

NSW Annual Immunisation Coverage Report, 2017

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Abstract: Introduction: This annual report documents vaccination coverage in NSW for children, adolescents and the elderly, up to and including data for 2017. **Methods:** Data from the Australian Immunisation Register (AIR), the NSW School Vaccination Program and the NSW Population Health Survey were used to calculate measures of population vaccination coverage. Vaccination timeliness for Aboriginal and non-Aboriginal children was also assessed using AIR data. **Results:** In 2017, 'fully immunised' coverage at 12 and 60 months of age remains greater than 93% for children in NSW. Following the change in algorithm for 'fully immunised' coverage at 24 months of age (amended in October 2016 to include the fourth dose of diphtheria, tetanus, and acellular pertussis-containing vaccine given at 18 months of age), dropped to just below 90%. Coverage was greater than 93% for vaccines/antigens due at the 12 and 60 month milestones, except for the second dose of rotavirus vaccine at 12 months of age, which increased to just below 91% in 2017. Coverage was greater than 94% for vaccines/antigens due at the 24-month milestone, except for the fourth dose of diphtheria, tetanus, and acellular pertussis-containing vaccine (92.3%), the second dose of the measles, mumps and rubella-containing vaccine (92.9%) and the varicella-containing vaccine (92.6%). At each milestone, 'fully immunised' coverage was higher in Aboriginal children compared with non-Aboriginal children in NSW. However, on-time vaccination of the first and third dose of diphtheria, tetanus, and acellular pertussis-containing vaccine and the

second dose of the measles, mumps and rubella-containing vaccine was still less than optimal for Aboriginal children. In 2017, 86% of Year 7 female students and 84% of Year 7 male students received a first dose of human papillomavirus vaccine, with 81% of females and 78% of males completing the two-dose course. Over 70% of Year 11 and 12 students received the meningococcal ACWY conjugate vaccine introduced in February 2017. In 2017, approximately 72% of persons aged 65 years and over self-reported receiving the influenza vaccine in the previous 12 months. **Conclusion:** Improved vaccination coverage between 2000 and 2017 has been achieved in NSW through a number of strategies including the Save the Date to Vaccinate campaign and smartphone app, the Aboriginal Immunisation Healthcare Worker Program, introducing early childhood education and care enrolment requirements in 2014, and other strategies implemented in low coverage areas. This report reflects the continued successful delivery of the vaccination program across the age spectrum in NSW.

Introduction

This is the 9th annual immunisation coverage report for NSW, with analysis encompassing the years 2000–2017. These annual reports provide important information on trends and issues in vaccination coverage and facilitate the monitoring of NSW vaccination programs.

This report uses the longstanding international practice of reporting coverage at key milestone ages to measure coverage against national benchmarks and to track trends over time. It is adapted from annual national immunisation reports published since 2009.¹

High levels of reporting to the Australian Immunisation Register (AIR), previously known as the Australian Childhood Immunisation Register (ACIR), are maintained for childhood vaccinations by a system of incentive payments for immunisation providers and parents/guardians.² Reported vaccination coverage may be impacted by changes to immunisation policy, the incentive payment

Box 1. Selected recent and significant changes in immunisation policy, immunisation incentives and coverage calculation algorithms relevant to NSW³

July 2017: Coverage assessment algorithm for 'fully immunised' at the 60-month milestone amended to no longer include the second dose of a measles–mumps–rubella (MMR)-containing vaccine.

May 2017: Meningococcal ACWY conjugate vaccine funded in NSW for Grade 11–12 students and persons aged 17–18 years who no longer attend school.

February 2017: Two-dose human papillomavirus (HPV) vaccine schedule adopted in NSW for Year 7 students in line with World Health Organization recommendations.⁴

October 2016: Coverage assessment algorithm for 'fully immunised' at the 24-month milestone amended to include a fourth dose of diphtheria, tetanus and acellular pertussis (DTPa)-containing vaccine.

March 2016: Booster (fourth) dose of DTPa vaccine at 18 months of age added to the National Immunisation Program (NIP) schedule.

January 2016: New immunisation requirements for federal government family assistance payments (the 'No Jab, No Pay' policy⁵) came into effect. Only parents of children (aged less than 20 years) who are 'fully immunised' or on a recognised catch-up schedule continue to receive the Child Care Benefit, Child Care Rebate, and/or the Family Tax Benefit Part A end-of-year supplement. Children with medical contraindications or natural immunity for certain diseases continue to be exempt from the requirements. However, conscientious objection is no longer a valid exemption from immunisation requirements.

March 2015: Booster (fourth) dose of DTPa vaccine recommended at 18 months of age in NSW.

December 2014: Coverage assessment algorithm for 'fully immunised' at the 24-month milestone amended to require a dose of meningococcal C-containing vaccine, a dose of varicella-containing vaccine and a second dose of MMR-containing vaccine. The expansion of the definition of 'fully immunised' reinforces the importance of these vaccines by linking them to payments to families and immunisation providers.⁶

January 2014: Implementation of strengthened vaccination requirements for childcare enrolment in NSW.⁷

December 2013: Immunisation coverage assessment algorithm for 'fully immunised' at the 12-month milestone amended to include a third dose of pneumococcal conjugate vaccine (PCV).

July 2013: A combination measles, mumps, rubella, varicella (MMRV) vaccine for children aged 18 months was added to the NIP in July 2013, replacing the separate MMR vaccine previously given to 4 year olds, and the monovalent varicella vaccine previously given to 18 month olds.

system and changes to the 'fully immunised' coverage algorithms. Some of these changes are highlighted in Box 1 and are also referred to in this report.

The ACIR was established on 1 January 1996 by incorporating demographic data from Medicare on all enrolled children aged less than 7 years.⁸ Up to 31 December 2015, all vaccination records for a child remained on the register indefinitely, but no new vaccination encounter records were added after the 7th birthday.² From 1 January 2016, the register was changed to include records of vaccinations given up to less than 20 years of age and was further expanded from 30 September 2016 to become the AIR that captures records of vaccinations given to eligible individuals in Australia throughout their life.⁹

Participation in the AIR is opt-out so it constitutes a nearly complete population register. Persons not enrolled in Medicare can be added to the AIR via a supplementary number. Since 2001, vaccinations given overseas may be recorded if a provider endorses their validity. Data are transferred to the AIR when a recognised immunisation provider supplies details of an eligible vaccination.

This can be done electronically, e.g. via medical practice software, through direct data entry on the AIR website or by submitting paper encounter or history forms. Medical contraindications or natural immunity to certain diseases, based on guidance from the Australian Immunisation Handbook¹⁰ and a vaccination provider factsheet,⁵ can only be reported by general practitioners using the AIR Medical Exemption Form.¹¹ All vaccination records for a person remain on the register indefinitely. As of 1 January 2016, conscientious objection to vaccination was no longer recorded on the AIR.

Table 1 outlines vaccines delivered through the NSW Immunisation Program in 2017. The adolescent vaccination schedule of the NSW immunisation program underwent two significant changes in 2017. First, HPV vaccination for Year 7 students changed from a three-dose schedule to a two-dose schedule. This change was based on international evidence demonstrating that two vaccine doses given at least 6 months apart to adolescents aged 9–14 years provides an equivalent immunologic response to three doses.^{12,13} Second, in response to the emergence of meningococcal serogroup W as a significant cause of

Table 1. NSW Immunisation Program Schedule for children, adolescents and adults in 2017

Age	Vaccine					
Children						
Birth	Hep B					
6 weeks	Hep B ^a	DTPa ^a	Hib ^a	Polio ^a	13vPCV	Rotavirus
4 months	Hep B ^a	DTPa ^a	Hib ^a	Polio ^a	13vPCV	Rotavirus
6 months	Hep B ^a	DTPa ^a	Hib ^a	Polio ^a	13vPCV	Flu ^b
12 months			Hib-MenC	MMR		Flu ^b
18 months		DTPa			MMRV	Flu ^b
4 years		DTPa ^c		Polio ^c		Flu ^b
Adolescents						
12 years (Year 7)		dTpa		VZV ^d	HPV ^e	
17–18 years (Year 11–12)			Men ACWY ^f			
15 years						Flu ^b Pneumo ^g
Adults						
≥50 years						Flu ^b Pneumo ^h
≥65 years						Flu ^b Pneumo
70 years				HZ ⁱ		
Pregnant women		dTpa ^j				Flu ^k
^a Usually given as combined DTPa-HepB-IPV-Hib vaccine. ^b Annual vaccination, all aged ≥6 months with medical risk factors, Aboriginal children aged ≥6 months – 5 years, Aboriginal people aged ≥15 years, non-Aboriginal adults aged ≥65 years. ^c Usually given as combined DTPa-IPV vaccine ^d Catch-up only. ^e Changed from a three-dose to a two-dose schedule in February 2017. ^f NSW Meningococcal W Response Program implemented meningococcal ACWY vaccination targeted at older adolescents (students in Year 11 and 12). ^g Aboriginal people aged ≥15 years with medical risk factors. ^h All Aboriginal adults only. ⁱ From 1 November 2016, a single dose of HZ vaccine is recommended and funded for adults at 70 years of age. Adults aged 71–79 years are eligible under a 5-year catch-up program until 31 October 2021. ^j During the third trimester of pregnancy. ^k At any stage of pregnancy. DTPa: diphtheria–tetanus–pertussis (acellular) – paediatric formulation; Flu: influenza; Hep B: hepatitis B; Hib: <i>Haemophilus influenzae</i> type b; HPV: human papilloma virus; HZ: herpes zoster; IPV: inactivated polio vaccine; Men ACWY: meningococcal ACWY; Men C: meningococcal C; MMR: measles-mumps-rubella; PCV: pneumococcal conjugate vaccine; Pneumo: Pneumovax 23 vaccine; VZV: varicella zoster virus. Source: http://www.health.nsw.gov.au/immunisation/Publications/nsw-immunisation-schedule.pdf .						

invasive meningococcal disease in Australia, the NSW Meningococcal W Response Program implemented meningococcal ACWY vaccination targeted at older adolescents in Years 11 and 12 from 1 May 2017.¹⁴

Methods

Measuring vaccination coverage using the Australian Immunisation Register

This report details vaccination coverage for 2017 using AIR data up to 31 March 2018. The cohort method has been used for calculating coverage at the population level (national and state/territory)¹⁵ since the inception of the immunisation register. Cohort vaccination status was assessed at 12 months of age (for vaccines due at 6 months), 24 months of age (for vaccines due at 12 and 18 months), and

60 months of age (for vaccines due at 48 months). A 3-month lag period was allowed for the late notification of vaccinations to the AIR.¹⁵ If a child's record indicates receipt of the last dose of a vaccine that requires more than one dose to complete the series, it was assumed that earlier vaccinations in the sequence had been given. This assumption has been shown to be valid.^{16,17}

The proportion of children designated as 'fully immunised' was calculated using 12-month-wide cohorts with the number of children completely vaccinated with the vaccines of interest by the designated age as the numerator, and the total number of Medicare-registered children in the age cohort as the denominator. The 12-month-wide cohorts used were children born between 1 January 2016 and 31 December 2016 for the 12-month milestone, between

