

NSW Annual Immunisation Coverage Report, 2021

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Abstract. Introduction: This report documents vaccination coverage in NSW up to 2021 and is the first in the series to report 'whole-of-life' coverage data for vaccines given to children, adolescents and adults under the National Immunisation Program (NIP). **Methods:** Data from the Australian Immunisation Register (AIR), NSW School Vaccination Program and 2021 NSW Population Health Survey were used to calculate childhood, adolescent and adult vaccination coverage and childhood vaccination timeliness in 2021, with comparisons made to 2020 where relevant. **Results:** 'Fully vaccinated' coverage at 12 and 60 months of age in NSW was 0.6 and 0.9 of a percentage point lower in 2021 than in 2020, dropping to 94.2% and 93.8%, respectively, whereas 'fully vaccinated' coverage at 24 months of age was 0.2 of a percentage point higher at 92.1%. Due to the lag time involved in assessment at milestone ages, 'fully vaccinated' coverage figures for 2020 and 2021 predominantly reflect vaccinations due in 2019 and 2020, respectively, and hence show a small impact on childhood coverage in the first year of the COVID-19 pandemic. 'Fully vaccinated' coverage at 12, 24 and 60 months of age for NSW Aboriginal children in 2021 was 93.6%, 92.3% and 97.0%, respectively, 0.5–0.7 of a percentage point lower than in 2020. Whilst coverage at 24 and 60 months of age was higher in Aboriginal children than in non-Aboriginal children, longstanding issues with timeliness of vaccination in Aboriginal children

persist. 'Fully vaccinated' coverage assessed at earlier/more timely milestones (9, 15, 21 and 51 months of age) was 4.9–8.3 percentage points lower than at the standard milestones in Aboriginal children, compared to 2.3–5.8 percentage points lower in non-Aboriginal children, and on-time vaccination (within 30 days of due date) was 1.9–12.9 percentage points lower in Aboriginal than in non-Aboriginal children. In 2021, the NSW School Vaccination Program administered human papillomavirus (HPV) vaccine first dose to 82% of female and 79% of male Year 7 students, dTpa vaccine to 78% of Year 7 students and meningococcal ACWY vaccine to 60% of Year 10 students. Only 23% of Year 7 girls and 22% of Year 7 boys received their second dose of HPV vaccine in 2021, likely due to COVID-19 pandemic-related disruption of the school-based program. Adult zoster vaccine coverage in NSW in 2021 was 27.2% for adults aged 70–<71 years but 43.7% for those aged 71–<80 years, reflecting ongoing catch-up vaccination. Adult 13vPCV coverage was 14.9% for adults aged 70–<71 years and 16.7% for 71–<80 years. Influenza vaccination coverage in 2021 was lower than in 2020 across most age groups, with coverage in children aged 6 months to <5 years down from 46.1% in 2020 to 23.3% in 2021. In adults aged ≥65 years, influenza vaccination coverage recorded on AIR in 2021 was 61.4%, but self-reported coverage in 2021 NSW Population Health Survey respondents was 84.3%. Overall COVID-19 vaccination coverage was high in NSW with 95.0% and 93.6% of all people aged ≥16 years having received a first and second dose of a COVID-19 vaccine by 31 December 2021, but was lower in Aboriginal people. **Conclusions:** This report reflects successful delivery of vaccination programs in NSW despite the major disruptions associated with the COVID-19 pandemic. It will be important to monitor catch-up vaccination to ensure that pandemic-related dips in coverage are reversed.

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Introduction

This is the 13th annual immunisation coverage report for NSW. It facilitates the continued monitoring of NSW vaccination programs through comprehensive analysis of vaccination trends and interpretation of their relationship to factors including policy and program changes. This 2021 report is the first in the series to report ‘whole-of-life’ coverage data from the Australian Immunisation Register (AIR), i.e. data for vaccines given to children, adolescents and adults under the National Immunisation Program (NIP), following the AIR’s expansion in 2016. Comprehensive analyses of coverage data for the calendar year 2021 are included in this report. Whilst trend data from 2012 onwards are shown, there is a particular focus on changes from 2020 to 2021, including impact of the COVID-19 pandemic and associated public health response measures on vaccination coverage.

