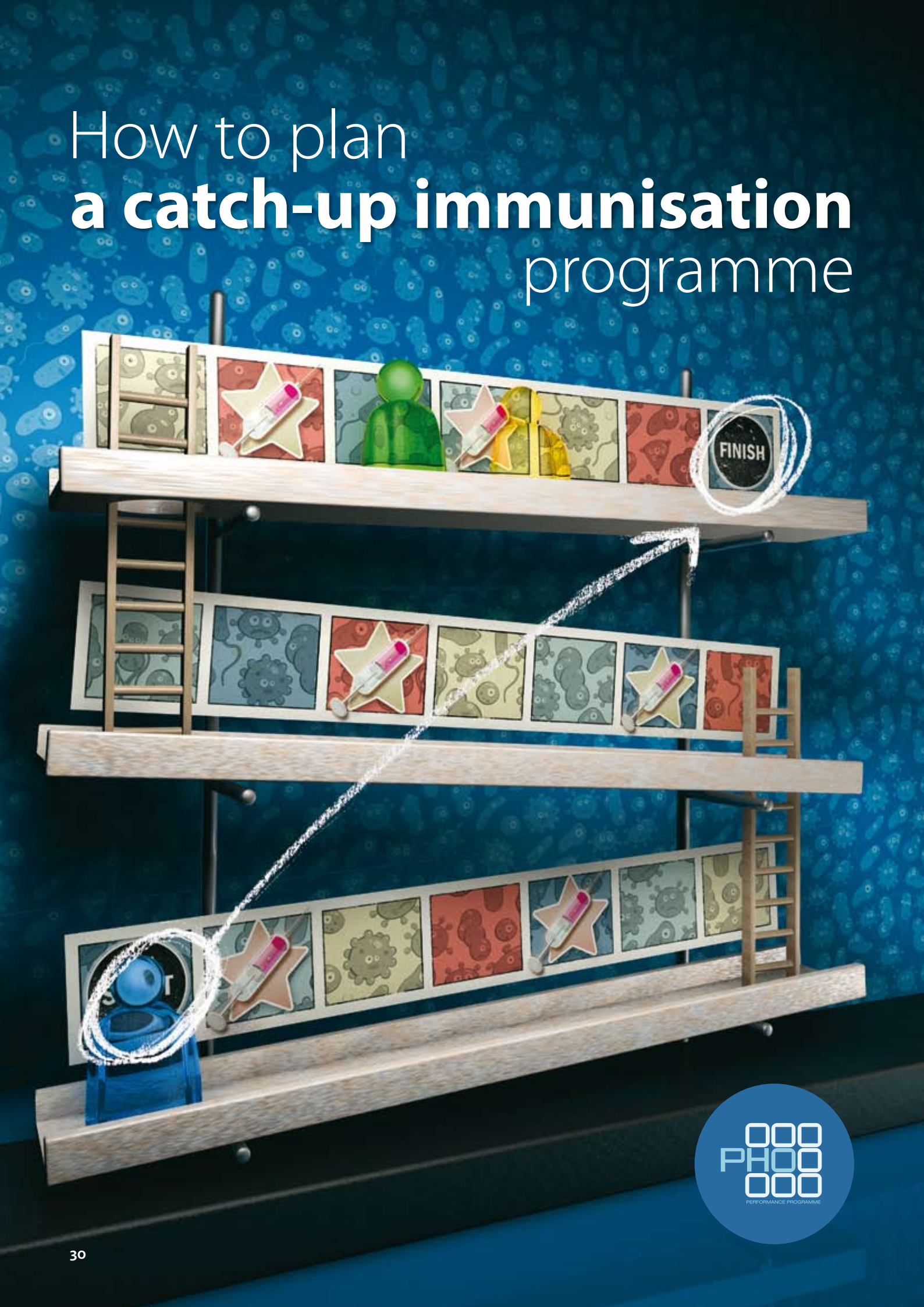
How to plan **a catch-up immunisation** programme



Immunisation rates in New Zealand continue to increase, especially among Māori and Pacific children. However, there is still room for improvement, as latest figures show that in 2011 one in ten children did not complete their immunisation schedule. Misinformation about vaccines, lack of information or poor understanding of the diseases being immunised against, barriers to accessing health services and recent immigration to New Zealand all contribute to incomplete or absent immunisation histories. It is important to actively identify children, and adults, who have missed immunisations and plan and implement a catch-up programme.

