New Zealand Child and Youth Epidemiology Service

Health and wellbeing of under-five year olds in the South Island 2017

Immunisation

Mavis Duncanson, Glenda Oben, Judith Adams, Andrew Wicken,
Simon Morris, Georgia Richardson and Magnus A McGee
New Zealand Child and Youth Epidemiology Service
Department of Women's and Children's Health
University of Otago
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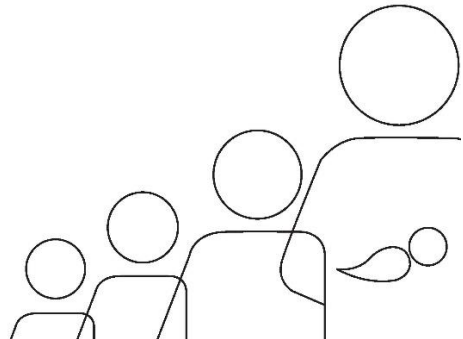

This report has been prepared for the South Island Alliance: Nelson Marlborough, Canterbury, South Canterbury, West Coast and Southern District Health Boards.

While every endeavour has been made to use accurate data in this report, there are currently variations in the way data are collected from DHB and other agencies that may result in errors, omissions or inaccuracies in the information in this report. The NZCYES does not accept liability for any inaccuracies arising from the use of these data in the production of these reports, or for any losses arising as a consequence thereof.

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VI. IMMUNISATION

Immunisation is the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine.[1] Vaccination is a cost-efficient means of reducing inequities in health.[2,3] Vaccine-preventable diseases, including diphtheria, pertussis, measles, *Haemophilus influenzae* type b disease, hepatitis B and pneumococcal disease, pose a significant risk to the health of children. Vaccines against these diseases, and others, are included in the National Immunisation Schedule for all New Zealand children.[4] High immunisation coverage is vital to protect the population as a whole, protecting not only vaccinated individuals but also reducing the spread of disease to those who are too young or too sick to be vaccinated.[4] The National Immunisation Schedule is reviewed regularly; in 2014, the rotavirus vaccine was introduced and in 2017, vaccination against chickenpox (varicella).[4] Some vaccines in addition to those in the routine schedule are available to children in special groups, for example children with cystic fibrosis.[4]

Increasing immunisation coverage and timeliness is one of the Ministry of Health's targets.[5] Immunisation uptake has been lower in populations living in areas with higher NZDep2013 index of deprivation scores and there has also been inequity in immunisation rates between Māori and Pacific children compared with their non-Māori non-Pacific peers.[6] The 2017 immunisation-specific health target is that 95 percent of eight-month-olds will have completed their primary course of immunisation (six weeks, three months and five months immunisation events) on time.[5] This target supports early enrolment of infants in general practice and on-going engagement with primary care and well child services.[5]

Data sources and methods

Indicator(s)

1. Proportion of children fully immunised at each milestone age

Numerator: Number of children who had completed their age appropriate immunisations by the time they turned that milestone age

Denominator: Number of children who turned the milestone age during the reporting period

Data source: National Immunisation Register (NIR)

2. Hospitalisation for vaccine-preventable diseases

Numerator: Number of 0–4 year olds discharged from hospital with a primary diagnosis of a vaccine-preventable disease

Data source: National Minimum Dataset (NMDS)

Denominator: StatsNZ Estimated Resident Population (ERP; with linear extrapolation between Census years)

Additional information

Milestone ages for vaccination are: 6 months, 8 months, 12 months (1 year), 18 months, 24 months (2 years), and 5 years. Fully immunised NIR values were suppressed where less than 10 children were in the group. Parents are able to 'opt off' having their child's immunisation information stored in the NIR. For information on the NIR see http://www.health.govt.nz/our-work/preventative-health-wellness/immunisation/national-immunisation-register/questions-and-answers-national-immunisation-register

Vaccine-preventable (targeted) diseases comprises: Diphtheria, Haemophilus influenzae type B (Hib), Hepatitis B, Measles, Mumps, Pertussis (whooping cough), Polio (poliomyelitis), Rotavirus, Rubella, Pneumococcal disease, Tetanus. Additional vaccine-targeted diseases for high-risk groups (or available through purchase) include Hepatitis A, Meningococcal C and A, C, Y, W135, Varicella (chickenpox), Influenza, and Tuberculosis (TB). For the codes used to identify these listed diseases, refer to Appendix 5

Immunisation coverage

Nationally the majority of infants and children were fully immunised at each milestone age (Table VI–1). At each milestone age, less than one percent of parents chose to opt-off having their child's immunisation information documented in the National Immunisation Register (NIR) and less than five percent declined any of the scheduled vaccinations. Note that children of parents who opted off inclusion of information in the NIR may or may not have been immunised.