This report uses the longstanding international practice of reporting coverage at key milestone ages to measure coverage against national targets and to track trends over time. Its format is adapted from the annual national immunisation coverage reports published by the National Centre for Immunisation Research and Surveillance (NCIRS) since 2009.¹ Reported vaccination coverage may be impacted by changes to immunisation policy and programs, as well as changes to the ‘fully vaccinated’ coverage algorithms defined by the Australian Government Department of Health and Aged Care. Some of the key changes in Australian and NSW immunisation policies and programs are highlighted in Box 1, with the vaccines delivered through the NSW Immunisation Program in 2021 outlined in Table 1.

Methods

The Australian Immunisation Register (AIR)

The Australian Childhood Immunisation Register (ACIR) was established on 1 January 1996 by incorporating demographic data from Medicare on all enrolled children aged <7 years.³ 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 their seventh birthday.⁴ The register was expanded from 1 January 2016 to include records of vaccinations given up to less than 20 years of age and from 30 September 2016 to become the AIR, capturing records of vaccinations given to individuals in Australia throughout their life.⁵ All people registered with Medicare are automatically added to AIR and assigned a unique Personal Identification Number (PIN) which travels with that person for life, across all relevant Medicare card numbers (e.g. where multiple, due to family circumstances or maturity). Participation in the AIR is opt-out so it constitutes a nearly complete population register for Australian residents.³ Individuals who are not Medicare-registered, but for whom a vaccination encounter is reported to AIR, are assigned a Supplementary Identification Number (SIN),⁴ with subsequent assignment of a PIN

where the individual is identified to be Medicare-registered. A person remains on the AIR until Medicare is notified that the person has passed away or moved away from Australia permanently, at which time an ‘end-date’ is applied to that person’s AIR record. All vaccination records for a person remain on the register indefinitely.

Since 2001, vaccinations given overseas can 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 occurs predominantly via medical practice management software or through direct data entry on the AIR website, or less commonly by submitting paper encounter or history forms. Mandatory reporting to the AIR was introduced in 2021 for all vaccines given to people of any age under the NIP, and influenza and COVID-19 vaccines.⁶ Medical contraindications or natural immunity to certain diseases, based on guidance from the Australian Immunisation Handbook⁷ and a vaccination provider factsheet,⁸ can only be reported by eligible medical practitioners using the AIR immunisation medical exemption form.⁹ Since 1 January 2016, conscientious objection to vaccination is no longer recorded on the AIR.

The AIR contains limited demographic information for each individual (date of birth, gender, Indigenous status, postcode and PIN/SIN) and information regarding vaccinations received (brand/type, dose number, date of encounter, immunisation provider type/postcode, and method of reporting to AIR). Prior to completing the analyses for this report duplicate demographic records were excluded where the individual identification number was identical, with the most up-to-date record kept based on the Medicare registration date. Duplicate vaccination records were also excluded where the individual identification number, vaccine type, vaccine dose and encounter date were identical. Other exclusions included individuals with an ‘end-date’ applied, individuals with a postcode not matched to a state/territory, and also individuals assigned a SIN.

Vaccination coverage and vaccination delay are presented in this report for all people in NSW and also by Aboriginal status. Aboriginal and Torres Strait Islander status on AIR is recorded as ‘Indigenous’, ‘non-Indigenous’ or ‘unknown’. For this report, two categories of Aboriginal status were used: ‘Aboriginal’ (Indigenous) and ‘non-Aboriginal’ (non-Indigenous and unknown combined). Completeness of Aboriginal identification for children in the ACIR was shown to have been acceptable by 2005,¹⁰ and has been improving each year. Aboriginal status was not specified for approximately 0.7% of the NSW population registered on AIR as at 3 April 2022, down from 1.2% in the dataset used for the 2020 report.

Vaccination coverage and vaccination delay are presented in this report for NSW and by local health district (LHD). There are 15 geographically based LHDs in NSW—eight

Box 1. Selected recent and significant changes in immunisation policy relevant to NSW over the past 5 years²

July 2021: All vaccinations given under the NIP required to be reported to AIR within 24 hours, and no more than 10 working days, after vaccination.

June 2021: First inactivated recombinant zoster vaccine (Shingrix) available on private prescription.

May 2021: First recombinant quadrivalent influenza vaccine registered for use in people aged ≥ 18 years.

March 2021: All influenza vaccinations given to be reported to AIR within 24 hours, and no more than 10 working days, after vaccination.