Immunisations in New Zealand

Immunising against communicable diseases has been a health priority in New Zealand since 1926 when the diphtheria vaccine first became available in orphanages and some schools. Fourteen vaccines are now routinely offered on the New Zealand immunisation schedule, which is reviewed every two years, and new vaccines added as appropriate. The result has been a significant decline in all vaccine preventable diseases in New Zealand over the last century.[1] Immunisation coverage in New Zealand has risen significantly since vaccination for children became a PHO Performance Programme (PPP) indicator in January, 2006 (a funded indicator from July, 2008). Achievement rates for the PPP indicator "age-appropriate immunisations completed by age two years" have risen from approximately 45% in 2007 to 92% in March 2012.[2] Importantly, the gap between the high need group (Māori and Pacific Peoples and people living in decile 9/10 socioeconomic areas) and the total population has narrowed to only 0.8%. For some immunisations, Māori and Pacific peoples have a significantly higher uptake than the New Zealand population as a whole. For example, the immunisation rate for human papillomavirus in 2010 was 52% for the total population, but 57% for Māori and 70% for Pacific peoples.[3] This stands as an example of the effectiveness of well-targeted, well-planned campaigns.

From ambiguous acronym to deadly disease

BCG – Bacille Calmette-Guéruin (Tuberculosis)

DTaP – Diphtheria, Tetanus and Pertussis

HepB – Hepatitis B

Hib – Haemophilus influenza type b

HPV – Human Papillomavirus

IPV – Inactivated Polio

MenACWY – Meningococcal

MMR – Measles, Mumps and Rubella

PCV – Pneumococcal conjugate

Pneumo_ps – Pneumococcal polysaccharide

Td – Tetanus and Diphtheria (for older children and adults)

Tdap – Tetanus, Diphtheria and Pertussis (used for the age eleven vaccination)

Many antigens are given as combined vaccines to reduce the number of injections required, particularly in younger children, e.g. "DTaP-IPV-Hib-HepB" and "DTaP-IPV".

Ia su'i tonu le mata o le niu

To go about an undertaking in the proper way – SAMOAN

Māu anō e rapu he oranga

Your livelihood in your own hands – MĀORI

Despite evidence of increasing success, there is still opportunity to improve. The United Nations Children's Fund and the World Health Organisation rank New Zealand 24th out of 25 developed nations for immunisation rates (i.e. the second worst performer).[4] At present, one in ten children has not completed their age-appropriate immunisation schedule by their second birthday.[2] Immunisations may be missed completely or not received on time, leaving children at risk, particularly of pertussis and pneumococcal disease, when they are at their most vulnerable. In addition, recent immigrants to New Zealand, particularly children, may require complete vaccination courses, boosters, or catch-ups in order to be compliant with the New Zealand Immunisation Schedule.

Identifying patients who require a catch-up

Practices are encouraged to implement processes to regularly assess the immunisation status of patients, particularly young children. A child that has not had sufficient vaccinations can be identified by checking patient records, accessing the National Immunisation Register and asking parents/caregivers. If vaccination is declined for a child by parents/caregivers, practitioners should set a reminder in the patient's record to periodically revisit this decision. Childhood immunisation Outreach Services can also be utilised.

For individuals or families who have recently immigrated, ask about immunisation record cards or child-health booklets. Only documented immunisations should be used to assess the patient's immunisation status.

Assessing what vaccines are required

All children and young people aged less than 16 years should have a minimum set of immunisations (Table 1).[1] Adults will also benefit from a catch-up programme, however, many vaccines are not funded in people aged over 16 years, such as PCV and MenACWY. The focus of a catch-up programme is to deliver the required antigens, in the required number of doses, as quickly as possible. An antigen is the disease unit that is included in a vaccine, e.g. the MMR vaccine contains antigens for measles, mumps and rubella. People who have been immunised in other countries may not have received the same vaccines as those administered in New Zealand, but they may still have received the recommended antigens. For example, the OPV, oral polio virus vaccine, is used in Fiji, rather than the DTap-IPV-Hib-Hep vaccine used in New Zealand, which contains the inactivated polio virus. Both vaccines contain the same antigen, the polio virus, so a child immunised with the OPV in Fiji does not require the IPV when being caught up in

Table 1: Recommended total doses of priority immunisations, by age[1]

	Age at immunisation commencement			
Vaccine antigen	**< 12 months**	**12 – 48 months**	**4 – 7 years**	**7 – 16 years**
DTaP	3	3	4	
Tdap or Td+				4^
IPV	3	3	4	3
Hep B	3	3	3	3~
Hib	3	1	1	
PCV*	3	2	2	
MMR		1	2	2
HPV#				3

\+ Diptheria and tetanus with or without pertussis

^ Two years required between doses three and four. After age seven years use Td for the initial course and Tdap for the age 11 years booster. Tdap can be used for the full course to offer greater pertussis protection but is not funded

~ Two doses may be given if commenced in children aged 11 – 16 years; use HBVaxPro 10 mcg, second dose four months after the first

* Ideally use the same-valent vaccine for all doses. A minimum of eight weeks is required between doses if commenced after age 12 months

\# Recommended age is age 12 years. Funded catch-up available up to age 20 years. Females only

New Zealand, although they may still require the rest of the antigens in the DTaP-IPV-Hib-Hep vaccine.

