

NSW Annual Immunisation Coverage Report, 2012

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Abstract: This annual report documents trends in immunisation coverage in NSW for children, adolescents and the elderly, up to and including data for 2012. **Methods:** Data from the Australian Childhood Immunisation Register, the NSW School Immunisation Program and the NSW Population Health Survey were used to calculate various measures of population coverage, coverage for Aboriginal children and vaccination timeliness for Aboriginal and non-Aboriginal children. **Results:** Greater than 90% coverage has been reached for children at 12, 24 and 60 months of age. Delayed receipt of vaccines is still an issue for Aboriginal children. For adolescents, coverage for the first and second doses of human papillomavirus vaccine and the dose of diphtheria, tetanus and acellular pertussis was greater than 80%. Pneumococcal vaccination in the elderly has been steadily rising, although it did drop slightly in 2012, and still remains lower than the influenza coverage estimates. **Conclusion:** This report provides trends in immunisation coverage in NSW across the age spectrum. Completion of the recommended immunisation schedule at the earliest appropriate age should be the public health goal at both the state and local health district level where high levels of vaccine coverage at milestone ages have been achieved.

The *New South Wales (NSW) Annual Immunisation Coverage Report* provides important information on trends and issues in immunisation coverage in NSW to facilitate the monitoring of NSW immunisation 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 Childhood Immunisation Register have been maintained by a system of incentive payments for immunisation providers and carers.² However, changes to immunisation policy, the incentive payment system and changes to the 'fully immunised' coverage algorithms may be impacting on reported vaccination coverage; some recent changes are highlighted in Box 1 and also referred to in this report.

The Australian Childhood Immunisation Register was established on 1 January 1996 by incorporating demographic data from Medicare on all enrolled children aged less than 7 years.³ The operations of the Australian Childhood Immunisation Register have been discussed in detail elsewhere.²

Table 1 presents the NSW Immunisation Program for children in 2012. No new vaccines were introduced to the NSW Immunisation Program during 2012.

Methods

Measuring immunisation coverage using the Australian Childhood Immunisation Register

The cohort method has been used for calculating coverage at the population level (national and state/territory)⁴ since the inception of the Australian Childhood Immunisation Register. Cohort immunisation status is assessed at 12 months of age (for vaccines due at 6 months), 24 months of age (for vaccines due at 12 months), and 5 years of age (for vaccines due at 4 years). A 3-month lag period is allowed for the late notification of immunisations to the Australian Childhood Immunisation Register.⁴ 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 is assumed that earlier vaccinations in the sequence have been given. This assumption has been shown to be valid.^{5,6}

The proportion of children designated as 'fully immunised' was calculated using the number of Medicare-registered children who were completely immunised with the vaccines of interest by the designated age as the numerator and the total number of Medicare-registered

Box 1. Recent significant changes in immunisation policy, immunisation incentives and coverage calculation algorithms

July 2011 – Prevenar 13[®] (13-valent pneumococcal conjugate vaccine, 13vPCV) replaced Prevenar[®] (7-valent pneumococcal conjugate vaccine, 7vPCV) on the NIP for children at 2, 4 and 6 months of age in all states and territories except Northern Territory (adopted 13vPCV from 1 October 2011).

December 2009 – Changes in the coverage calculation algorithms that tightened the rules regarding receipt of *Haemophilus influenzae* type b and hepatitis B vaccines for children aged 12 and 24 months to lead to more accurate measures of *Haemophilus influenzae* type b and hepatitis B vaccine coverage in Australia.

October 2009 – The recommendation by the Australian Technical Advisory Group on Immunisation (ATAGI) that the fourth dose of DTPa vaccine can be given from 3½ years of age instead of the previously recommended 4 years of age.

March 2009 – The recommendation by NSW Health and ATAGI to parents and immunisation providers to consider bringing the first dose of DTPa forward to 6 weeks of age to provide earlier protection.

January 2009 – Changes to the overdue rules so that children were classified as overdue for pre-school boosters at 4 years and 1 month instead of the previous 5 years of age. This applied to parental and provider incentive payments.

The Maternity Immunisation Allowance changed from a full payment at 18–24 months of age to being paid in two instalments: the first when the child is fully immunised and aged between 18 and 24 months; and the second when the child is fully immunised and aged between 4 and 5 years. This applied only to children who had not yet already received the full payment at 2 years of age.

October 2008 – The General Practice Immunisation Incentive Service Incentive Payment (\$18.50 for completing a schedule point) ceased. Information payments of \$6 were retained.

December 2007 – Coverage algorithm for immunisations due at 4 years of age changed to assess children at 5 years, not 6 years.

Table 1. Schedule of vaccines delivered through the NSW Immunisation Program, 2012

Age	Vaccine							
Childhood vaccines								
Birth	Hep B							
6–8 weeks	Hep B	DTPa	Hib	Polio		PCV		Rotavirus
4 months	Hep B	DTPa	Hib	Polio		PCV		Rotavirus
6 months	Hep B	DTPa	Hib	Polio		PCV		
12 months			Hib		MMR			Men C
18 months						VZV		
4 years		DTPa		Polio	MMR			
Adolescent vaccines								
12 years	Hep B ^a	dTpa				VZV ^a	HPV ^b	
15 years		dTpa						Flu ^e Pneumo ^d
Adult vaccines								
≥50 years								Flu ^e Pneumo ^c
65 years								Flu ^e Pneumo

Hep B: hepatitis B vaccine; DTPa: diphtheria, tetanus, and acellular pertussis-containing vaccine; Hib: *Haemophilus influenzae* type b vaccine; MMR: measles–mumps–rubella vaccine; VZV: varicella zoster virus vaccine; PCV: pneumococcal conjugate vaccine; Men C: meningococcal C vaccine; HPV: human papilloma virus vaccine (females only); Flu: influenza vaccine; Pneumo: Pneumovax 23 vaccine.

^aCatch-up only.

^bFemales only.

^cAll Aboriginal adults only.

^dAboriginal adults ≥15 years with medical risk factors.

^eAnnual vaccination, all aged ≥6 months with medical risk factors, Aboriginal adults ≥15 years, non-Aboriginal adults ≥65 years.

Source: National Immunisation Program Schedule.

children in the age cohort as the denominator. 'Fully immunised' at 12 months of age was defined as a child having a record on the Australian Childhood Immunisation Register of three doses of a diphtheria (D)-, tetanus (T)- and pertussis (P)-containing vaccine, three doses of polio vaccine, three doses of *Haemophilus influenzae* type b (Hib) vaccine and three doses of hepatitis B vaccine. 'Fully immunised' at 24 months of age was defined as three or four doses of a DTP-containing vaccine, three doses of polio vaccine, four doses of Hib vaccine, three doses of hepatitis B vaccine, and one dose of a measles- mumps- and rubella (MMR)-containing vaccine. 'Fully immunised' at 5 years of age was defined as four or five doses of a DTP-containing vaccine, four doses of polio vaccine, and two doses of an MMR-containing vaccine.

Immunisation coverage estimates were also calculated for individual National Immunisation Program vaccines, including those not included in calculations for incentive payments and 'fully immunised' status. They were: the third dose of pneumococcal conjugate vaccine and the second dose of rotavirus vaccine by 12 months of age; and one dose each of varicella and meningococcal C vaccines by 24 months of age.

Timeliness

We categorised delayed vaccination as 1–6 months and greater than 6 months. All children included in the analysis were old enough to potentially experience delays in immunisation greater than 6 months for immunisation due by 24 months of age or earlier. Timeliness of different vaccines and doses was also compared by plotting the cumulative percentage receiving each vaccine dose by age, with the proportion ever immunised set as 100%.