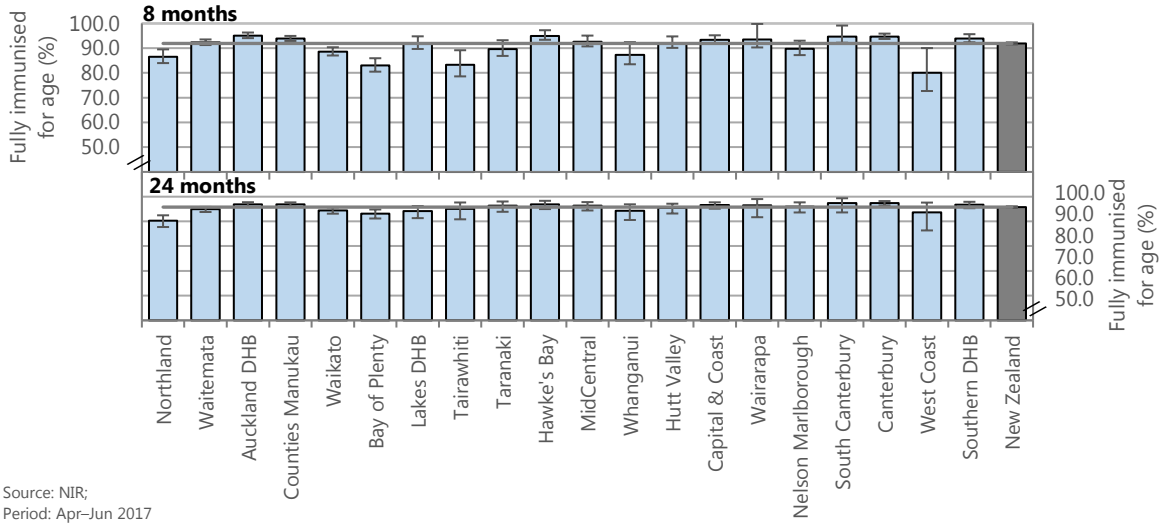
Table VI–1 National immunisation coverage, year ending June 2017

Milestone age	Eligible (*n*)	Fully immunised for age		Opt-offs		Declines	
		n	%	*n*	%	*n*	%
1 July 2016–30 June 2017							
6 month	60,160	48,068	80.0	360	0.6	2,390	4.0
8 month	60,132	55,422	92.0	368	0.6	2,370	3.9
12 month (1 year)	60,030	56,353	94.0	358	0.6	2,284	3.8
18 month	60,127	51,284	85.0	359	0.6	2,517	4.2
24 month (2 years)	60,875	56,469	93.0	351	0.6	2,545	4.2
5 year	64,413	56,937	88.0	433	0.7	3,163	4.9

Source: Ministry of Health

Figure VI–1 and Table VI–2 present the proportion of infants fully immunised at 8-months or at two years for each district health board in the South Island region during April to June 2017. The proportion of fully immunised 8-month-olds was lower than the national rate in West Coast DHB, and similar to or higher than the national rate for the other South Island DHBs. A similar pattern was seen for fully immunised two year olds.

Figure VI–1 Children fully immunised, by milestone age and district health board, Apr–Jun 2017



Source: NIR;
Period: Apr–Jun 2017

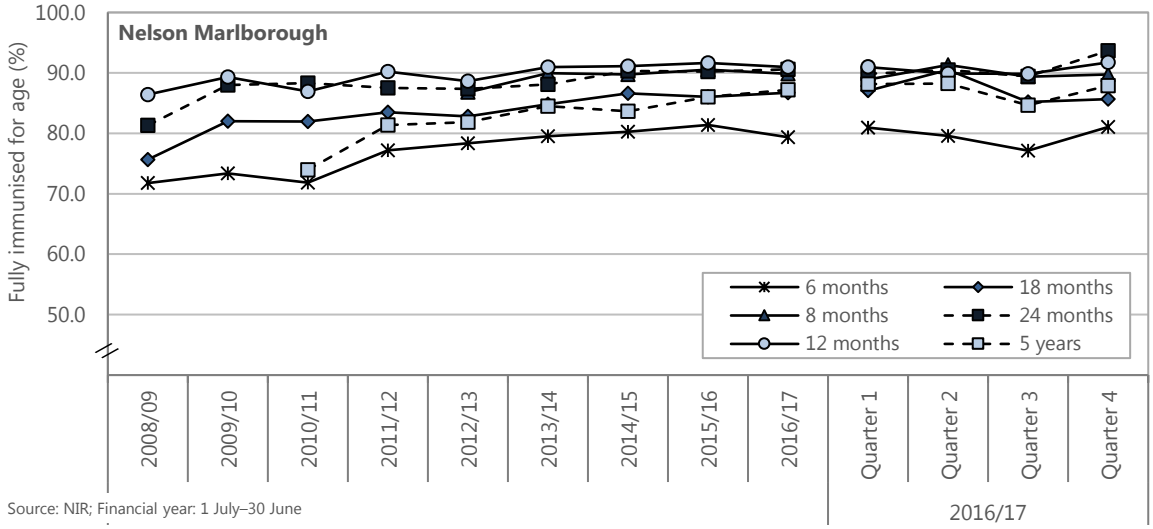
Table VI–2 Proportion fully immunised, by milestone age, South Island DHBs Apr–Jun 2017

DHB	Eligible (n)	Fully immunised	
		n	%
Fully immunised at milestone age: Apr–Jun 2017			
8 months			
Nelson Marlborough	420	377	89.8
South Canterbury	170	161	94.7
Canterbury	1,646	1,559	94.7
West Coast	80	64	80.0
Southern	845	793	93.8
New Zealand	15,316	14,079	91.9
24 months			
Nelson Marlborough	410	384	93.7
South Canterbury	168	160	95.2
Canterbury	1,625	1,549	95.3
West Coast	77	70	90.9
Southern	867	820	94.6
New Zealand	14,918	13,933	93.4