February 2021: Commonwealth-funded COVID-19 vaccinations for all willing Australians (initially vaccines registered for people aged ≥ 16 years and then for adolescents aged 12–15 years from September 2021). Roll-out of COVID-19 vaccination program implemented in phases, with population groups prioritised according to the advice of ATAGI. Mandatory reporting to AIR of COVID-19 vaccinations within 10 days of administration commenced.

July 2020: Meningococcal B vaccine funded under the NIP for all Aboriginal children at 6 weeks, 4 months and 12 months of age, with a catch-up program until 30 June 2023 for Aboriginal children less than 2 years of age.

A single dose of 13-valent pneumococcal conjugate vaccine (13vPCV) funded for Aboriginal adults at 50 years of age, followed by a dose of 23-valent pneumococcal polysaccharide vaccine (23vPPV) 2–12 months later and then a second dose of 23vPPV 5–10 years after that. For non-Aboriginal adults, a single dose of 13vPCV is funded from 70 years of age, replacing the previously funded dose of 23vPPV at 65 years of age.

March 2020: Influenza vaccine funded under the NIP for all children aged 6 months to <5 years.

First enhanced quadrivalent influenza vaccine (adjuvanted) funded nationally for people aged ≥ 65 years.

April 2019: Meningococcal ACWY conjugate vaccine funded under the NIP for adolescents aged 14–16 years, delivered through the school-based program, and adolescents aged 15–19 years delivered through primary care providers as part of an ongoing catch-up program.

March 2019: NSW ceased state-funded meningococcal ACWY conjugate vaccine program for adolescents due to it being funded under the NIP in April.

February 2019: Annual seasonal influenza vaccination funded under the NIP for Aboriginal people aged 5–14 years, meaning all Aboriginal persons aged ≥ 6 months now eligible for funded vaccine.

July 2018: Schedule for routine childhood vaccination with 13vPCV changed from 2, 4 and 6 months of age to 2, 4 and 12 months of age.

Meningococcal ACWY conjugate vaccine funded for all children at 12 months of age, replacing the combined Haemophilus influenzae *type b* (Hib) and meningococcal C vaccine, with the Hib component moved to 18 months of age and given as monovalent vaccine.

April 2018: Annual seasonal influenza vaccination funded by NSW Health for all children aged 6 months to <5 years and enhanced trivalent influenza vaccines (high-dose and adjuvanted) funded nationally for all adults aged ≥ 65 years.

February 2018: 2-dose schedule of 9-valent human papillomavirus (9vHPV) vaccine funded under the NIP for adolescents aged 12–14 years, delivered through the school-based vaccination program.

January 2018: Further strengthening of vaccination requirements for childcare enrolment in NSW.

Meningococcal ACWY school-based vaccination program funded for all NSW secondary school students in Years 10 and 11, as well as adolescents aged 15–19 years who have not received the vaccine at school.

May 2017: Meningococcal ACWY school-based vaccination program funded for all NSW secondary school students in Years 11 and 12, as well as adolescents aged 17–18 years who no longer attend school.

February 2017: A 2-dose HPV vaccine schedule adopted in NSW for Year 7 students in line with World Health Organization recommendations.

metropolitan and seven rural/regional. Data for an additional LHD (Network with Victoria) is also reported on. Analysis of childhood coverage was also undertaken at small area level using the Australian Bureau of Statistics (ABS)-defined statistical area level 3 (SA3),¹¹ chosen because each is small enough to show differences within areas and provide more detail than LHDs, but not too small to render maps unreadable. To maintain both privacy and precision, SA3s with a population size less than 26 for a year-wide birth cohort of children were

excluded prior to any mapping and small area analyses. Maps were created using version 15 of the MapInfo mapping software.¹² As postcode is the only sub-jurisdictional geographical indicator on the AIR, ABS Census Boundary Information, namely the ABS Postal Area to SA3 Concordance 2016, was used to match residential postcodes to SA3s.¹³

This report details childhood, adolescent and adult vaccination coverage in the 2021 calendar year using AIR data

Table 1. NSW Immunisation Program Schedule for children, adolescents and adults in 2021

