Everything you need to know about FLU
Four out of five people infected show no symptoms of influenza

The Southern Hemisphere Influenza and Vaccine Effectiveness Research and Surveillance (SHIVERS) Serosurvey, in 2015, provided information about the immunity that people in the community have against influenza. When the results were applied to the New Zealand population in 2015, around 1.1 million people (26%) would have been infected with influenza. Around 880,000 (80%) of these people were asymptomatic carriers who could have spread the virus among their family, co-workers, classmates and patients without ever realising it.¹

And once spread, influenza has a serious effect on our community

Other SHIVERS data showed that when applied to the New Zealand population:

- 31,850 sought help from their GP
- 2,209 were hospitalised

Help prevent the potentially devastating effects of influenza in your community

Recommend annual influenza vaccination

Please make sure you get vaccinated every year

The SHIVERS Serosurvey

The purpose of this study was to contribute to knowledge about influenza infection in the community and identify if participants:

- developed immunity to influenza by the end of the winter and
- had influenza during the winter
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The list of references is available in a separate document in the Resources section on the www.influenza.org.nz website.
Important information for 2019

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

From April 1 start date

From 2019, the annual Influenza Immunisation Programme (the Programme) will start from 1 April each year, subject to influenza vaccine being available for distribution from then.

The start date differs to previous years when the Programme started as soon as the influenza vaccine became available, usually early March. Emerging evidence on the effectiveness of influenza vaccination, influenza surveillance data, the impact of the start date on service delivery and feedback from the sector were considered by the Ministry of Health when making this decision.

New Zealand influenza surveillance data shows that in recent years the peak of influenza activity has been in August.

A start date from 1 April for influenza vaccination will provide better protection for our vulnerable population during the expected peak of influenza activity. For influenza immunisation providers, a later start date also allows more time for planning and implementation of the Programme.

The Ministry of Health recommends that providers of non-funded influenza immunisation, such as workplace vaccinators, consider providing their service from 1 April.


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 80% of healthcare workers against influenza annually
- Distribute more than 1.2 million influenza vaccine doses annually, i.e. protect more than 25% of the community

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 6
- Children aged 4 years or under who have been hospitalised for respiratory illness or have a history of significant respiratory illness
- People aged under 18 years living in the Kaikoura and Hurunui areas (within the Canterbury District Health Board)

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.
- 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 vaccination every year can keep older people healthy and active for longer.
- Influenza immunisation during pregnancy helps protect the woman and her baby against influenza.
Influenza vaccination precaution

Influenza vaccination may be contraindicated or need to be delayed for people receiving some newer cancer treatments. The immune-stimulant actions of atezolizumab (TECENTRIQ®), ipilimumab (YERVOY®), nivolumab (OPDIVO®) and pembrolizumab (KEYTRUDA®) on the immune system increase a person’s risk of developing autoimmune conditions.

It is not known whether receipt of an influenza vaccine whilst receiving these treatments or for up to 6 months after treatment increases a theoretical risk of triggering the occurrence of these side effects. Please contact the person’s oncologist or 0800 IMMUNE (0800 466 863) for current advice about influenza vaccination for these people BEFORE administering the vaccine.

INFLUVAC® TETRA and FLUARIX® TETRA can be given to people with egg allergy or anaphylaxis

INFLUVAC® TETRA and FLUARIX® TETRA can be safely administered to people with a history of egg allergy or egg anaphylaxis at general practices, pharmacies or at the workplace. Studies have shown that influenza vaccines containing one microgram or less of ovalbumin do not trigger anaphylaxis in sensitive individuals. The residual ovalbumin in one dose of INFLUVAC® TETRA or FLUARIX® TETRA is significantly below this limit.

Ordering influenza vaccine

Online ordering is preferred at www.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 8.

Ordering printed influenza resources

The following three resources are ordered from HealthEd (www.healthed.govt.nz). They replace the After your flu immunisation leaflet and Avoid flu during pregnancy brochure used in previous years.

- After your child is immunised (HE1504),
- After your immunisation (HE2505) for teenagers and adults, and
- Immunise during pregnancy (HE2503)

Two funded quadrivalent influenza vaccines for 2019

1. INFLUVAC® TETRA
   For adults and children aged 3 years or older.

2. FLUARIX® TETRA
   For children aged under 3 years, i.e. 6–35 months.

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

Pharmacist vaccinators

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

- pregnant women, and
- people aged 65 years or older

Recording influenza vaccination on the National Immunisation Register (NIR)

All influenza vaccinations given in general practice and by community pharmacists 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 9.

Pharmacist vaccinators use the NIR web application ImmuniseNow to 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.

Go to influenza.org.nz for additional associated content

- Southern Hemisphere Influenza and Vaccine Effectiveness, Research and Surveillance (SHIVERS) Serosurvey
- Related diseases (pneumococcal, meningococcal and pertussis)
- Flu Kit references
- Claiming funded vaccine
- Use of antivirals for influenza treatment and/or prevention
- Datasheets for INFLUVAC® TETRA and FLUARIX® TETRA

The Ministry of Health and the Immunisation Advisory Centre appreciate all your hard work, and thank you for your role in ensuring New Zealanders are protected from influenza.
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 two or more weeks.6

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 four days of illness.7

A recent 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.9

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.10

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 two weeks.6

Not everyone with influenza has symptoms or feels unwell. However, asymptomatic individuals can still transmit the virus to others.6,9,11-12

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.1

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%]).13

The SHIVERS hospital-based surveillance for severe acute respiratory infections in Auckland during 2017 identified that adults aged 80 years or older had the highest severe acute influenza respiratory infection hospitalisation rates of all age groups. There were 283 cases per 100,000 people in adults aged 80 years or older compared with 97 cases/100,000 for adults aged 65–79 years, 17 cases/100,000 for midlife adults and 145 cases/100,000 for infants aged under 1 year.14

Pacific peoples had higher hospitalisation rates for severe acute influenza respiratory infection than Maori, 83 cases per 100,000 people compared with 65 cases/100,000. Both groups had higher hospitalisation rates than Asian, European and other ethnicities.14

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.14

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.16

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.17 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.6,10-12 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%]).13 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.18-20 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 has remained steady at 65–66% over the past few years and increased to 68% in 2018.21 The Ministry of Health goal is 80% of all healthcare workers vaccinated against influenza annually. The 2018 Workforce Influenza Immunisation Coverage Rates by District Health Boards report is available on the Ministry of Health website www.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 two 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 four days after vaccination.22,23

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.