Source: NIR

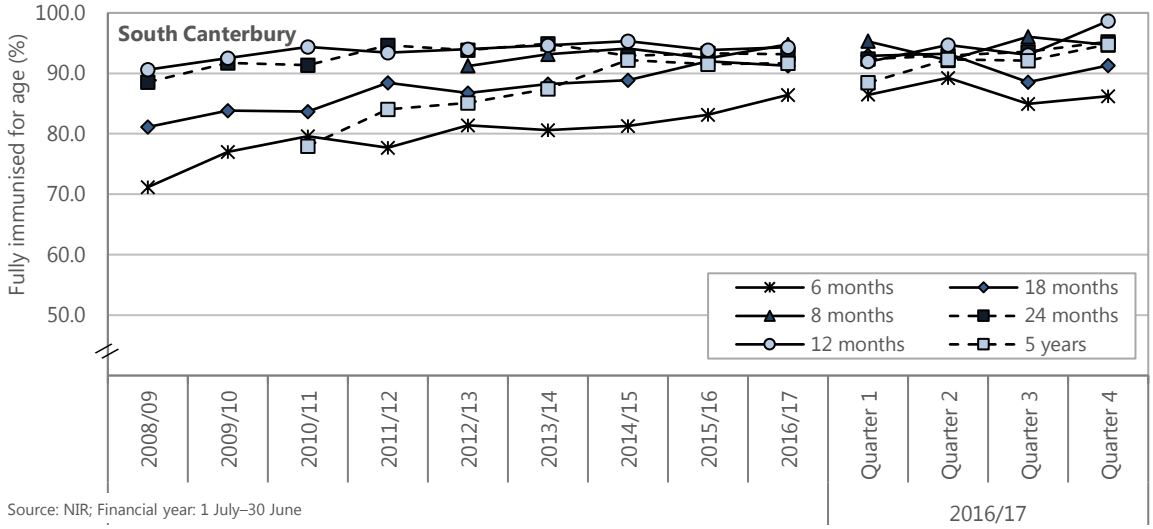
Immunisation rates have gradually increased for all ages in the South Island DHBs since 2008/2009. More recently, rates have tended to stabilise except for 5-year-olds. On the West Coast immunisation rates have been more variable (Figure VI–2 to Figure VI–6).

Figure VI–2 Immunisation coverage by milestone age, Nelson Marlborough DHB years ended 30 June 2009–2017



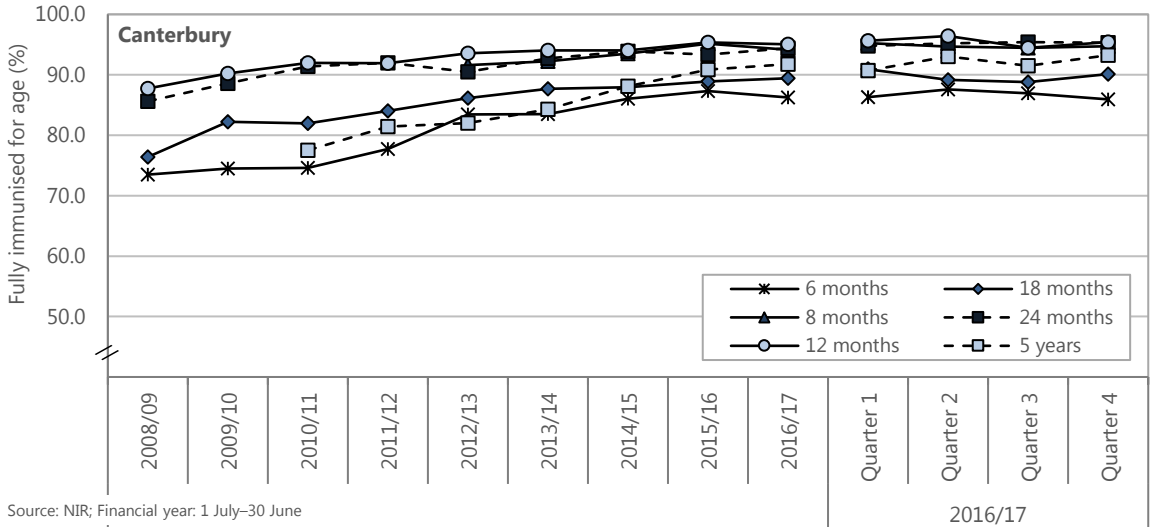
Source: NIR; Financial year: 1 July–30 June

Figure VI–3 Immunisation coverage by milestone age, South Canterbury DHB years ended 30 June 2009–2017