Local health districts

Immunisation coverage estimates and vaccination delay estimates are presented in this report by NSW local health district (LHD). LHDs were introduced in January 2011, replacing area health services. There are 15 LHDs in NSW, eight in metropolitan NSW and seven in rural and regional NSW.

Aboriginal status

Indigenous status on the Australian Childhood Immunisation Register 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 Australian Childhood Immunisation Register. For this report we considered two categories of children: 'Aboriginal' (Indigenous) and 'non-Aboriginal' (non-Indigenous). Children with unknown Aboriginal status

were presumed to be 'non-Aboriginal'. Coverage estimate time trends are presented from 2004 only, due to poor rates of reporting of Aboriginal status prior to that time.⁷

Small area coverage

Coverage was calculated for the Australian Bureau of Statistics (ABS)-defined SA3s (statistical area level 3), which form part of the new Australian Statistical Geography Standard (ASGS).⁸ We chose SA3s 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 4 to 3500 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 impreciseness of any coverage estimates calculated for these areas. Maps were created using MapInfo mapping software (version 12, MapInfo Corporation, New York, USA) and the ABS Census Boundary Information. As postcode is the only geographical indicator on the Australian Childhood Immunisation Register, the ABS Postal Area to Statistical Area Level 3 Concordance 2011 was used to match Australian Childhood Immunisation Register residential postcodes of the children to SA3s.⁹

Vaccine objectors/No vaccines recorded

Parents who object to vaccination can lodge a conscientious objection to immunisation form with the Australian Childhood Immunisation Register. This renders them eligible for immunisation incentive payments despite their children not being vaccinated. Other parents may also object to immunisation but refuse to lodge any official objection. We used the percentage of children with no vaccines recorded on the Australian Childhood Immunisation Register as a proxy measure of the total number of children whose carers objected to immunisation, whether or not they are registered as such. Proportions of registered vaccine objectors and children with no vaccines recorded by LHD were calculated from the cohort of children registered with Medicare and born between 1 January 2005 and 31 December 2011; at the time of data extraction these children were aged between 12 and 72 months. We chose this cohort when calculating proportions so that children under the age of 12 months were not included, to allow sufficient time for registration of objection and to exclude infants late for vaccination.

Coverage in the elderly and adolescents

Influenza and pneumococcal vaccination coverage estimates in the elderly were from the 2012 NSW Population Health Survey. This is a rolling random digit-dialled telephone survey, with vaccination status determined from patient recall at the time of the interview. Influenza and

pneumococcal vaccination coverage estimates are based on 4019 and 3721 respondents in NSW, respectively.¹⁰ Coverage for vaccines given to adolescents was collected from the NSW School Immunisation Program. Vaccination status is recorded by school immunisation teams and counts collated by LHDs and NSW Health. The denominator is the school population, start of year enrolments. The coverage rates may underestimate the 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.¹¹

Summary of results

Coverage

- In NSW, overall coverage measured at 12 and 24 months is stable and coverage at 5 years of age is improving (Figure 1).
- For all LHDs in NSW except Mid North Coast and Northern NSW, ‘fully immunised’ coverage at 12 months of age and coverage for all individual vaccines (except rotavirus) is greater than 90% (Table 2 and Figure 2).
- Coverage for rotavirus is lower than other vaccines as catch-up cannot be given once infants turn 15 weeks (dose 1) and 25 weeks (dose 2) of age.
- Similarly, for all LHDs except Northern NSW, ‘fully immunised’ coverage at 24 months of age and coverage

for all individual vaccines (except varicella) is also greater than 90% (Table 3 and Figure 3).

- Coverage for varicella is lower and probably due to it being the only vaccine given at 18 months of age.
- Recorded ‘fully immunised’ coverage for the 5-year age group and coverage for all individual vaccines is greater than 90% for many LHDs (Table 4).
- In 2012, the 5-year coverage for DTPa, polio and MMR continued to increase markedly from 2011 to be slightly below 92% (Table 4 and Figures 1 and 4).

Indigenous coverage

- In the 2010 report, coverage was lower for Aboriginal children than non-Aboriginal children at the 12-month and 60-month age milestones, but there was little difference at 24 months of age. In 2012, there is now little difference in coverage at 24 and 60 months between Aboriginal and non-Aboriginal children with a disparity only occurring for children at the 12-month milestone (Table 5).
- The disparity in coverage between Aboriginal and non-Aboriginal children at the 12-month milestone also exists at the LHD level but not across all LHDs (Table 6). In some LHDs coverage is higher for Aboriginal children (e.g. Northern Sydney and Northern NSW) and in some LHDs coverage is much lower (e.g. Sydney, Western Sydney, Far West, Hunter New England, and

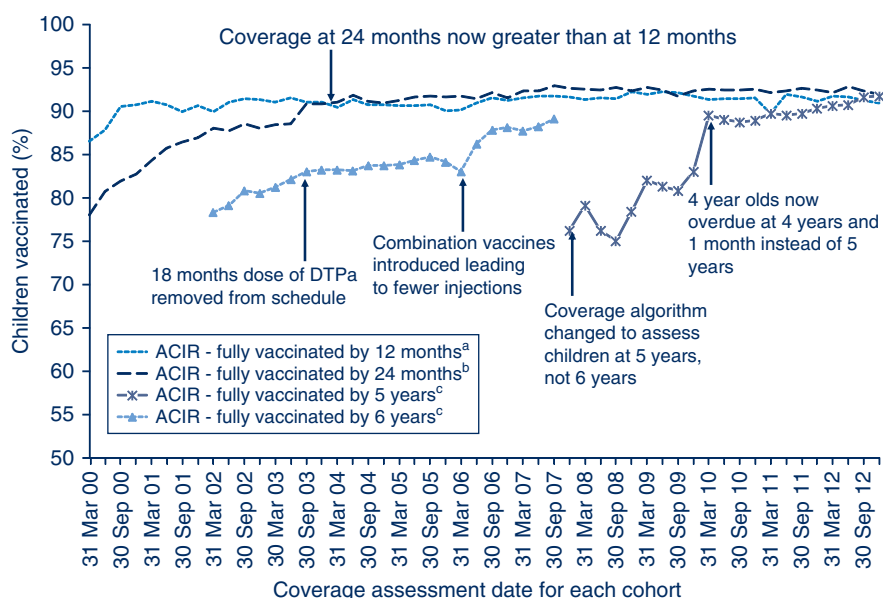


Figure 1. Trends in ‘fully immunised’^{a,b,c} vaccination coverage, NSW, 2000–2012, at four census points.

^aThree doses of a diphtheria (D)-, tetanus (T)- and pertussis (P)-containing vaccine, three doses of polio vaccine, two or three doses of PRP-OMP containing *Haemophilus influenzae* type b (Hib) vaccine or three doses of any other Hib vaccine, and two or three doses of Comvax hepatitis B vaccine or three doses of all other hepatitis B vaccines.

^bThree or four doses of a DTP-containing vaccine, three doses of polio vaccine, three or four doses of PRP-OMP containing Hib vaccine or four doses of any other Hib vaccine, three or four doses of Comvax hepatitis B vaccine or four doses of all other hepatitis B vaccines, and one dose of a measles- mumps- and rubella (MMR)-containing vaccine.

^cFour or five doses of a DTP-containing vaccine, four doses of polio vaccine, and two doses of an MMR-containing vaccine.