1 January 2015 and 31 December 2015 for the 24-month milestone, and between 1 January 2012 and 31 December 2012 for the 5-year (60-month) milestone. ‘Fully immunised’ at 12 months of age was defined as a child having a record on the AIR of a third dose of DTPa-containing vaccine, a third dose of polio-containing, *Haemophilus influenzae* type b (Hib)-containing and hepatitis B-containing vaccines (predominantly given as the combined DTPa-hepB-IPV-Hib vaccine), and a third dose of 13-valent PCV. Vaccination coverage estimates were also calculated at the 12-month milestone for the second dose of rotavirus vaccine, a National Immunisation Program (NIP) vaccine that is not included in calculations for incentive payments and ‘fully immunised’ status. In March 2016, an additional booster (fourth dose) of DTPa at 18 months of age was added to the NIP and has been included in the algorithm for ‘fully immunised’ at 24 months of age since 1 October 2016. As such, ‘fully immunised’ at 24 months of age was defined as a child having a record on the AIR of a fourth dose of DTPa-containing vaccine, a third dose of polio-containing and hepatitis B-containing vaccines, a fourth dose of Hib-containing vaccine (or a third dose of the *Haemophilus B* conjugate (PRP-T) vaccine if given after 11.5 months of age), a second dose of MMR-containing vaccine, a first dose of varicella-containing vaccine and a first dose of meningococcal C-containing vaccine. ‘Fully immunised’ at 60 months of age was defined as a child having a record on the AIR of a fourth or fifth dose of DTPa-containing vaccine, a fourth dose of polio-containing vaccine and a second dose of MMR-containing vaccine.

Timeliness

Age-appropriate and timely vaccination was defined as receipt of a scheduled vaccine dose within 30 days of the recommended age for administration. Timeliness of the first and third dose of DTPa-containing vaccine and of the second dose of MMR-containing vaccine was measured using 12-month-wide birth cohorts. However, children included in the timeliness analysis were assessed at 1–<3 years after doses were due, to allow time for late vaccinations to be recorded. Therefore, these cohorts were not the same as those assessed for coverage milestones.

Aboriginal and non-Aboriginal timeliness of the first dose of DTPa-containing vaccine in 2017 was compared by plotting the cumulative percentage receiving the dose by age. Trends in the percentage of Aboriginal and non-Aboriginal children vaccinated on-time for the third dose of DTPa-containing vaccine and the second dose of MMR-containing vaccine were plotted for 2008–2017. The delay outcome measure for these vaccine doses in 2017 was also categorised as ‘no delay’, ‘delay of 1–<3 months’, delay of 3–<7 months or ‘delay \geq 7 months’ for both Aboriginal and non-Aboriginal children.

Local health districts

Vaccination coverage estimates and vaccination delay estimates are presented in this report for NSW and by NSW local health district (LHD). LHDs were introduced in January 2011, replacing area health services. There are 15 geographically based LHDs in NSW – eight in metropolitan NSW and seven in rural and regional NSW. Data for an additional LHD (Network with Victoria) is also reported on.

Aboriginal status

Indigenous status on the AIR is recorded nationally as ‘Indigenous’, ‘non-Indigenous’ or ‘unknown’, as reported by the child’s carer to Medicare, or by the immunisation provider to the AIR. For this report, two categories of children were considered: ‘Aboriginal’ (Indigenous) and ‘non-Aboriginal’ (non-Indigenous). As the completeness of Aboriginal identification in the register increased substantially after 2005,¹⁸ the 0.4% of children whose Aboriginal status was not specified were presumed to be non-Aboriginal for the purposes of the analyses conducted for this report.

Small area coverage

Coverage was calculated by Australian Bureau of Statistics (ABS)-defined statistical area level 3 (SA3), which forms part of the Australian Statistical Geography Standard (ASGS).¹⁹ SA3s were chosen as areas to be mapped because they provide more detail than LHDs but are not too small to render maps unreadable (population sizes for a year-wide birth cohort of children for SA3s in NSW range from 110 to 2799 children). SA3s with a population size for a year-wide birth cohort of children less than 26 were excluded from any mapping due to the imprecision of any coverage estimates calculated for these areas. Maps were created using MapInfo mapping software²⁰ and the ABS Census Boundary Information. As postcode is the only geographical indicator on the AIR, the ABS Postal Area to SA3 Concordance 2011 was used to match children’s residential postcodes to SA3s.²¹

Adolescents

Coverage for vaccines given to adolescents in 2017 was collected from the NSW School Vaccination Program, which included HPV vaccine, dTpa vaccine and varicella vaccine for Year 7 students, as well as meningococcal ACWY vaccine for Year 11 and 12 students. Vaccination status is recorded by school immunisation teams and the counts of children vaccinated are collated by LHDs and NSW Health. The denominator is the school population enrolments, as at the start of year. Coverage rates may be an underestimate of true vaccination coverage as they represent only those vaccinations received through the school program and do not include doses received from

general practitioners or other immunisation providers.²² For HPV vaccination, catch-up vaccination has been offered since 2012 to Year 8 students who commenced the course of HPV vaccine in Year 7 in order to support course completion. HPV vaccination coverage from 2012 to 2016 includes catch-up vaccination given in Terms 1–4. Data on the Year 8 catch-up vaccination doses are incomplete for 2017 and only include data on catch-up doses given in Terms 1–2 of 2018, as data on later catch-up doses were not available at the time of publication.

Adults

Adult influenza and pneumococcal vaccination data have been collected since 1997 through the NSW Population Health Survey. This is a rolling telephone survey utilising random digit dialling, with vaccination status determined from patient recall to interview questions asking ‘Were you vaccinated or immunised against flu in the last 12 months?’ and ‘When were you last vaccinated or immunised against pneumonia?’ Data is obtained from NSW HealthStats.²³ Influenza vaccination coverage data for 2002–2017 are reported for adults aged 65 years and older. Pneumococcal vaccination coverage data from 2002 to 2016 includes data for Aboriginal adults aged 50–64 years and all adults aged 65 years and over. The telephone survey did not collect data on adult pneumococcal vaccination in 2017.

Summary of results

Coverage (all children)

- Quarterly ‘fully immunised’ coverage estimates in NSW, assessed at 12 months, 24 months and 60 months of age reached 93.7%, 89.4% and 94.5% respectively at the age assessment quarterly data point in December 2017 (Figure 1).
- The annual NSW coverage estimate of ‘fully immunised’ at the 12-month milestone increased from 93.5% in 2016 to 93.8% in 2017 (Table 2).
- The annual NSW coverage estimate of ‘fully immunised’ at the 24-month milestone decreased from 90.5% in 2016 to 89.9% in 2017 (Table 3). This was most likely due to the change in algorithm for ‘fully immunised’ at 24 months of age in October 2016 requiring a fourth dose of DTPa-containing vaccine instead of just three doses.
- The annual NSW coverage estimate of ‘fully immunised’ at the 60-month milestone increased in 2017 by 0.3 of a percentage point to 93.5% (Table 4).
- ‘Fully immunised’ coverage at 12 months of age increased in 2017 from 2016 in all LHDs in NSW except for Far West, Murrumbidgee and Nepean Blue Mountains, where slight decreases were seen, and in Hunter New England and Sydney, where coverage remained stable (Table 2). At this milestone, ‘fully immunised’ coverage was 93% or above for all LHDs except Mid North Coast and Northern NSW (Table 2).

- NSW coverage for all vaccines/antigens at 12 months of age increased in 2017 from 2016, with coverage greater than or equal to 94% for all vaccines except rotavirus (Figure 2). Coverage for all individual vaccines/antigens, excluding rotavirus vaccine, was greater than 94% in all LHDs except Mid North Coast and Northern NSW (Table 2).
- Coverage for rotavirus vaccine in NSW increased by almost 1 percentage point in 2017 to 90.8% (Table 2). Coverage for rotavirus vaccine remained lower than other vaccines as catch-up cannot be given once infants turn 15 weeks (dose 1) and 25 weeks (dose 2) of age.
- ‘Fully immunised’ coverage at 24 months of age decreased in 2017 from 2016 in all LHDs except for Hunter New England and Western NSW where it increased marginally, and in Central Coast and Western Sydney where it remained the same. At this milestone, ‘fully immunised’ coverage remained below 90% for Mid North Coast, Northern NSW, Northern Sydney, South Eastern Sydney, South Western Sydney, Sydney and Western Sydney (Table 3).
- Coverage in NSW for all vaccines/antigens at the 24-month milestone (except the fourth dose of DTPa-containing vaccine and MMRV vaccine) remained greater than 94% in 2017 (Table 3, Figure 3) and greater than 93% for all LHDs except for Northern NSW (Table 3).
- From 1 October 2016, the coverage calculation of DTPa-containing vaccine at 24 months of age was changed to be assessed as the fourth dose instead of the third dose. This change resulted in reported DTPa-containing vaccine coverage at 24 months of age decreasing in 2017 in all LHDs. In NSW, it decreased by 4 percentage points from 96.3% in 2016 to 92.3% in 2017 (Table 3, Figure 3).
- Varicella-containing vaccine coverage at 24 months of age increased in NSW from 92.4% in 2016 to 92.6% in 2017 with coverage 91% or above for all LHDs except for Northern NSW (Table 3).
- In 2017, MMR-containing vaccine coverage in NSW at 24 months of age was 95.0% for the first dose and 92.9% for the second dose (Table 3). Coverage for the second dose of MMR-containing vaccine was greater than 91% for all LHDs except for Northern NSW.
- When assessed at 60 months of age, coverage of the second dose of MMR-containing vaccine in 2017 was 95.7% in NSW and was above 94% in all LHDs except Northern NSW and Northern Sydney (Table 4).
- Coverage for all vaccines/antigens for the 60-month milestone in NSW remained greater than 93% in 2017 (Table 4, Figure 4) and was greater than 90% in all LHDs except Northern NSW (Table 4).