The World Health Organisation regularly updates their "vaccine-preventable disease monitoring summary", which has information on immunisation schedules for other countries. For further information, or to check the schedule of a particular country, visit:
www.who.int/immunization_monitoring/data/en/

If the schedule has been interrupted or is partially complete by New Zealand standards, it is not necessary to repeat prior doses or start the schedule again.[1] Subtract the number of received doses of each antigen from the number required (Table 1) and administer the remaining doses with the appropriate timings.

Note that the maximum number of doses that a child needs is reduced if they begin a vaccination catch-up programme when older, due to a greater immune response or a reduced risk of acquiring severe disease with increasing age (Table 1).

If the immunisation history of a person is unknown, undocumented or they have not received any previous vaccinations, a full course of age-appropriate vaccinations should be given. In general, there are no significant adverse effects associated with receiving extra doses of a vaccine. The exceptions are the tetanus and diphtheria vaccines, which are associated with an increased risk (0.5 – 7%) of local and systemic adverse effects, such as localised swelling and fever <39°C.[5] Where there is no documentation of diphtheria or tetanus vaccination, catch up doses should still be given, although greater monitoring for adverse reactions is necessary.

The New Zealand Immunisation Schedule (Table 2, over page) should be followed once a child is up to date with their immunisations for their age.

Additional immunisations may be required for recent immigrants

Most children who have immigrated from developing countries will have received the tuberculosis vaccine, three doses of the diphtheria/tetanus/pertussis vaccine and the oral polio vaccine by age six months and one dose of some form of the measles vaccine by age 15 months.[1] They are unlikely to have had haemophilus influenzae type B, pneumococcal, HPV or the full measles/mumps/rubella (MMR) vaccines. In some cases, MMR may have been given to infants aged less than one year, but this should not be counted towards the New Zealand schedule.

In addition to the vaccines on the New Zealand immunisation schedule, people who have recently immigrated to New Zealand may require additional vaccines, based on their risk and history:

- Tuberculosis vaccine is funded for people emigrating from a country with greater than 40 infections per 100,000 people, e.g. Vanuatu, who do not have documented history of the vaccine. Data on the prevalence of tuberculosis can be found at: **www.who.int/topics/tuberculosis/en/**
- Varicella vaccine is recommended, but unfunded, for adults and children born in tropical countries. The incidence of varicella is lower in most tropical countries than it is in New Zealand, so natural immunity rates are likely to be lower. This is particularly important for women of child-bearing age, and immunisation should be encouraged where finances allow. The vaccine costs approximately $90 per dose.
- Hepatitis B vaccine is extremely important in people who have immigrated to New Zealand from South or East Asia, where prevalence is between 10 – 15% of the population. It is recommended that all children aged less than 16 years be vaccinated against hepatitis B as per the New Zealand Immunisation Schedule. In addition, if a member of the household is found to be a hepatitis B carrier, the entire household should be screened and immunisation offered to those who are non-immune, regardless of age

How to deliver the required vaccines

Spacing doses of the same vaccine

An accelerated programme for a primary vaccine course, which does not adhere to the spacing used in the standard immunisation schedule, can be used when catching up a child who has missed doses. The minimum time between administering doses of the same vaccine should be four weeks, regardless of the vaccine.[1] Boosters are given a minimum of four to six months after a primary course. The spacing of boosters ranges from months to years depending on the vaccine and the schedule. In general, a booster will be the third or fourth scheduled dose. For example, the fourth dose of pneumococcal conjugate vaccine on the infant schedule is a booster dose and the third dose of HPV vaccine is a booster dose (see Tables 1 and 2).[1]

Administering multiple vaccines in one consultation

Multiple vaccines can be given in a single consultation. It is recommended that practitioners follow the New Zealand

Table 2: The New Zealand immunisation schedule[1]