Source: Australian Childhood Immunisation Register.

Table 2. Percentage of children immunised at 12 months of age, by vaccine for each local health district in NSW, compared with NSW and Australia, 2012

Vaccine	Local Health District ^a																NSW %	Australia %
	CC %	FW %	HNE %	IS %	MN %	MM %	NBM %	NV %	NN %	NS %	SES %	SWS %	SN %	SYD %	WN %	WS %		
Diphtheria, tetanus, pertussis	93.1	91.9	93.7	92.6	89.0	93.3	92.6	94.6	86.1	92.5	91.3	91.1	91.9	92.2	91.8	92.0	92.0	92.2
Poliomyelitis	93.0	91.9	93.7	92.6	89.1	93.3	92.5	94.8	86.0	92.4	91.3	91.0	91.7	92.1	91.8	91.9	91.9	92.2
<i>Haemophilus influenzae</i> type b	92.9	90.7	93.5	92.6	88.8	93.3	92.3	94.4	85.8	91.7	90.9	90.8	91.6	91.7	91.8	91.4	91.6	91.9
Hepatitis B	92.7	91.3	93.5	92.5	88.7	93.2	92.3	94.6	85.7	91.3	90.9	90.8	91.6	91.5	91.8	91.3	91.5	91.7
Rotavirus	86.5	88.7	87.7	86.0	83.4	87.4	87.2	90.8	81.0	85.6	86.3	85.9	87.5	86.6	87.1	86.5	86.3	83.6
PCV ^b	92.2	91.9	92.7	91.6	87.1	92.5	91.7	93.9	84.3	90.6	89.4	90.0	90.9	90.0	91.0	90.4	90.5	90.9
Fully immunised ^c	92.6	90.7	93.4	92.5	88.7	93.2	92.2	94.1	85.5	90.7	90.6	90.6	91.4	91.2	91.7	90.9	91.2	91.5
Fully immunised (including rotavirus and PCV)	83.6	82.6	84.9	83.2	79.1	83.7	83.2	86.2	76.2	82.2	81.9	81.5	84.5	82.9	82.8	81.8	82.4	82.4
Total number of children	4124	344	11 354	4441	2449	2932	4991	609	3188	10 388	10 833	13 112	2192	7834	3775	13 990	96 673	298 882

Birth cohort from 2011.

^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; NSW: New South Wales.

^b7-valent or 13-valent pneumococcal conjugate vaccine.

^cThree doses of a diphtheria (D), tetanus (T) and pertussis (P)-containing vaccine, three doses of polio vaccine, two or three doses of PRP-OMP containing *Haemophilus influenzae* type b (Hib) vaccine or three doses of any other Hib vaccine, and two or three doses of Comvax hepatitis B vaccine or three doses of all other hepatitis B vaccines.

Source: Australian Childhood Immunisation Register.

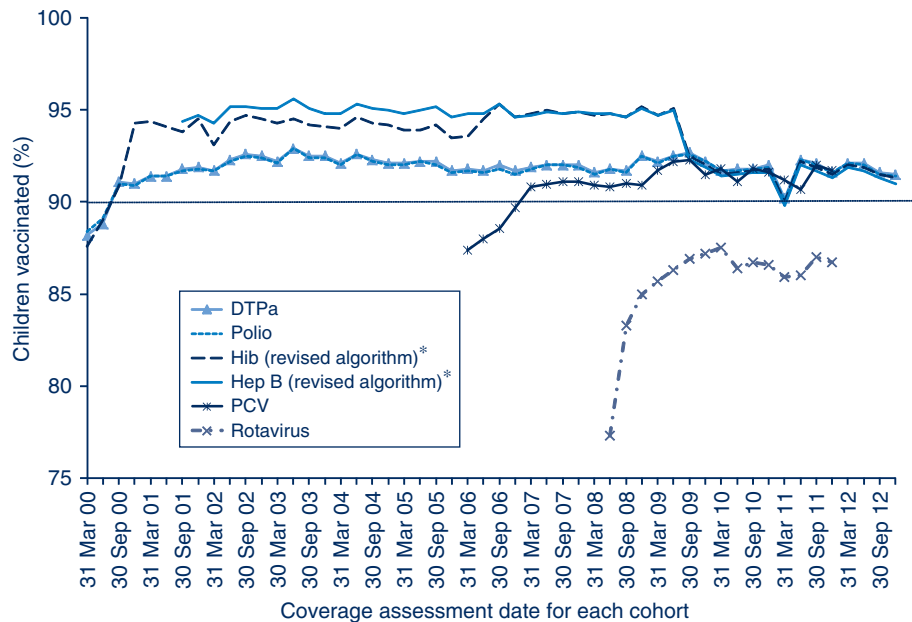


Figure 2. Trends in vaccination coverage estimates by vaccine at 12 months of age (third dose of DTPa, polio, hepatitis B, Hib, rotavirus and PCV), NSW, 2000–2012.

By 3-month birth cohorts born between 1 January 1999 and 31 December 2011. Coverage assessment date was 12 months after the last birth date of each cohort.

^aPrior to September 2009, the algorithm stated that receipt of two or three doses of *Haemophilus influenzae* type b (Hib) and hepatitis B vaccines rendered a child 'fully immunised' for these vaccines. After September 2009, changes to the algorithm were made to tighten the rules regarding 'fully immunised' for Hib and hepatitis B vaccines.

PCV: pneumococcal conjugate vaccine

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

Source: Australian Childhood Immunisation Register.

Table 3. Percentage of children immunised at 24 months of age, by vaccine for each local health district in NSW, compared with NSW and Australia, 2012

Vaccine	Local Health District ^a																NSW %	Australia %
	CC %	FW %	HNE %	IS %	MN %	MM %	NBM %	NV %	NN %	NS %	SES %	SWS %	SN %	SYD %	WN %	WS %		
Diphtheria, tetanus, pertussis	94.9	95.2	95.9	95.1	93.1	96.0	95.5	96.6	89.7	94.0	93.6	94.3	95.3	94.2	96.0	94.2	94.4	94.5
Poliomyelitis	94.9	94.9	95.9	95.0	93.1	96.0	95.4	96.6	89.7	93.9	93.5	94.2	95.1	94.2	96.0	94.2	94.4	94.5
<i>Haemophilus influenzae</i> type b	95.2	97.0	96.2	95.7	93.2	96.5	96.0	96.7	89.8	93.9	93.7	95.1	95.6	94.5	96.6	94.4	94.8	94.6
Hepatitis B	94.6	94.9	95.6	94.8	92.9	96.0	95.3	96.1	89.4	92.7	92.6	94.0	94.6	93.4	95.9	93.6	93.9	93.9
Measles–mumps–rubella	94.6	94.9	95.6	94.7	92.4	95.8	94.7	95.4	88.2	92.5	92.7	94.0	94.9	93.3	95.4	93.7	93.8	93.9
Varicella	83.0	85.8	85.7	83.0	81.0	86.6	83.1	87.2	76.8	81.9	82.3	82.6	87.1	82.8	85.2	83.5	83.2	84.4
Meningococcal C	94.4	94.2	95.4	94.2	92.1	95.5	94.6	95.1	87.9	92.2	92.3	93.6	94.8	92.9	95.3	93.1	93.4	93.4
Fully immunised ^b	93.2	92.4	94.4	93.2	91.1	94.7	93.4	94.7	86.9	90.2	90.4	92.1	93.5	91.1	94.2	91.5	92.0	92.1
Fully immunised (including varicella and meningococcal C)	81.3	83.8	84.4	81.2	80.1	85.5	81.4	86.6	75.3	79.0	79.8	80.0	85.5	80.2	83.5	80.8	81.0	82.5
Total number of children	4024	394	11361	4535	2441	3087	4841	673	3302	11047	10695	13054	2314	7675	3951	13923	97981	301155

Birth cohort from 2010.