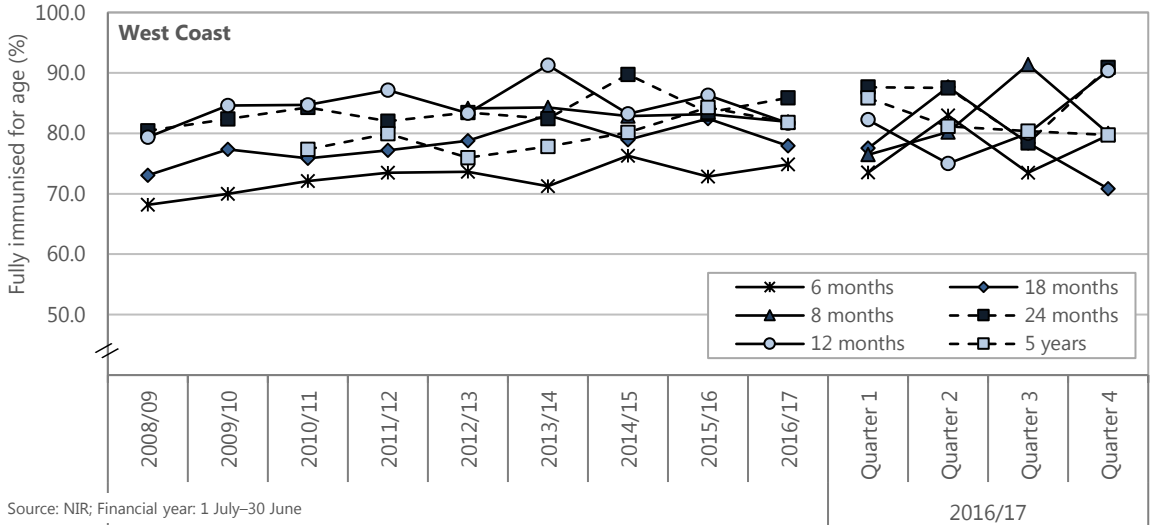
Source: NIR; Financial year: 1 July–30 June

Figure VI–4 Immunisation coverage by milestone age, Canterbury DHB years ended 30 June 2009–2017



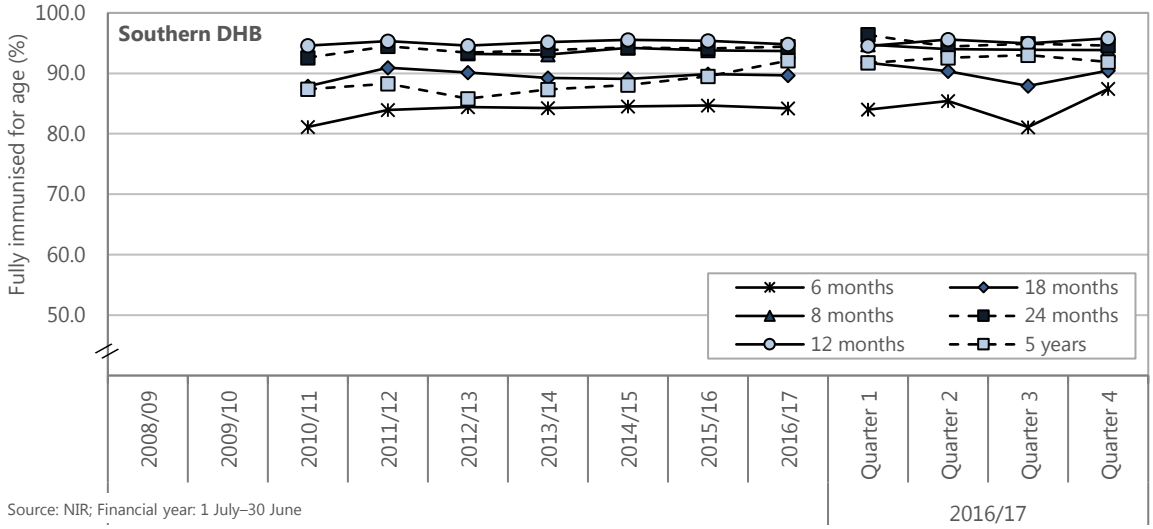
Source: NIR; Financial year: 1 July–30 June

Figure VI–5 Immunisation coverage by milestone age, West Coast DHB years ended 30 June 2009–2017



Source: NIR; Financial year: 1 July–30 June

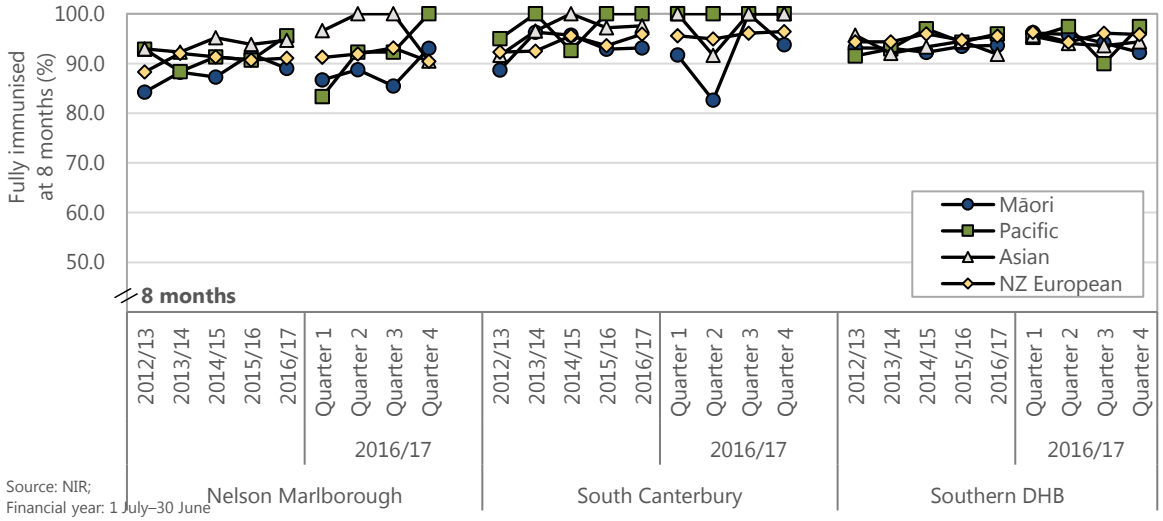
Figure VI–6 Immunisation coverage by milestone age, Southern DHB years ended 30 June 2009–2017