Age	Vaccine
Children	
Birth	Hep B
6 weeks	Hep B ^a DTPa ^a Hib ^a IPV ^a MenB ^b 13vPCV Rotavirus
4 months	Hep B ^a DTPa ^a Hib ^a IPV ^a MenB ^b 13vPCV Rotavirus
6 months	Hep B ^a DTPa ^a Hib ^a IPV ^a MenB ^c 13vPCV ^c Flu ^d
12 months	MMR MenB ^b Men ACWY ^e 13vPCV Flu ^d
18 months	DTPa Hib ^f MMRV Flu ^d
4 years	DTPa ^g IPV ^g Flu ^d
Adolescents	
11–13 years (Year 7)	dTpa HPV ^h Flu ^d COVID-19 ⁱ
15–17 years (Year 10)	Men ACWY Flu ^d COVID-19 ⁱ
Adults	
≥50 years	Flu ^d 13vPCV & 23vPPV ^j COVID-19 ⁱ
≥65 years	Flu ^d COVID-19 ⁱ
70 years	HZ ^k 13vPCV ^l COVID-19 ⁱ
Pregnant women	dTpa ^m Flu ⁿ COVID-19 ⁱ
<p>Hep B: hepatitis B; DTPa: diphtheria–tetanus–pertussis (acellular)–paediatric formulation; Hib: <i>Haemophilus influenzae</i> type b; IPV: inactivated polio vaccine; 13vPCV: 13-valent pneumococcal conjugate vaccine; Flu: influenza; MMR: measles–mumps–rubella; Men ACWY: meningococcal ACWY conjugate vaccine; MMRV: measles–mumps–rubella–varicella; dTpa: diphtheria–tetanus–pertussis (acellular)–formulation for individuals aged ≥10 years; HPV: human papilloma virus; 23vPPV: Pneumovax 23 vaccine; HZ: herpes zoster.</p> <p>^aUsually given as combined DTPa-HepB-IPV-Hib vaccine.</p> <p>^bFunded for Aboriginal children only.</p> <p>^cChildren with medical risk factors require an additional dose at 6 months of age as well as the routine schedule.</p> <p>^dAnnual vaccination for all children aged 6 months to <5 years, all people with medical risk conditions and all Aboriginal people aged ≥6 months, and non-Aboriginal adults aged ≥65 years.</p> <p>^eAs of 1 July 2018, MenACWY vaccine replaced Hib-MenC vaccine given at 12 months of age.</p> <p>^fAs of 1 July 2018, a monovalent Hib vaccine given at 18 months of age.</p> <p>^gUsually given as combined DTPa-IPV vaccine.</p> <p>^hTwo-dose schedule.</p> <p>ⁱCOVID-19 vaccination program commenced in February 2021 (initially for people aged ≥16 years and then for adolescents aged 12–15 years from September 2021). The roll-out of the vaccination program was implemented in phases, with population groups prioritised according to the advice of ATAGI.</p> <p>^jAll Aboriginal adults aged ≥50 years receive a dose of 13vPCV, followed by a first dose of 23vPPV 2–12 months later and then a second dose of 23vPPV at least 5 years later.</p> <p>^kFrom 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 five-year catch-up program until 31 October 2023.</p> <p>^lFrom July 2020, the 23vPPV dose at 65 years of age was replaced by a dose of 13vPCV from 70 years of age.</p> <p>^mUsually given to pregnant women at 28 weeks gestation but can be given anytime between 20 and 32 weeks gestation of each pregnancy and should be given as early as possible (from 20 weeks) to women identified as being at risk of early delivery.</p> <p>ⁿAt any stage of pregnancy.</p> <p>Source: http://www.health.nsw.gov.au/immunisation/Publications/nsw-immunisation-schedule.pdf.</p>	

as at 3 April 2022. Where relevant, comparisons have been made to vaccination coverage in 2020 and trends presented from 2012 onwards.

Measuring childhood vaccination coverage using the AIR
 Childhood vaccination status was assessed at 12 months of age (for vaccines due at 6 months), 24 months of age (for vaccines due at 6, 12 and 18 months) and 60 months of age (for vaccines due at 48 months) using the cohort method which has been used for calculating coverage at the population level (national and state/territory)¹⁴ since the inception of the register. A minimum three-month lag period was allowed for the late notification of vaccinations to the AIR, but only vaccines given on or before a child’s first, second or fifth birthday, respectively, were included in coverage calculations.¹⁴ 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.^{15,16}

The proportion of children designated as ‘fully vaccinated’ at each milestone 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 AIR-registered children in the age cohort as the denominator. The nationally agreed definitions of ‘fully vaccinated’ coverage at 12, 24 and 60 months of age, as outlined in Box 2, are set by the Australian Government Department of Health and Aged Care for the purpose of standardised reporting. Vaccination coverage estimates in this report may however differ slightly from estimates published elsewhere that are calculated using rolling annualised quarterly coverage data.