Aboriginal coverage

- In 2017, ‘fully immunised’ coverage for NSW Aboriginal children at the 12-month milestone continued to

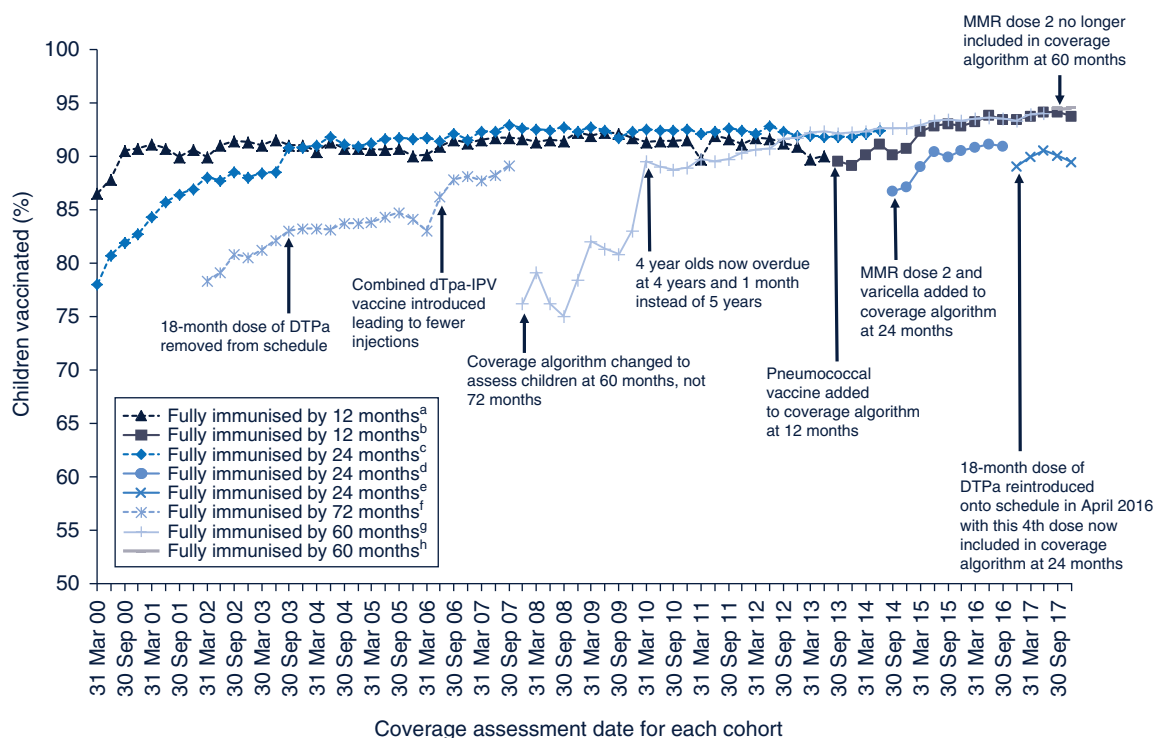


Figure 1. Trends in ‘fully immunised’ coverage, NSW, 2000–2017.

^aUp until 30 June 2013, ‘fully immunised’ at 12 months of age was defined as a child having a record of a third dose of DTPa-containing vaccine, and a third dose of polio-containing, Hib-containing and Hep B-containing vaccines.

^bSince 1 July 2013, ‘fully immunised’ at 12 months of age was defined as a child having a record of a third dose of DTPa-containing vaccine, a third dose of polio-containing, Hib-containing and Hep B-containing vaccines, and a third dose of 13-valent PCV.

^cUp until 30 June 2014, ‘fully immunised’ at 24 months of age was defined as a child having a record of a third dose of DTPa-containing vaccine, a third dose of polio-containing and Hep B-containing vaccines, a fourth dose of Hib-containing vaccine, and a first dose of MMR-containing vaccine.

^dBetween 1 July 2014 and 30 September 2016, ‘fully immunised’ at 24 months of age was defined as a child having a record of a third dose of DTPa-containing vaccine, a third dose of polio-containing and Hep B-containing vaccines, a fourth dose of Hib-containing vaccine, a second dose of MMR-containing vaccine, a first dose of varicella-containing vaccine and a first dose of Men C-containing vaccine.

^eSince 1 October 2016, the algorithm for ‘fully immunised’ at 24 months of age changed to include a fourth dose of DTPa-containing vaccine, a third dose of polio-containing and Hep B-containing vaccines, a fourth dose of Hib-containing vaccine, a second dose of MMR-containing vaccine, a first dose of varicella-containing vaccine and a first dose of Men C-containing vaccine.

^fUp until 30 September 2007, ‘fully immunised’ at 72 months of age was defined as a child having a record of a fourth dose of DTPa-containing vaccine, a fourth dose of polio-containing vaccine and a second dose of MMR-containing vaccine.

^gBetween 1 October 2007 and 30 June 2017 ‘fully immunised’ at 60 months of age was defined as a child having a record of a fourth dose of DTPa-containing vaccine, a fourth dose of polio-containing vaccine and a second dose of MMR-containing vaccine.

^hSince 1 July 2017, ‘fully immunised’ at 60 months of age was defined as a child having a record of a fourth or fifth dose of DTPa-containing vaccine and a fourth dose of polio-containing vaccine.

DTPa: diphtheria–tetanus–pertussis (acellular) – paediatric formulation.

Hep B: hepatitis B.

Hib: *Haemophilus influenzae* type b.

Men C: meningococcal C.

MMR: measles–mumps–rubella.

PCV: pneumococcal conjugate vaccine.

Source: Australian Immunisation Register, data as at 31 March 2018.

improve, increasing by 0.8 of a percentage point from 2016 to 94.6% (Table 5), and remained higher than for non-Aboriginal children at the same age (93.7%).

- ‘Fully immunised’ coverage for Aboriginal children at the 12-month milestone in 2017 was higher compared with non-Aboriginal children in Central Coast, Far West, Mid North Coast, Network with Victoria, Northern NSW, Northern Sydney, South Eastern Sydney,

Sydney and Western Sydney LHDs, but lower in the other LHDs (Table 5).

- Following the change in the definition of ‘fully immunised’ at 24 months of age to include a fourth instead of third dose of DTPa-containing vaccine, coverage for NSW Aboriginal children at this milestone decreased by 0.8 of a percentage point from 2016 to 91.4% in 2017 (Table 5). This remained higher than for non-Aboriginal

Table 2. Percentage of children immunised at 12 months of age^a by vaccine/antigen and local health district, NSW, compared with NSW overall and Australia, 2017

Vaccine/Antigen	Local Health District ^b																	
	CC %	FW %	HNE %	IS %	MN %	MM %	NBM %	NV %	NN %	NS %	SES %	SWS %	SN %	SYD %	WN %	WS %	NSW %	Australia %
Diphtheria, tetanus, pertussis	96.1	95.8	95.9	95.6	92.9	96.0	94.9	95.5	89.5	95.1	94.6	94.4	95.9	94.7	96.4	94.2	94.8	94.7
Poliomyelitis	96.0	95.8	95.9	95.6	92.9	96.0	94.8	95.5	89.5	95.1	94.6	94.4	95.9	94.7	96.4	94.2	94.8	94.7
<i>Haemophilus influenzae</i> type b	95.9	95.8	95.8	95.5	92.7	96.0	94.8	95.5	89.3	94.6	94.2	94.2	95.8	94.2	96.4	93.8	94.5	94.5
Hepatitis B	95.7	95.8	95.8	95.4	92.7	95.9	94.7	95.5	89.1	94.1	94.0	94.2	95.7	93.9	96.2	93.5	94.3	94.3
Rotavirus	92.6	91.1	92.3	92.7	89.5	91.1	91.9	93.4	84.4	91.4	90.9	89.2	91.5	90.6	92.7	89.9	90.8	86.8
13-valent pneumococcal conjugate	95.6	95.8	95.8	95.4	92.3	95.7	94.7	95.3	88.8	93.9	94.0	93.7	95.8	93.8	96.3	93.5	94.2	94.2
Fully immunised^c	95.5	95.8	95.6	95.2	92.1	95.7	94.4	95.3	88.6	93.2	93.4	93.4	95.5	93.0	96.1	92.6	93.8	93.8
Total number of children	4052	382	11244	4743	2328	2983	5340	725	3204	10818	10799	14580	2257	7755	3817	15093	100120	315078

^aCohort born 1 January 2016 – 31 December 2016.
^bCC: Central Coast; FW: Far West; HNE: Hunter New England; IS: Illawarra Shoalhaven; MN: Mid North Coast; MM: Murrumbidgee; NBM: Nepean Blue Mountains; NV: Network with Victoria; NN: Northern NSW; NS: Northern Sydney; SES: South Eastern Sydney; SWS: South Western Sydney; SN: Southern NSW; SYD: Sydney; WN: Western NSW; WS: Western Sydney; NSW: New South Wales.
^c'Fully immunised' at 12 months of age was defined as a child having a record on the AIR of a third dose of diphtheria, tetanus and acellular pertussis-containing vaccine, a third dose of polio-containing, *Haemophilus influenzae* type b-containing and hepatitis B-containing vaccines, and a third dose of 13-valent pneumococcal conjugate vaccine.
Source: Australian Immunisation Register, data as at 31 March 2018.

Table 3. Percentage of children immunised at 24 months of age^a by vaccine/antigen and local health district, NSW, compared with NSW overall and Australia, 2017

Vaccine/Antigen	Local Health District ^b																	
	CC %	FW %	HNE %	IS %	MN %	MM %	NBM %	NV %	NN %	NS %	SES %	SWS %	SN %	SYD %	WN %	WS %	NSW %	Australia %
Diphtheria, tetanus, pertussis	94.6	96.2	94.8	94.2	91.1	94.7	93.3	94.4	86.4	91.3	90.4	91.7	92.6	90.9	94.6	92.4	92.3	92.4
Poliomyelitis	97.4	98.1	97.5	97.4	94.5	97.7	97.0	96.4	90.7	95.7	95.3	96.0	97.0	95.5	98.0	96.4	96.2	96.3
<i>Haemophilus influenzae</i> type b (Hib)	96.3	98.6	96.6	96.0	93.0	96.9	96.1	95.9	89.3	93.0	93.0	94.5	96.2	93.2	97.1	94.8	94.6	94.7
Meningococcal C	96.3	98.9	97.0	96.5	93.4	97.0	96.3	96.1	89.4	93.3	93.5	94.6	96.2	93.6	97.3	94.7	94.9	95.0
Hepatitis B	96.9	98.1	97.4	96.9	93.9	97.4	96.8	96.4	90.6	94.1	94.3	95.7	96.6	94.6	98.0	95.1	95.5	95.7
Measles–mumps–rubella Dose 1	96.5	98.9	96.9	96.3	93.8	97.4	96.1	95.7	89.6	94.0	93.4	94.6	96.1	93.6	97.1	95.3	95.0	95.3
Measles–mumps–rubella Dose 2	94.7	96.4	95.2	94.6	91.7	95.2	94.3	95.2	86.8	91.2	91.6	92.9	93.7	91.5	95.1	92.7	92.9	93.0
Varicella	94.2	95.9	94.9	94.2	91.0	95.1	93.7	95.0	86.3	91.4	91.5	92.1	93.3	91.2	94.7	92.2	92.6	92.6
Fully immunised^c	93.2	94.2	93.6	92.7	89.4	93.3	91.9	93.3	85.1	87.6	87.6	89.2	91.2	87.3	93.2	88.6	89.9	90.2
Total number of children	4208	364	11399	4824	2413	3029	5327	774	3211	10719	10337	14337	2375	7320	3801	14958	99396	314622

^aCohort born 1 January 2015 – 31 December 2015.
^bCC: Central Coast; FW: Far West; HNE: Hunter New England; IS: Illawarra Shoalhaven; MN: Mid North Coast; MM: Murrumbidgee; NBM: Nepean Blue Mountains; NV: Network with Victoria; NN: Northern NSW; NS: Northern Sydney; SES: South Eastern Sydney; SWS: South Western Sydney; SN: Southern NSW; SYD: Sydney; WN: Western NSW; WS: Western Sydney; NSW: New South Wales.
^c'Fully immunised' at 24 months of age defined as a child having a record on the AIR of a fourth dose of diphtheria, tetanus and acellular pertussis-containing vaccine, a third dose of polio-containing and hepatitis B-containing vaccines, a fourth dose of *Haemophilus influenzae* type b-containing vaccine (or a third dose of the *Haemophilus B* conjugate (PRP-T) vaccine if given after 11.5 months of age), a second dose of measles, mumps and rubella-containing vaccine, a first dose of varicella-containing vaccine and a first dose of meningococcal C-containing vaccine.
Source: Australian Immunisation Register, data as at 31 March 2018.

children at the same age, which decreased from 90.4% in 2016 to 89.8% in 2017.

