorisation.

The shelf life of influenza vaccines

All influenza vaccines are marked with an expiry date that must be checked before vaccine administration.

Cold chain

The vaccines must be stored between +2°C and +8°C at all times. They must not be frozen.

Temperature-monitored chilly bins must be used if vaccines are temporarily stored outside the vaccine refrigerator or being transported. For more information, please refer to the *National Standards for Vaccine Storage and Transportation for Immunisation Providers 2017 (2nd Edition)*, available at health.govt.nz/coldchain.

If vaccines have been stored outside the required temperature range, quarantine the vaccines and contact your Immunisation/Cold Chain Coordinator.

Temperature logging devices

A temperature logging device and instructions may be included with your order.

2021 influenza vaccine order form

Failing to complete in full may delay the processing of your order.

TO: Healthcare Logistics
ONLINE: hcl.co.nz (preferred option) or
TOLL-FREE FAX: 0508 408 358*

**Faxed or emailed orders incur a manual order processing fee of $10 per order. This fee can be avoided by ordering online.*

Date: ..... Healthcare Logistics customer number: .....

Provider name: ..... Contact name: .....

Delivery address: .....

..... Contact phone: .....

Email address for invoice: .....
(Email address for invoicing only needs to be provided once)

Customer purchase order number (if applicable): .....

I would like to order:	
packs	FLUAD QUAD (10 doses per pack) [1162968]. Only approved for use in adults aged 65 years or older.
packs	AFLURIA QUAD (10 doses per pack) [1162967]. For children and adults aged 5–64 years.
packs	INFLUVAC TETRA (one dose per pack) [2609096], not for pharmacies. For children aged 3–4 years.
packs	AFLURIA QUAD JUNIOR (one dose per pack) [1162965], not for pharmacies. For children aged 6–35 months, i.e. under 3 years.

Notes for providers:

- The 2021 FLUAD QUAD and AFLURIA QUAD are supplied without needles.
  - Needles need to be purchased separately, they are available from EBOS Healthcare or pharmacy wholesalers.
- Due to demand, please allow up to 48 hours for dispatch. Please do not book your clinics before the stock has arrived.
- FLUAD QUAD and AFLURIA QUAD minimum order quantities are as follows:

MARCH–MAY	60 doses
JUNE–JULY	30 doses
AUGUST	20 doses
SEPTEMBER ONWARDS	10 doses

- To reduce wastage when ordering, please consider your expected usage. You will be asked to order in full chilly bin quantities for initial orders of FLUAD QUAD:
  - North Island: small bin holds 6 packs (i.e., 60 doses), medium bin holds 10 packs (i.e., 100 doses), large bin holds 20 packs (i.e., 200 doses), and the extra-large bin holds 30 packs (i.e., 300 doses, this bin is only for North Island customers).
  - South Island: small bin holds 6 packs (i.e., 60 doses), medium bin holds 8 packs (i.e., 80 doses), and the large bin holds 20 packs (i.e., 200 doses).

Refund for unused/expired funded influenza vaccine

Please ensure you continue to have influenza vaccine stock available until 31 December for those who are eligible for influenza vaccination. One refund will be available for a total of 10 doses of unused FLUAD QUAD and/or 10 doses of unused AFLURIA QUAD and/or one dose of unused INFLUVAC TETRA and/or one dose of unused AFLURIA QUAD JUNIOR from any one account. To be eligible for a refund, the unused stock must be returned prior to 31 January 2022. Contact Healthcare Logistics on 0508 425 358 to request a Return Authorisation.

28/04/21

This form is also available on influenza.org.nz in the *Resources* section.

Recording influenza vaccinations on the National Immunisation Register

The *National Immunisation Register* (NIR) is a national database, held by the Ministry of Health (the Ministry).

The NIR records *National Immunisation Schedule* vaccinations given to children and some *Schedule* vaccines given to adults, such as influenza vaccinations. The Ministry and District Health Boards use the NIR to help monitor vaccination coverage, including vaccination of those aged 65 years or older and pregnant women, assess protection against diseases such as influenza and plan future population health programmes.

The following points are useful for informing your patients about the NIR:

- The NIR provides an accurate record of a person's vaccination history, to help with their ongoing heath care even if they change doctors, and to help the Ministry measure vaccination coverage across the whole population.
- The NIR records a person's NHI number, name, gender, address, date of birth and vaccination information.
- Only authorised professionals will see, use or change the information.
- Information that does not identify individuals may be used for research or planning.

The NIR leaflet (HE2423) informs adults about the NIR. Leaflet pads can be ordered from healthed.govt.nz.

Influenza coverage reports by District Health Board (DHB), Primary Health Organisation (PHO), age, ethnicity and deprivation are available for providers, including general practice, with access to the Business Objects NIR *Datamart* or *Qlik Sense*.

Recording adult influenza vaccination, including pregnant women, on the NIR in:

General Practice

The NIR and Practice Management Systems (PMS) record all influenza vaccinations given in general practice for all age groups and for pregnant women.

To ensure an adult's influenza vaccination information is recorded on the NIR, you must select the opt-on button on your PMS.

To help avoid errors in recording influenza on the NIR:

- Ensure you have the most up-to-date PMS software version.
- Send a list of all the vaccinators and general practitioners (GPs) who will deliver the influenza vaccine in your practice to your local DHB NIR administrator before the beginning of the influenza season to ensure they are entered into the system.
- Vaccinators should validate the vaccinee's address in all address fields before they are messaged to the NIR.
- The provider should be noted as the "GP" and the nurse or "GP" who administers the vaccine as the "vaccinator".
- All influenza vaccinations should be recorded on the NIR.

Note: The NIR does not schedule influenza vaccinations or identify overdue influenza vaccinations in the Overdue Tasks report as it does for the childhood vaccinations.

Pharmacy

Pharmacist vaccinators use the NIR web application *ImmuniseNow* to check vaccinees' immunisation history and record influenza vaccinations on the NIR.

If the person is already registered on the NIR, a notification will be sent to their general practice advising that an influenza vaccination has been given by a pharmacist.

Other influenza vaccination settings

The Ministry is working towards expanding access to immunisation records as part of the development of the *National Immunisation Solution* for other influenza vaccination settings such as DHB staff health clinics and occupational health providers. In the meantime, occupational health providers are expected to notify a person's general practice when they have administered an influenza vaccine so their records can be updated.

For questions about recording influenza vaccination on:

- The NIR, please contact your DHB NIR administrator or the Ministry of Health Support team:

Email: **onlinehelpdesk@health.govt.nz**

Phone: **0800 855 066, select option 5 and then select option 3**

- *ImmuniseNow*, contact the Ministry of Health Support Team (details directly above).
- Your general practice or pharmacy PMS, please contact your vendor directly.

Influenza vaccination consent form

This form records your consent to have an influenza immunisation

Patient/Guardian details

Surname/Family name: ..... First name: ..... Phone: .....

Date of birth: ..... *(DD/MM/YYYY)* Gender: • Male • Female • Gender diverse *(please circle one)* NHI: ..... *NHI (National Health Index) number if known*

Ethnicity (please circle one or more):

• NZ European • Māori • Samoan • Cook Island Māori • Tongan • Niuean • Chinese • Indian

• Other (such as Dutch, Japanese, Tokelauan) Please state which other ethnicity: .....

Name of guardian (if applicable): .....

Patient's address: .....

Patient's medical centre/GP: .....

If any of the following apply to you/the person being immunised, please advise the healthcare professional:

- Received a COVID-19 immunisation
- Currently unwell with a high fever
- Allergic to any food or medicine
- Taking blood thinning medication or have a bleeding disorder
- Had a severe response to an influenza immunisation in the past

Possible responses to influenza immunisation

Influenza immunisation is usually well tolerated. Possible responses include pain, redness and/or swelling at the injection site for a day or two; a mild fever, muscle aches or headache within the first two days. Rarely, an allergic response can occur.

You/the immunised person should remain under observation in case of an allergic response. You will be advised how long to wait; this could be up to 20 minutes.

Influenza immunisation does not protect against other respiratory viruses such as the common cold. Talk to your healthcare professional about the benefits and possible risks. For more information about the influenza vaccine, please refer to the consumer medicine information sheet located at **www.medsafe.govt.nz**

National Immunisation Register

The Ministry of Health keeps a record of influenza immunisations on the National Immunisation Register so that authorised healthcare professionals can find out what immunisations have been given.

If you do not want your immunisation recorded on the National Immunisation Register, please advise your healthcare professional.

Consent statements:

I have read or have had explained to me information about influenza immunisation, including how long to wait after the immunisation.

I have had a chance to ask questions and they were answered to my satisfaction.

I believe I understand the benefits and possible risks of influenza immunisation.

I understand that influenza immunisation is a choice.

I consent to the influenza immunisation being given.

I agree for this immunisation information to be shared with my/the immunised person's regular healthcare provider.

Signed: .....

Date (DD/MM/YYYY): .....