Box 2. Vaccinations required to be deemed 'fully vaccinated' by each assessment age

Milestone	Vaccinations
9 months/12 months (Cohort born 1 January 2020–31 December 2020)	3rd dose DTPa (given at 6 months) 3rd dose polio (given at 6 months) 3rd dose HepB (given at 6 months) 3rd dose Hib (given at 6 months) 2nd or 3rd dose 13vPCV (given at 4 or 6 months)
15 months (Cohort born 1 January 2019–31 December 2019)	3rd dose DTPa (given at 6 months) 3rd dose polio (given at 6 months) 3rd dose HepB (given at 6 months) 3rd dose Hib (given at 6 months) 3rd dose 13vPCV (given at 6 or 12 months) 1st dose meningococcal C-containing vaccine (given at 12 months) 1st dose MMR (given at 12 months)
21 months/24 months (Cohort born 1 January 2019–31 December 2019)	4th dose DTPa (given at 18 months) 3rd dose polio (given at 6 months) 3rd dose HepB (given at 6 months) 4th dose Hib (given at 18 months) 1st dose meningococcal C-containing vaccine (given at 12 months) 1st dose varicella (given at 18 months) 2nd dose MMR (given at 18 months) 3rd dose 13vPCV (given at 6 or 12 months)
51 months/60 months (Cohort born 1 January 2016–31 December 2016)	4th or 5th dose DTPa (given at 48 months) 4th dose polio (given at 48 months)

Vaccination coverage was also calculated separately for the second dose of rotavirus vaccine (an NIP vaccine not included in the calculation for 'fully vaccinated') by 12 months of age. For the first time in this series of reports, coverage of dose 1–3 of meningococcal B vaccine was assessed for the first cohort of Aboriginal children eligible for meningococcal B vaccination following the implementation of a 3-dose schedule on the NIP in July 2020.

Childhood vaccination coverage ('fully vaccinated' and individual vaccines/antigens) was calculated for each milestone age by Aboriginal status, LHD, SA3, NSW and Australia overall.

Measuring childhood vaccination timeliness using the AIR

For the first time in this series of NSW reports, 'fully vaccinated' coverage was assessed at 3 months after last vaccine dose due (i.e. at 9, 15, 21 and 51 months of age) as outlined in Box 2. As these are earlier than the standard assessment milestones of 12, 24 and 60 months of age, they capture aspects of vaccination timeliness. The algorithms used at 9, 21 and 51 months of age were the same as those used in the standard milestones of 12, 24 and 60 months of age, respectively, whilst the algorithm used at 15 months of age was the same as that used as one of the Key Performance Indicator measures of the Aboriginal Immunisation

Healthcare Worker (AIHCW) program, funded by NSW Health since July 2012 with the aim of improving vaccination coverage and timeliness in Aboriginal children throughout NSW.¹⁷

On-time vaccination for selected vaccine doses was defined as receipt within 30 days of the recommended age. Timeliness of the first and third dose of DTPa-containing vaccine, the second dose of 13vPCV and the first and second dose of MMR-containing vaccine was measured using 12-month-wide birth cohorts. Timeliness of these vaccines and doses were compared in Aboriginal and non-Aboriginal children by plotting the cumulative percentage receiving the vaccine dose by age in months. Timeliness of the third dose of DTPa-containing vaccine and the second dose of MMR-containing vaccine was also assessed by Aboriginal status using a vaccination delay measure categorised as 'no delay', 'delay of 1–<3 months', 'delay of 3–<7 months' or 'delay ≥7 months'. To allow time for very late vaccinations to be included in the timeliness analyses, children were assessed up to 2 years after doses were due, and therefore these cohorts were not the same as those assessed for 'fully vaccinated' coverage milestones.

Timeliness of childhood vaccination ('fully vaccinated' and individual vaccines/antigens) was calculated for each

milestone age by Aboriginal status, LHD, NSW and Australia overall.