From 1 April through 31 December 2019:

• INFLUVAC® TETRA is the funded vaccine for eligible adults and children aged 3 years or older
• FLUARIX® TETRA is the funded vaccine for eligible children aged under 3 years, i.e. aged 6–35 months

Recommend annual influenza vaccination.

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 2019, of the four influenza strains included in the funded vaccines, two are new (in bold).23

• A/Michigan/45/2015 (H1N1) pdm09-like virus
• A/Switzerland/8060/2017 (H3N2)-like virus
• B/Colorado/06/2017-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 2019

INFLUVAC® TETRA
INFLUVAC® TETRA is funded if administered to eligible adults and children aged 3 years or older, from 1 April through 31 December 2019.

FLUARIX® TETRA
FLUARIX® TETRA is funded if administered to eligible children aged under 3 years, i.e. 6–35 months, from 1 April through 31 December 2019.

Note: Both INFLUVAC® TETRA and FLUARIX® TETRA are prescription medicines. For full prescribing information, please refer to the data sheets at www.medsafe.govt.nz or www.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 benefit for administering the vaccine.25

Adults aged 18 years or older who meet PHARMAC’s influenza vaccination eligibility criteria must also be eligible to receive publicly funded health and disability services in New Zealand to receive funded influenza vaccination.25 For more information, please refer to the Health and Disability Services Eligibility Direction 2011 for eligibility criteria (available at www.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 200726 (available at www.health.govt.nz/publication/section-88-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 6 or the New Zealand Pharmaceutical Schedule on the PHARMAC website (www.pharmac.govt.nz/tools-resources/pharmaceutical-schedule).

Influenza vaccination before winter offers the best protection.
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; or
   • have diabetes; or
   • have chronic renal disease; or
   • have any cancer, refer to the vaccine precaution below#, excluding basal and squamous skin cancers if not invasive; or
   • have any of the following other conditions:
     - autoimmune disease, or
     - immune suppression or immune deficiency, or
     - HIV, or
     - transplant recipient, or
     - neuromuscular or CNS disease/disorder, or
     - haemoglobinopathy, 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;

4. People under 18 years of age living in the Kaikoura and Hurunui areas (within the Canterbury District Health Board)

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
- children on long-term aspirin
- error of metabolism at risk of major metabolic decompensation
- pre- or post-splenectomy
- children with Down syndrome
- pregnant women (any trimester)

*Influenza vaccination precaution for some cancer treatments*

Influenza vaccination may be contraindicated or need to be delayed for people receiving some newer cancer treatments. Please read the information under Contraindications and precautions to receiving influenza vaccine on page 16 for people receiving atezolizumab (TECENTRIQ®), ipilimumab (YERVOY®), nivolumab (OPDIVO®) and pembrolizumab (KEYTRUDA®) and contact the person’s oncologist or 0800 IMMUNE (0800 466 863) for current advice about influenza vaccination for these people BEFORE administering the vaccine.

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 neuron 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 www.hcl.co.nz is the preferred option and does not incur a manual order processing fee.

Send fax orders to 0508 408 358. The fax order form is available on page 8 and through the Resources section on www.influenza.org.nz. For enquiries phone 0508 425 358.

Cost of the influenza vaccines
The vaccine costs $9.00 (excl. GST) per dose. For people eligible for funded influenza vaccine, refer to page 6, the vaccine is free (i.e. no vaccine cost and no administration service cost to the person). General practices can claim for the cost of the vaccine and the immunisation benefit for administration of a funded influenza vaccine to an eligible individual via the usual Sector Services process.

Note: Claims can only be made when the vaccine is given during the funded Influenza Immunisation Programme, from 1 April through 31 December.

How much is the immunisation subsidy?
$21.00 (excl. GST)

Order or delivery charges?
There are no delivery charges. However, faxed or emailed orders incur a manual order processing fee of $10 per order. This fee can be avoided by ordering online.

Minimum order requirements?
The total influenza vaccine order must meet minimum quantities as follows:

<table>
<thead>
<tr>
<th>Month</th>
<th>Minimum Order</th>
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<tbody>
<tr>
<td>March</td>
<td>60 doses</td>
</tr>
<tr>
<td>April</td>
<td>60 doses</td>
</tr>
<tr>
<td>May</td>
<td>60 doses</td>
</tr>
<tr>
<td>June</td>
<td>30 doses</td>
</tr>
<tr>
<td>July</td>
<td>20 doses</td>
</tr>
<tr>
<td>Aug-Dec</td>
<td>10 doses</td>
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</tbody>
</table>

Notes for providers:
- Please, only order FLUARIX® TETRA when required to vaccinate children aged under 3 years, i.e. aged 6–35 months.

Influenza vaccine chilly bins
Influenza vaccine chilly bins cannot be recycled. To reduce wastage when ordering, please consider your expected usage. A small bin holds 60 doses, a medium chilly bin holds up to 120 doses, a large bin holds up to 180 doses, and the extra-large bin holds up to 500 doses.

Vaccine availability at the start of the season
Pre-orders for influenza vaccines can be placed from 1 March. Orders will be dispatched when stock is available and released by the Ministry of Health.

Please do not organise clinics before your vaccine stock has arrived. The funded Influenza Immunisation Programme starts from 1 April.

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.

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 INFLUVAC® TETRA and/or one dose of unused FLUARIX® TETRA from any one account. To be eligible for a refund, the unused stock must be returned prior to 31 January 2020. Contact Healthcare Logistics on 0508 425 358 to request a Return Authorisation.

The shelf life of funded influenza vaccines
All influenza vaccines are marked with an expiry date that should 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 (available at www.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.
2019 funded influenza vaccine order form

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

TO: Healthcare Logistics
ONLINE: www.hcl.co.nz (preferred option, registration required) 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: ______________________

Surgery 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:

☐ INFLUVAC® TETRA DOSES [1148879], funded influenza vaccine (only available in multiples of 10).

☐ FLUARIX® TETRA DOSES [1148878], funded influenza vaccine (only available in single dose packs).

Please, only order FLUARIX® TETRA when required to vaccinate children aged under 3 years, i.e. aged 6–35 months.