Signed by Guardian (if applicable): .....

Relationship to the patient: .....

Vaccination record (clinical use only)	
Vaccine:	Administered: Left / right arm
Vaccine batch number:	Expiry date:
Vaccinator:	The influenza vaccine is a prescription medicine.

Visit **fightflu.co.nz**

Useful contact information

All the information and contacts you may need:

Vaccination eligibility, clinical queries and general information

The Immunisation Advisory Centre (IMAC)
The University of Auckland
Phone: **0800 IMMUNE (0800 466 863**)
Email: **0800immune@auckland.ac.nz**
The New Zealand *Pharmaceutical Schedule* is available from PHARMAC at **pharmac.govt.nz**.

HealthEd

Website: **healthed.govt.nz**

The following resources are ordered from HealthEd:

- *After your child is immunised* (HE1504),
- *After your immunisation* (HE2505) for teenagers and adults, and
- *Immunise during pregnancy* (HE2503), also available in Chinese Simplified, Chinese Traditional, English, Hindi, Māori, Samoan and Tongan
- *National Immunisation Register* leaflet (HE2423) for adults

All other influenza resources can be ordered from **influenza.org.nz**

Ordering vaccine

Healthcare Logistics (HCL)
ONLINE: **hcl.co.nz**
(preferred option, registration required)
TOLL-FREE fax: **0508 408 358***

**Faxed or emailed orders incur a manual order processing fee of $10 per order. The fax order form is available on page 11 and through the Resources section on influenza.org.nz.*

Enquiries

Email: **Flu@healthcarelogistics.co.nz**

Phone: **0508 425 358**

Ordering needles

EBOS Healthcare
Phone (primary care): **0800 105 501**
Website: **eboshealthcare.co.nz**

Cold chain

Your Immunisation/Cold Chain Coordinator.

The *National Standards for Vaccine Storage and Transportation for Immunisation Providers 2017 (2nd Edition)* and the Ministry of Health *National Immunisation Programme cold chain management* webpage

Website: **health.govt.nz/coldchain**

Claiming funded vaccine

Sector Services Help Desk

Phone: **0800 855 066, select option 2**

The manual claim form is available from **health.govt.nz/new-zealand-health-system/claims-provider-payments-and-entitlements/immunisation-subsidy**

Reporting adverse events following immunisation

Centre for Adverse Reactions Monitoring (CARM)

Phone: **(03) 479 7247**

Email: **carmnz@otago.ac.nz**

Website: **nzphvc.otago.ac.nz**

(online reporting, use your practice number as login)

National Influenza Immunisation Programme promotion

Email: **influenza@auckland.ac.nz**

Website: **influenza.org.nz**

Your Immunisation Coordinator may be able to assist with more information.

National Immunisation Register

Ministry of Health Support team

Email: **onlinehelpdesk@health.govt.nz**

Phone: **0800 855 066, select option 5 and then option 3**

Your District Health Board NIR administrator may be able to assist with more information.

ImmuniseNow

Ministry of Health Support team

Phone: **0800 855 066, select option 5 and then option 3**

Vaccine data sheets

Medsafe

Website: **medsafe.govt.nz**

Influenza information for health professionals

Website: **influenza.org.nz**

Ministry of Health influenza vaccination policy and position statements

Ministry of Health *Influenza* webpage

Website: **health.govt.nz/our-work/preventative-health-wellness/immunisation/influenza**

Summary of 2021 influenza vaccines

Vaccine brand	AFLURIA QUAD JUNIOR	INFLUVAC TETRA	AFLURIA QUAD		FLUAD QUAD
Manufacturer	SEQIRUS 0800 502 757	MYLAN 0800 579 811	SEQIRUS 0800 502 757		SEQIRUS 0800 502 757
Age	6–35 months, i.e., under 3 years	3–4 years	5–8 years	9–64 years	≥ 65 years
Dose	0.25 mL	0.5 mL	0.5 mL	0.5 mL	0.5 mL
Number of doses	1 or 2*	1 or 2*	1 or 2*	1	1
	**Two doses separated by at least four weeks if an influenza vaccine is being used for the first time.*				
Route of administration	Intramuscular	Intramuscular	Intramuscular		Intramuscular
Presentation	Pre-filled syringe with fixed needle: 0.25 mL	Pre-filled syringe with needle: 0.5 mL	Pre-filled syringe, no needle: 0.5 mL		Pre-filled syringe, no needle: 0.5 mL
Residual antibiotics	Neomycin, polymixin B	Gentamicin	Neomycin, polymixin B		Kanamycin, neomycin
Latex	Latex-free	Cannot be considered latex-free	Latex-free		Latex-free
	AFLURIA QUAD JUNIOR, INFLUVAC TETRA, AFLURIA QUAD and FLUAD QUAD				
Ovalbumin	Each 0.5 mL dose contains less than 1 microgram of ovalbumin				
Influenza strains for 2021	• A/Victoria/2570/2019 (H1N1)pdm09-like virus • A/Hong Kong/2671/2019 (H3N2)-like virus • B/Washington/02/2019-like virus • B/Phuket/3073/2013-like virus				
Storage	• Vaccines must be stored, protected from light, at +2°C to +8°C. DO NOT FREEZE. • Temperature-monitored chilly bins must be used if vaccines are temporarily stored outside the vaccine refrigerator or being transported. • Quarantine vaccines stored outside the required temperature range and contact your Immunisation/Cold Chain Coordinator.				
Funding status	• Fully funded when administered to eligible individuals. • Available for purchase by those who do not meet the funded eligibility criteria.				
Order from	HEALTHCARE LOGISTICS (HCL) Email: **Flu@healthcarelogistics.co.nz** Phone: **0508 425 358** Fax: **0508 408 358** Website: **hcl.co.nz**				
	AFLURIA QUAD JUNIOR, INFLUVAC TETRA, AFLURIA QUAD and FLUAD QUAD are prescription only medicines. Please refer to the Medsafe data sheets for further details. **medsafe.govt.nz** and **influenza.org.nz**				

Questions and answers about the 2021 influenza vaccines

What are the influenza vaccines for 2021?

There are four influenza vaccines that are fully funded when administered to an individual who meets the eligibility criteria described in the *Pharmaceutical Schedule* during the funded period. The same four vaccines are also available for purchase by individuals who are not eligible to receive a funded influenza vaccination.

- FLUAD QUAD (Seqirus) is the only influenza vaccine approved for use adults aged 65 years or older.
- AFLURIA QUAD (Seqirus) is only for use in children and adults aged 5–64 years.
- INFLUVAC TETRA (Mylan) is only for use in children aged 3–4 years.
- AFLURIA QUAD JUNIOR (Seqirus) is only for use in children aged under 3 years, i.e., aged 6–35 months.

For more information, please refer to the Medsafe data sheets (medsafe.govt.nz or influenza.org.nz) and *Summary of 2021 influenza vaccines* on page 15.

What is FLUAD QUAD?

- FLUAD QUAD is a quadrivalent influenza vaccine that is funded for adults aged 65 years or older.
- FLUAD QUAD contains an adjuvant, called MF59, to enhance the immune response to the vaccination.[29]

What are the influenza vaccine strains for 2021?

The quadrivalent influenza vaccines in 2021 offer protection against the following influenza strains, the first two listed below are new:[25]

- A/Victoria/2570/2019 (H1N1)pdm09-like virus
- A/Hong Kong/2671/2019 (H3N2)-like virus
- B/Washington/02/2019-like virus
- B/Phuket/3073/2013-like virus

Is there a minimum interval between an influenza vaccination at the end of 2020 and this year's vaccination?

No minimum interval is required between an influenza vaccination in 2020 and one in 2021. The 2021 influenza vaccination can be given as soon as the vaccine is available.

What is the spacing between administration of the mRNA-CV (COMIRNATY™/Pfizer-BioNTech COVID-19) vaccination and other vaccines?

In view of the absence of data on concomitant delivery, and to minimise confusion with any associated reactions, a gap of two weeks is generally recommended between giving mRNA-CV after any other vaccine. However, based on first principles of how these vaccines work, adverse impacts on immunogenicity or safety are unlikely with a shorter gap, so if it is clinically important to deliver in a shorter time, do not delay.[3]

- If it is not practicable to keep a two-week gap between vaccines, then do not delay.
- If a live vaccine has been administered, wait four weeks before giving a COVID-19 vaccine but if not practicable, then do not delay.
- If a COVID-19 vaccine is administered first, then maintain a two-week gap before any other vaccines.[3]

Note: the second mRNA-CV dose is given at least 21 days after the first dose.[3]

Can FLUAD QUAD, AFLURIA QUAD, INFLUVAC TETRA or AFLURIA QUAD JUNIOR be administered simultaneously with other non COVID-19 vaccines?

Yes. Influenza vaccine can be administered with other non-COVID-19 vaccines, such as Tdap, the zoster (shingles) vaccine, meningococcal, pneumococcal or the childhood *National Immunisation Schedule* vaccines. However, the vaccines must be given at different injection sites.