^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; NSW: New South Wales.

^bThree or four doses of a diphtheria, tetanus and acellular pertussis-containing vaccine, three doses of polio vaccine, three or four doses of PRP-OMP containing *Haemophilus influenzae* type b (Hib) vaccine or four doses of any other Hib vaccine, three or four doses of Comvax hepatitis B vaccine or four doses of all other hepatitis B vaccines, and one dose of a measles- mumps- and rubella-containing vaccine.

Source: Australian Childhood Immunisation Register.

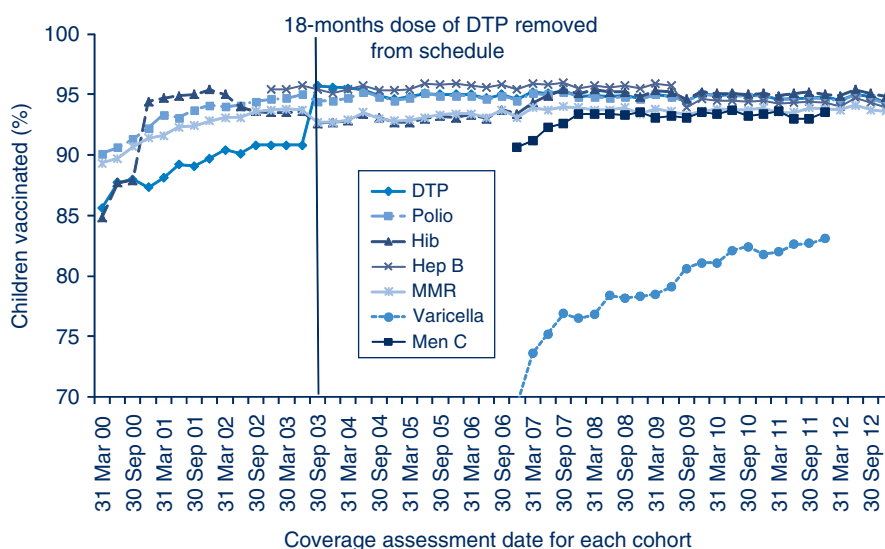


Figure 3. Trends in vaccination coverage estimates by vaccine at 24 months of age (third dose of DTP^a (fourth dose – pre-September 2003), third dose of polio, third dose of hepatitis B, third or fourth dose of Hib, MMR, one dose of varicella and one dose of Men C), NSW 2000–2012.

By 3-month birth cohorts born between 1 January 1998 and 31 December 2010. Coverage assessment date was 24 months after the last birth date of each cohort.

DTP^a: diphtheria–tetanus–pertussis (acellular) – paediatric formulation

Hep B: hepatitis B

Hib: *Haemophilus influenzae* type b

Men C: meningococcal C

MMR: measles–mumps–rubella

Source: Australian Childhood Immunisation Register.

Table 4. Percentage of children immunised at 5 years of age, by vaccine for each local health district in NSW, compared with NSW and Australia, 2012

Disease	Local Health District ^a																NSW %	Australia %
	CC %	FW %	HNE %	IS %	MN %	MM %	NBM %	NV %	NN %	NS %	SES %	SWS %	SN %	SYD %	WN %	WS %		
Diphtheria, tetanus, pertussis	92.8	91.9	94.1	93.8	90.3	93.7	92.7	94.4	86.0	89.5	90.0	92.4	91.2	89.9	93.5	91.4	91.6	91.5
Poliomyelitis	92.7	91.9	94.1	93.8	90.1	93.7	92.6	94.4	86.1	89.4	90	92.4	91	89.8	93.4	91.4	91.5	91.5
Measles–mumps–rubella	92.7	92.2	93.9	93.7	90.0	93.7	92.7	94.6	85.9	89.0	89.8	92.4	90.9	89.5	93.4	91.2	91.4	91.4
Fully immunised ^b	92.3	91.4	93.8	93.5	89.6	93.4	92.3	93.8	85.5	88.6	89.4	92.0	90.5	89.0	93.2	90.8	91.0	91.0
Total number of children	4399	384	11740	4916	2617	3255	5066	680	3662	11435	10205	13733	2430	6604	4034	13730	99639	279257

Birth cohort from 2007.

^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; NSW: New South Wales.

^bFour or five doses of a diphtheria, tetanus and acellular pertussis-containing vaccine, four doses of polio vaccine, and two doses of a measles- mumps- and rubella-containing vaccine.

Source: Australian Childhood Immunisation Register.

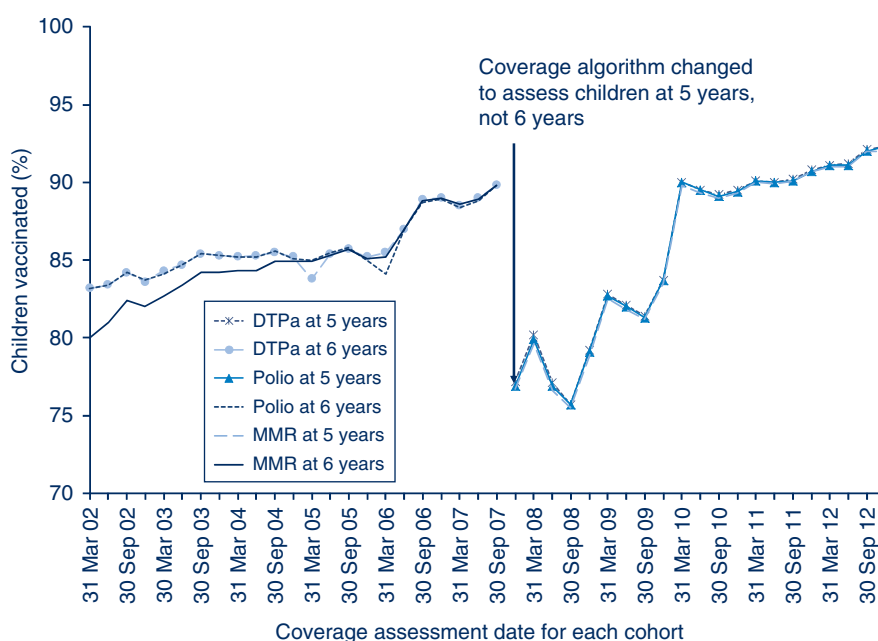


Figure 4. Trends in vaccination coverage estimates by vaccine (fourth dose of DTPa and polio and second dose of MMR) at 5 years of age (6 years up to December 2007), NSW 2002–2012.

By 3-month birth cohorts born between 1 January 1996 and 31 December 2007. 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. DTPa: diphtheria–tetanus–pertussis (acellular) – paediatric formulation. MMR: measles–mumps–rubella

Source: Australian Childhood Immunisation Register.

Illawarra Shoalhaven). A similar pattern is seen at the 24-month milestone (Table 6).

- In 2012, at the 60-month milestone, there are nine LHDs with ‘fully immunised’ coverage higher for Aboriginal than non-Aboriginal children (Table 6). This was not the case in 2010 where coverage was lower for Aboriginal children in all LHDs.