Source: NIR; Financial year: 1 July–30 June

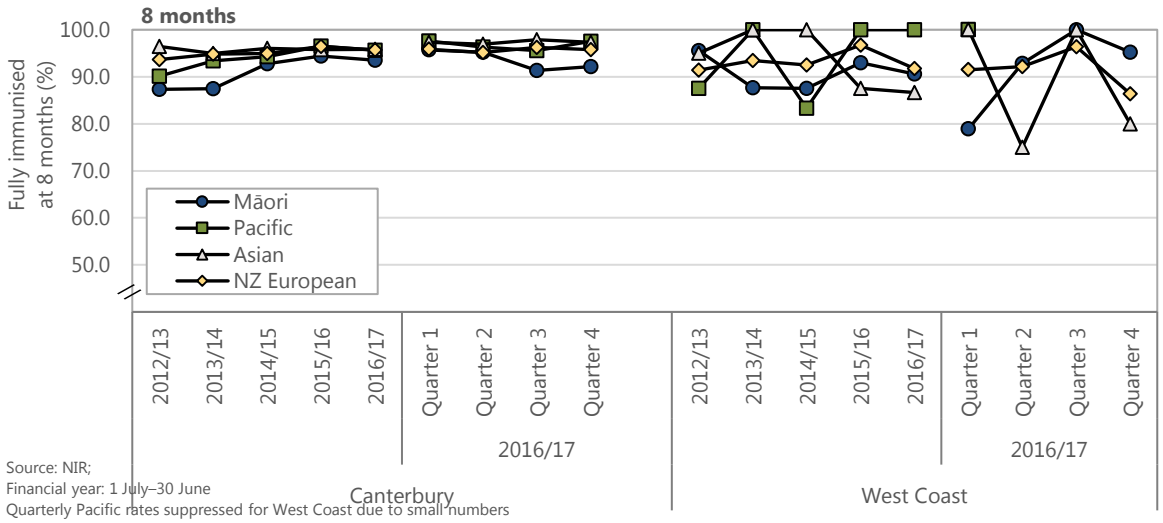
Figure VI–7 and Figure VI–8 present the proportion of fully immunised at eight months old by ethnicity. With the exception of Southern and West Coast DHBs, the immunisation rate among Māori 8-month-olds has generally been lower than the other ethnic groups for the South Island DHBs, although the rates have improved annually since 2012/2013. For Southern DHB, the immunisation rates of 8-month-olds were similar between the various ethnic groups, and have remained relatively consistently above 90% since 2012/2013. For the same period, the immunisation rates on the West Coast have been variable.

Figure VI–7 Immunisation coverage at eight months of age, by ethnicity, Nelson Marlborough, South Canterbury, and Southern DHBs years ended 30 June 2013–2017



Source: NIR;
Financial year: 1 July–30 June

Figure VI–8 Immunisation coverage at eight months of age, by ethnicity, Canterbury and West Coast DHBs years ended 30 June 2013–2017



Source: NIR;
Financial year: 1 July–30 June
Quarterly Pacific rates suppressed for West Coast due to small numbers

For Nelson Marlborough, West Coast and Southern DHBs, the immunisation rate for 8-month-olds residing in areas with high scores on NZDep2013 (quintile 5) was generally lower than the rates for 8-month-olds in areas with lower deprivation scores (quintiles 1 and 3) from 2012/2013–2016/2017 and in all quarters of 2016/2017 (Figure VI–9, Figure VI–10). Immunisation rates for 8-month-olds in South Canterbury and Canterbury DHBs were consistently above 90% in all NZDep2013 deprivation quintiles for Canterbury from 2013/2014–2016/2017 and in all quarters of 2016/2017 (Figure VI–9, Figure VI–10).

Figure VI–9 Immunisation coverage at eight months of age, by NZ Deprivation Index quintile, Nelson Marlborough, South Canterbury, and Southern DHBs years ended 30 June 2013–2017