You will be supplied the doses that you commit to in your online or faxed order (please remember we cannot split boxes).

Notes for providers:

• Due to demand, please allow up to 48 hours for dispatch. Please do not book your clinics before the stock has arrived

• Total influenza vaccine order must meet minimum quantities as follows:

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<thead>
<tr>
<th></th>
<th>APRIL</th>
<th>MAY</th>
<th>JUNE</th>
<th>JULY</th>
<th>AUG-DEC</th>
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<tbody>
<tr>
<td>Min 60 doses</td>
<td>Min 60 doses</td>
<td>Min 60 doses</td>
<td>Min 30 doses</td>
<td>Min 20 doses</td>
<td>Min 10 doses</td>
</tr>
</tbody>
</table>

• Influenza chilly bins cannot be recycled. To reduce wastage when ordering, please consider your expected usage. A small bin holds 60 doses, a medium chilly bin holds up to 120 doses, a large bin holds up to 180 doses, and the extra-large bin holds up to 500 doses

• Some orders may have a temperature logging device included with the shipment. Do not be concerned if your shipment does not contain a temperature logging device

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 INFLUVAC® TETRA and/or one dose of unused FLUARIX® TETRA from any one account. To be eligible for a refund, the unused stock must be returned prior to 31 January 2020. Contact Healthcare Logistics on 0508 425 358 to request a Return Authorisation.

This form is also available on www.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 health 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 www.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.

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 record an adult’s influenza vaccination information on the NIR 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 funded influenza vaccinations should be recorded on the NIR
- For adults wanting to opt off the recording of their influenza vaccination on the NIR please leave the opt-on/off fields blank. The vaccination information will only be recorded on your PMS and will not be sent to 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 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 ImmuniseNow in the future for other influenza vaccination settings such as DHB staff health clinics. It is expected that this will be in place for 2019.

Occupational health providers are also 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 contact the Ministry of Health Support team 0800 505 125 and select option 3.
- ImmuniseNow, contact the Ministry of Health Support Team (details above)
- Your general practice or pharmacy PMS, please contact your vendor directly
Influenza vaccination consent form

Patient/Guardian
Surname: ___________________________ First name: ___________________________
Phone: ___________________________ Date of birth: ____________ Gender: M F NHI: ____________
Ethnicity: NZ European Maori Samoan Cook Island Maori Tongan Niuean Chinese Indian Other (such as Dutch, Japanese, Tokelauan) Please state: ____________
Name of guardian (if applicable): ___________________________
Address: ___________________________
Your doctor’s name / surgery address: ___________________________

This form confirms that you have given your consent to have an influenza vaccination.
If any of the following apply to you then please advise your healthcare professional:

☐ I am currently unwell with a high fever ☐ I have had a previous severe response to an influenza vaccination
☐ I have a history of a bleeding disorder ☐ I have received treatment for cancer during the last 12 months

Possible responses to influenza vaccination:
Influenza vaccination 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 should remain under observation to watch for an allergic response for 20 minutes after your vaccination.
The influenza vaccine does not protect against other respiratory viruses such as the common cold. For more information on the influenza vaccine please refer to the consumer medicine information sheet located at www.medsafe.govt.nz.

The Ministry of Health keeps a record of influenza vaccinations on the National Immunisation Register so that authorised health professionals can find out what vaccinations have been given. It helps to monitor the population’s protection against influenza. If you do not want your vaccination recorded on the National Immunisation Register please advise your doctor, nurse or healthcare professional.

I have read or have had explained to me information about influenza vaccination, and I have had a chance to ask questions that were answered to my satisfaction. I believe I understand the benefits and risks of influenza vaccination. I understand getting the vaccination is my choice. I agree to get the vaccination and that it is recommended that I wait here for 20 minutes after my vaccination.

I consent to this information being given to my healthcare provider to update applicable records.

Signed: ___________________________ Date: ___________________________
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. Talk to your healthcare professional about the benefits and possible risks.
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 www.pharmac.govt.nz.

**Ordering printed influenza resources**
Refer to the last page in this document for information on all the influenza resources available.  
HealthEd  
Website: www.healthed.govt.nz
The following three resources are ordered from HealthEd. They replace the After your flu immunisation leaflet and Avoid flu during pregnancy brochure used in previous years.  
- After your child is immunised (HE1504),  
- After your immunisation (HE2505) for teenagers and adults, and  
- Immunise during pregnancy (HE2503).  
The National Immunisation Register leaflet (HE2423) for adults is also ordered from HealthEd.  
All other influenza resources can be ordered from:  
Website: www.influenza.org.nz

**Ordering vaccine**
Healthcare Logistics (HCL)  
ONLINE: www.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 8 and through the Resources section on www.influenza.org.nz.
Enquiries  
Phone: 0508 425 358

**Cold chain**
Your Immunisation/Cold Chain Coordinator.  
The National Standards for Vaccine Storage and Transportation for Immunisation Providers 2017, and the Ministry of Health National Immunisation Programme cold chain management webpage  
Website: www.health.govt.nz/coldchain

**Claiming funded vaccine**
Sector Services Help Desk  
Phone: 0800 458 448 and select option 5  

**NHI number**
Sector Services  
Phone: 0800 855 151

**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**
Phone: (09) 373 7599 ext. 82075  
Email: influenza@auckland.ac.nz  
Website: www.influenza.org.nz  
Your Immunisation Coordinator may be able to assist with more information.

**National Immunisation Register**
Ministry of Health Support team  
Phone: 0800 505 125 and select option 3  
Your District Health Board NIR administrator may be able to assist with more information.