Why is an influenza vaccination recommended every year?

Yearly vaccination is recommended for two reasons: first, because protection from the previous vaccination lessens over time; and second, because the circulating influenza viruses can change and the strains in the vaccine usually change each year in response to the changing virus pattern.

How long does a person have to wait after receiving an influenza vaccination?

The 20-minute waiting period continues to be the best option when the waiting area is adequate and safe.

Adolescents aged 13 years or older and adults receiving only an influenza vaccination:

- If the risk of exposure to infectious disease in a crowded waiting rooms is higher than the low risk of anaphylactic events; adolescents and adults who meet ALL the following criteria may not need to wait for 20 minutes post-vaccination:
  1) do not have a history of severe allergic reactions,
  2) have been assessed for any immediate post vaccination adverse reactions (5 minutes),
  3) are aware of when they need to and how to seek post-vaccination advice,
  4) will have another adolescent or adult with them for the first 20 minutes post vaccination, and
  5) have the ability to contact emergency services if required.

Adolescents aged 13 years or older and adults receiving any other vaccination, and all children aged under 13 years need to remain under observation for the 20-minutes post-vaccination.

Can FLUAD QUAD, AFLURIA QUAD, INFLUVAC TETRA or AFLURIA QUAD JUNIOR be administered to people receiving anticoagulant medication?

Yes. Influenza vaccines can be administered to people on anticoagulants, including aspirin, dabigatran (PRADAXA®), enexoparin (CLEXANE®), heparin, rivaroxaban (XARELTO®), ticagrelor (BRILINTA™) and warfarin.[30] After vaccination, apply firm pressure over the injection site without rubbing for 10 minutes to reduce the risk of bruising.

Can FLUAD QUAD, AFLURIA QUAD, INFLUVAC TETRA or AFLURIA QUAD JUNIOR be given to people with egg allergy or anaphylaxis?

Yes. These vaccines can be administered to people with a history of egg allergy or egg anaphylaxis at general practices, pharmacies or at the workplace, although the data sheet advises caution in people who have a history of egg anaphylaxis. Studies have shown that influenza vaccines containing one microgram or less of ovalbumin do not trigger anaphylaxis in sensitive individuals.[31] The residual ovalbumin in one dose of FLUAD QUAD, AFLURIA QUAD, INFLUVAC TETRA, and AFLURIA QUAD JUNIOR is below this limit.[29,32,33]

Can FLUAD QUAD, AFLURIA QUAD, INFLUVAC TETRA or AFLURIA QUAD JUNIOR be given to people with a sulfonamide (sulfur) allergy?

Yes. Sulfonamide (sulfur) antibiotics, such as co-trimoxazole, sulfasalazine, and sulfite preservatives used in food, are different to medicines containing the words sulfate or sulphate, e.g., neomycin sulfate.[34]

How are AFLURIA QUAD and AFLURIA QUAD JUNIOR produced?

AFLURIA QUAD and AFLURIA QUAD JUNIOR are split virion vaccines that contain disrupted haemagglutinin proteins from the surface of the virus. Influenza virus is grown in embryonated hens' eggs from disease-free flocks and inactivated. The haemagglutinin protein for each strain is harvested, purified and inactivated for use in the vaccine.[32]

How is INFLUVAC TETRA produced?

INFLUVAC TETRA is an inactivated vaccine that contains inactivated haemagglutinin proteins from the surface of the virus. Influenza virus is grown in embryonated hens' eggs and inactivated with formaldehyde.[33]

How is FLUAD QUAD produced?

FLUAD QUAD is an inactivated vaccine that contains inactivated haemagglutinin proteins from the surface of the virus and a squalene-based oil-in-water emulsion. Influenza virus is grown in embryonated hens' eggs and inactivated with formaldehyde. The haemagglutinin protein for each strain is harvested, purified and combined with MF59, the squalene-based oil in water adjuvant.[29]

Do FLUAD QUAD, AFLURIA QUAD, INFLUVAC TETRA or AFLURIA QUAD JUNIOR contain antibiotics?

Yes. FLUAD QUAD vaccines contain traces of kanamycin and neomycin,[29] INFLUVAC TETRA vaccines contain traces of gentamicin,[30] and AFLURIA QUAD and AFLURIA QUAD JUNIOR vaccines contain traces of neomycin and polymixin B[31] due to their use during production. The vaccines should be used with caution in people with known anaphylaxis to these respective antibiotics.

Are FLUAD QUAD, AFLURIA QUAD, INFLUVAC TETRA or AFLURIA QUAD JUNIOR latex free?

FLUAD QUAD, AFLURIA QUAD and AFLURIA QUAD JUNIOR syringes do not have any components made using natural rubber latex.[29,32]

INFLUVAC TETRA syringes do not contain any latex components. However, the manufacturer (Mylan) is unable to confirm that the product did not come in contact with any latex materials during the manufacturing and packaging process.

If no latex-free influenza vaccine is available, please call 0800 IMMUNE (0800 466 863) before vaccinating a person who is highly sensitive to latex with a history of severe hypersensitivity response.

Do FLUAD QUAD, AFLURIA QUAD, INFLUVAC TETRA or AFLURIA QUAD JUNIOR contain blood products?

No. Blood products are not used in the manufacturing processes for these vaccines.[29,32,33]

Do FLUAD QUAD, AFLURIA QUAD, INFLUVAC TETRA or AFLURIA QUAD JUNIOR contain thiomersal?

No. These vaccines are preservative free. They do not contain thiomersal.[29,32,33]

Can you get influenza from FLUAD QUAD, AFLURIA QUAD, INFLUVAC TETRA or AFLURIA QUAD JUNIOR?

No. These vaccines have been made from influenza viruses that have been concentrated, inactivated, and then broken apart. Neither FLUAD QUAD, AFLURIA QUAD, INFLUVAC TETRA nor AFLURIA QUAD JUNIOR can cause influenza as the vaccines do not contain any live viruses.[29,32,33]

Sometimes influenza vaccination is accused of causing the disease. There are two possible reasons for this. First, when vaccinated, the body responds to vaccination by producing an immune response. This can include systemic symptoms such as fever, headache or fatigue, which may mistakenly be assumed to be early signs of influenza but are the body responding to the vaccination. Second, other respiratory viruses and bacteria circulate during the winter months and influenza vaccination does not protect against these.

Most of these other viruses cause milder infections.

However, some viruses and bacteria may produce influenza-like symptoms and/or quite severe illness that can lead to the suggestion that influenza vaccination is ineffective. These illnesses should not be confused with influenza.

How effective are the vaccines against influenza strains not included in the formulation?

Effectiveness can be reduced by a difference between circulating virus strains and vaccine strains. The influenza virus keeps changing and new vaccines are formulated for each northern and southern hemisphere season. There may be some cross protection against a virus type that is not in the vaccine[35,36] but the amount of protection cannot be guaranteed or easily quantified.

Does the influenza vaccine protect against coronaviruses?

Influenza vaccine does not protect against coronavirus infections; however, it will help prevent a serious illness that causes hundreds of deaths each winter in New Zealand.

Could influenza vaccination increase the risk of infection with coronaviruses or make COVID-19 disease worse?

No. Influenza vaccination does not increase the risk of being infected with the SARS-CoV-2 (COVID-19) virus or any other respiratory virus.[37,38]

Safety of inactivated influenza vaccines

Safety of inactivated influenza vaccines

The influenza vaccines currently used in New Zealand are inactivated. They do not contain live viruses[29,32,33] and cannot cause influenza. FLUAD QUAD contains an adjuvant, MF59, to enhance the person's immune response to the vaccine.[29] The AFLURIA QUAD, INFLUVAC TETRA and AFLURIA QUAD JUNIOR vaccines do not contain an adjuvant.[32,33]

MF59 is a squalene-based oil-in-water adjuvant that has been used in influenza vaccines since 1997. Although squalene is produced naturally in the human body, the squalene used in the vaccine comes from shark liver. Squalene is also used during the manufacture of food, cosmetics, and medicines. MF59 in influenza vaccines has an excellent safety record.[39]

Influenza vaccination does not increase the risk of being infected with the SARS-CoV-2 (COVID-19) virus or any other respiratory virus. A U.S. study of people presenting for medical care with a respiratory illness from 2010 to 2013 found that influenza vaccination reduced the risk of influenza disease and had no effect on the risk of other respiratory viruses.[37] Analysis of medically attended influenza-like illnesses over seven influenza seasons, from 2010 to 2017, in Canada also showed that influenza vaccination reduced the risk of influenza and did not have an effect on illnesses caused by other respiratory viruses, including coronaviruses.[38]

Common responses to influenza vaccination

Influenza vaccine is generally well tolerated. Some systemic responses to vaccination may appear influenza-like. However, inactivated vaccines cannot cause the disease.