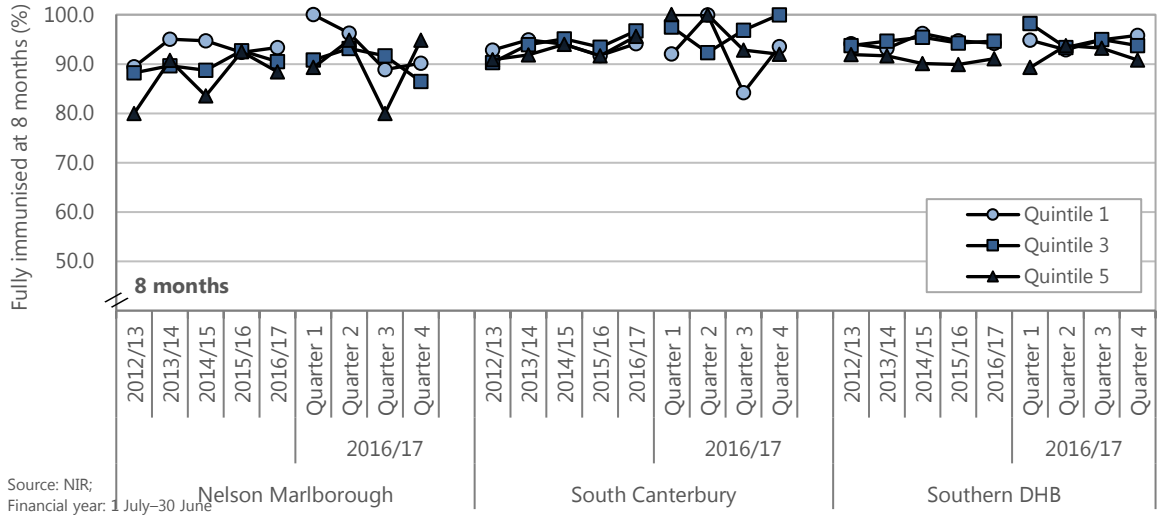
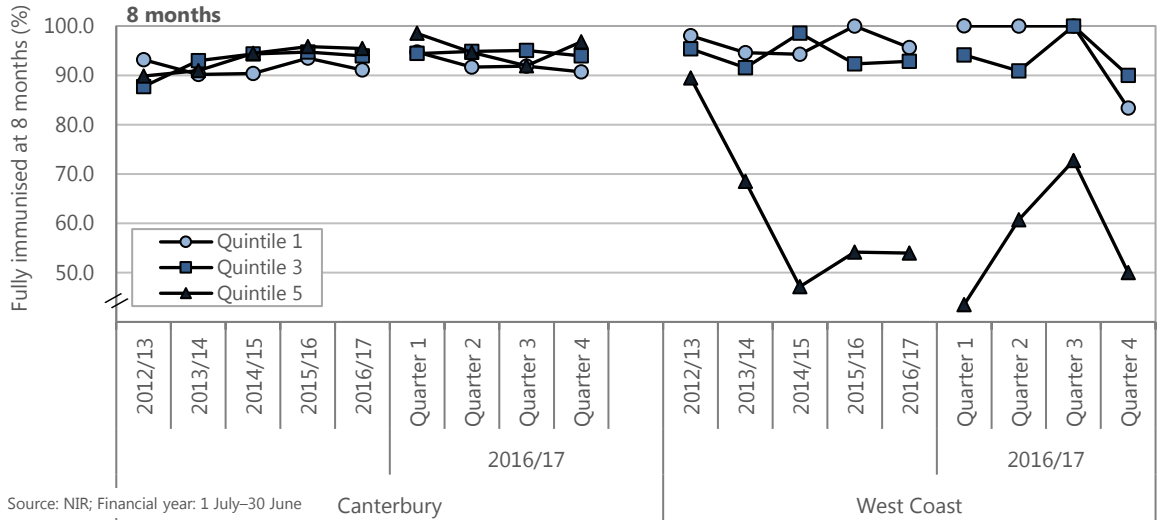


Figure VI–10 Immunisation coverage at eight months of age, by NZ Deprivation Index quintile, Canterbury and West Coast DHBs years ended 30 June 2013–2017



Hospitalisations for vaccine-preventable diseases

The national rates of 0–4 year olds hospitalised with vaccine-preventable diseases between 2012 and 2016 are presented in Table VI–3. Hospitalisations of this age group were predominantly for gastroenteritis, varicella (chickenpox) and pertussis (Table VI–3). Since the introduction of the rotavirus vaccine, the hospitalisation rate of under 5-year-olds for gastroenteritis has decreased noticeably (Figure VI–11).

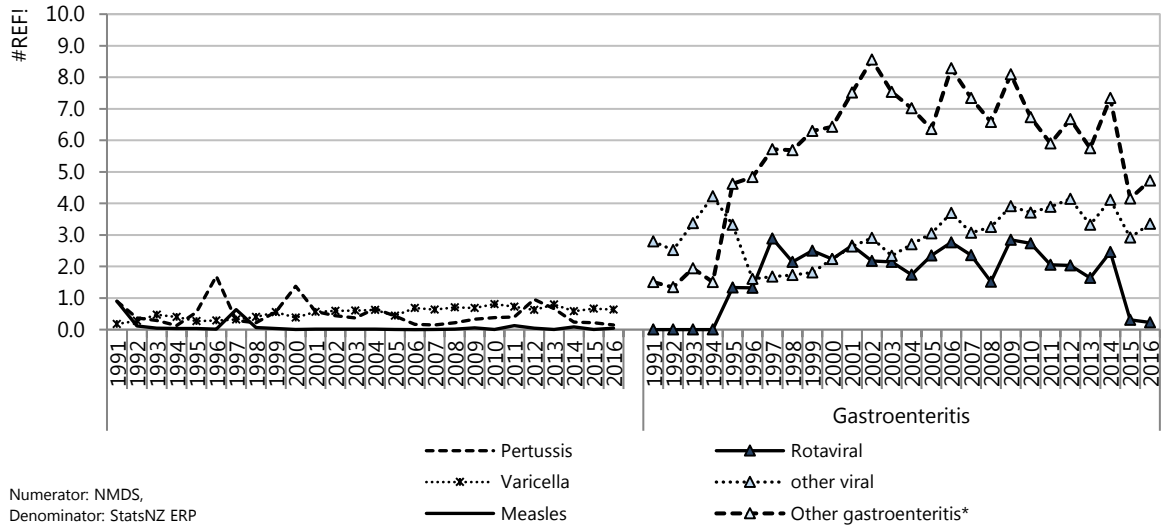
In all South Island DHBs, there has been a notable decrease in gastroenteritis-related hospitalisations (Figure VI–12), particularly since 2014 which is likely due to the introduction of the rotavirus vaccine in July 2014.