**ImmuniseNow**  
Ministry of Health Support team  
Phone: 0800 505 125 and select option 3

**Vaccine data sheets**
Medsafe  
Website: www.medsafe.govt.nz  
Influenza information for health professionals  
Website: www.influenza.org.nz

**Ministry of Health influenza vaccination policy and position statements**
Ministry of Health Influenza webpage  
Website: www.health.govt.nz/our-work/preventative-health-wellness/immunisation/influenza
# Summary of 2019 funded influenza vaccines

<table>
<thead>
<tr>
<th>Vaccine brand:</th>
<th>INFLUVAC® TETRA</th>
<th>FLUARIX® TETRA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer:</td>
<td>Mylan • Phone: 0800 737 271</td>
<td>GlaxoSmithKline NZ Ltd • Phone: 0800 808 500</td>
</tr>
<tr>
<td>Funding status:</td>
<td>Fully funded for eligible adults and children aged 3 years or older</td>
<td>Fully funded for eligible children aged under 3 years, i.e. aged 6–35 months</td>
</tr>
</tbody>
</table>

### Dosage:

<table>
<thead>
<tr>
<th>Age</th>
<th>Dose</th>
<th>Number of doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>6–35 months</td>
<td>NOT FOR USE IN THIS AGE GROUP</td>
<td></td>
</tr>
<tr>
<td>3–8 years</td>
<td>0.5 mL</td>
<td>1 or 2*</td>
</tr>
<tr>
<td>≥ 9 years</td>
<td>0.5 mL</td>
<td>1</td>
</tr>
</tbody>
</table>

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

### Influenza strains for 2019:

- A/Michigan/45/2015 (H1N1)pdm09-like virus
- A/Switzerland/8060/2017 (H3N2)-like virus
- B/Phuket/3073/2013-like virus
- B/Colorado/06/2017-like virus

### Route of administration:

- Intramuscular

### Precaution:

- Influenza vaccination may be contraindicated or need to be delayed for people receiving the following cancer treatments, atezolizumab (Tecentriq®), ipilimumab (Yervoy®), nivolumab (Opdivo®) and pembrolizumab (Keytruda®). For more information, please refer to page 16.

### Components of special note:

- Gentamicin
- 1 microgram or less of ovalbumin

### Latex:

- INFLUVAC® TETRA cannot be considered latex-free
- FLUARIX® TETRA is latex-free

### Presentation:

- Pre-filled syringe: 0.5 mL

### 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

### Order from:

- Healthcare Logistics (HCL) • Phone: 0508 425 358 • Fax: 0508 408 358 • www.hcl.co.nz

INFLUVAC® TETRA and FLUARIX® TETRA are a prescription only medicines. Please refer to the Medsafe data sheets for further details.

Questions and answers about the 2019 funded influenza vaccines

What are the funded influenza vaccines for 2019?

- **INFLUVAC® TETRA** (Mylan) is the funded influenza vaccine for adults and children aged 3 years or older.
- **FLUARIX® TETRA** (GSK) is the funded influenza vaccine for children aged under 3 years, i.e. aged 6–35 months.

Both are quadrivalent vaccines. For more information, please refer to the Medsafe data sheets (www.medsafe.govt.nz or www.influenza.org.nz) and Summary of 2019 funded influenza vaccines table on page 12.

What are the influenza vaccine strains for 2019?

The funded quadrivalent influenza vaccines in 2019 offer protection against the following influenza strains:

- A/Michigan/45/2015 (H1N1)pdm09-like virus
- A/Switzerland/8060/2017 (H3N2)-like virus
- B/Colorado/06/2017-like virus
- B/Phuket/3073/2013-like virus

Is there a minimum interval between an influenza vaccination at the end of 2018 and this year’s vaccination?

No minimum interval is required between an influenza vaccination in 2018 and one in 2019. The 2019 influenza vaccination can be given from 1 April, as soon as the vaccine is available.

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 **INFLUVAC® TETRA** or **FLUARIX® TETRA** be administered to people receiving anticoagulant medication?

Yes. Influenza vaccines can be administered to people on anticoagulants, including aspirin, dabigatran (PRADAXA®), enoxaparin (CLEXANE®), heparin, and warfarin.24 After vaccination, apply firm pressure over the injection site without rubbing for 10 minutes to reduce the risk of bruising.

Can **INFLUVAC® TETRA** or **FLUARIX® TETRA** be administered simultaneously with other vaccines?

Yes. Influenza vaccine can be administered with other 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.

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.29

Around one in 10 adults have an increased risk of experiencing fatigue, headache and/or body aches and pains during the 14 days after receiving influenza and PCV13 vaccines at the same visit.30

Around two in 10 adults have an increased risk of redness or pain at the site of one or both injection sites when receiving influenza and 23PPV (PNEUMOVAX®23) vaccines concurrently.31-33 Separating administration of these vaccines by 2 days can be offered, but is not essential.

Can **INFLUVAC® TETRA** and **FLUARIX® TETRA** be given to people with egg allergy or anaphylaxis?

Yes. These vaccines can be safely administered to people with a history of egg allergy or egg anaphylaxis at general practices, pharmacies or at the workplace.2 Studies have shown that influenza vaccines containing one microgram or less of ovalbumin do not trigger anaphylaxis in sensitive individuals.3 The residual ovalbumin in one dose of INFLUVAC® TETRA or FLUARIX® TETRA is significantly below this limit.4,5

Can **INFLUVAC® TETRA** and **FLUARIX® TETRA** 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. gentamicin sulphate.34
How are INFLUVAC® TETRA and FLUARIX® TETRA produced?
INFLUVAC® TETRA and FLUARIX® TETRA are subunit vaccines that contain only viral surface antigens (haemagglutinin proteins). Influenza virus is grown in embryonated hens’ eggs from disease-free flocks and inactivated. The haemagglutinin protein for each strain is harvested and purified for use in the vaccine.4,35

Do INFLUVAC® TETRA and FLUARIX® TETRA contain gentamicin?
Yes. Both vaccines contain traces of gentamicin due to the use of this substance during production.4,35 INFLUVAC® TETRA and FLUARIX® TETRA should be used with caution in people with a hypersensitivity to gentamicin.

Are INFLUVAC® TETRA and FLUARIX® TETRA latex free?
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.
FLUARIX® TETRA prefilled syringes with a separate needle do not have any components made using natural rubber latex.35
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 INFLUVAC® TETRA and FLUARIX® TETRA contain blood products?
No. Blood products are not used in the manufacturing processes for these vaccines.4,35

Do INFLUVAC® TETRA and FLUARIX® TETRA contain thiomersal?
No. Both these vaccines are preservative free. They do not contain thiomersal.4,35

Can you get influenza from INFLUVAC® TETRA and FLUARIX® TETRA?
No. These vaccines have been made from influenza viruses that have been concentrated, inactivated, and then broken apart. Neither INFLUVAC® TETRA nor FLUARIX® TETRA can cause influenza as the vaccines do not contain any live viruses.4,35
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 vaccine36,37 but the amount of protection cannot be guaranteed or easily quantified.