Common responses associated with the non-adjuvanted influenza vaccines (AFLURIA QUAD, INFLUVAC TETRA and AFLURIA QUAD JUNIOR) in children and adults include pain, redness and/or swelling at the site of injection. Local responses are almost always mild. Systemic responses such as headache, muscle aches and fatigue may occur in adults.[40,41] Fever, irritability and loss of appetite are more likely to occur in children.[42,43] These are generally mild and usually resolve after a day or so. Systemic events may appear influenza-like.

Adults aged 65 years or older are more likely to experience local and/or systemic responses to the adjuvanted influenza vaccine FLUAD QUAD than the non-adjuvanted AFLURIA QUAD vaccine[44-46] because the adjuvant enhances the person's immune response.[45,47]

Common responses associated with the FLUAD QUAD in adults aged 65 years or older include injection site warmth,[44] tenderness/pain,[44-46] swelling,[46] and/or itching[46] at the site of injection. Systemic responses such as and fatigue,[44-46] feverishness,[46] nausea,[46] muscle aches,[44,45] and/or headache[44,45] may also occur. Generally, the vaccine responses are mild to moderate.[45,46] Injection site pain and swelling, and fatigue, feverishness and/or nausea typically resolve more quickly in adjuvanted vaccine recipients during the four days after vaccination compared with those who receive a non-adjuvanted.[45,46]

Serious events associated with influenza vaccination

The most significant serious adverse event associated with influenza vaccination is anaphylaxis, a serious allergic response that usually comes on within minutes of receiving the vaccine. This occurs around once in a million influenza vaccine doses.[48]

Vaccine-related serious adverse events, such as a convulsion associated with fever or cellulitis-like local reaction, are rare.[4,36,49]

Guillain-Barré syndrome and influenza vaccination

Guillain-Barré syndrome (GBS) has an annual incidence of around 1–4 cases per 100,000 people worldwide.[50]

During a swine influenza vaccination campaign in the United States in the 1970s, an increase in GBS was observed in vaccine recipients (around one case per 100,000 vaccinations) and the vaccination campaign was halted and surveillance of GBS expanded.[51]

Epidemiological studies since then have suggested either no increased risk or a possible slight increase in risk of around one case per million adult influenza vaccinations. A meta-analysis of these studies identified a small increase in the risk of GBS following influenza vaccination.[52] However, studies have also identified that the risk of GBS following an episode of influenza-like illness is significantly higher than the risk following influenza vaccination, especially in older adults.[53,54] This highlights the importance of balancing the potential risks of disease with the potential risks and benefits of influenza vaccination to make an informed decision.[55]

Febrile events following influenza vaccination

Fever is a common adverse event in children after vaccination.[42,43] Convulsions associated with fever can occur in susceptible children. Around 3–8 children in 100 aged under 7 years will experience a febrile convulsion, most likely when aged between 16 and 30 months.[56]

In one study, children aged 6–23 months were two to three times more likely to develop a fever of 38°–39°C during the first 24 hours after receiving influenza and PCV13 (PREVENAR 13®) vaccines at the same visit compared with children who received the vaccines on separate days.[57]

Parents/guardians whose children are recommended to receive both influenza vaccine and PCV13 should be advised of the possible increase in risk of fever following concurrent administration of these vaccines. Separating administration of these vaccines by 2 days can be offered but is not essential.

For the PREVENAR 13® data sheet, please refer to the Medsafe website medsafe.govt.nz.

Reporting adverse events following influenza vaccination

Healthcare professionals/vaccinators are professionally and ethically responsible for reporting any serious or unexpected adverse events after the administration of all medicines, including the influenza vaccine, regardless of whether or not they consider the event to have been caused by the vaccination.

Information should include:

- vaccinee's details
- the vaccine administered
- vaccine batch number
- date of onset of symptoms
- type and duration of adverse event
- treatment required
- outcome if known but do not delay reporting while waiting outcome information

Some providers can report events through their practice management system. Reports can be completed online (nzphvc.otago.ac.nz), or the form can be downloaded and printed using the above link, completed and mailed to:

Freepost 112002
The Medical Assessor
Centre for Adverse Reactions Monitoring
University of Otago Medical School
PO Box 913, Dunedin 9054
or faxed to: **(03) 479 7150**

Contraindications and precautions to receiving influenza vaccine

Who should not receive the vaccine?

Influenza vaccination is contraindicated for individuals who have had documented anaphylaxis to any ingredient in the vaccine except egg,[31] or a previous dose of inactivated influenza vaccine. These individuals should not receive the vaccine.

Effectiveness of inactivated influenza vaccines

The efficacy (prevention of illness among vaccinated individuals in controlled trials) and effectiveness (prevention of illness in vaccinated populations) of influenza vaccines is dependent on several factors. Research comparing vaccinated with unvaccinated participants show outcome measures that include laboratory-confirmed infection with influenza virus provide the most robust evidence of vaccine efficacy.

The age, immune status and health of the recipient are important as well as the match between circulating viral strains and the vaccine strains. The type of vaccine can also influence how effective an influenza vaccine is. The inclusion of an adjuvant in influenza vaccines is one approach to enhance a person's immune response to the vaccine,[47,58] which could benefit older adults experiencing a natural decline in immune function associated with ageing.[59-62]

Trivalent influenza vaccines contain two influenza A strains (a H1N1 and a H3N2 strain) and one influenza B strain (from either the Yamagata or Victoria line). Quadrivalent influenza vaccines contain two influenza A strains (a H1N1 and a H3N2) and two influenza B strains (one from each line). Receipt of a quadrivalent influenza vaccine broadens the immune response, which may provide additional protection if influenza B viruses from both lines are circulating or the predominant circulating influenza B virus is not from the line included in the trivalent vaccine.[63]

When influenza vaccine strains match circulating influenza viruses, protection against influenza is primarily dependent on circulating antibodies. These peak during the first month after vaccination and decrease over 6 months (influenza A (H1N1) and B viruses) or 5 months (influenza A (H3N2) viruses) after vaccination.[64]

Influenza vaccines are effective in children. However, less evidence is available for children aged under 2 years.[36,65] In healthy adults, influenza vaccines are effective in reducing cases of influenza particularly when the vaccine and circulating virus strains are well matched.[36,66] Inactivated influenza vaccine effectiveness is around 60% against laboratory-confirmed influenza and just below 20% against influenza-like illness.[67] Vaccine effectiveness may not be as high in older people.[68-72] However, older people who have been vaccinated but subsequently get influenza are less likely to have severe disease,[73,74] complications,[72,73,75,76] including cardiovascular events,[75,77,78] cerebrovascular events,[78] hospitalisation,[69,72,79] increased disability or frailty[80,81] or influenza-related death.[69,79] The table on the following page summarises selected current estimates of inactivated influenza vaccine efficacy and/or effectiveness against a range of clinical outcomes.

Pooled New Zealand data from the Southern Hemisphere Influenza and Vaccine Effectiveness Research and Surveillance (SHIVERS) study have shown that non-adjuvanted influenza vaccine effectiveness over 2012–2015 was around 46% (95% confidence interval 35–55%) preventing influenza-like illness presentations to general practice and 52% (41–62%) preventing influenza-related hospitalisations.[65,82-84] Low influenza activity in 2018 caused imprecision in the assessment of influenza vaccine effectiveness. Estimated vaccine effectiveness in preventing influenza-like illness presentations to general practice was 38% (95% confidence interval 1–61%) and in preventing influenza-related hospitalisations was 35% (95% confidence interval 12–52%).[14]

How long after vaccination does it take for antibodies to be produced?

It can take up to 2 weeks for the vaccine to provide the best influenza protection. However, influenza vaccinations can be given when influenza virus activity has been identified as protective antibody levels have been observed to develop rapidly from 4 days after vaccination.[23]

Summary of selected current estimates of inactivated influenza vaccine efficacy and/or effectiveness against a range of clinical outcomes