Adolescent coverage

- Coverage in adolescents varies by vaccine and dose with better coverage for the first and second doses of human papillomavirus vaccine (HPV) and the dose of dTpa in Year 7 attendees (Table 7). Across the 3 years (2010–2012) there has been a considerable increase in coverage for adolescents for all vaccines.

Table 5. Vaccination coverage estimates by age, disease and Aboriginal status in NSW, 2012

Disease	Milestone age	Aboriginal	Non-Aboriginal
Diphtheria–tetanus–pertussis	12 months ^a	86.7	92.2
	24 months ^b	93.9	94.4
	5 years ^c	91.9	91.5
Poliomyelitis	12 months ^a	86.6	92.1
	24 months ^b	93.9	94.4
	5 years ^c	91.8	91.5
<i>Haemophilus influenzae</i> type b	12 months ^a	86.5	91.8
	24 months ^b	95.1	94.8
	5 years ^c	NI	NI
Hepatitis B	12 months ^a	86.6	91.7
	24 months ^b	93.9	93.9
	5 years ^c	NI	NI
Measles–mumps–rubella	12 months ^a	NI	NI
	24 months ^b	93.8	93.8
	5 years ^c	92.0	91.4
Varicella	12 months ^a	NI	NI
	24 months ^b	80.1	83.1
	5 years ^c	NI	NI
Meningococcal C	12 months ^a	NI	NI
	24 months ^b	93.5	93.4
	5 years ^c	NI	NI
Pneumococcal conjugate vaccine	12 months ^a	85.8	90.8
	24 months ^b	NI	NI
	5 years ^c	NI	NI
Rotavirus	12 months ^a	79.8	86.6
	24 months ^b	NI	NI
	5 years ^c	NI	NI

^aBirth cohort born 1 January 2011–31 December 2011.
^bBirth cohort born 1 January 2010–31 December 2010.
^cBirth cohort born 1 January 2007–31 December 2007.
NI: this vaccine at this age milestone is not included in the calculation of coverage estimates
Source: Australian Childhood Immunisation Register.

- Coverage estimates do not include doses administered in general practice.

Coverage in the elderly

- The proportion of people aged ≥ 65 years reporting vaccination for influenza in the past 12 months has remained relatively stable and over 70% in NSW during the period 2002–2012 (Figure 5 and Table 8). However, the percentage reporting pneumococcal vaccination in the previous 5 years (23vPPV) has been steadily rising, although it has remained lower than the influenza coverage estimates (Figure 5 and Table 8).

Timeliness

- For the third dose of DTPa and second dose of MMR vaccines, there is significantly greater delay in immunisation for Aboriginal children than non-Aboriginal children (Figures 6 and 7). However, the disparities

have decreased from 2010. This disparity in vaccination delay for the third dose of DTPa between Aboriginal and non-Aboriginal children varies between LHDs (Table 9). However, for the second dose of MMR vaccine there are some LHDs where delay is greater for non-Aboriginal children (Table 10).

- During most of 2012, more than 70% of children in NSW received their first dose of hexavalent combination vaccine between 6 and less than 8 weeks (Figure 8). This percentage has been increasing since 2009 when vaccination at 6 weeks was encouraged to provide early protection against whooping cough.

Small area coverage

- Rotavirus (76.1–93.2%), pneumococcal conjugate (79.6–95.2%), and the second dose of MMR vaccine (79–96.8%) coverage for small areas varied across the state (Figures 9–11).

Table 6. Percentage of children fully immunised at 12 months, 24 months and 5 years of age, by Aboriginal status for each local health district in NSW, compared with NSW and Australia, 2012

Child age and Aboriginal status	Local Health District ^a														NSW %	Australia %	
	CC %	FW %	HNE %	IS %	MN %	MM %	NBM %	NV %	NN %	NS %	SES %	SWS %	SN %	SYD %			WN %
12 months – fully immunised^b																	
Aboriginal	89.9	84.9	88.1	87.9	87.7	85.1	89.2	95.1	93.0	91.7	86.4	86.6	89.2	81.4	84.2	82.0	85.7
Non-Aboriginal	92.8	92.1	93.9	92.8	88.8	93.9	92.3	94.0	85.8	90.7	90.6	90.6	91.6	91.4	93.4	91.0	91.8
12 months – fully immunised (including rotavirus and PCV)																	
Aboriginal	76.6	75.8	78.1	78.6	67.7	61.6	76.1	70.7	70.6	83.3	77.3	76.4	80.8	69.8	71.5	73.5	68.9
Non-Aboriginal	84.0	84.2	85.6	83.5	80.5	85.7	83.5	87.3	76.8	82.2	82.0	81.6	84.8	83.1	85.4	81.9	83.0
24 months – fully immunised^c																	
Aboriginal	95.6	89.5	92.7	94.0	90.4	91.0	91.4	100	92.0	89.7	92.2	89.4	91.6	85.6	91.4	85.3	91.5
Non-Aboriginal	93.1	93.1	94.5	93.2	91.2	95.0	93.4	94.3	86.4	90.2	90.4	92.1	93.6	91.2	94.8	91.6	92.0
24 months – fully immunised (including varicella and meningococcal C)																	
Aboriginal	79.6	75.0	79.0	83.8	78.0	79.1	75.3	84.1	79.3	87.2	77.4	72.8	77.9	70.0	77.5	66.7	80.1
Non-Aboriginal	81.4	85.9	84.9	81.0	80.4	86.0	81.6	86.8	74.9	79.0	79.8	80.2	86.0	80.3	84.7	81.0	82.6
5 years – fully immunised^d																	
Aboriginal	96.2	91.4	93.3	96.4	90.8	93.6	90.8	93.6	91.3	83.8	93.0	95.4	88.0	88.6	88.8	85.6	91.0
Non-Aboriginal	92.2	91.4	93.8	93.4	89.5	93.7	92.4	93.8	84.9	88.6	89.4	91.9	90.6	89.0	94.0	90.9	91.0

^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 Sydney; SYD: Sydney; WN: Western NSW; WS: Western Sydney; NSW: New South Wales.

^bThree doses of a diphtheria (D), tetanus (T) and pertussis-containing (P) vaccine, three doses of polio vaccine, two or three doses of PRP-OMP containing *Haemophilus influenzae* type b (Hib) vaccine or three doses of any other Hib vaccine, and two or three doses of Comvax hepatitis B vaccine or three doses of all other hepatitis B vaccines.

^cThree or four doses of a DTP-containing vaccine, three doses of polio vaccine, three or four doses of PRP-OMP containing Hib vaccine or four doses of any other Hib vaccine, three or four doses of Comvax hepatitis B vaccine or four doses of all other hepatitis B vaccines, and one dose of a measles- mumps- and rubella (MMR)-containing vaccine.

^dFour or five doses of a DTP-containing vaccine, four doses of polio vaccine, and two doses of an MMR-containing vaccine.

Source: Australian Childhood Immunisation Register.

Table 7. Vaccination coverage estimates for individual vaccines, NSW adolescent school attendees in NSW, 2012

Vaccine	2012 Coverage (%)	2012 Doses given	2011 Coverage (%)	2011 Doses given	2010 Coverage (%)	2010 Doses given
HPV dose 1 ^a	86	36 811	81	34 524	77	32 975
HPV dose 2 ^a	83	35 749	76	32 582	72	30 793
HPV dose 3 ^a	73	31 562	71	30 426	66	28 537
Hepatitis B dose 1 ^a	69	60 925	68	30 426	63	54 701
Hepatitis B dose 2 ^a	63	54 948	63	53 517	57	49 507
dTpa ^a	81	70 997	77	65 756	70	61 262
Varicella ^a	50	43 714	45	38 409	32	27 775
dTpa ^b	67	58 065	66	57 633	63	56 384

^aYear 7 school attendees.