Measuring adolescent vaccination coverage in the school-based program

Coverage data for vaccines given to adolescents in 2021 through the NSW School Vaccination Program were provided by NSW Health. Vaccination data for human papillomavirus (HPV) vaccine and dTpa vaccine for Year 7 students, and meningococcal ACWY vaccine for Year 10 students, are recorded by school immunisation teams and collated by the LHDs and NSW Health. Coverage for each vaccine was calculated using the counts of students vaccinated as the numerator and the school population enrolments, as at the start of year, as the denominator, and 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. School-based HPV catch-up vaccination has been offered since 2012 to Year 8 students who commenced the course in Year 7, in order to support course completion. Annual Year 7 HPV vaccination coverage from 2012 to 2020 include school catch-up vaccinations given in Year 8 in the following year. Similar to in 2020, schools in NSW were closed for periods during 2021 due to the COVID-19 pandemic, which led to disruption of the school vaccination program. As a result, vaccination coverage estimates for 2021 are provisional with significant catch-up vaccination expected to occur in 2022.

Measuring adolescent vaccination uptake and coverage using the AIR

With the expansion of the ACIR to the AIR, all data previously held in the National HPV Vaccination Program Register (HPV Register) were transferred to the AIR in late 2018. All HPV vaccinations given through school-based programs, as well as HPV vaccinations given by any other immunisation provider, are now reported directly to the AIR.¹⁸

The number of dose 1 and dose 2 HPV vaccinations given during 2021 to NSW adolescents aged 11–<15 years was determined. Of the adolescents aged 11–<15 years with a record on AIR of a first dose of HPV vaccine given during 2021, the proportion who also received dose 2 by 31 December 2021 was calculated to assess course completion within the same calendar year. This proportion was compared to the proportion of adolescents completing the 2-dose HPV vaccination schedule within the calendar year of 2020. The proportion of adolescents who commenced HPV vaccination in 2020 and completed the 2-dose schedule by receiving a catch-up second dose in 2021 was also calculated. Adolescent HPV vaccination uptake during 2020 and 2021 was calculated by gender, Aboriginal status, LHD, NSW and Australia overall.

The World Health Organization recommends assessing coverage by 15 years of age for the purpose of international comparison over time.¹⁹ As HPV vaccination in NSW is delivered routinely in Year 7, usually around 12–13 years of age, all adolescents should have had the opportunity to complete the vaccination course by 15 years of age. Similar to childhood vaccination coverage, HPV vaccine coverage by 15 years of age was calculated using the cohort method. In the cohorts of Medicare-registered adolescents who turned 15 years of age during 2021 or 2020 (i.e. cohorts born in 2006 or 2005, respectively), the proportion who had received dose 1, dose 2 and/or dose 3 of HPV vaccine aged 11–<15 years was calculated. The outcome of interest in these cohorts is completion of a clinically valid course (either 2 or 3 doses). As all adolescents in the 2006 and 2005 birth cohorts were under 15 years of age at first dose, course completion was defined as receipt of two doses if dose 2 was given following a minimum interval of 5 months after dose 1 or receipt of three doses if dose 2 was given at less than 5 months after dose 1. The proportion of eligible adolescents in the population completing the vaccination course (course completion) is therefore a different measure to population coverage with either dose 2 or dose 3. Similarly, adolescent dTpa vaccination coverage by 15 years of age was also calculated using the cohort method. The proportion of adolescents in the same 2006 and 2005 birth cohorts as above who had received a booster dose of dTpa vaccine aged 11–<15 years was calculated. Adolescent meningococcal ACWY vaccination coverage by 17 years of age was also calculated using the cohort method. In the cohorts of Medicare-registered adolescents who turned 17 years of age during 2021 or 2020 (i.e. cohorts born in 2004 or 2003, respectively), the proportion who had received a dose of meningococcal ACWY vaccine aged 13–<18 years was calculated.

Adolescent vaccination coverage was calculated by gender, Aboriginal status, LHD, NSW and Australia overall.