Population	Type of outcome	Level of protection (95% confidence intervals)
Pregnant women	Effectiveness against • confirmed influenza • acute respiratory illness requiring an – emergency department visit or – hospitalisation	 50% (15–71%)[85] 81% (31–95%)[86] 65% (3–87%)[86]
Infants aged under 6 months whose mothers received an influenza vaccination during pregnancy	Effectiveness against • confirmed influenza • influenza-related hospitalisation	 41% (7–63%)[87] to 49% (12–70%)[67, 85] 47% (12–68%)[88]
Healthy children • aged under 2 years • aged 6–35 months • aged 6 months to 17 years • aged 2–15 years	Effectiveness against • confirmed influenza • confirmed influenza • influenza-related death Efficacy against confirmed influenza Effectiveness against • influenza-related hospitalisation • influenza-like illness	 Insufficient data[36,65] 66% (9-88%)[89] 66% (29–84%)[89] 65% (47–78%)[90] 64% (52–72%)[65] 56% (12–78%)[91] 28% (21–35%) to 47% (33–58%)[65]
Children with a high-risk condition aged 6 months to 17 years	Effectiveness against influenza-related death	51% (31–67%)[90]
Healthy adults aged 18–64 years	Effectiveness against • confirmed influenza • influenza-related hospitalisation in NZ • influenza-like illness • influenza-like general practice visit in NZ	 59% (53–64%) to 66% (55–75%)[67] 61% (34–77%)[66] 16% (5–25%) to 18% (2–31%)[67] 55% (24–73%)[66]
Adults with high-risk conditions • heart failure • diabetes (newly diagnosed, aged 65 years or older) • chronic obstructive pulmonary disease	Risk of • all-cause mortality • all-cause mortality • influenza-related hospitalisation Effectiveness against influenza-related hospitalisation	 17% reduced risk[92] 56% reduced risk[93] 11% reduced risk[93] 22% (15–27%) to 43% (35–52%)[94]
Adults aged 40 years or older	Effectiveness against acute myocardial infarction	29% (9–44%)[95]
Adults aged 65 years or older	Effectiveness against • confirmed influenza • influenza-like illness • pneumonia/influenza related hospitalisation in community-dwelling elderly • non-fatal and fatal complications	**MF59 adjuvanted vaccines are in bold** 49% (33–62%)[69] 58% (34–73%)[71] **60% (-1.3–84%)**[72] 39% (35–43%)[69] 41% (27–53%)[71] **51% (39–61%)**[72] 28% (26–30%)[69]

Some studies have suggested residual protection from prior season influenza vaccination influences current season vaccine efficacy and/or antibody waning.[64,96-98] Pooled analyses of these studies are inconclusive and have highlighted an area for further research.[63,96,98] However, a review of 15 influenza seasons in Italy,[99] where around two-thirds of older adults received a MF59 adjuvanted influenza vaccine and one-third a non-adjuvanted vaccine, found that the reduction in risk associated with influenza vaccination was not affected by prior season influenza vaccination.[99]

An increasing body of evidence supports the significant role of prior and current season influenza vaccination in reducing the risk of influenza-related hospitalisation with severe illness,[73,100] ischaemic stroke,[101,102] heart failure,[103] and acute coronary syndrome,[104,105] acute myocardial infarction,[106] or respiratory disease.[105] A protective effect of influenza vaccination has also been identified through a lower risk of all-cause mortality in vaccinated adults with heart failure.[107]

Influenza and older people

The World Health Organization[16] and the Ministry of Health[3] recommend annual influenza vaccination for all adults aged 65 years or older. Annual influenza vaccination with FLUAD QUAD is funded for all eligible adults aged 65 years or older.

Influenza vaccination supports healthy ageing and maintenance of independence for older people.

Influenza vaccination provides older people with low to modest protection against influenza infection[68-71] but can also reduce influenza disease severity[73,74] and complications[73,75,76] in older people who have been vaccinated but subsequently get influenza. Influenza-related death,[69,79] hospitalisation,[69,79,108] and increases in disability or frailty[81,101] are lower in older people who receive influenza vaccination compared with those who do not.

Influenza vaccine efficacy for the prevention of acute myocardial infarction (AMI) following influenza is between 19% and 45%,[75] which is similar to the effect of other measures to lower cardiovascular disease risk factors such as smoking cessation, use of statins and treatment of hypertension.[75] Repeated annual influenza vaccination has a positive cumulative effect of greater protection against influenza complications and hospitalisation compared with only ever being vaccinated against influenza once.[73,100-105,107]

Ageing and the serious impact of influenza infection

The natural decline in immune function associated with aging can increase an older person's vulnerability to both the risk of infectious disease and serious complications.[59-62]

Disease complications in older people with influenza include pneumonia,[109-113] secondary bacterial infection,[114,115] acute coronary syndrome[104,105] (including AMI),[75,95,102,116] heart failure,[77] ischaemic stroke,[101,102,117] haemorrhagic stroke,[118] exacerbation of asthma[119] and increased frailty.[113,120] Influenza may also exacerbate chronic underlying conditions,[110,111,114] including cardiovascular disease,[77,121] ischaemic heart disease (IHD),[122] heart failure,[103,107,117] diabetes and chronic obstructive pulmonary disease (COPD).[123]

Influenza increases the risk of mortality

Mortality is significantly higher in older people with influenza[16,112,124,125] than younger healthy adults with influenza.[125] The risk of influenza- related death increases with advancing age, the presence of chronic conditions, or increasing levels of frailty.[110,112]

Influenza increases the risk of hospitalisation

The risk of influenza-related hospitalisation is greater for older people compared with healthy adults aged under 65 years.[66,111-113,126,127] Increasing levels of frailty[80,113,127,128] and the presence of chronic conditions such as diabetes or heart, kidney, neurological or respiratory diseases[111-113,125,127] add to the risk of influenza-related hospitalisation.

Influenza increases the risks of disability and frailty

Older people have lower physiological reserves to aid a return to pre-illness function.[81] Periods of restricted activity or hospitalisation related to illness or injury in older people living in the community are significant causes of ongoing disability completing activities of daily living (ADLs).[80,113]

Following hospitalisation of older people living in the community with an illness such as influenza, disability completing ADLs was substantially higher in those who required admission to an intensive care unit (ICU) than those who did not.[81] In a review, 10–63% of older people admitted to an ICU experienced new or worsened disability with ADLs during the year after discharge. The disability persisted beyond the first year in 22–37% of these people.[81]

Admission of older adults to an ICU has been shown to be related to a two-fold increase in outcomes such as polypharmacy, urinary incontinence, depression, immobility, faecal incontinence and cognitive impairment in the subsequent 12 months.[129] The survival rate of older people has also been shown to be reduced following discharge from an ICU, ranging from two-thirds at 6 months[130] to around half at 12 months[129] (66%[130] and 49%[129]).

Influenza vaccination and older people

The importance of influenza vaccination of older people extends beyond prevention of acute infection. Prevention of disease or reduction in disease severity and complications are critical for older people to help prevent the sequelae of increasing dependence, frailty and premature death associated with illness.[80,81,113,129,130]

Increasing the number of older people vaccinated against the disease annually can have a significant impact on improving health outcomes in older people[108,131] when influenza is circulating in our community.

Recording influenza vaccination of older people on the National Immunisation Register (NIR)

Influenza vaccination of older people should be recorded on the NIR to help monitor vaccination coverage and assess influenza protection. For more information, please refer to the section *Recording influenza vaccinations on the National Immunisation Register* on page 12.

Discuss influenza vaccination with older people and their whānau:

1. **Explain**
    a. Annual influenza vaccination supports healthy ageing, independence and quality of life.
    b. They are more likely to catch influenza and get very ill or die, even if they are fit and healthy.
    c. Influenza vaccination can protect them from getting influenza or if they get influenza, they are less likely to get very ill.
    d. Influenza vaccination cannot give them influenza as it does not contain live viruses.
    e. Being immunised can stop them giving influenza to their family and friends.
2. **Make a clear recommendation that they receive an influenza vaccination**
3. **Suggest that family and friends in regular contact also get vaccinated against influenza**

Effectiveness of influenza vaccination in older people

Protection against infection

Evidence suggests the effectiveness of influenza vaccination in the older person living in the community is low to modest.[69,70,72] Demcheli et al. (2018) updated their *2010 Cochrane Review* and suggest non-adjuvanted vaccine effectiveness is 58% (34–73%) against laboratory-confirmed influenza.[71] Advancing age[60,62] and increasing frailty[68] limit an older person's response to vaccines and decrease vaccine efficacy against acute infection. The use of adjuvanted influenza vaccine (FLUAD QUAD) can enhance the immune response in older adults and increase protection against the influenza infection and complications.[47,58,72,78,99]

Additional preventative strategies to reduce older people's risk of exposure to influenza are also important. These include influenza vaccination of those who are in close contact with older people, for example living or working with older people. A reduction in circulating influenza disease/increase in herd immunity in the community through increased influenza vaccination coverage provides extra protection for the older person as it reduces the likelihood of transmission of influenza to the older person.[132,133]

Protection against serious complications

Older people who have been vaccinated but subsequently get influenza are less likely to develop a severe illness,[73,74] be hospitalised[69,72,79,108] or require admission to an intensive care unit.[124] Non-adjuvanted influenza vaccination has also been associated with a 36% (95% confidence interval 16–51%) lower risk of major adverse cardiovascular events, i.e. hospitalisation or death related to unstable angina, coronary artery obstruction requiring urgent revascularisation, acute myocardial infarction (AMI), heart failure, or ischaemic stroke.[77]

Studies show influenza vaccine efficacy for the prevention of AMI during the year following influenza illness is between 19% and 45%,[75] which is similar to other measures to reduce cardiovascular disease risk factors such as smoking cessation (32–43%), statin use (19–30%) and treatment of hypertension (17–25%).[75]