^bYear 10 school attendees.

HPV: human papillomavirus (does not include catch-up doses administered in 2013)

dTpa: diphtheria–tetanus–pertussis (acellular) – adolescent and adult formulation

Source: NSW School Immunisation Program.

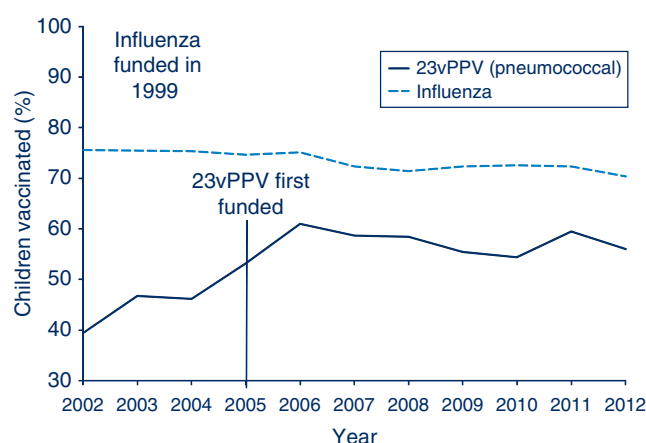


Figure 5. Trends in vaccination coverage estimates by vaccine for adults aged 65 years and over in NSW, vaccinated against pneumococcal disease in the last 5 years and vaccinated against influenza in the last 12 months, 2002–2012.

23vPPV: 23-valent pneumococcal polysaccharide vaccine

Source: NSW Population Health Survey 2012 (HOIST). Centre for Epidemiology and Evidence, NSW Ministry of Health.

Table 8. Percentage of adults aged 65 years and over reporting vaccination^a against pneumococcal disease and influenza for each Local Health District in NSW, and for NSW, 2012

Vaccine	Local Health District ^b													NSW		
	CC	FW	HNE	IS	MNC	M	NBM	NNSW	NS	SES	SWS	SNSW	SYD		WNSW	WS
Pneumococcal % vaccinated	60.6	52.2	63.1	54.3	58.6	67.1	47.7	62.0	48.2	55.8	54.1	57.0	45.1	54.4	55.7	56.0
Influenza % vaccinated	72.8	67.9	74.3	70.5	72.5	74.3	67.2	71.7	68.1	69.2	64.9	73.1	68.5	71.7	70.6	70.4

^aVaccinated against pneumococcal disease in the last 5 years and vaccinated against influenza in the last 12 months.

^bCC: Central Coast; FW: Far West; HNE: Hunter New England; IS: Illawarra Shoalhaven; MNC: Mid North Coast; M: 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 2012 (HOIST). Centre for Epidemiology and Research, NSW Ministry of Health.

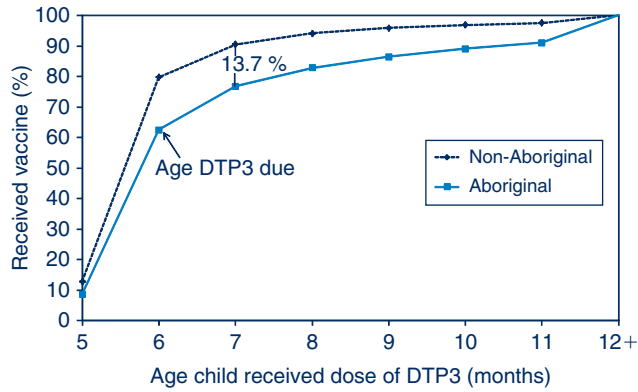


Figure 6. Timeliness of the third dose of DTPa vaccine (DTP3) by Aboriginal status for the cohort of children born in 2010 in NSW.

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 Childhood Immunisation Register.

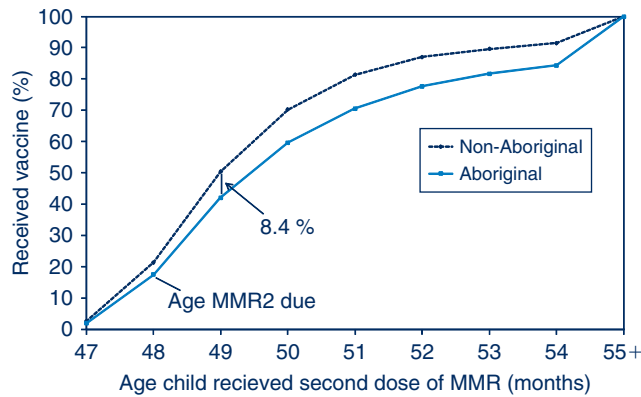


Figure 7. Timeliness of the second dose of MMR vaccine by Aboriginal status for the cohort of children born in 2006 in NSW.

Percentage covered = number of children who received vaccine dose at particular ages/the total number of children who received the vaccine dose.
 MMR: measles–mumps–rubella

Source: Australian Childhood Immunisation Register.

Table 9. Percentage of children with vaccination delay for the third dose of DTPa by Aboriginal status for each local health district for the cohort of children born in NSW in 2010

Vaccination delay and Aboriginal status	Local Health District ^a																
	CC	FW	HNE	IS	MN	MM	NBM	NV	NN	NS	SES	SWS	SN	SYD	WN	WS	NSW
1–6 months late																	
Aboriginal (%)	25.6	31.0	25.8	23.5	34.3	27.4	24.7	25.0	26.8	16.2	18.2	28.9	22.1	24.4	29.6	24.4	26.7
Non-Aboriginal (%)	18.6	18.3	14.1	18.2	16.8	15.8	18.1	15.6	18.5	13.1	14.0	17.5	15.0	13.1	15.3	14.9	15.4
>6 months late																	
Aboriginal (%)	4.0	9.9	6.9	4.5	9.3	8.9	5.2	6.8	6.3	8.1	3.6	4.8	4.1	11.6	8.5	9.8	7.0
Non-Aboriginal (%)	2.7	2.9	1.8	2.4	3.5	1.9	2.4	2.0	3.4	1.3	1.2	2.1	2.1	1.2	1.7	2.0	1.9

^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; NSW: New South Wales.

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

Source: Australian Childhood Immunisation Register.

Table 10. Percentage of children with vaccination delay for the second dose of measles-mumps-rubella by Aboriginal status for each local health district for the cohort of children born in NSW in 2006

Vaccination delay and Aboriginal status	Local Health District ^a																
	CC	FW	HNE	IS	MN	MM	NBM	NV	NN	NS	SES	SWS	SN	SYD	WN	WS	NSW
1–6 months late																	
Aboriginal (%)	56.6	59.3	44.5	49.7	55.8	45.7	49.6	40.0	50.4	45.7	52.5	54.8	52.1	58.5	43.6	47.0	48.7
Non-Aboriginal (%)	54.4	52.0	47.5	53.0	52.8	48.1	49.9	48.1	52.1	49.1	46.5	49.6	49.7	43.0	48.3	45.6	48.5
>6 months late																	
Aboriginal (%)	10.7	11.1	17.3	16.8	16.7	21.2	12.2	13.3	8.7	20.0	13.9	18.8	21.9	17.1	17.6	15.1	16.2
Non-Aboriginal (%)	7.5	14.3	7.4	8.8	8.7	8.7	10.5	5.9	9.5	8.9	8.8	10.3	8.9	8.6	10.5	9.4	9.0

^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; NSW: New South Wales.
Source: Australian Childhood Immunisation Register.