Vaccine	Brand name	Schedule									Notes
		6 weeks	3 months	5 months	15 months	4 years	11 years	12 years	45 Years	65 Years	
Bacille Clamette-Guérin	BCG vaccine										Babies at risk and specific individuals as a result of TB follow-up
Hexavalent diphtheria, tetanus toxoid with acellular pertussis, Hib, Hep B and IPV	Infanrix-hexa	●	●	●							
Diptheria and tetanus toxoid with acellular pertussis, and inactivated polio	Infanrix-IPV					●					
Hepatitis B	HBvaxPro										High-risk groups
Haemophilus influenzae type b	Act-HIB				●						
Human papillomavirus (HPV) (females only)	Gardasil							●			Three doses, catch-up programme in place
Influenza	Fluarix or Fluvax									●	High risk groups, pregnant women; required annually
Inactivated polio vaccine (IPV)	IPOL										High-risk groups
Meningococcal ACWY	Mencevax ACWY or Menomune ACYW-135										High-risk groups
Measles, mumps and rubella (MMR)	MMR II				●	●					
Pneumococcal conjugate vaccine (PCV)	Synflorix	●	●	●	●						High-risk groups and in outbreak (Prevenar 13)
Pneumococcal polysaccharide	Pneumovax 23										High-risk groups and in outbreak
Tetanus and diphtheria toxoid of older children/adults	ADT Booster								●	●	
Tetanus, diphtheria toxoid and acellular pertussis	Boostrix						●				High-risk groups

schedule (Table 2), as closely as possible when applicable, however, if several vaccines need to be caught up, it is safe to give more than one in any single session. Each vaccine should be given with a separate syringe, at a different site.[1] If necessary, two vaccines can be given in the same limb, separating injection sites by at least 2 – 3 cm. Spacing vaccines over several visits, to avoid multiple injections in one consultation, is not recommended, as this increases the chance of incomplete vaccination.[1]

Use combination vaccines to reduce the number of injections given, unless contradicted by age. For example, a child aged six years should have had four DTaP, four IPV, three Hep and one Hib antigens. These can be given as three combined DTaP-Hib-Hep-IPV vaccines and one DTaP-IPV vaccine, as is done in the New Zealand Schedule.

Live vaccines, such as MMR or varicella vaccines, may be administered in the same consultation. If this is not possible, different live vaccines should be administered a minimum of four weeks apart to avoid possible reduced immune response.[1]

The New Zealand Immunisation Schedule has further advice and examples on how to plan a catch up programme, see: **www.health.govt.nz/publication/immunisation-handbook-2011** or contact 0800 IMMUNE or your immunisation co-ordinator

Eligibility for funded vaccines for immigrants

In New Zealand, eligibility for funded health and disability services is limited to:

- New Zealand citizens (including associated states and territories: Cook Islands, Niue and Tokelau)
- Holders of resident visas or permanent resident visas
- Registered refugees
- All children aged under 17 years of a New Zealand citizen, or New Zealand resident

Citizens of Fiji, Samoa, Tonga, Kiribati, Tuvalu and Vanuatu may be eligible for funded health care through a special agreement between Governments.

For further information on patient eligibility, or special agreements, visit: **http://www.health.govt.nz/new-zealand-health-system/publicly-funded-health-and-disability-services/services-pacific-island-people**

PHO Performance Programme indicators for immunisations

The PHO Performance Programme (PPP) currently has three funded immunisation based indicators; "Age appropriate vaccinations for eight month olds" (a new indicator from 1 July 2012), "Age appropriate vaccinations for two year olds" and "65 years + influenza vaccination coverage".

Age appropriate vaccinations for 8 month olds indicator is the percentage of children who are fully immunised for their age, by age eight months.

The programme goal for indicator is: for at least 85% of the enrolled patient population aged under eight months to have received the full set of vaccines included in the immunisation schedule.[2]

N.B. This goal will increase to > 90% by 1 July 2014 and >95% by 31 December 2014.

Performance is calculated each quarter, by the number of children who turned eighth months in the previous quarter, who have received the full complement of immunisations, divided by the total number of children who turned eight months in the previous quarter, enrolled at that practice.[2]

Age appropriate vaccinations for 2 year olds indicator is the percentage of children who are fully immunised for their age, by age two years.

The programme goal for the indicator is: for at least 95% of the enrolled patient population aged under two years to have received the final dose of the full set of vaccines included in the immunisation schedule.[2]

Performance is calculated each quarter, by the number of children whose second birthday fell in the previous quarter, who have received the full complement of immunisations, divided by the total number of children whose second birthday fell in the previous quarter, enrolled at that practice.[2]

Sixty-five years+ influenza vaccination coverage indicator is the percentage of all people aged 65 years or over who have received an annual influenza immunisation.

The programme goal for influenza vaccination is: for at least 75% of the enrolled patient population aged 65 years or over to have received the influenza vaccine during the most recent influenza campaign.[2]

Performance is calculated by the number of people aged 65 years or over who have received their immunisation by the final date for the most recent campaign, divided by the total number of people aged 65 years or over enrolled at that practice.[2]

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