A review of 15 influenza seasons in Italy,[99] where around two-thirds of older adults received a MF59 adjuvanted influenza vaccine and one-third a non-adjuvanted vaccine, compared hospitalisations for pneumonia, cerebrovascular, and cardiovascular events in the two

vaccine groups. Receipt of the MF59 adjuvanted vaccine was associated with a 39% (95% confidence interval 4–61%) reduction in the risk of hospitalisations for these three conditions compared with receipt of the non-adjuvanted vaccine.[99] A Spanish study[78] comparing older people who received an MF59 adjuvanted influenza vaccine with those who were unvaccinated showed a reduced risk of hospitalisation during the 2004/2005 influenza season with acute coronary syndrome of 87% (95% confidence interval 35–97%) or with a cerebrovascular accident of 93% (95% confidence interval 52–99%) in the vaccinated group. However, this effect was not shown to persist after the influenza season ended.[78]

Influenza vaccination is increasingly being shown to have a role in reducing influenza-related complications including heart failure,[103,117,121] haemorrhagic stroke,[118] acute coronary syndrome,[104,105] and respiratory failure[123] in older people with underlying chronic conditions. Influenza vaccine effectiveness against pneumonia for the older person living in the community and the frail older person living in care range from 25% to 53%.[76] Vaccination of frail older people is still very important as it can reduce their risk of influenza-related hospitalisation,[79] pneumonia[76,134] or death.[69,79]

An increasing body of evidence supports the important role of prior and current season influenza vaccination in reducing the risk of influenza-related hospitalisation with severe illness,[73,100] ischaemic stroke,[101,102] heart failure,[103] and acute coronary syndrome[104,105] or respiratory disease.[105] Vaccinated adults with heart failure are more likely to survive if they have received regular annual influenza vaccinations.[107]

Safety of influenza vaccination in older people

As well as the common influenza vaccination responses, headache, muscle aches and fatigue may occur in older adults.[40,41] Symptoms may appear influenza-like. However, the influenza vaccines used in New Zealand do not contain live viruses[29] and cannot cause influenza.

Influenza vaccination does not increase the risk of being infected with the SARS-CoV-2 (COVID-19) virus or any other respiratory virus.[37,38] Studies of adults aged 65 years or older in Italy and the U.S. who were diagnosed with COVID-19 disease in 2020 and who had received a Northern Hemisphere influenza vaccination in the 2019–2020 season do not suggest that influenza vaccination has a negative effect on COVID-19 disease. In a province in Italy, a study of around 17,500 older adults who were diagnosed with COVID-19 disease, those who had received influenza vaccination were less likely to be diagnosed with COVID-19 disease than those who had not been vaccinated, and influenza vaccination had no effect on the risk of hospitalisation or death.[135] A review of COVID-19 disease and deaths in adults aged 65 years or older across Italy found that in areas with high influenza vaccination coverage less COVID-19 disease related deaths occurred in older adults.[136] In the U.S., a similar relationship between influenza vaccination coverage and less COVID-19 related deaths in older adults was seen.[137]

Influenza vaccines can be administered to people on anticoagulants, including aspirin, dabigatran (PRADAXA®), enexoparin (CLEXANE®), heparin, rivaroxaban (XARELTO®), ticagrelor (BRILINTA™) and warfarin.[30] After vaccination, apply firm pressure over the injection site without rubbing for 10 minutes to reduce the risk of bruising.

Please refer to the Medsafe website medsafe.govt.nz for the PRADAXA®, CLEXANE®, XARELTO® and BRILINTA™ data sheets.

Influenza and pregnancy

Influenza affects different population groups disproportionately with pregnant women, the very young, the very old and people with certain health conditions at highest risk of serious complications.

Two important groups at high risk of disease and serious complications have been recognised since the 1918 influenza pandemic;[138] they are pregnant women and their babies (up to 6 months of age).[139-147]

Influenza vaccination of pregnant women during any stage of pregnancy has been found to be highly effective in preventing influenza and its complications in the woman and her baby, during pregnancy and for up to 6 months after birth by the passive protection passed on to the baby in utero, through the placenta.[87,88]

The World Health Organization recommends influenza vaccination of pregnant women at any stage of pregnancy, and that they are given the highest priority.[16] Influenza vaccination has been recommended and funded in New Zealand for pregnant women since 2010.

Inactivated influenza vaccine is used in New Zealand. There are no concerns about the safety of influenza vaccination during any trimester of pregnancy.[147-159]

Pregnancy

It is well established that some of the physiological changes that occur during pregnancy leave pregnant women and their growing baby at greater risk of serious influenza complications.[141,160-163] Influenza infection during pregnancy can have catastrophic consequences for both mother and baby including premature birth, stillbirth, small for gestational age and perinatal death.[140-143,146]

Physiological changes during pregnancy that can lead to complications from influenza include the following:

- Immune system: While humoral (antibody mediated) immunity appears to be enhanced, the cellular arm of the immune system is temporarily suppressed. This is to prevent harmful immune responses being directed at the growing baby, which is genetically foreign to the mother. These changes can leave a pregnant woman more vulnerable to some intracellular pathogens including viral infections.[141,160-162]
- Physical changes: Changes in the pelvic region, abdominal and thoracic cavities place pressure on surrounding organs. Lung capacity is decreased, and oxygen consumption increased. Blood volume, heart rate and the amount of blood pumped per contraction (stroke volume) are increased.[160]

Risk from influenza for the woman

Data from the Southern Hemisphere Influenza and Vaccine Effectiveness Research and Surveillance (SHIVERS) hospital-based surveillance for severe acute respiratory infections in Auckland during 2012–2014 identified that pregnant women with influenza were five times more likely to be hospitalised than non-pregnant women.[11] A normally healthy woman who is pregnant has a similar risk for complications from influenza as non-pregnant women who have co-morbidities. This risk increases with gestation. When pre-existing medical conditions are superimposed on pregnancy the risks become even higher.[139,147]

Evidence suggests that pregnant women are even more vulnerable during pandemics.[142,146]

Risk from maternal influenza for the growing baby

Direct vertical transmission of the influenza virus to the growing baby is thought to be extremely rare. The adverse effects observed on the baby in mothers who have influenza are likely to be indirect, i.e., as a result of the mother's response to the virus. Maternal influenza infection can be associated with congenital abnormalities caused by fever.[140] Overall there is an increase of general pregnancy complications in women who have influenza.[141-143,146,147]

Historical studies proposed a possible link between maternal influenza infection during pregnancy and an increased risk of cancer in infants and children, such as leukaemia, brain tumours or neuroblastomas. The increased risk of cancer in a child born to a mother who had influenza during pregnancy was extremely low as these are rare cancers.[164]

Risk from influenza for young babies

Babies aged under 6 months have a higher risk of being hospitalised with influenza than other age groups.[144,145,147,165] Influenza-related complications can include fever-related convulsions, vomiting and diarrhoea, pneumonia and occasionally brain inflammation. Babies aged under 6 months cannot be vaccinated against influenza.

Influenza vaccination during pregnancy

Improving immunisation for pregnant women

Within New Zealand, influenza vaccination coverage of pregnant women has been very modest. Research has identified that the most significant barriers to vaccination during pregnancy are –

- A lack of information about:
  - influenza disease and potential complications, and
  - the "two for one" benefit of maternal influenza vaccination.
- No recommendation from the woman's Lead Maternity Carer or other healthcare professionals involved in her care.
- Structural barriers to accessing services through general practice.[166]

There is considerable research to show that patients value the recommendation of their health professional.[167-169]

Studies also show the importance of an explanation covering the risks associated with influenza disease, the effectiveness of vaccination for the woman and her baby, and the excellent safety record of influenza vaccination during pregnancy during the decision-making process.[167-170]

Funded influenza vaccination for eligible pregnant women, refer to page 7, is provided through general practice, some antenatal clinics and some community pharmacies.

It is recommended that women who become pregnant after winter and have not received the current influenza vaccination are offered influenza vaccination up to and including 31 December.

Influenza vaccination of pregnant women should be recorded on the NIR to help monitor vaccination coverage and assess influenza protection. For more information, please refer to the section *Recording influenza vaccinations on the National Immunisation Register* on page 12.

Discuss influenza vaccination with pregnant women and their whānau

1. Explain

a. The risk of influenza for the pregnant woman, her growing baby and her vulnerable newborn.

b. The effectiveness of the vaccine in reducing the influenza risk for the woman and her baby, both during pregnancy and after birth.

c. The excellent safety record of influenza vaccination during pregnancy; and the potential complications from catching influenza, which pose a greater threat to the woman and her baby.

2. Make a clear recommendation for the woman to receive an influenza vaccination during pregnancy

Effectiveness and safety of influenza vaccination during pregnancy

How effective is the inactivated influenza vaccine when given during pregnancy?

The immune response to influenza vaccination in pregnant women is similar to that of non-pregnant women.[171,172] The efficacy (prevention of illness among vaccinated individuals in controlled trials) and effectiveness (prevention of illness in vaccinated populations) of influenza vaccines is dependent on several factors. The age and immune status of the recipient are important as well as the match between circulating viral strains and the vaccine.