Measuring adult vaccination coverage using the AIR

For the first time in this series of reports, adult vaccination coverage was calculated using AIR data. Using the cohort method, zoster vaccination coverage was calculated for the cohorts of Medicare-registered adults who turned 71 years of age during 2021 or 2020 (i.e. cohorts born in 1950 or 1949, respectively), as well as for the cohorts of adults eligible for catch-up vaccination (i.e. those turning 72–<80 years of age in 2021 or 2020). The proportion of these cohorts who had received either one dose of Zostavax vaccine or two doses of Shingrix vaccine before their 71st birthday or their 80th birthday was calculated. Adult 13vPCV vaccination coverage was also calculated for the cohorts of Medicare-registered adults who turned 71 years of age during 2021 or 2020 (i.e. cohorts born in 1950 or 1949, respectively), as well as for the cohorts turning 72–<80 years of age in 2021 or 2020. The proportion of these cohorts who had received a dose of 13vPCV before

their 71st or their 80th birthday was calculated. Coverage of 13vPCV was also calculated for the cohort of adults aged 50–< 70 years in 2021.

Adult vaccination coverage was calculated at the state-level by Aboriginal status.

Measuring influenza vaccination coverage

Influenza vaccination coverage for all people aged 6 months and older was calculated for specific age groups (6 months–< 5 years, 5–<15 years, 15–<50 years, 50–<65 years and ≥65 years) by dividing the number of Medicare-registered people in the relevant age group with at least one dose of influenza vaccine recorded on the AIR in the calendar year of interest (i.e. 2020 or 2021) by the total number of Medicare-registered people in the relevant age group (based on birth cohorts with age assessed at 30 June in the year of interest). This differs from previous reports where denominators were the number of Medicare-registered people in each age group based on calculated age at start of the calendar year of interest. Influenza vaccination coverage was calculated by age group, Aboriginal status, LHD, NSW and Australia overall.

Influenza vaccination data have also been collected for adults aged ≥65 years since 1997 through the NSW Adult Population Health Survey.²⁰ This is a rolling telephone survey utilising random digit dialling, with vaccination status determined from patient response to the interview question asking ‘Were you vaccinated or immunised against flu in the last 12 months?’ Self-reported influenza vaccination coverage in adults aged ≥65 years by LHD was provided by NSW Health. As the target number of completed surveys was not met across all LHDs, data was not available for single calendar years and as such was provided as the combined 2020–2021 data, which was compared to the combined 2019–2020 data from last year’s report.

Measuring COVID-19 vaccination coverage

The 2021 COVID-19 vaccination coverage for adolescents aged 12–15 years and for people aged ≥16 years, ≥50 years and ≥70 years were obtained from available data published by the Australian Government Department of Health and Aged Care.²¹ Using these publically available data, coverage for people aged 16 to 49 years and 50 to 69 years were also calculated. First and second dose coverage was calculated using the number of first and second doses of a COVID-19 vaccine recorded on AIR for people in each age group as at 4 January 2022 as the numerator and the Australian Bureau of Statistics Estimated Resident Population for each age group as at 30 June 2020 as the denominator. COVID-19 vaccination coverage for Aboriginal people aged ≥16 years were also obtained from the publically available data.²¹ These used the number of first and second doses of a COVID-19

vaccine recorded on AIR for Aboriginal people aged ≥16 years as at 4 January 2022 as the numerator and the total number of Aboriginal people aged ≥16 years registered on AIR as at 4 January 2022 as the denominator. COVID-19 vaccination coverage data are presented for NSW and Australia.