- At the 24-month milestone, 'fully immunised' coverage for Aboriginal children in 2017 was higher compared with non-Aboriginal children in the Central Coast, Illawarra Shoalhaven, Mid North Coast, Nepean Blue Mountains, Northern NSW, Northern Sydney, South Eastern Sydney, South Western Sydney, Sydney and Western Sydney LHDs, but lower in the six other LHDs (Table 5).
- 'Fully immunised' coverage for NSW Aboriginal children at the 60-month milestone continued to improve, increasing from 96.6% in 2016 to 97.0% in 2017 (Table 5). This was 4 percentage points higher than coverage for non-Aboriginal children at the same age, which remained stable at 93.1%.

Table 4. Percentage of children immunised at 60 months of age^a by vaccine/antigen and local health district, NSW, compared with NSW overall and Australia, 2017

Vaccine/Antigen	Local Health District ^b																	NSW %	Australia %
	CC %	FW %	HNE %	IS %	MN %	MM %	NBM %	NV %	NN %	NS %	SES %	SWS %	SN %	SYD %	WN %	WS %			
Diphtheria, tetanus, pertussis	95.9	97.7	96.3	96.1	93.0	96.5	95.5	95.8	89.8	90.8	91.0	94.9	94.9	90.9	97.0	93.5	93.8	93.7	
Poliomyelitis	95.9	97.7	96.2	96.0	92.9	96.4	95.5	95.9	89.9	91.1	91.1	95.0	94.9	91.0	97.0	93.7	93.8	93.7	
Measles-mumps-rubella	97.0	98.7	97.6	97.0	94.6	97.2	96.9	96.6	91.4	93.9	94.2	96.3	96.5	94.6	98.0	95.5	95.7	95.7	
Fully immunised ^c	95.6	97.7	96.0	95.8	92.6	96.1	95.2	95.7	89.4	90.2	90.5	94.3	94.5	90.3	96.8	92.9	93.5	93.3	
Total number of children	4435	384	12291	5109	2661	3275	5439	762	3644	12532	10725	15184	2506	7231	4114	15797	106089	332894	

^aCohort born 1 January 2012 – 31 December 2012.

^bCC: Central Coast; FW: Far West; HNE: Hunter New England; IS: Illawarra Shoalhaven; MN: Mid North Coast; MM: Murrumbidgee; NBM: Nepean Blue Mountains; NV: Network with Victoria; NN: Northern NSW; NS: Northern Sydney; SES: South Eastern Sydney; SWS: South Western Sydney; SN: Southern NSW; SYD: Sydney; WN: Western NSW; WS: Western Sydney; NSW: New South Wales.

^cFully immunised^c at 60 months of age defined as a child having a record on the AIR of a fourth or fifth dose of diphtheria, tetanus and acellular pertussis-containing vaccine, a fourth dose of polio-containing vaccine and a second dose of measles, mumps and rubella-containing vaccine.

Source: Australian Immunisation Register, data as at 31 March 2018.

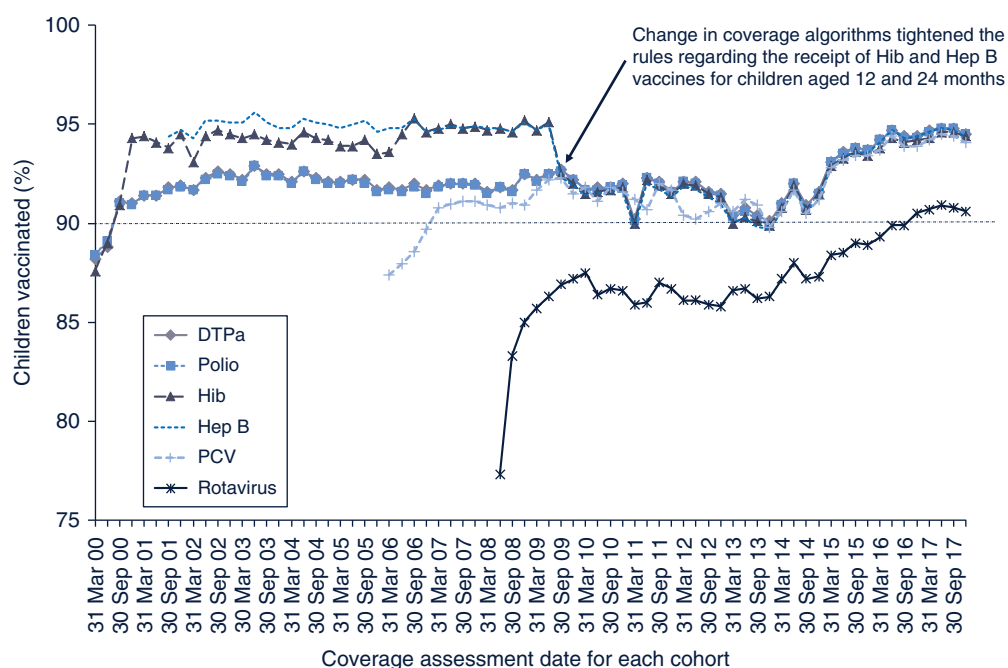


Figure 2. Trends in vaccination coverage estimates at 12 months of age by vaccine/antigen^a, NSW, 2000–2017.

By 3-month birth cohorts born between 1 January 1999 and 31 December 2016. Coverage assessment date was 12 months after the last birth date of each cohort.

^aA third dose of DTPa-containing, polio-containing, Hib-containing and Hep B-containing vaccines, a third dose of 13-valent PCV and a third dose of rotavirus vaccine.

DTPa: diphtheria–tetanus–pertussis (acellular) – paediatric formulation.

Hep B: hepatitis B.

Hib: *Haemophilus influenzae* type b.

PCV: pneumococcal conjugate vaccine.

Source: Australian Immunisation Register, data as at 31 March 2018.

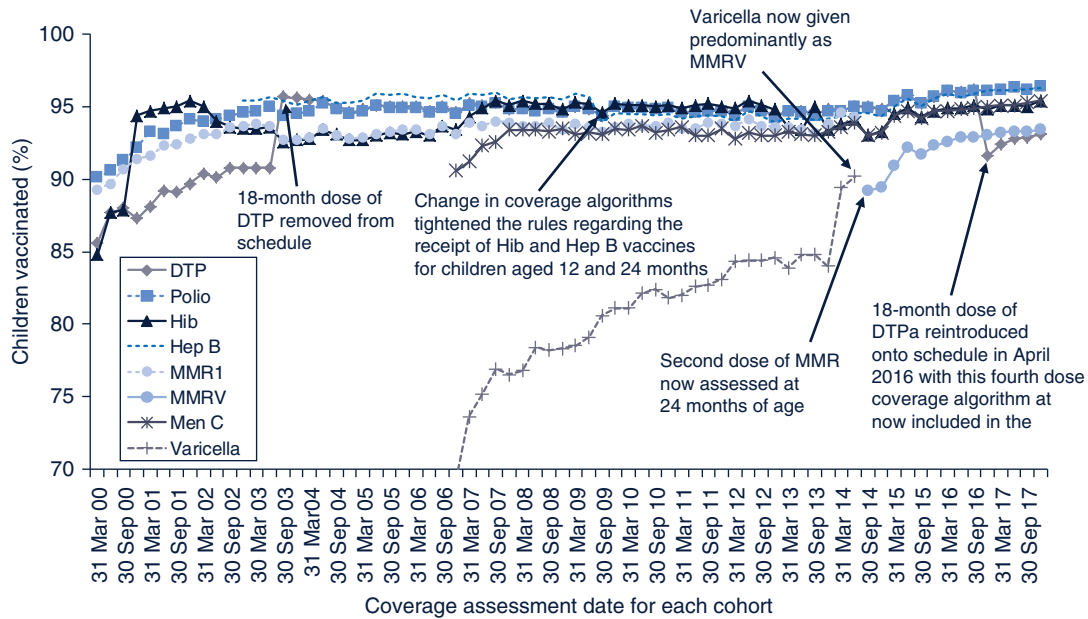


Figure 3. Trends in vaccination coverage estimates at 24 months of age by vaccine/antigen^a, NSW, 2000–2017.

By 3-month birth cohorts born between 1 January 1998 and 31 December 2015. Coverage assessment date was 24 months after the last birth date of each cohort.

^aDTPa-containing vaccine (a fourth dose assessed up until 30 September 2003, a third dose assessed between 1 October 2003 and 30 September 2016, and a fourth dose assessed from 1 October 2016), a third dose of polio-containing vaccines, a fourth dose of Hib-containing vaccine, MMR-containing vaccine (a first dose assessed up until 30 June 2014, and a second dose assessed from 1 July 2014), a first dose of varicella-containing vaccine and a first dose of Men C-containing vaccine.

DTPa: diphtheria–tetanus–pertussis (acellular) – paediatric formulation

Hep B: hepatitis B.

Hib: *Haemophilus influenzae* type b.

Men C: meningococcal C.

MMR: measles–mumps–rubella.

MMRV: measles–mumps–rubella–varicella.

Source: Australian Immunisation Register, data as at 31 March 2018.

- At the 60-month milestone, ‘fully immunised’ coverage was higher in 2017 for Aboriginal compared with non-Aboriginal children in all LHDs (Table 5).
- In 2017, coverage estimates for vaccines/antigens at each milestone mostly increased for NSW Aboriginal children compared with 2016. However, coverage of DTPa-containing vaccine at 24 months decreased by almost 5 percentage points. Coverage of DTPa-containing vaccine and polio-containing vaccine at 60 months also decreased slightly (Table 6).
- In 2017, coverage estimates for vaccines/antigens at the 12-month milestone were similar in Aboriginal children compared with non-Aboriginal children except for rotavirus vaccine, which was 1.8 percentage points lower in Aboriginal children (Table 6).
- Coverage estimates for vaccines/antigens at 24 and 60 months of age remained higher in Aboriginal children compared with non-Aboriginal children (Table 6).