Influenza vaccination during pregnancy provides "two for one" protection, reducing the maternal risk of influenza disease and associated complications and the risk for their baby during the first 6 months after birth.[85-88,147,173-178]

A review of acute respiratory illness (ARI) and influenza vaccination during pregnancy over the 2012 and 2013 Australian influenza seasons identified that women who received an influenza vaccination during their pregnancy were 81% less likely to attend an emergency department with an ARI, and 65% less likely to be hospitalised than pregnant women who were not vaccinated.[86]

A review over the 2010–2016 United States (U.S.) influenza seasons found influenza vaccination was 40% (95% confidence interval 12–59%) effective in preventing laboratory-confirmed influenza hospitalisation of pregnant women, despite a low average vaccination rate of 16% (range 8–21%).[179] This was slightly lower than 44% (95% confidence interval 5–67%) effective in preventing symptomatic laboratory-confirmed influenza in pregnant women who did not require hospitalisation over 2010–2012[180] but similar to the pooled vaccine effectiveness of 41% (95% confidence interval 34–48%) in prevention of laboratory-confirmed influenza hospitalisations in adults aged 18–64 years over the 2010–2015 influenza seasons.[181]

An increase in circulating maternal influenza antibodies after vaccination supports maximum transplacental antibody transfer to the growing baby and protection against influenza after birth.[172] Babies born during an influenza season in 2002–2005 in the U.S. were followed until they were aged 6 months.

Those born to mothers who received an influenza vaccination during pregnancy were 41% less likely to have laboratory confirmed influenza and 39% less likely to be admitted to hospital with an influenza-like illness than babies whose mother did not have an influenza vaccination.[87]

How safe is receiving the influenza vaccine during pregnancy?

Inactivated influenza vaccines have been recommended for and used in pregnant women since the 1960s, along with ongoing safety monitoring and research.[148] Influenza vaccination during pregnancy has an excellent safety record for the woman herself, the growing baby and newborn.[148-150]

Studies comparing hundreds of thousands of vaccinated women with unvaccinated women have identified a lower incidence of stillbirth for vaccinated women[153-155,157] and no difference in the incidence of preterm births, or occurrence of congenital malformations.[151-153,155,156,158,159,163] No relationship between maternal influenza vaccination and spontaneous abortion has been identified.[156-158,178,182-184]

No association has been found between maternal vaccination with influenza or pertussis (Tdap) vaccines and infant hospitalisation or death within the first 6 months of life.[185]

Questions and answers about influenza vaccination of pregnant women

Is AFLURIA QUAD the funded influenza vaccine for pregnant women?

Yes. One dose of the inactivated quadrivalent influenza vaccine is recommended each influenza season/year that a woman is pregnant.

Why is an influenza vaccination recommended every year?

Yearly vaccination is recommended for two reasons: first, because protection from the previous vaccination lessens over time; and second, because the circulating influenza viruses can change and the strains in the vaccine usually change each year in response to the changing virus pattern.

Can a woman receive two influenza vaccinations during her pregnancy?

Yes. A woman who is pregnant across two influenza seasons is recommended to have an influenza vaccination in both seasons. In addition to the reasons explained above, a pregnant woman's risk from influenza also increases with increasing gestation.

Is there a minimum interval between receiving an influenza vaccination at the end of 2020 and receiving one in 2021?

No. The 2021 influenza vaccination can be given as soon as the vaccine is available. No minimum time is required between an influenza vaccination in 2020 and one in 2021.

When is the best time to be vaccinated?

Influenza vaccination can be given at any time during pregnancy. It is preferable to vaccinate as soon as the vaccine is available, well before the start of winter. The funded vaccine is available through to 31 December.

Can influenza and whooping cough booster vaccinations be given at the same visit?

If the woman is in her second or third trimester the influenza vaccine and whooping cough booster vaccine (Tdap) can be administered at the same visit at general practice and some antenatal clinics. Both vaccines are funded for pregnant women.

Can women with a history of miscarriage receive an influenza vaccination?

Yes. Influenza vaccination does not increase the risk of miscarriage. However, catching influenza can increase the risk.

Can a post-partum woman receive an influenza vaccination? Will it protect her baby if she is breastfeeding?

It is safe for a breastfeeding woman to have the influenza vaccination. Breastfeeding may offer some initial influenza protection to her baby. However, babies will have more protection if their mother is vaccinated during pregnancy.

Is the influenza vaccine a live vaccine?

No. The influenza vaccine used in New Zealand does not contain any live viruses; the influenza viruses are completely inactivated and cannot cause influenza.

Are there any preservatives in the influenza vaccine, e.g., thiomersal?

No. The vaccine used in New Zealand is preservative free.

Should pregnant women who work with children receive an influenza vaccination?

Yes. Influenza infection rates are generally highest in children, and they are a major source of the spread of influenza. The influenza virus may be found in respiratory secretions (breathing, coughing and sneezing) for 2 weeks or longer in children. The risk of exposure to the influenza virus is higher and, for pregnant women, so is their risk of influenza disease and serious complications.

It is also important for all people working with children, and especially young babies, to be vaccinated against influenza to reduce the risk of passing influenza onto them.

Vaccination and breastfeeding

The influenza vaccine can be given to a breastfeeding woman.

- Protecting the mother can help prevent her becoming infected and transmitting influenza to her baby.
- Breastfeeding may offer some protection against influenza.

Influenza and children

Influenza infection rates are generally highest in children.[145,186] In a 2017 review of influenza hospitalisations in Australian children aged under 16 years over 2011–2013, previously healthy children accounted for 57% of admissions.[187] Over the 2010–2016 influenza seasons in the United States, 50% of children aged under 18 years who died with laboratory-confirmed influenza (n=327 of 654) were previously healthy.[188] In Auckland during 2019, infants aged under 1 year had the highest severe acute influenza respiratory infection hospitalisation rate of all age groups. There were 326 cases per 100,000 people in infants aged under 1 year compared with 216 cases/100,000 for adults aged 80 years or older, 98 cases/100,000 for children aged 1–4 years, and 77 cases/100,000 for adults aged 65–79 years.[14] Healthy children are also the major cause of the spread of influenza viruses in the community.[145,186]

Vaccination of healthy children has the potential to substantially reduce influenza-like illness and related costs in both the children themselves and their families.[189] Influenza vaccination recommendations vary between countries. The United States recommends annual vaccination for all persons from 6 months of age.[190] The United Kingdom influenza vaccination programme includes annual vaccination for all children aged 2–10 years with a live attenuated nasal spray influenza vaccine with the strategy to offer both individual protection and herd immunity.[191] This type of influenza vaccine is not currently available in New Zealand.

New Zealand's current strategy

The current New Zealand strategy for children is to offer free influenza vaccination to those with certain medical conditions most likely to lead to serious influenza-related complications.[192] For more information, please refer to the section *Eligible conditions for funded influenza vaccination* on page 8.

Children aged 6 months to under 9 years who are receiving the influenza vaccine for the first time should receive two doses 4 weeks apart.[193] Children who have received a previous influenza vaccination need only a single dose.

Age	Vaccine	Dose	Number of doses
6–35 months	AFLURIA QUAD JUNIOR	0.25 mL	1 or 2*
3–4 years	INFLUVAC TETRA	0.5 mL	1 or 2*
5–8 years ≥ 9 years	AFLURIA QUAD	0.5 mL	1 or 2* 1

** Two doses separated by at least 4 weeks if an influenza vaccine is being used for the first time.*

Why does a child aged under 9 years need two doses if being vaccinated for the first time?

Children under 9 years of age who are receiving influenza vaccine for the first time have a better immune response after two priming doses of vaccine. This may be because they are more likely to be immunologically naive to influenza.[193] Children who have received one influenza vaccine any time in the past only need a single dose in the current season.

Use of paracetamol following vaccination

The routine prophylactic use of paracetamol or any other antipyretic to control fever either prior to or following influenza vaccination is not recommended. Evidence shows that the laboratory measured immune response to some antigens can be reduced.[194,195] However, there is no evidence that this causes individuals to be less protected from disease.[195]

The current recommendations are as follows:

- Do not use routine prophylactic paracetamol pre- or post-vaccination in the absence of pain or significant discomfort.
- For children who are uncomfortable with fever, give plenty of breastfeeds or cool drinks, dress them in a single layer, ensure the room is not too hot or too cold, and give them lots of cuddles.
- Use of paracetamol is recommended for relief of pain or significant discomfort post-vaccination.
- Ibuprofen may be given as an alternative to paracetamol.[196]

Note: Treatment advice may differ for other groups.

Anyone with concerns following vaccination should seek medical advice.

Influenza and other special groups

Immunocompromised

Individuals who are immune compromised are at high risk of severe influenza and complications. It is important to offer vaccination prior to the initiation of chemotherapy or immune suppressant medication. When this is not possible, influenza vaccination is recommended and can be given while an individual is receiving most treatments. Following cessation of chemotherapy, normal immune responses return after about 30 days.[197]

Specialist's advice should be sought when considering influenza vaccination of individuals who have received a haematopoietic stem cell or solid organ transplantation in the preceding 6 months.