Table VI–3 Hospitalisations for vaccine-targeted diseases in 0–4 year olds, by primary diagnosis, New Zealand 2012– 2016

Primary diagnosis	2012–2016 (*n*)	Rate	95% CI
Vaccine-targeted diseases			
New Zealand			
Diphtheria	0	..	..
Tetanus	0	..	..
Pertussis	700	0.44	0.41–0.48
Polio (poliomyelitis)	0	..	..
(Acute) Hepatitis B	<5	s	s
Haemophilus influenzae	0	..	..
Pneumococcal disease	131	0.08	0.07–0.10
Measles	56	0.04	0.03–0.05
Mumps	8	0.01	0.00–0.01
Rubella	<5	s	s
Gastroenteritis: Rotaviral	2,088	1.32	1.27–1.38
Gastroenteritis: other viral	5,624	3.56	3.47–3.66
Gastroenteritis: non-viral	600	0.38	0.35–0.41
Gastroenteritis: Other or NOS	8,419	5.33	5.22–5.45
Meningitis: bacterial	240	0.15	0.13–0.17
Meningitis: viral, other, NOS	585	0.37	0.34–0.40
Meningococcal disease	170	0.11	0.09–0.13
Tuberculosis	25	0.02	0.01–0.02
Varicella	1,045	0.66	0.62–0.70

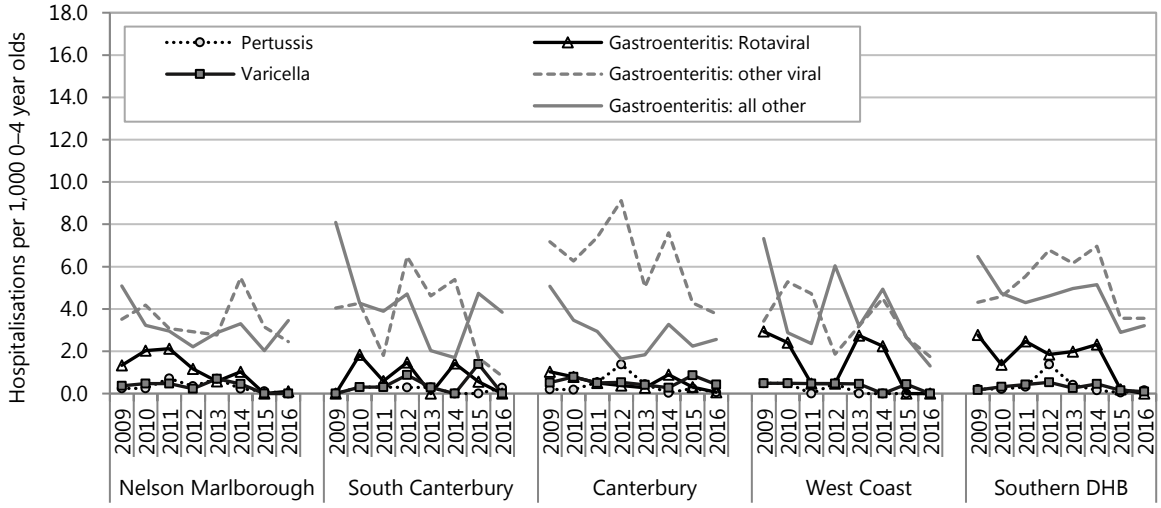
Numerator: NMDS, Denominator: StatsNZ ERP; Rate per 1,000 0–4 year olds

Figure VI–11 Trends in hospitalisations for select vaccine-preventable diseases in 0–4 year olds, by primary diagnosis, New Zealand 1991–2016



Numerator: NMDS,
Denominator: StatsNZ ERP

Figure VI–12 Trends in hospitalisations for select vaccine-targeted diseases in 0–4 year olds, by primary diagnosis, South Island DHBs, 2009–2016



Numerator: NMDS, Denominator: StatsNZ ERP;
Select vaccine-targeted diseases, Calendar year, Gastroenteritis: all other includes non-viral, other or NOS

Evidence for good practice

Vaccine coverage is influenced by a complex mix of social, behavioural, demographic and structural factors, but basically it requires that parents have access to, and acceptance of, vaccination for their children. The review by Thomson et al.[7] identified 23 possible determinants of sub-optimal vaccination coverage, and organised these into five dimensions, the 5As:

- **Access** The ability of individuals to be reached by, or to reach, recommended vaccines
- **Affordability** The ability of individuals to afford vaccination, both in terms of financial and non-financial costs (e.g., time)
- **Awareness** The degree to which individuals have knowledge of the need for, and availability of, recommended vaccines and their objective benefits and risks
- **Acceptance** The degree to which individuals accept, question or refuse vaccination
- **Activation** The degree to which individuals are nudged towards vaccination uptake.