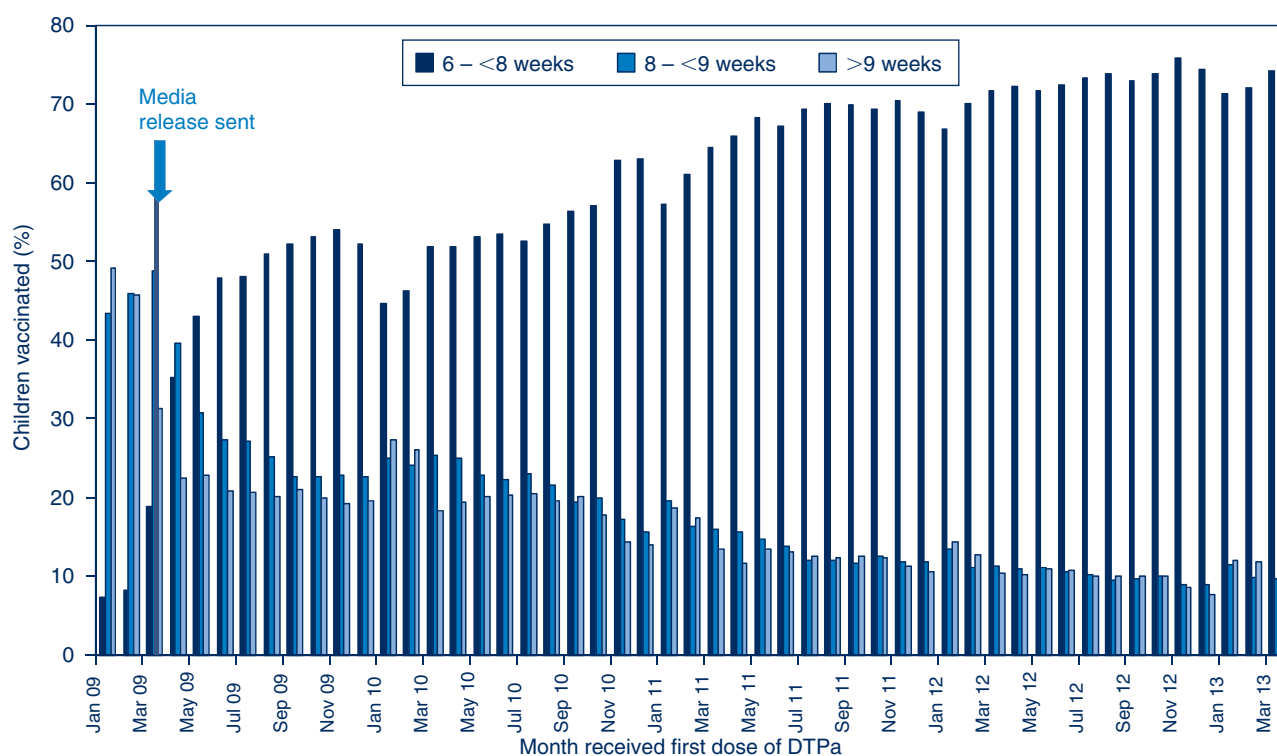


Figure 8. Age at which children in NSW received their first dose of hexavalent combination vaccine by month of receipt, January 2009–December 2012.

The media release was a message for providers and the public on 10 March 2009 that asked parents and providers to consider bringing the first dose of pertussis-containing vaccine forward to 6 weeks of age to provide earlier protection. Hexavalent combination: diphtheria–tetanus–pertussis (acellular), polio, Hib, hepatitis B – paediatric formulation

Source: Australian Childhood Immunisation Register.

Vaccine objection and children with no vaccines recorded

- The percentage of vaccine objectors and children with no vaccines recorded varied by LHD with a high percentage of objectors and children with no vaccines recorded in the Northern NSW LHD (5.8% and 7.5%, respectively) and the lowest in the Western NSW LHD (0.8% and 1.9%, respectively) (Table 11).

Conclusion

Data provided by the Australian Childhood Immunisation Register in this report reflect the successful delivery of the National Immunisation Program in NSW, while identifying some areas for improvement, especially with regard to vaccination delay in Aboriginal children. The Australian Childhood Immunisation Register, the NSW Population Health Survey and monitoring through the NSW School

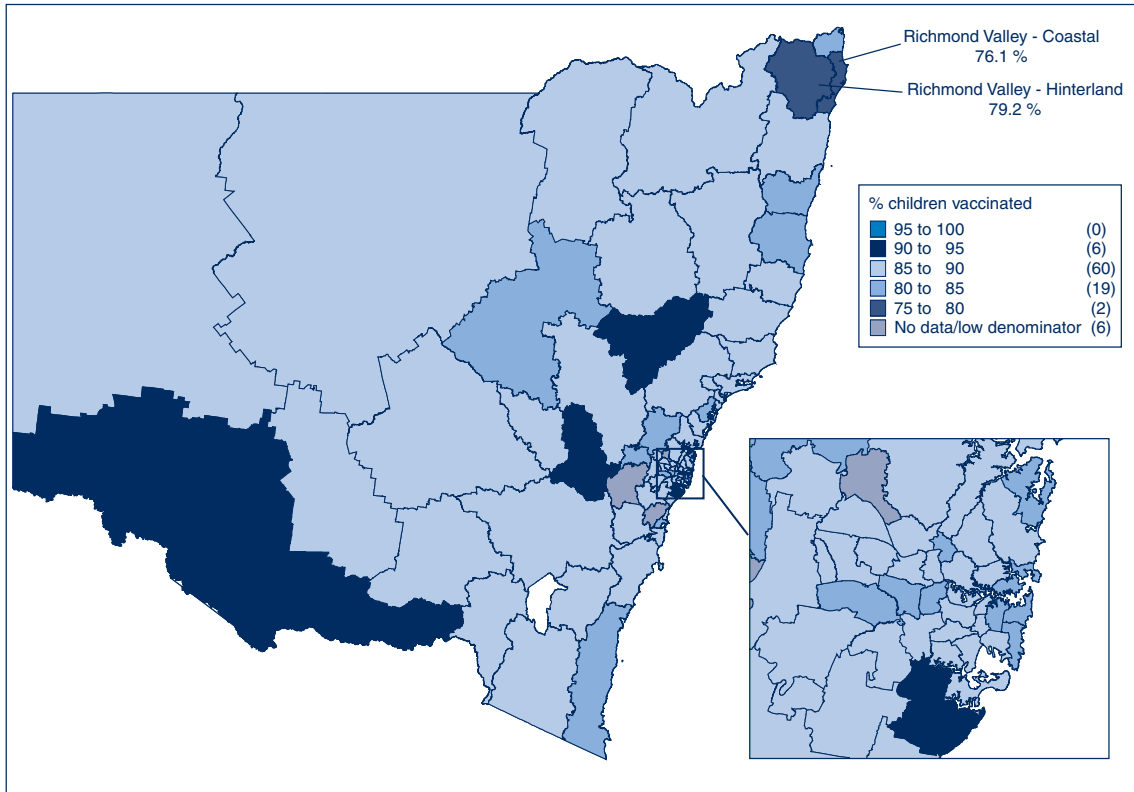


Figure 9. Rotavirus vaccine coverage at 12 months of age, by statistical areas level 3, NSW, for the cohort of children born in 2011.