Pharmacist vaccinators
Many community pharmacies offer purchased influenza vaccination for individuals aged 13 years or older. Some community pharmacies also provide funded influenza vaccination for:

- pregnant women, and
- people aged 65 years or over
Safety of inactivated influenza vaccines

Common responses to vaccination
Influenza vaccine is generally well tolerated. Common responses associated with inactivated influenza vaccines in adults and children include pain, redness and/or swelling at the site of injection. Local responses are almost always mild. Systemic events such as headache, muscle aches and fatigue may occur in adults.38-44 Fever, irritability and loss of appetite are more likely to occur in children.38-40,45-50 These are generally mild and usually resolve after a day or so. Systemic events may appear influenza-like. However, the influenza vaccines currently used in New Zealand do not contain live viruses and cannot cause the disease.38-40

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.51 With the possible exceptions of Guillain-Barré syndrome (refer below) and the side effects related to some new immune-stimulant cancer treatments could be triggered, refer to page 16, other serious adverse events are no more likely to occur in individuals who are vaccinated compared with those who are unvaccinated.38-40

Guillain-Barré syndrome and influenza vaccination
Guillain-Barré syndrome (GBS) has an annual incidence of around 1–4 cases per 100,000 people worldwide.52 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.53 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.54 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.55,56 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.57

Febrile events following influenza vaccination
Fever is a common adverse event in children after vaccination.46-50 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.58 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.29 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 www.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 are able to report events through their practice management system. Reports can be completed online (www.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

Clinical information
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, or a previous dose of inactivated influenza vaccine. These individuals should not receive the vaccine.

Influenza vaccination may be contraindicated or need to be delayed for people receiving some newer cancer treatments
The immune-stimulant actions of atezolizumab (TECENTRIQ®), ipilimumab (YERVOY®), nivolumab (OPDIVO®) and pembrolizumab (KEYTRUDA®) on the immune system increase a person’s risk of developing autoimmune conditions. It is not known whether receipt of an influenza vaccine whilst receiving these treatments or for up to 6 months after treatment increases a theoretical risk of triggering the occurrence of these side effects.

Please contact the person’s oncologist or 0800 IMMUNE (0800 466 863) for current advice about influenza vaccination for these people BEFORE administering 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. The age, immune status and health of the recipient are important as well as the match between circulating viral strains and the vaccine. 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.

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.

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.

Influenza vaccines are effective in children. However, less evidence is available for children aged under 2 years. In healthy adults influenza vaccines are effective in reducing cases of influenza particularly when the vaccine and circulating virus strains are well matched. Inactivated influenza vaccine effectiveness is around 60% against laboratory-confirmed influenza and just below 20% against influenza-like illness. Vaccine effectiveness may not be as high in older people. However, older people who have been vaccinated but subsequently get influenza are less likely to have severe disease, complications including cardiovascular events, hospitalisation, increased disability or frailty, or influenza-related death.

Table 1 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 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. 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%).

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.
Table 1: Summary of selected current estimates of inactivated influenza vaccine efficacy and/or effectiveness against a range of clinical outcomes

<table>
<thead>
<tr>
<th>Population</th>
<th>Type of outcome</th>
<th>Level of protection (95% confidence intervals)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants aged under 6 months whose mothers received an influenza vaccination during pregnancy</td>
<td>Effectiveness against LCI</td>
<td>41% (7–63)%&lt;sup&gt;80&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Effectiveness against LCI-related hospitalisation</td>
<td>49% (12–70%)&lt;sup&gt;53,81&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>47% (12–68%)&lt;sup&gt;52&lt;/sup&gt;</td>
</tr>
<tr>
<td>Healthy children aged under 2 years</td>
<td>Effectiveness against LCI</td>
<td>Insufficient data&lt;sup&gt;37,61&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>66% (9–88%)&lt;sup&gt;83&lt;/sup&gt;</td>
</tr>
<tr>
<td>Healthy children aged 6–35 months</td>
<td>Effectiveness against LCI</td>
<td>66% (29–84%)&lt;sup&gt;41&lt;/sup&gt;</td>
</tr>
<tr>
<td>Children aged 6 months to under 18 years</td>
<td>Effectiveness against LCI-related death:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– Healthy, no high-risk condition</td>
<td>65% (47–78%)&lt;sup&gt;84&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>– With a high-risk condition</td>
<td>51% (31–67%)&lt;sup&gt;84&lt;/sup&gt;</td>
</tr>
<tr>
<td>Healthy children aged 2 years to under 16 years</td>
<td>Efficacy against LCI</td>
<td>64% (52–72%)&lt;sup&gt;41&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Effectiveness against LCI-related hospitalisation</td>
<td>56% (12–78%)&lt;sup&gt;39&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Effectiveness against ILI</td>
<td>28% (21–35%) to 47% (33–58%)&lt;sup&gt;81&lt;/sup&gt;</td>
</tr>
<tr>
<td>Healthy adults (aged 18–64 years)</td>
<td>Effectiveness against LCI generally or LCI-related hospitalisation in NZ</td>
<td>59% (53–64%) to 66% (55–75%)&lt;sup&gt;53&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Effectiveness against ILI generally or ILI-related general practitioner (GP) visit in NZ</td>
<td>61% (34–77%)&lt;sup&gt;52&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Effectiveness against LCI</td>
<td>16% (5–25%) to 18% (2–31%)&lt;sup&gt;63&lt;/sup&gt;</td>
</tr>
<tr>
<td>Pregnant women</td>
<td>Effectiveness against LCI</td>
<td>50% (15–71%)&lt;sup&gt;41&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Effectiveness against acute respiratory illness requiring an emergency department visit or hospitalisation</td>
<td>81% (31–95%)&lt;sup&gt;89&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>65% (3–87%)&lt;sup&gt;60&lt;/sup&gt;</td>
</tr>
<tr>
<td>Adults aged 65 years or older (Cochrane Reviews 2010&lt;sup&gt;36&lt;/sup&gt; and 2018&lt;sup&gt;66&lt;/sup&gt;)</td>
<td>Effectiveness in preventing LCI, ILI, influenza-related hospitalisations, complications or mortality</td>
<td>Inconclusive due to poor quality of studies&lt;sup&gt;16&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Reanalysis of randomised control trial studies from 2010 Review:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>58% (34–73%)&lt;sup&gt;53&lt;/sup&gt;</td>
<td>41% (27–53%)&lt;sup&gt;46&lt;/sup&gt;</td>
</tr>
<tr>
<td>Adults aged 65 years or older (Re-analysis of Cochrane Review 2010 information)&lt;sup&gt;42&lt;/sup&gt;</td>
<td>Effectiveness against LCI</td>
<td>49% (33–62%)&lt;sup&gt;45&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Effectiveness against ILI</td>
<td>39% (35–43%)&lt;sup&gt;45&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Effectiveness against non-fatal and fatal complications</td>
<td>28% (26–30%)&lt;sup&gt;46&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Key: LCI = laboratory-confirmed influenza; ILI = influenza-like illness.