Access can be improved by ensuring that all babies are registered on the National Immunisation Register and enrolled with a general practice as soon as possible after birth[8], and by making it easy for parents to get their child to immunisation appointments, for example, by offering appointments at times that suit parents, and offering help with transport or with care for other children. There is strong evidence that home visiting programmes, in which home visitors assess clients' vaccination status, discuss the importance of recommended vaccinations, and either provide vaccinations to clients in their homes or refer them to available immunisation services are effective in increasing vaccination rates. Such programmes, however, are resource-intensive and expensive compared to other options for increasing vaccination rates.[9]

Childhood vaccinations are free in New Zealand so affordability is probably mostly related to the time cost for parents who may, for example, need time off work to take their baby to their GP for vaccination, and to care for their baby afterwards if they are too upset to return to childcare.

There is little evidence from high income countries regarding how best to educate parents about the benefits of vaccination.[10,11] A 2017 Cochrane review[12] assessed qualitative studies that explored: parents' and informal caregivers' views and experiences regarding communication about childhood vaccinations and the manner in which information is communicated; and the influence that vaccination communication has on parents' and informal caregivers' decisions regarding vaccination. The review included 38 studies, mostly from high-income countries (a purposive sample from the 79 studies meeting the review's inclusion criteria).

It found that, in general, parents wanted more information than they were getting and that, for some parents, lack of information led to worry and regret about vaccination. Parents wanted balanced information about the benefits and harms of vaccination, that was clearly and simply presented, and tailored to their situation. They wanted information to be available at a wider variety of locations, including outside health services, and they

wanted it in good time before each vaccination visit (rather than at the visit when they were distracted and worried about their child). Parents considered health workers as an important source of information. Sometimes poor communication and negative relationships with health workers affected parents' vaccination decisions. Parents generally found it hard to know which information sources to trust and to find information they felt was unbiased and balanced. It seemed that parents who were more hesitant about vaccination wanted more information.

Parents who intend to get their child vaccinated can be nudged towards getting it done by prompts such as letters and phone calls.[13,14] There is emerging evidence that text messages may also be effective.[15-17]

Computer-based clinical decision support systems and electronic health records that give healthcare providers reminders that a patient they are seeing is due for vaccination may be effective in improving vaccination rates.[18-21] National immunisation registries, such as New Zealand's, allow any authorisssed health professional in the country to access a child's immunisation records, even if they are not the child's usual healthcare provider.[22,23] They allow health authorities to identify gaps in immunisation coverage and target resources at groups with low immunisation coverage, and to monitor vaccine safety and effectiveness.[22-24]

A small percentage of parents are hesitant about vaccinating their children and their hesitancy may have results ranging from delay in accepting one or more offered vaccines to complete refusal of all vaccines. Vaccine-hesitant parents are a diverse group and the factors associated with vaccine hesitancy are complex and context-specific, varying with time, place and vaccine.[25] According to the World Health Organization's Strategic Advisory Group of Experts (SAGE) Vaccine Hesitancy working group, vaccine hesitancy is influenced by complacency, convenience and confidence. Complacency occurs when the perceived risk of contracting a vaccine preventable disease is low or the perceived severity of a vaccine preventable disease is low.[26] Lack of confidence in a vaccine's safety and fears about the reliability and competence of the health system are major causes of vaccine hesitancy.[26] Convenience is related to practical difficulties of getting a child vaccinated, such as how far a parent has to travel.[26]

It has been suggested that the trend for people to become more involved in their own healthcare and seek out their own information on vaccination has contributed to vaccine hesitancy.[27] There is a wealth of inaccurate information on the internet and elsewhere that can influence parents not to vaccinate their children.[28] Health care professionals need to be aware of the prevailing misinformation so that they can be ready to respond to parents' concerns.[29]

If they are parents themselves, as many are, health professionals can share their experiences and decision-making regarding vaccinating their own children.[30] Parents who are willing to share their reasons for vaccinating their children can be powerful ambassadors for vaccination in their communities.[29] Such parents may benefits from using the C.A.S.E. method: Corroborate hesitant parents' fears (find an area that you can agree on, thus building rapport), offer personal information about yourself and your vaccination experiences (About me), provide information on the Science, and give advice based on the science (Explain/advise).[31]

Personal stories, such as those of parents whose child has suffered from a vaccine preventable disease, can be more powerful than scientific information in convincing parents of the benefits of vaccination, and can provide a stronger defence against anti-vaccine messages, which tend to rely almost exclusively on personal narratives.[30] Therefore, it is worth considering adding personal stories to evidence-based information about vaccination provided to parents.[30]

New Zealand guidelines

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International guidelines

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Evidence-based reviews

- Centers for Disease Control and Prevention. **The Community Guide: Vaccines.** https://www.thecommunityguide.org/search/vaccines#page=1 This page contains links to 48 systematic reviews relevant to increasing vaccination rates, carried out by the US Community Preventive Services Taskforce
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