Source: Australian Childhood Immunisation Register.

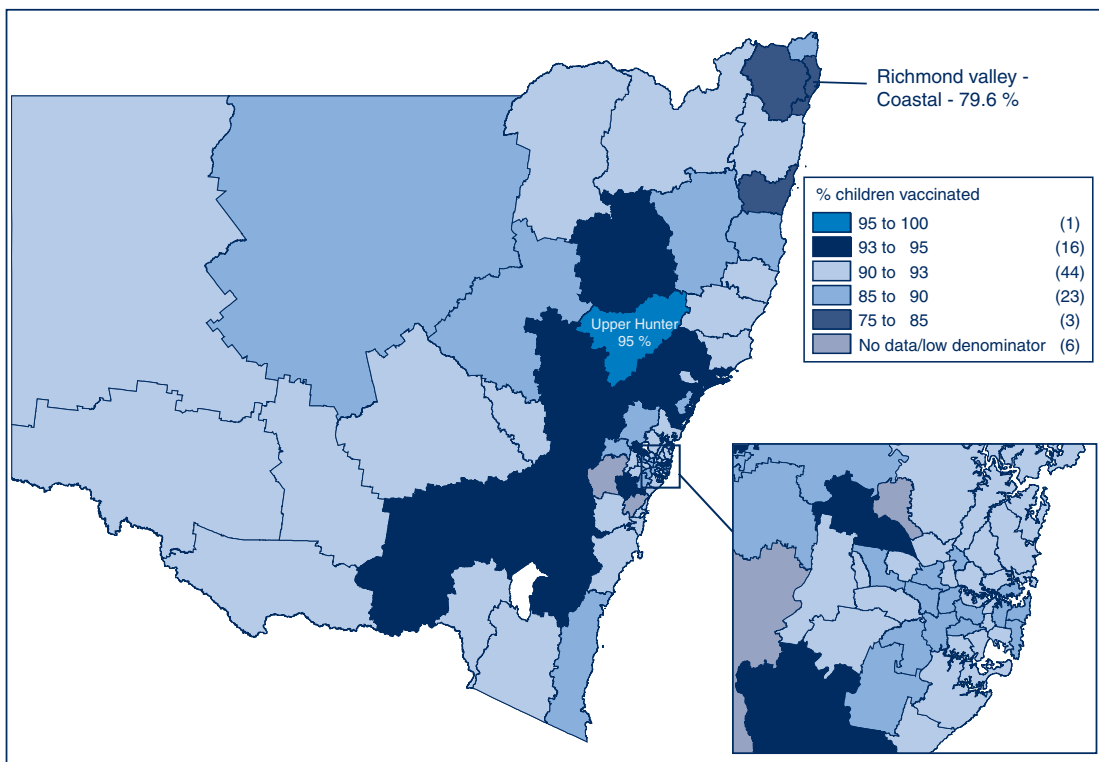


Figure 10. Pneumococcal conjugate vaccine coverage at 12 months of age, by statistical area level 3, NSW, for the cohort of children born in 2011.

Source: Australian Childhood Immunisation Register.

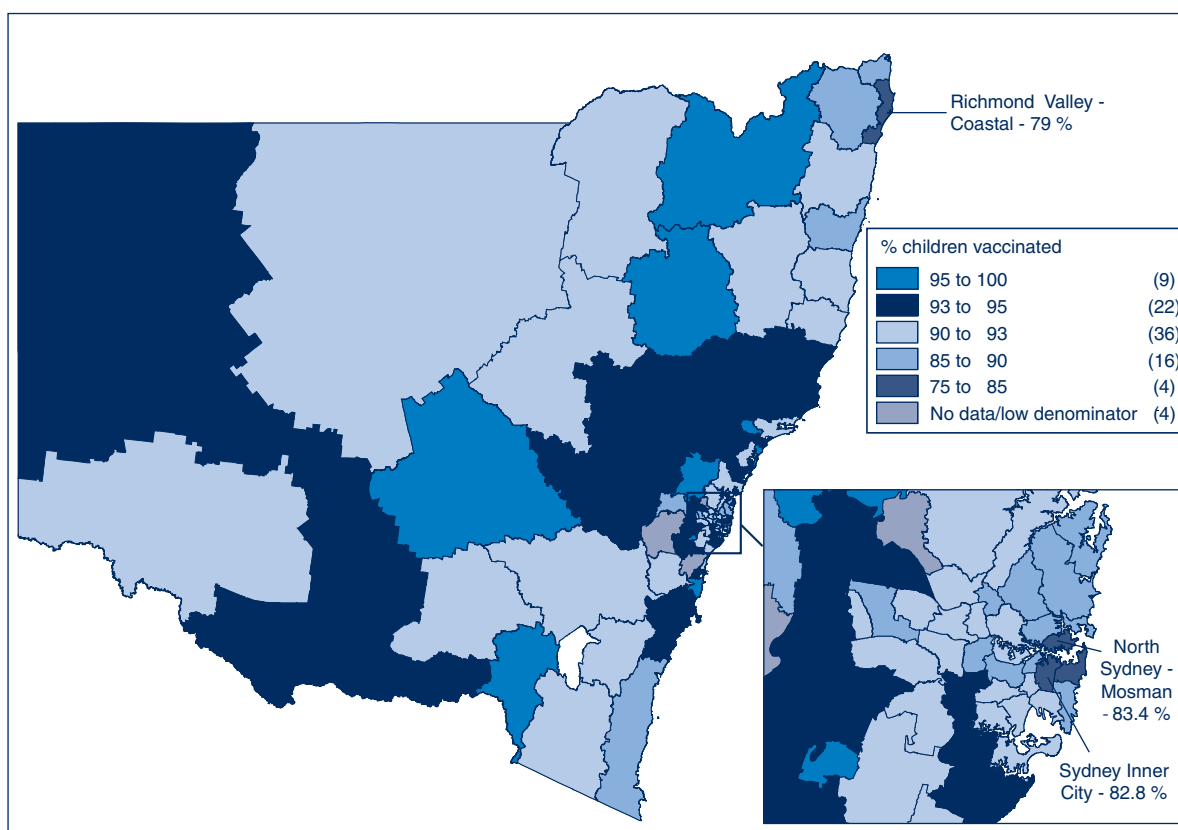


Figure 11. Second dose MMR vaccine coverage at 60 months of age, by statistical area level 3, NSW, for the cohort of children born in 2007.
Source: Australian Childhood Immunisation Register.

Table 11. Percentage of children who parents have registered as vaccine objectors and children with no vaccines recorded on the Australian Childhood Immunisation Register for the cohort born 2006–2011, for each local health district in NSW, compared with NSW

Vaccine	Local Health District ^a																
	CC	FW	HNE	IS	MN	MM	NBM	NV	NN	NS	SES	SWS	SN	SYD	WN	WS	NSW
Vaccine objectors (%)	2.2	1.0	1.3	1.4	3.4	1.0	1.4	1.8	5.8	1.8	1.7	0.6	2.3	1.3	0.8	0.6	1.5
No vaccines recorded (%)	2.8	1.9	2.2	2.7	4.8	2.2	2.6	2.4	7.5	4.3	4.2	2.8	3.5	4.0	1.9	3.2	3.4

^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; NSW: New South Wales.
Source: Australian Childhood Immunisation Register.

Vaccination Program continue to be very useful tools for administering the National Immunisation Program and monitoring its implementation in NSW.

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