Some studies have suggested residual protection from prior season influenza vaccination influences current season vaccine efficacy and/or antibody waning<sup>60,87–89</sup>. Pooled analyses of these studies are inconclusive and have highlighted an area for further research<sup>1,60,87,89</sup>. In contrast, 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<sup>16–20</sup>, ischaemic stroke<sup>31–32</sup>, heart failure<sup>21</sup>, and acute coronary syndrome<sup>24–25</sup>, acute myocardial infarction<sup>24</sup>, or respiratory disease<sup>25</sup>. A protective effect of cumulative influenza vaccination has also been identified through an improved survival rate in vaccinated adults with heart failure<sup>27</sup>.

Recommend annual influenza vaccination for better protection against serious influenza complications.
Influenza and older people

The World Health Organization\(^5\) and the Ministry of Health\(^*\) recommend annual influenza vaccination for all adults aged 65 years or older. Annual influenza vaccination is funded for all eligible adults aged 65 years or older.

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

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.\(^{6,5,10,5,12,1,222}\) Increasing levels of frailty\(^{74,10,5,12,12,3,12}\) and the presence of chronic conditions such as diabetes or heart, kidney, neurological or respiratory diseases\(^{10,5,1,2,1,3,12}\) 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.\(^7\) 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).\(^{74,10,5,1,2,1}\) 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.\(^7\) 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.\(^7\)

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.\(^9\) 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\(^125\) to around half at 12 months\(^125\) (66%\(^125\) and 49%\(^125\)),

Influenza vaccine efficacy for the prevention of acute myocardial infarction (AMI) following influenza is between 19% and 45%,\(^7\) 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.\(^7\) 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.\(^6,5,10–15\)

**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.\(^5,10–15\)

Disease complications in older people with influenza include pneumonia,\(^10,5,12,14\) secondary bacterial infection,\(^10,5,12,14\) acute coronary syndrome\(^10,5,12,14\) (including AMI),\(^7,11,12,13,14\) heart failure,\(^7,11,12,13,14\) ischaemic stroke,\(^7,11,12,13,14\) haemorrhagic stroke,\(^7,11,12,13,14\) exacerbation of asthma\(^11,14\) and increased frailty.\(^10,5,12,14\)

Influenza may also exacerbate chronic underlying conditions,\(^10,5,12,14\) including cardiovascular disease,\(^7,11,12,13,14\) ischaemic heart disease (IHD),\(^7,11,12,13,14\) heart failure,\(^7,11,12,13,14\) and chronic obstructive pulmonary disease (COPD).\(^11,14\)

**Influenza increases the risk of mortality**

Mortality is significantly higher in older people with influenza\(^10,5,12,14\) than younger healthy adults with influenza.\(^11,14\) The risk of influenza-related death increases with advancing age, the presence of chronic conditions, or increasing levels of frailty.\(^10,5,12,14\)

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Erratum: An incorrect reference number was used for this text. The reference number should have read as follows: "Influenza vaccine efficacy for the prevention of acute myocardial infarction (AMI) following influenza is between 19% and 45\%.\(^7\)"
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. 74,75,107,124,125

Increasing the number of older people vaccinated against the disease annually can have a significant impact on improving health outcomes in older people98,126 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 9.

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**

***Please refer to page 16 for information when influenza vaccination may be contraindicated.
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.64-65 Demcheli et al. (2018) recently updated their 2010 Cochrane Review and suggests vaccine effectiveness is 58% (34–73%) against laboratory-confirmed influenza.64 Advancing age100,102 and increasing frailty67 limit an older person’s response to vaccines and decrease vaccine efficacy against acute infection.

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.127,128

Protection against serious complications
Older people who have been vaccinated but subsequently get influenza are less likely to develop a severe illness,68,69 be hospitalised64,73,99 or require admission to an intensive care unit.109 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.72

Studies show influenza vaccine efficacy for the prevention of AMI during the year following influenza illness is between 19% and 45%,70 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%).72

Influenza vaccination is increasingly being shown to have a role in reducing influenza-related complications including heart failure,51,102,103 haemorrhagic stroke,110 acute coronary syndrome,24,91 and respiratory failure118 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%.71 Vaccination of frail older people is still very important as it can reduce their risk of influenza-related hospitalisation,73 pneumonia71,129 or death.64,73

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,68,70 ischaemic stroke,21,92 heart failure,93 and acute coronary syndrome54,69 or respiratory disease.95 Vaccinated adults with heart failure are more likely to survive if they have received regular annual influenza vaccinations.97

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.38-44 Symptoms may appear influenza-like. However, the influenza vaccines used in New Zealand do not contain live viruses and cannot cause influenza.38-40

Influenza vaccines can be administered to people on anticoagulants, including aspirin, dabigatran (PRADAXA®), enoxaparin (CLEXANE®), heparin, and warfarin.28 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 www.medsafe.govt.nz for the PRADAXA® and CLEXANE® 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, they are pregnant women and their babies (up to 6 months of age),

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.

The World Health Organization recommends influenza vaccination of pregnant women at any stage of pregnancy, and that they are given the highest priority. 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.

The funded Influenza Immunisation Programme is from April through December.

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.

Influenza infection during pregnancy can have catastrophic consequences for both mother and baby including premature birth, stillbirth, small for gestational age and perinatal death.

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.

- **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.

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. 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.

Evidence suggests that pregnant women are even more vulnerable during pandemics.

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. Overall there is an increase of general pregnancy complications in women who have influenza.

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.