Timeliness

- In 2017, the percentage of non-Aboriginal children in NSW who received their first dose of DTPa-containing vaccine by 7 weeks of age (as per the recommended

- 6-week schedule point) was 70.1% compared with 64.8% of Aboriginal children (Figure 5). By 8 weeks of age, coverage of the first dose of DTPa-containing vaccine for both non-Aboriginal and Aboriginal children in NSW reached 85.6% and 81.4%, respectively. By 10 weeks of age, 95.5% of non-Aboriginal children and 92.2% of Aboriginal children in NSW had received a first dose of DTPa-containing vaccine.
- In NSW, the disparity between Aboriginal and non-Aboriginal children in ‘on-time vaccination’ for the third dose of DTPa-containing vaccine steadily improved from almost 17 percentage points in 2008 to just over 10 percentage points in 2017 (Figure 6).
- In 2017, the percentage of non-Aboriginal children in NSW who received their third dose of DTPa-containing vaccine on-time (i.e. between 5–<7 months of age) was 83.6% compared with 72.9% of Aboriginal children (Figure 6, Table 7).
- ‘On-time vaccination’ for the third dose of DTPa-containing vaccine varied by LHD, ranging from 79.3% in South Western Sydney to 86.7% in Hunter New England for non-Aboriginal children, and from 65.0% in Southern NSW to 80.7% in Northern Sydney for Aboriginal children (Table 7).

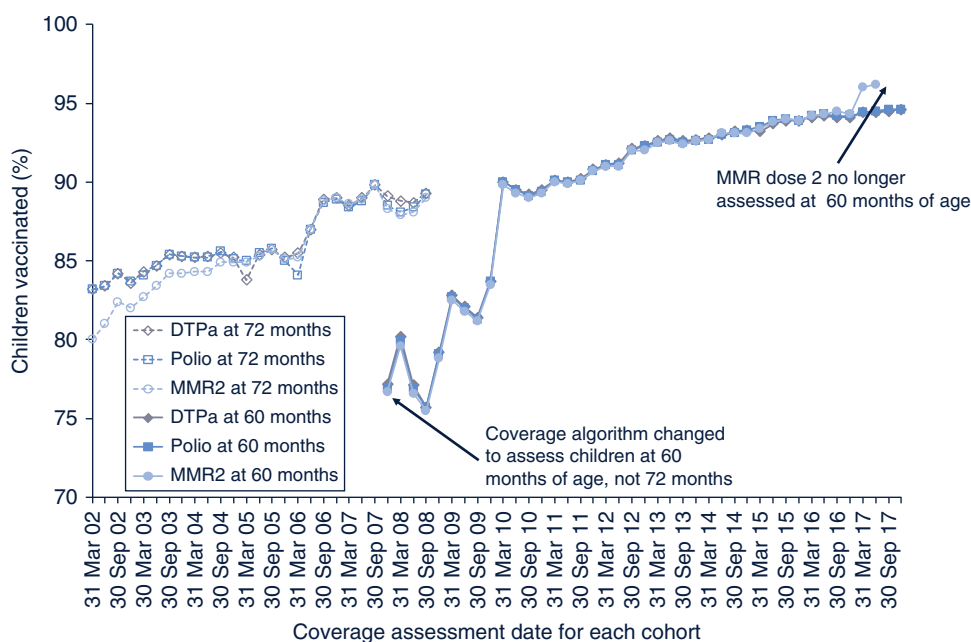


Figure 4. Trends in vaccination coverage estimates at 60 months (72 months up to December 2007) by vaccine/antigen^a, NSW, 2000–2017.

By 3-month birth cohorts born between 1 January 1996 and 31 December 2012. Coverage assessment date was 72 months after the last birth date of each cohort up to December 2007 and then 60 months after the last birth date of each cohort.

^aDTPa-containing vaccine (a fourth dose assessed up until 30 September 2016, and a fourth or fifth dose assessed from 1 October 2016), a fourth dose of polio-containing vaccine, and up until 30 June 2017, a second dose of MMR-containing vaccine.

DTPa: diphtheria–tetanus–pertussis (acellular) – paediatric formulation.

MMR: measles–mumps–rubella.

Source: Australian Immunisation Register, data as at 31 March 2018.

- Between 2008 and 2014, the percentage of children in NSW who received their second dose of MMR-containing vaccine on-time (i.e. between 47–<49 months of age) rose from 24.6% to 48.9% for non-Aboriginal children and from 20.6% to 44.7% for Aboriginal children (Figure 7).
- The moving of the second dose of MMR-containing vaccine to 18 months of age in mid-2014 resulted in substantial improvements in ‘on-time vaccination’ in both Aboriginal and non-Aboriginal children (Figure 7). However, the disparity between Aboriginal and non-Aboriginal timeliness for the second dose of MMR-containing vaccine dose increased from 4 percentage points (when given on-time between 47–<49 months of age) to almost 12 percentage points (when given on-time between 17–<19 months of age).
- Between 2014 and 2017, the percentage of children in NSW who received their second dose of MMR-containing vaccine on-time (i.e. between 17–<19 months of age) decreased from 75.9% to 71.5% for non-Aboriginal children and from 64.2% to 61.5% for Aboriginal children (Figure 7). Despite this, the disparity between Aboriginal and non-Aboriginal timeliness improved from 11.7 percentage points to 10 percentage points.
- In 2017, ‘on-time vaccination’ for the second dose of MMR-containing vaccine varied by LHD, ranging from 64.3% in Northern NSW to 74.8% in Hunter New

England for non-Aboriginal children, and from 53.5% in Network with Victoria to 67.7% in Northern Sydney for Aboriginal children (Table 8).

- For both the third dose of DTPa-containing vaccine and the second dose of MMR-containing vaccine, there were greater delays in vaccination for Aboriginal children than for non-Aboriginal children in all LHDs in 2017 (Tables 7 and 8). The majority of delayed vaccination was in the 1–<3 months delay category for both Aboriginal and non-Aboriginal children across all LHDs.

Small area coverage

- Coverage by small area (SA3) varied across the state for rotavirus vaccine (76.1%–94.8%) and 13-valent PCV (80.7%–98.1%) measured at the 12-month milestone, and the second dose of MMR-containing vaccine (78.7%–97.9%) measured at the 24-month milestone (Figures 8–10).

Adolescent coverage

- Coverage in adolescents varied by vaccine and dose with coverage for varicella lower in 2017 compared with the two doses of HPV vaccine (in both females and males), the dTpa vaccine, and the newly introduced meningococcal ACWY conjugate vaccine (Table 9).
- Varicella vaccine is recommended in the school program for children not previously vaccinated or who have

Table 5. Percentage of children fully immunised at 12 months, 24 months and 60 months of age by Aboriginal status and local health district, NSW, compared with NSW overall and Australia, 2017

Child age and Aboriginal status	CC %	FW %	HNE %	IS %	MN %	MM %	NBM %	NV %	Local Health District ^a										NSW %	Australia %
									NN %	NS %	SES %	SWS %	SN %	SYD %	WN %	WS %				
12 months – fully immunised^b																				
Aboriginal	97.3	100.0	94.8	93.6	92.8	95.1	92.9	97.1	93.0	97.1	96.2	92.4	95.4	93.6	94.8	95.1	94.6	92.3		
Non-Aboriginal	95.4	94.6	95.7	95.3	92.0	95.8	94.5	95.1	88.1	93.2	93.4	93.5	95.5	93.0	96.5	92.5	93.7	93.9		
24 months – fully immunised^c																				
Aboriginal	96.4	89.5	91.9	93.2	89.6	90.3	92.1	91.5	94.1	96.9	91.4	91.0	86.8	92.4	89.5	89.2	91.4	88.4		
Non-Aboriginal	92.9	95.7	93.8	92.7	89.4	93.7	91.9	93.4	84.1	87.6	87.5	89.2	91.6	87.2	94.2	88.6	89.8	90.3		
60 months – fully immunised^d																				
Aboriginal	97.8	99.0	97.4	97.4	97.4	97.8	97.0	95.7	94.7	94.1	94.6	97.0	95.1	92.9	98.1	96.4	97.0	96.3		
Non-Aboriginal	95.5	97.2	95.8	95.6	92.0	96.0	95.2	95.7	88.8	90.2	90.5	94.2	94.5	90.3	96.5	92.9	93.1	93.1		

^aCC: Central Coast; FW: Far West; HNE: Hunter New England; IS: Illawarra Shoalhaven; MN: Mid North Coast; MM: Murrumbidgee; NBM: Nepean Blue Mountains; NV: Network with Victoria; NN: Northern NSW; NS: Northern Sydney; SES: South Eastern Sydney; SWS: South Western Sydney; SN: Southern NSW; SYD: Sydney; WN: Western NSW; WS: Western Sydney; WS: New South Wales.
^bCohort born 1 January 2016 – 31 December 2016: 'Fully immunised' at 12 months of age defined as a child having a record on the AIR of a third dose of diphtheria, tetanus and acellular pertussis-containing vaccine, a third dose of polio-containing, *Haemophilus influenzae* type b-containing and hepatitis B-containing vaccines, and a third dose of 13-valent pneumococcal conjugate vaccine.
^cCohort born 1 January 2015 – 31 December 2015: 'Fully immunised' at 24 months of age defined as a child having a record on the AIR of a fourth dose of diphtheria, tetanus and acellular pertussis-containing vaccine, a third dose of polio-containing and hepatitis B-containing vaccines, a fourth dose of *Haemophilus influenzae* type b-containing vaccine (or a third dose of meningococcal C-containing vaccine, a first dose of varicella-containing vaccine and a first dose of meningococcal C-containing vaccine).
^dCohort born 1 January 2012 – 31 December 2012: 'Fully immunised' at 60 months of age defined as a child having a record on the AIR of a fourth or fifth dose of diphtheria, tetanus and acellular pertussis-containing vaccine, a fourth dose of polio-containing vaccine and a second dose of measles, mumps and rubella-containing vaccine.
 Source: Australian Immunisation Register, data as at 31 March 2018.

Table 6. Vaccination coverage estimates by age, vaccine/antigen and Aboriginal status, NSW, 2017

Vaccine/Antigen	Milestone age	Aboriginal	Non-Aboriginal
Diphtheria-tetanus-pertussis	12 months ^a	94.6	94.8
	24 months ^b	92.8	92.3
	60 months ^c	97.2	93.6
Poliomyelitis	12 months ^a	94.6	94.8
	24 months ^b	97.7	96.1
	60 months ^c	97.1	93.6
<i>Haemophilus influenzae</i> type b	12 months ^a	94.6	94.5
	24 months ^b	96.6	94.5
	60 months ^c	NI	NI
Hepatitis B	12 months ^a	94.6	94.3
	24 months ^b	97.6	95.4
	60 months ^c	NI	NI
Measles-mumps-rubella	12 months ^a	NI	NI
	24 months ^b Dose 1	96.9	94.9
	24 months ^b Dose 2	93.9	92.9
	60 months ^c	98.7	95.6
Meningococcal C	12 months ^a	NI	NI
	24 months ^b	97.1	94.7
	60 months ^c	NI	NI
Varicella	12 months ^a	NI	NI
	24 months ^b	93.3	92.5
	60 months ^c	NI	NI
Pneumococcal conjugate vaccine	12 months ^a	94.6	94.2
	24 months ^b	NI	NI
	60 months ^c	NI	NI
Rotavirus	12 months ^a	89.0	90.8
	24 months ^b	NI	NI
	60 months ^c	NI	NI

^aCohort born 1 January 2016–31 December 2016.
^bCohort born 1 January 2015–31 December 2015.
^cCohort born 1 January 2012–31 December 2012.
 NI: vaccine at this age milestone not included in the calculation of coverage estimates.
 Source: Australian Immunisation Register, data as at 31 March 2018.

not had the disease. Coverage for this vaccine decreased from 70% in 2016 to 66% in 2017 (Table 9). This was the last year varicella vaccine was offered as part of the school program.