The response to influenza vaccination in those with a poorly functioning immune system is likely to be low,[198] additional preventative strategies are important to reduce their exposure to influenza. The vaccination is also recommended, although not funded, for those who are in close contact with individuals who are more vulnerable or at high risk of complications. Front-line healthcare workers are usually funded by their employer.

International travel

Studies have indicated that influenza is the most commonly contracted vaccine preventable disease amongst international travellers.[199] Influenza outbreaks have been linked to travellers.[199,200] Certain types of travel where large numbers of people are likely to be in close proximity, such as cruise ship voyages[201-203] or events that include mass gatherings[204] are particularly high risk.

During the regular pre-travel consultation, all people travelling outside New Zealand should be advised to receive an influenza vaccination. The pre-travel consultation can also be used opportunistically to ensure that those who are eligible to receive funded influenza vaccine are vaccinated. This is particularly important for older travellers and those who are at higher risk of influenza complications.

In tropical countries, influenza activity can occur throughout the year, so vaccination is worthwhile regardless of season. In temperate climates in the Northern Hemisphere influenza activity is more common from December to March.

If a traveller has received the Southern Hemisphere vaccine in the preceding New Zealand autumn or winter and the same strains are circulating in the Northern Hemisphere, they should remain protected.

If they have not been vaccinated in the proceeding autumn or winter or it is getting close to 6 months[64] since their last influenza vaccination, repeat vaccination is recommended prior to travel.

Providers are expected to have influenza vaccine stock throughout the funded period to 31 December. Influenza vaccine brands with a longer expiry date may be available from some providers during January and February. Anyone receiving a second influenza vaccination during the same funded period[#] or an influenza vaccination after 31 December will need to pay.

If the Southern and Northern Hemisphere vaccine strains differ significantly,[*] it would be preferable to obtain the local vaccine on arrival. However, vaccination with the Southern Hemisphere vaccine may offer some protection and would be preferable to having no vaccine. The Northern Hemisphere vaccine is not available in New Zealand.

[#] *Except children aged under 9 years who are receiving influenza vaccine for the first time.*

[*] *A comparison chart of Southern Hemisphere and Northern Hemisphere influenza vaccine strains can be seen on the next page of this booklet.*

Are there any circumstances where people may consider re-vaccinating within a year?

Yes, by 6 months after vaccination protective levels are lower and may not be sufficient to provide good protection.[64]

When the available vaccine gives protection against influenza viruses circulating in the Northern Hemisphere, travellers – particularly older travellers and those who are at higher risk of influenza complications – who will be exposed to a Northern Hemisphere influenza season should consider vaccination or repeat vaccination prior to travel. Please note that revaccination prior to travel is not funded.

Protective antibodies peak 1 week to 1 month after vaccination and then begin to wane.[23]

Southern Hemisphere vaccine vs Northern Hemisphere vaccine

The 2020–2021 Northern Hemisphere vaccine is different to the 2021 Southern Hemisphere vaccine.[25,204]

Southern Hemisphere influenza vaccine for 2021[25]	Northern Hemisphere influenza vaccine for 2020–2021[205]
Quadrivalent egg-based vaccines	Quadrivalent egg-based vaccines
• A/Victoria/2570/2019 (H1N1)pdm09-like virus • A/Hong Kong/2671/2019 (H3N2)-like virus • B/Washington/02/2019-like virus • B/Phuket/3073/2013-like virus	• A/Guangdong-Maonan/SWL1536/2019 (H1N1) pdm09-like virus • A/Hong Kong/2671/2019 (H3N2)-like virus • B/Washington/02/2019-like virus • B/Phuket/3073/2013-like virus

References

The list of references is available in a separate document in the *Resources* section of the influenza.org.nz website.

AFLURIA® QUAD and **AFLURIA® QUAD JUNIOR** are inactivated split virion quadrivalent influenza vaccines in single dose pre-filled glass syringes containing 0.5 mL or 0.25 mL, respectively, of suspension for injection. Indicated for the prevention of influenza caused by the four A and B virus strains contained in the vaccine in children and adults aged 5–64 years (AFLURIA QUAD) and infants and children aged 6–35 months (AFLURIA QUAD JUNIOR). **Contraindications:** Anaphylaxis following a dose of any influenza vaccine or anaphylaxis following exposure to any component of the vaccine, excluding egg protein. **Precautions:** Postpone in patients with acute febrile illness. Manage any fever, febrile convulsions, or anaphylactic reactions; consider interactions with other vaccines, medications, or laboratory tests; history of anaphylaxis to egg, history of Guillain-Barre syndrome which has occurred within 6 weeks of previous influenza vaccination. Response may be lower in immunocompromised patients. **Adverse effects:** Common injection site reactions e.g., pain, swelling, and redness; AFLURIA QUAD: headache, myalgia, malaise, nausea, chills, vomiting, and fever; AFLURIA QUAD JUNIOR: irritability, diarrhoea and loss of appetite. **Administration:** Gently shake before administering via intramuscular or deep subcutaneous injection. **Dosage:** AFLURIA QUAD – A single 0.5 mL dose is required for adults and children from 5 years of age; children aged 5–8 years not previously vaccinated require two doses given at least four weeks apart. AFLURIA QUAD JUNIOR – A single 0.25 mL dose is required for infants and children 6–35 months of age; infants and children not previously vaccinated require two doses given at least four weeks apart. **Sponsor:** Seqirus (NZ) Ltd. Auckland. AFLURIA QUAD and AFLURIA QUAD JUNIOR are funded prescription medicines – restrictions apply.

INFLUVAC® TETRA is an inactivated quadrivalent influenza vaccine in single-dose pre-filled glass syringe containing 0.5 mL of suspension for injection. Indicated for the prevention of influenza caused by the four A and B virus strains contained in the vaccine in children aged 3–4 years. **Contraindications:** Anaphylaxis following a dose of any influenza vaccine or anaphylaxis following exposure to any component of the vaccine, excluding egg protein. **Precautions:** Postpone if acute febrile illness. Thrombocytopenia, bleeding disorder (administer SC); previous Guillain-Barre syndrome; immunological response may be diminished if the patient is undergoing immunosuppressant treatment. Interactions: No interaction studies have been performed. **Adverse effects:** Local reactions, fatigue, headache, irritability, appetite loss, fever, allergic reactions, neurological disorders such as febrile convulsions, neuritis and Guillain-Barre syndrome. Anxiety-related reactions, including vasovagal reactions (syncope), hyperventilation or stress-related reactions. May be accompanied by several neurological signs such as transient visual disturbance, paresthesia and tonic-clonic limb movements during recovery. **Dosage:** Children aged 3–4 years: 0.5 mL; children 3–4 years not previously vaccinated require two doses given at least four weeks apart. The safety and efficacy of INFLUVAC TETRA have not been established in children under 3 years of age. **Administration:** IM or deep SC injection. **Sponsor:** Mylan New Zealand Ltd. Auckland. INFLUVAC TETRA is a funded prescription medicine – restrictions apply.

FLUAD® QUAD is an inactivated quadrivalent influenza vaccine with an MF59 adjuvant in a single dose pre-filled glass syringe containing 0.5 mL of suspension for injection. Indicated for the prevention of influenza caused by the four A and B virus strains contained in the vaccine in adults aged 65 years or older. **Contraindications:** Anaphylaxis following a dose of any influenza vaccine or anaphylaxis following exposure to any component of the vaccine, excluding egg protein. **Precautions:** Postpone in patients with acute febrile illness. Manage any anaphylactic reactions; consider interactions with other vaccines, medications, or laboratory tests; history of anaphylaxis to egg, history of Guillain-Barre syndrome which has occurred within 6 weeks of previous influenza vaccination. Immune responses may not be protective in all vaccinees, particularly in immunosuppressed patients. **Adverse effects:** Common injection site reactions e.g., redness, swelling, pain, ecchymosis, or induration; headache, sweating, myalgia, arthralgia, fever, malaise, shivering, or fatigue. Rare but serious events include thrombocytopenia; lymphadenopathy; muscular weakness; allergic reactions such as anaphylactic shock, anaphylaxis, or angioedema; encephalomyelitis, Guillain Barre syndrome, neuritis, neuralgia, paraesthesia, or convulsions; vasculitis with transient renal involvement; generalised skin reactions (such as erythema multiforme, pruritus, urticaria or non-specific rash); and severe injection-site reactions (extensive limb swelling or cellulitis-like reactions). **Administration:** Gently shake before administering via intramuscular injection. **Dosage:** A single 0.5 mL dose is required for adults aged 65 years or older. **Sponsor:** Seqirus (NZ) Ltd. Auckland. FLUAD QUAD is a funded prescription medicine – restrictions apply.

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