Risk from influenza for young babies

Babies aged under 6 months have a higher risk of being hospitalised with influenza than other age groups. 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

There is considerable research to show that patients value the recommendation of their health professional. 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.

Funded influenza vaccination for eligible pregnant women, refer to page 5, 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 9.

**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. 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.

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 ARI, and 65% less likely to be hospitalised than pregnant women who were not vaccinated.

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%). 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 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.

An increase in circulating maternal influenza antibodies after vaccination supports maximum transplacental antibody transfer to the growing baby and protection against influenza after birth. 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 didn’t have an influenza vaccination.

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. Influenza vaccination during pregnancy has an excellent safety record for the woman herself, the growing baby and newborn.

Studies comparing hundreds of thousands of vaccinated women with unvaccinated women have identified a lower incidence of stillbirth for vaccinated women and no difference in the incidence of preterm births, or occurrence of congenital malformations. No relationship between maternal influenza vaccination and spontaneous abortion has been identified.

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.
Questions and answers about influenza vaccination of pregnant women

Is INFLUVAC® TETRA 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 of the 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 2018 and receiving one in 2019?
No. The 2019 influenza vaccination can be given as soon as the vaccine is available from 1 April through 31 December. No minimum time is required between an influenza vaccination in 2018 and one in 2019.

When is the best time to be vaccinated?
Influenza vaccination can be given at any time during pregnancy. It is preferable to vaccinate from 1 April, as soon as the vaccine is available, well before the start of winter. The funded vaccine is available through 31 December.

Can influenza and whooping cough booster vaccinations be given at the same visit?
If the woman is between 28–38 weeks of pregnancy (in her 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 two 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.\textsuperscript{137,178,179} In a recent review of influenza hospitalisations in Australian children aged under 16 years over 2011–2013, previously healthy children accounted for 57\% of admissions.\textsuperscript{180} 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.\textsuperscript{181} In Auckland during 2018, children aged under 5 years had the highest rate of hospitalisation with a severe acute influenza respiratory infection compared with other age groups, 281 cases per 100,000 people compared with 99/100,000 for adults aged 80 years or older, 47/100,000 for adults aged 65–79 years and 46/100,000 for midlife adults.\textsuperscript{79} Healthy children are also the major cause of the spread of influenza viruses in the community.\textsuperscript{137,178}

Vaccination of healthy children has the potential to substantially reduce influenza-like illness and related costs in both the children themselves and their families.\textsuperscript{182} Influenza vaccination recommendations vary between countries. The United States recommends annual vaccination for all persons from 6 months of age.\textsuperscript{183} The United Kingdom influenza vaccination programme includes annual vaccination for all children aged 2–9 years with a live attenuated nasal spray influenza vaccine with the strategy to offer both individual protection and herd immunity.\textsuperscript{184} This type of influenza vaccine is expected to be more effective in children but 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.\textsuperscript{185} For more information, please refer to the section Eligible conditions for funded influenza vaccination on page 6.

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.\textsuperscript{186} Children who have received a previous influenza vaccination need only a single dose.

Why does a child aged 6–35 months receive a full 0.5 mL dose of FLUARIX\textsuperscript{®} TETRA?

The historical recommendations to use a half-dose of influenza vaccine in this age group related to older whole-cell influenza vaccines that caused strong vaccine responses such as fever.

Current influenza vaccines are subunit vaccines that contain only viral surface antigens (haemagglutinin proteins). They are generally well tolerated by children in this age group. However, their ability to induce a robust immune response and protection from influenza is variable.

Receipt of a full 0.5 mL dose of inactivated influenza vaccine has the potential to improve protection against influenza.\textsuperscript{49} Studies of children receiving a full 0.5 mL dose of quadrivalent inactivated influenza vaccine show that the vaccine is well tolerated, with vaccine responses comparable to those following either a full dose or a half dose inactivated trivalent influenza vaccine.\textsuperscript{57,69,187}

**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.\textsuperscript{188,189} However, there is no evidence that this causes individuals to be less protected from disease.\textsuperscript{189}

The current recommendations are as follows:

- Do not use routine prophylactic paracetamol pre- or post-vaccination in the absence of pain or significant discomfort
- Infants who are uncomfortable with fever should first be managed with appropriate removal of clothing and other cooling measures such as cool drinks or tepid sponging
- Use of paracetamol is recommended for relief of pain or significant discomfort post-vaccination
- Ibuprofen is less effective than paracetamol in managing post-vaccination pain or high fever and is not recommended.\textsuperscript{189}

Anyone with concerns following vaccination should seek medical advice.

### Table: Eligible conditions for funded influenza vaccination

<table>
<thead>
<tr>
<th>Age</th>
<th>Funded vaccine brand</th>
<th>Dose</th>
<th>Number of doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>6–35 months</td>
<td>FLUARIX\textsuperscript{®} TETRA</td>
<td>0.5 mL\textsuperscript{a}</td>
<td>1 or 2\textsuperscript{a}</td>
</tr>
<tr>
<td>3–8 years</td>
<td>INFLUVAC\textsuperscript{®} TETRA</td>
<td>0.5 mL</td>
<td>1 or 2\textsuperscript{a}</td>
</tr>
<tr>
<td>≥ 9 years</td>
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</tbody>
</table>

\textsuperscript{a} A full 0.5 mL dose is administered for children aged 6–35 months

\textsuperscript{*} 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.\textsuperscript{185}

Children who have received one influenza vaccine any time in the past only need a single dose in the current season.

### Why does a child aged 6–35 months receive a full 0.5 mL dose of FLUARIX\textsuperscript{®} TETRA?

- 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.
- The historical recommendations to use a half-dose of influenza vaccine in this age group related to older whole-cell influenza vaccines that caused strong vaccine responses such as fever.
- Current influenza vaccines are subunit vaccines that contain only viral surface antigens (haemagglutinin proteins). They are generally well tolerated by children in this age group. However, their ability to induce a robust immune response and protection from influenza is variable.
- Receipt of a full 0.5 mL dose of inactivated influenza vaccine has the potential to improve protection against influenza.
Influenza and other special groups

Immune compromised

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, please refer to page 16 for advice on cancer treatments when influenza vaccination may be contraindicated. Two doses of vaccine administered 4 weeks apart are recommended in all age groups undergoing chemotherapy. Following cessation of chemotherapy, normal immune responses return after about 30 days.191

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.