- Coverage of the adolescent dTpa booster vaccine has remained stable since 2014, at around 84%–86% (Table 9).
- Coverage of each of the two doses of HPV vaccine in 2017 was higher (2%–3%) in female Year 7 students compared with male students. Completion of the two-dose schedule was 1–2 percentage points lower in both females and males when compared with the completion of the three-dose schedule in previous years (Table 9, Figure 11). However, 2017 data are preliminary and only include catch-up vaccination offered to students in Year 8 in Terms 1–2 in 2018. Data are not yet available for catch-up doses given to students in Terms 3–4.

- Coverage of the newly introduced meningococcal ACWY conjugate vaccine in 2017 was 72% and 76% for NSW Year 11 and 12 students, respectively (Table 9).

Coverage in adults

- The 2017 adult influenza vaccination coverage estimates are based on 6026 respondents in NSW aged 65 years and over.¹⁵
- The proportion of people aged 65 years and over reporting vaccination for influenza in the previous 12 months remained relatively stable between 2002 and 2017 (Figure 12). In 2017, 72.6% of surveyed adults reported they had received influenza vaccine in the previous 12 months.
- Influenza vaccination coverage in 2017 varied by LHD, ranging from 66.2% in Nepean Blue Mountains to 78.3% in Hunter New England (Table 10).

Table 7. Percentage of children^a with vaccination delay for the third dose of DTPa-containing vaccine by Aboriginal status and local health district, NSW, 2017

Vaccination delay/Aboriginal status	Local Health District ^b																
	CC	FW	HNE	IS	MN	MM	NBM	NV	NN	NS	SES	SWS	SN	SYD	WN	WS	NSW
No delay^c																	
Aboriginal (%)	78.4	70.6	75.2	76.6	71.7	73.5	74.3	70.7	69.8	80.7	77.8	75.8	65.0	79.4	68.5	65.8	72.9
Non-Aboriginal (%)	83.2	82.6	86.7	85.3	81.4	85.3	83.2	84.0	80.1	86.3	86.4	79.3	84.6	85.1	85.5	81.3	83.6
1-<3 months late																	
Aboriginal (%)	15.1	15.3	15.7	16.0	18.0	16.1	15.4	13.8	18.1	3.2	11.9	15.9	19.0	13.7	19.7	20.6	16.7
Non-Aboriginal (%)	11.7	13.1	9.3	10.1	12.1	10.1	11.3	10.4	12.7	8.2	8.9	13.4	10.9	8.9	9.7	10.9	10.5
3-<7 months late																	
Aboriginal (%)	5.3	5.9	5.9	4.4	7.8	6.8	8.1	5.2	7.9	3.2	7.4	6.3	8.6	6.9	6.7	7.1	6.5
Non-Aboriginal (%)	3.1	2.2	2.5	2.8	3.5	3.0	3.5	2.6	4.7	2.1	2.5	4.3	3.1	2.5	2.7	3.2	3.1
≥7 months late																	
Aboriginal (%)	1.0	8.2	3.1	2.7	3.0	3.4	2.2	10.3	4.1	3.2	3.0	2.0	7.4	0.0	5.0	6.4	3.6
Non-Aboriginal (%)	1.3	2.2	1.1	1.3	2.2	1.2	1.5	2.3	2.2	1.1	1.0	1.9	1.0	1.2	1.5	1.5	1.4

^aCohort born 1 January 2015 – 31 December 2015.

^bCC: Central Coast; FW: Far West; HNE: Hunter New England; IS: Illawarra Shoalhaven; MN: Mid North Coast; MM: Murrumbidgee; NBM: Nepean Blue Mountains; NV: Network with Victoria; NN: Northern NSW; NS: Northern Sydney; SES: South Eastern Sydney; SWS: South Western Sydney; SN: Southern NSW; SYD: Sydney; WN: Western NSW; WS: Western Sydney; NSW: New South Wales.

^cNo delay = third dose of DTPa-containing vaccine given between 5-<7 months of age and does not include the small percentage of the third dose of DTPa-containing vaccine given early (i.e. <5 months of age).

DTPa: diphtheria-tetanus-pertussis (acellular) – paediatric formulation.

Source: Australian Immunisation Register, data as at 31 March 2018.

Table 8. Percentage of children^a with vaccination delay for the second dose of MMR-containing vaccine due at 18 months of age by Aboriginal status and local health district, NSW, 2017

Vaccination delay/Aboriginal status	Local Health District ^b																
	CC	FW	HNE	IS	MN	MM	NBM	NV	NN	NS	SES	SWS	SN	SYD	WN	WS	NSW
No delay^c																	
Aboriginal (%)	63.0	64.3	66.7	63.0	56.3	61.6	62.8	53.5	55.8	67.7	57.2	65.7	57.3	64.4	56.5	56.7	61.5
Non-Aboriginal (%)	69.6	64.8	74.8	71.1	67.3	71.1	70.0	71.9	64.3	74.4	73.8	67.6	70.2	74.7	73.6	70.8	71.5
1-<3 months late																	
Aboriginal (%)	28.7	25.0	22.9	26.7	29.0	26.6	24.5	34.5	33.3	29.0	33.1	22.7	29.3	27.7	30.7	29.5	27.1
Non-Aboriginal (%)	23.8	28.2	19.9	22.6	24.7	23.1	23.4	23.3	26.6	18.3	19.8	24.3	23.0	18.4	20.8	20.9	21.4
3-<7 months late																	
Aboriginal (%)	7.3	8.3	7.5	8.4	12.3	7.8	10.0	10.3	9.9	3.2	9.0	9.0	10.2	5.9	9.9	11.3	8.9
Non-Aboriginal (%)	5.2	4.4	4.2	5.0	5.8	4.8	5.1	3.5	6.9	4.6	4.5	6.0	5.4	4.4	3.9	5.2	5.0
≥7 months late																	
Aboriginal (%)	0.3	1.2	2.3	1.7	1.8	3.4	2.2	1.7	1.0	0.0	0.0	2.0	3.2	1.0	2.6	1.8	2.0
Non-Aboriginal (%)	1.0	1.5	0.7	0.7	1.6	0.9	0.8	0.6	1.6	1.4	0.9	1.1	1.0	1.3	1.1	1.3	1.1

^aCohort born 1 January 2015 – 31 December 2015.

^bCC: Central Coast; FW: Far West; HNE: Hunter New England; IS: Illawarra Shoalhaven; MN: Mid North Coast; MM: Murrumbidgee; NBM: Nepean Blue Mountains; NV: Network with Victoria; NN: Northern NSW; NS: Northern Sydney; SES: South Eastern Sydney; SWS: South Western Sydney; SN: Southern NSW; SYD: Sydney; WN: Western NSW; WS: Western Sydney; NSW: New South Wales.

^cNo delay = second dose of MMR-containing vaccine given between 17-<19 months of age and does not include the small percentage of the second dose of MMR-containing vaccine given early (i.e. <17 months of age).

MMR: measles-mumps-rubella.

Source: Australian Immunisation Register, data as at 31 March 2018.

Conclusion

The NSW Immunisation Program has continued to be successfully delivered during 2017 with gains in immunisation coverage seen in many areas. The annual ‘fully immunised’ coverage estimates for both the 12-month and 60-month milestones increased in 2017. While a decrease in coverage at 24 months of age was seen, this was most likely due to a change in the algorithm for ‘fully

immunised’ at this milestone following the addition of the extra booster dose of DTPa due at 18 months of age.

‘Fully immunised’ estimates at 12 and 60 months of age have continued to improve in 2017 for Aboriginal children across NSW. The gap in coverage between Aboriginal and non-Aboriginal children in NSW has completely closed and the percentage of ‘fully immunised’ children continues

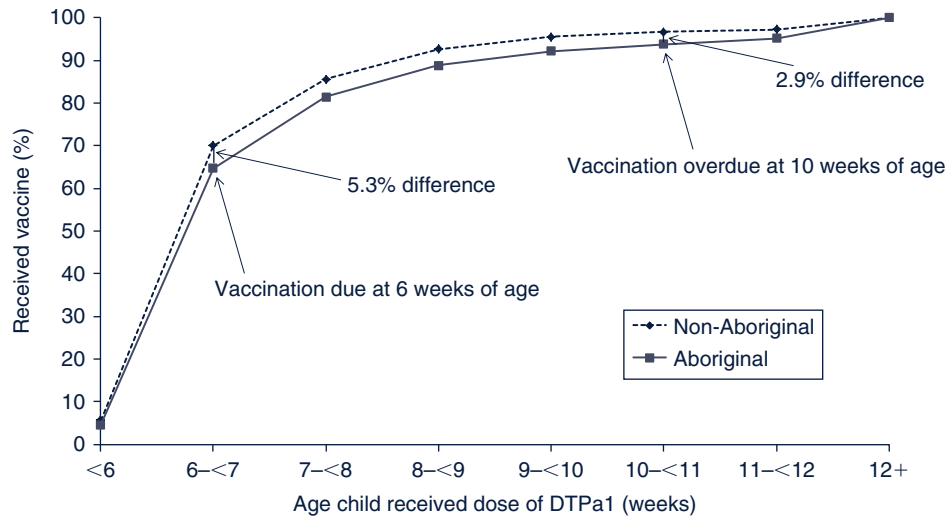


Figure 5. Timeliness of the first dose of DTPa-containing vaccine (DTPa1) by Aboriginal status for the cohort of children born in 2015, NSW, 2017.

Percentage covered = number of children who received vaccine dose at particular ages/the total number of children who received the vaccine dose.

DTPa: diphtheria–tetanus–pertussis (acellular) – paediatric formulation.

Source: Australian Immunisation Register, data as at 31 March 2018.

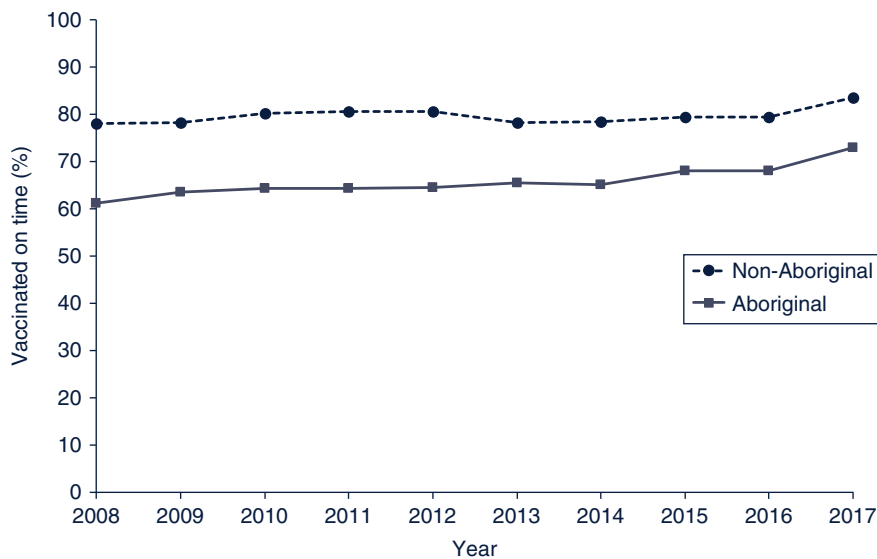


Figure 6. Trends in on time vaccination for the third dose of DTPa-containing vaccine, NSW, 2008–2017.