Protection against influenza may be improved in some individuals with immunosuppression, regardless of their age, after receipt of a second influenza vaccination a minimum of 4 weeks after the first.237 The second influenza vaccination is only funded for children aged 6 months to under 9 years when influenza vaccine is being used for the first time.

As the response to influenza vaccination in those with a poorly functioning immune system is likely to be low,293 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.194-195 Influenza outbreaks have been linked to travellers.194-195 Certain types of travel where large numbers of people are likely to be in close proximity, such as cruise ship voyages197-199 or events that include mass gatherings200 are particularly high risk.

For these reasons, all people travelling outside New Zealand should consider influenza vaccination pre-travel. This is especially important for those who are at higher risk of influenza complications, many of whom will be eligible for subsidised vaccination.

In tropical countries, influenza activity can occur throughout the year, so vaccination is worthwhile regardless of season. In temperate climates in the Northern Hemisphere activity is more common between the months of December and 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 since their last influenza vaccination, repeat vaccination is recommended prior to travel. However, depending on stock, influenza vaccine may not be available for purchase far beyond the funded time period. Anyone receiving an influenza vaccination outside the funded period 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.

* 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, e.g. prior to travel?

Yes. When the available vaccine gives protection against influenza viruses circulating in the Northern Hemisphere, travellers – particularly those in ‘high-risk’ groups – who will be exposed to a Northern Hemisphere influenza season should consider vaccination or repeat vaccination prior to travel.194 However, re-vaccination prior to travel is not funded.

Protective antibodies peak 1 week to 1 month after vaccination and then begin to wane.22,23 By 6 months after vaccination,22 protective levels are lower and may not be sufficient to provide good protection.
Southern Hemisphere vaccine vs Northern Hemisphere vaccine

The 2018–2019 Northern Hemisphere vaccine is different to the 2019 Southern Hemisphere vaccine.\textsuperscript{15,83}

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References

The list of references is available in a separate document in the Resources section of the www.influenza.org.nz website.
**INFLUVAC® TETRA** (inactivated influenza vaccine, surface antigen): Single-dose 0.5 mL pre-filled glass syringe with needle. **Indication:** For the prevention of influenza caused by influenza virus, types A and B in adults and children from 3 years of age in accordance with the recommendations in the National Immunisation Guideline. **Contraindications:** Anaphylaxis related to a previous dose. Hypersensitivity to eggs, chicken proteins, gentamycin, formaldehyde, cetrimonium bromide or polysorbate 80. Postpone if acute febrile illness. **Precautions:** Immunological response may be diminished if the patient is undergoing immunosuppressant treatment. **Interactions:** No interaction studies have been performed. **Adverse reactions:** Local reactions, fatigue, headache, irritability, appetite loss, fever. Anxiety-related reactions, including vasovagal reactions (syncope), hyperventilation or stress-related reactions. These may be accompanied by several neurological signs such as transient visual disturbance, paraesthesia and tonic-clonic limb movements during recovery. **Dosage:** Adults and children from 3 years of age: 0.5 mL; Children 3–8 years not previously vaccinated – two doses at least four weeks apart. Children less than 3 years of age: the safety and efficacy of Influvac Tetra have not been established. **Administration:** IM or deep SC injection. **Presentation:** Single dose 0.5 mL pre-filled glass syringe with 16 mm needle, in packs of 10. Each 0.5 mL may contain no more than 100 ng ovalbumin. **Cold chain:** Store between +2°C and +8°C. Store in the original package in order to protect from light. **Sponsor:** Mylan NZ Ltd. Auckland.

**FLUARIX® TETRA** (inactivated influenza vaccine, split virion): Single-dose 0.5 mL pre-filled glass syringe with separate needles. **Indication:** For the prevention of influenza caused by influenza virus, types A and B in adults and children from 6 months of age. The use of Fluarix Tetra should be based on official recommendations. **Contraindications:** Hypersensitivity related to a previous dose of Fluarix Tetra or influenza vaccine or any component of the vaccine. **Precautions:** Postpone if acute febrile illness. Thrombocytopenia, bleeding disorder; previous Guillain-Barre syndrome; an adequate immune response may not be elicited in patients undergoing immunosuppressant treatment or in patients with immunodeficiency. **Interactions:** Fluarix Tetra can be concomitantly administered with pneumococcal vaccines. **Adverse reactions:** Local reactions, fatigue, headache, irritability, drowsiness, appetite loss, nausea, vomiting, diarrhoea and/or abdominal pain, fever, myalgia, arthralgia and syncope (fainting). **Dosage:** Adults and children aged 6 months or older: 0.5 mL; Children aged 6 months to under 9 years not previously vaccinated – two doses at least four weeks apart. Children less than 6 months of age: the safety and efficacy of Fluarix Tetra have not been established. **Administration:** IM injection. **Presentation:** Single dose 0.5 mL pre-filled glass syringe with separate needles, in pack sizes of 1. Each 0.5 mL may contain residual amounts of ovalbumin. Prefilled syringe with separate needles are not made with natural rubber latex. **Cold chain:** Store between +2°C and +8°C. Store in the original package in order to protect from light. **Sponsor:** GlaxoSmithKline NZ Ltd. Auckland.
Help spread the word about influenza immunisation

Here are a number of resources to help you spread the word about influenza immunisation. To order these and view other resources go to [www.influenza.org.nz/resources](http://www.influenza.org.nz/resources)

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<td>Avoid flu during pregnancy A3 poster, double-sided (for use by midwives/LMCs and DHB clinics)</td>
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<td>Venue poster &amp; free for staff stickers A3 poster</td>
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HealthEd brochures can be ordered at [healthed.govt.nz](http://healthed.govt.nz)

* These HealthEd resources replace the previous influenza-specific pregnancy brochure and after immunisation leaflet shown below.

| IMAC1812 | IMAC1703 |

Thanks for your support – and here’s to a successful 2019 influenza season.

INFLUVAC® TETRA and FLUARIX® TETRA are prescription medicines. Before you administer these vaccines, please read the data sheet (at [www.medsafe.govt.nz](http://www.medsafe.govt.nz) or [www.influenza.org.nz](http://www.influenza.org.nz)) for information on the active ingredients, contraindications, precautions, interactions and adverse effects. TAPS 10824, IMAC1900.