Percentage vaccinated on time = number of children who received third dose of DTPa-containing vaccine between 5–<7 months of age/the total number of children who received the dose in each year of interest.

DTPa: diphtheria–tetanus–pertussis (acellular) – paediatric formulation.

Source: Australian Immunisation Register, data as at 31 March 2018.

to be higher in Aboriginal children compared with non-Aboriginal children at each milestone. However, there is still a higher percentage of Aboriginal children with vaccination delay for the first and third doses of DTPa-containing vaccine, as well as the second dose of MMR-containing vaccine, compared with non-Aboriginal children. In 2017, there were improvements in the disparity

in ‘on time’ vaccination between Aboriginal and non-Aboriginal children for the third dose of DTPa-containing vaccine and the second dose of MMR-containing vaccine. The NSW Aboriginal Immunisation Healthcare Worker program, funded by NSW Health since July 2012, is likely to have contributed to the observed improvements in Aboriginal coverage and ‘on-time’ vaccination.²⁴

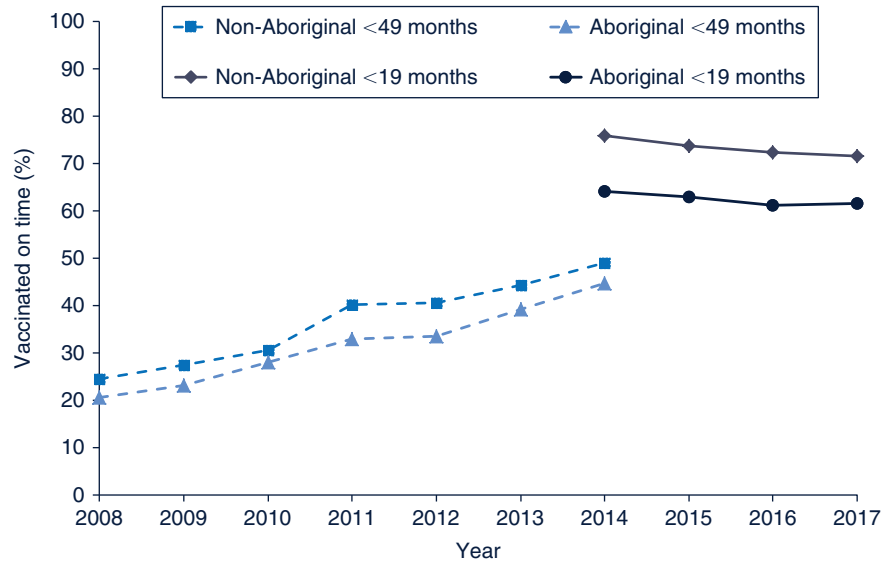


Figure 7. Trends in on time vaccination for the second dose of MMR-containing vaccine, NSW, 2008–2017.

Percentage vaccinated on time = number of children who received second dose of MMR-containing vaccine between 47–<49 months of age (2008–2014) or between 17–<19 months of age (2014–2017)/the total number of children who received the dose in each year of interest.
MMR: measles–mumps–rubella.

Source: Australian Immunisation Register, data as at 31 March 2018.

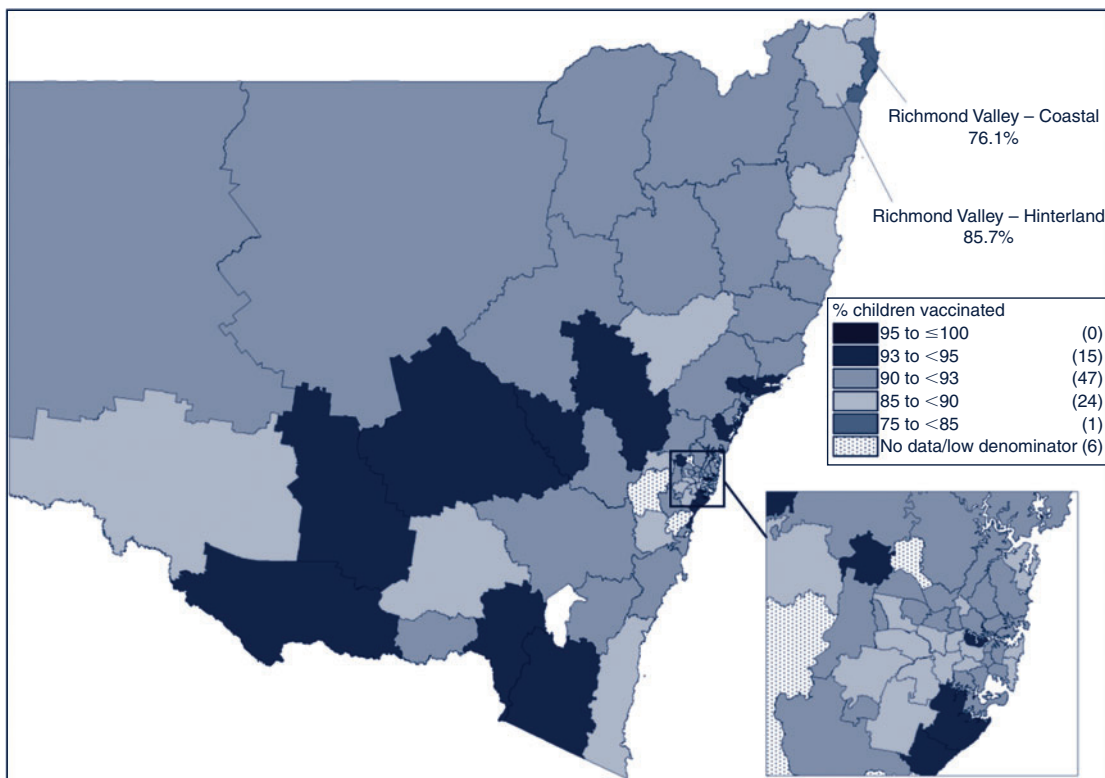


Figure 8. Second dose of rotavirus vaccine coverage at 12 months of age^a by statistical area level 3, NSW, 2017.

^aCohort born 1 January 2016 – 31 December 2016.

Source: Australian Immunisation Register, data as at 31 March 2018.

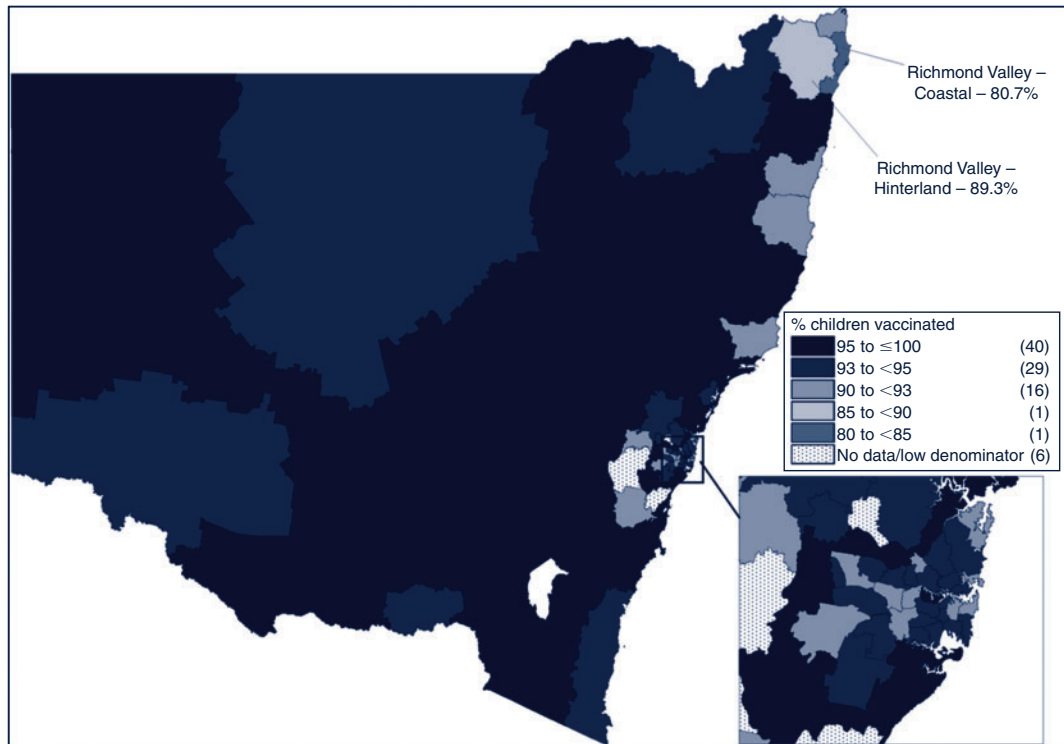


Figure 9. Third dose of 13-valent PCV coverage at 12 months of age^a by statistical area level 3, NSW, 2017.

^aCohort born 1 January 2016 – 31 December 2016.
PCV: pneumococcal conjugate vaccine.

Source: Australian Immunisation Register, data as at 31 March 2018.

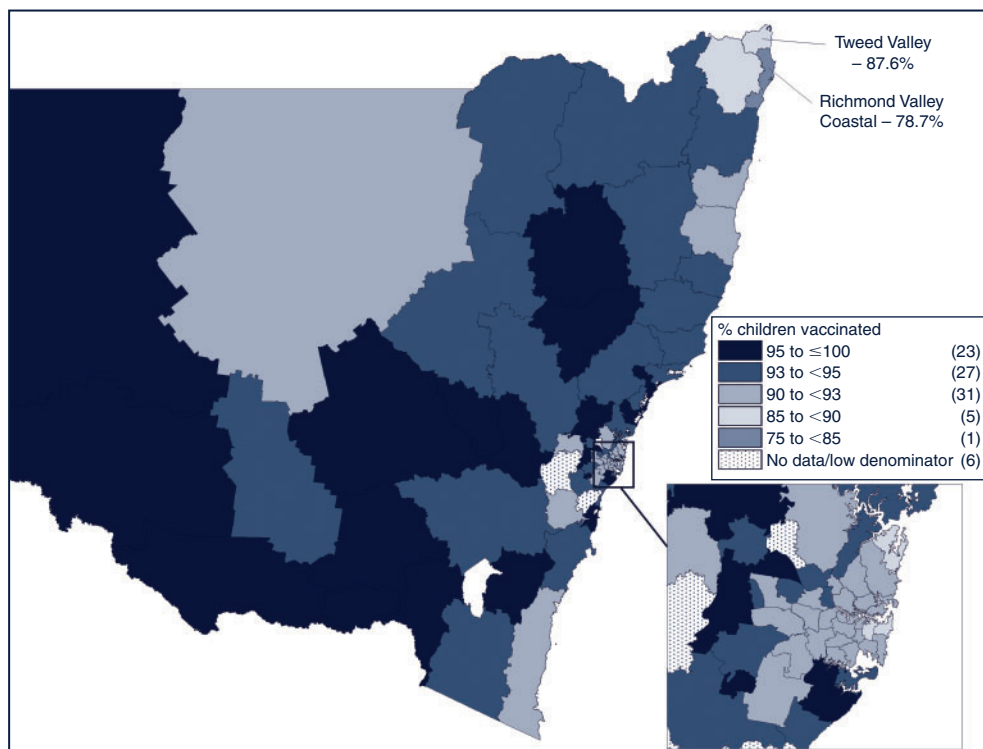


Figure 10. Second dose of MMR-containing vaccine coverage at 24 months of age^a by statistical area level 3, NSW, 2017.

^aCohort born 1 January 2015 – 31 December 2015.
MMR: measles–mumps–rubella.

Source: Australian Immunisation Register, data as at 31 March 2018.

Table 9. Adolescent^a vaccination coverage estimates for individual vaccines, NSW, 2013–2017

Vaccine	2017 Coverage (%)	2017 Doses given	2016 Coverage (%)	2016 Doses given	2015 Coverage (%)	2015 Doses given	2014 Coverage (%)	2014 Doses given	2013 Coverage (%)	2013 Doses given
HPV initiation of schedule ^b – females	86	37 692	86	37 061	87	37 572	87	37 119	86	36 911
HPV completion of schedule ^{b,c} – females	81	35 408	82	35 291	82	35 512	82	35 054	82	34 977
HPV initiation of schedule ^b – males	84	38 610	83	38 505	84	37 945	83	37 155	80	36 268
HPV completion of schedule ^{b,c} – males	78	35 969	80	36 878	80	35 950	78	35 311	76	34 404
dTpa ^b	85	76 531	85	76 342	86	75 633	84	73 856	81	71 918
Varicella ^b	66	59 721	70	62 429	66	58 630	42	37 123	53	46 738
4vMenCV ^{d,e}	72	58 615	na	na	na	na	na	na	na	na
4vMenCV ^{d,f}	76	55 638	na	na	na	na	na	na	na	na

^aCoverage estimates are for school attendees only and do not include doses administered in general practice.
^bYear 7 school attendees.
^cCompletion of HPV vaccination schedule required three doses up to the end of 2016. In 2017 NSW adopted a two-dose HPV schedule in line with the World Health Organization recommendations. HPV vaccination coverage includes catch-up vaccination offered to students in Year 8 in Terms 1–2 in 2018 who commenced the course of HPV vaccine in Year 7 in 2017. Coverage for this cohort is preliminary as data are not yet available for catch-up doses given to students in Terms 3–4.
^dIn 2017 the NSW Meningococcal W Response Program implemented meningococcal ACWY vaccination targeted at older adolescents.
^eYear 11 school attendees.
^fYear 12 school attendees.
dTpa: diphtheria–tetanus–pertussis (acellular) – adolescent and adult formulation.
HPV: human papillomavirus.
4vMenCV: meningococcal ACWY vaccine.
na: not applicable.
Source: NSW School Vaccination Program, data as at 19 June 2018.

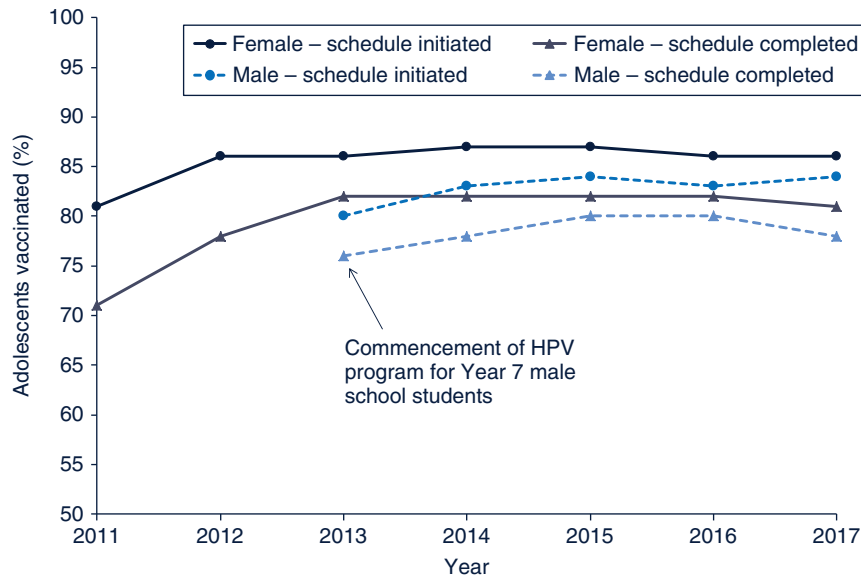


Figure 11. Trends in HPV vaccine coverage for adolescents^a in NSW, 2012–2017^b.

^aAdolescent school attendees (males and females) in Year 7 at time of vaccination. Coverage estimates are for school attendees only and do not include doses administered in general practice.

Schedule initiated – the percentage of year 7 students receiving their first dose of HPV vaccine.

Schedule completed^b – the percentage of Year 7 students completing the HPV vaccine schedule.

^bCompletion of HPV vaccination schedule required three doses up to end of 2016. In 2017, NSW adopted a two-dose HPV schedule in line with the World Health Organization recommendations. Completion of the HPV vaccination schedule from 2012 to 2015 includes catch-up vaccination for students who commenced the course in Year 7 and were provided with catch-up doses in Year 8 in 2012 (to the end of Term 2) and 2014–2017 (to the end of Term 4) respectively. Data for the completion of the HPV vaccination schedule in 2017 is preliminary – it only includes catch-up vaccination offered to students in Year 8 in Terms 1–2 in 2018 as data are not yet available for catch-up doses given to students in Terms 3–4.

HPV: human papillomavirus vaccine.

Source: NSW School Vaccination Program.

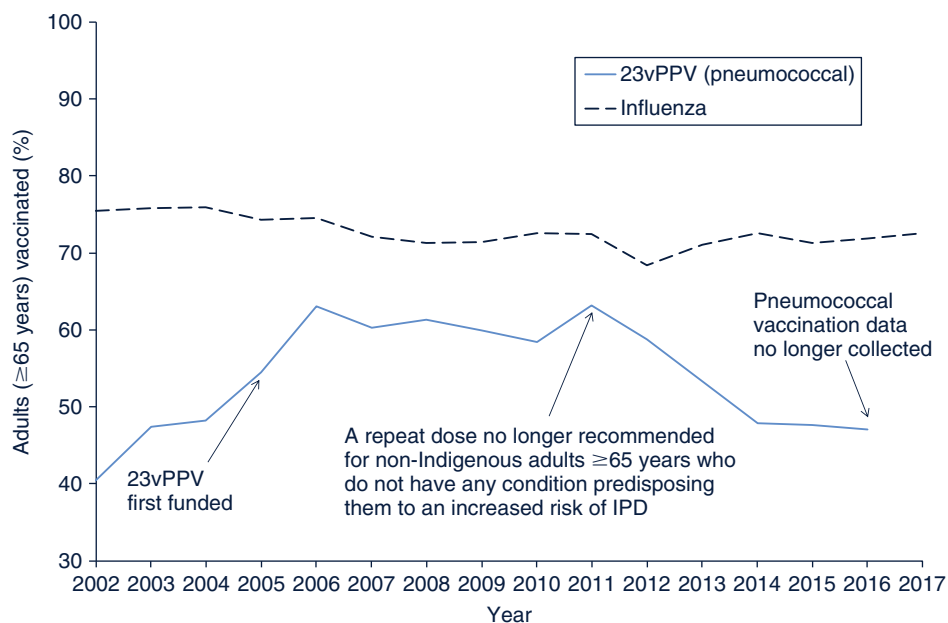


Figure 12. Trends in influenza^a and pneumococcal^b vaccination coverage estimates for older adults, NSW, 2002–2017.

^aAll adults aged 65 years and over who reported vaccination against influenza in the past 12 months.

^bAll adults aged 65 years and over and Aboriginal and Torres Strait Islander adults aged 50–64 years who reported vaccination against pneumococcal disease.

23vPPV: 23-valent pneumococcal polysaccharide vaccine.

Source: New South Wales Population Health Survey (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health. Data from www.healthstats.nsw.gov.au (updated 11 September 2018).

Table 10. Percentage of older adults reporting vaccination against influenza^a by local health district, NSW, 2016–2017

Year reporting influenza vaccination	Local Health District ^b															
	CC	FW	HNE	IS	MNC	MM	NBM	NNSW	NS	SES	SWS	SNSW	SYD	WNSW	WS	NSW
2016	69.9	75.9	74.5	73.6	68.7	71.3	67.1	69.9	65.7	69.6	74.4	75.5	71.1	72.5	75.3	71.6
2017	67.9	76.1	78.3	72.4	73.4	71.2	66.2	71.1	68.4	68.2	73.2	71.9	74.2	71.0	76.0	72.6

^aInfluenza vaccination coverage based on survey respondents aged 65 years and over who reported having been vaccinated against influenza in the previous 12 months.

^bCC: Central Coast; FW: Far West; HNE: Hunter New England; IS: Illawarra Shoalhaven; MNC: Mid North Coast; MM: Murrumbidgee; NBM: Nepean Blue Mountains; NNSW: Northern NSW; NS: Northern Sydney; SES: South Eastern Sydney; SWS: South Western Sydney; SNSW: Southern NSW; SYD: Sydney; WNSW: Western NSW; WS: Western Sydney; NSW: New South Wales.

Source: New South Wales Population Health Survey (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health. Data from www.healthstats.nsw.gov.au (updated 11 September 2018).

The NSW School Vaccination Program is continuing its success with 86% of females and 84% of males in Year 7 receiving the first dose of HPV in 2017. While coverage for adolescent dTpa vaccine remained stable at 85%, coverage for the adolescent dose of varicella vaccine decreased to 66% in 2017, which may reflect children in this cohort having been eligible for vaccination at 18 months of age under the national program that commenced in late 2005. In 2017, approximately three-quarters of Year 11 and Year 12 students were vaccinated as part of the NSW Meningococcal W Response Program.

Almost three-quarters of adults aged 65 years and over who were surveyed in 2017 through the rolling NSW Population Health Survey reported having received seasonal influenza vaccine in the previous 12 months.

The AIR, the NSW School Vaccination Register and the NSW Population Health Survey continue to be essential tools for monitoring the implementation of the National Immunisation Program in NSW. The AIR will become increasingly valuable as a monitoring tool as more adolescent and adult vaccination encounters are reported to it. Continued improvements in overall vaccine coverage have led to greater protection for NSW residents from vaccine-preventable diseases.

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