Summary of Results

Childhood vaccination coverage

- Quarterly ‘fully vaccinated’ coverage in NSW, assessed at 12 months, 24 months and 60 months of age were 93.9%, 92.5% and 93.9%, respectively in the December 2021 quarter (Figure 1).
- Compared to the December 2020 quarter, coverage assessed at 12 months and 60 months were lower, by 0.9 of a percentage point and 1.4 percentage points, respectively, whilst coverage assessed at 24 months was 0.8 of a percentage point higher. However, ‘fully vaccinated’ coverage at the three milestone ages decreased by 0.4–0.8 of a percentage point between the March 2021 and December 2021 quarterly data points (Figure 1).
- Quarterly coverage for the individual vaccines/antigens assessed at each of the three milestone ages also decreased between the March 2021 and December 2021 quarterly data points. Coverage at 12 months of age decreased by 0.7–0.8 of a percentage point for all vaccines, except rotavirus vaccine (which cannot be given once infants turn 15 weeks [dose 1] and 25 weeks [dose 2] of age), which decreased by 1.3 percentage points (Figure 2). Coverage at 24 months of age decreased by 0.2–0.6 of a percentage point for all vaccines (Figure 3) and coverage at 60 months of age decreased by 0.8 and 0.7 of a percentage point for the fourth or fifth dose of DTPa-containing vaccine and the fourth dose of polio-containing vaccine, respectively (Figure 4).
- The annual NSW ‘fully vaccinated’ coverage at the 12-month milestone was 94.2% in 2021 (Table 2), 0.6 of a percentage point lower than in 2020. ‘Fully vaccinated’ coverage at 12 months of age was 93.0% or greater in all LHDs except Northern NSW (Table 2).
- At 12 months of age, state level annual coverage for all individual vaccines/antigens, except for rotavirus vaccine, was 94.8% or greater in 2021 (Table 2), but 0.5–0.6 of a percentage point lower than in 2020.
- In all LHDs, except Northern NSW, coverage at 12 months of age for all individual vaccines/antigens, except for rotavirus vaccine, was greater than 93.3% in 2021 (Table 2).
- At state level, the annual ‘fully vaccinated’ coverage at the 24-month milestone was 92.1% in 2021 (Table 3), 0.2 of a percentage point higher than in 2020. ‘Fully vaccinated’ coverage at 24 months of age in 2021 was above 91.5% in all LHDs except Northern NSW, South Western Sydney and Western Sydney (Table 3).
- Coverage for all vaccines/antigens at the 24-month milestone was greater than 93.0% at state level in

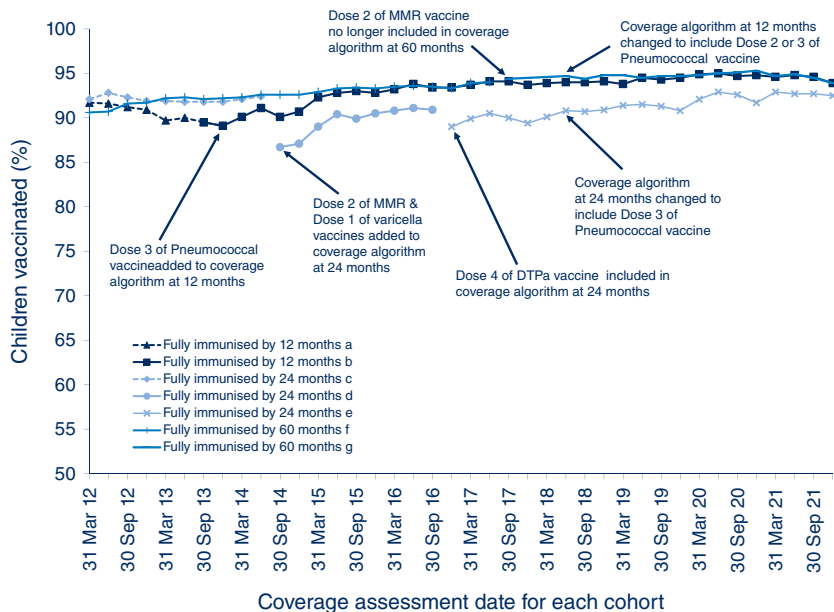


Figure 1. Trends in 'fully vaccinated' coverage, NSW, 2012–2021.

Coverage calculated for 3-month birth cohorts born between 1 January 2011 and 31 December 2020. Coverage assessment date was 12, 24 or 60 months after the last birth date of each cohort. Vaccination coverage estimates are calculated by quarter and may differ slightly from estimates published elsewhere using rolling annualised data.

For the 'Fully immunised by 12 months' quarterly data points in 2021 the 3-month cohorts were born between 1 January 2020–31 December 2020 with vaccines due from mid-2020 through to mid-2021 (6 month doses).

For the 'Fully immunised by 24 months' quarterly data points in 2021 the 3-month cohorts were born between 1 January 2019–31 December 2019 with vaccines due from mid-2019 (6 month doses) through to mid-2021 (18 month doses).

For the 'Fully immunised by 60 months' quarterly data points in 2021 the 3-month cohorts were born between 1 January 2016–31 December 2016 with vaccines due in 2020 (48 month doses).

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

^bBetween 1 July 2013 and 31 March 2018, 'fully vaccinated' at 12 months of age was defined as a child having a record of a third dose of DTPa-containing vaccine, third doses of polio-containing, Hib-containing and Hep B-containing vaccines, and a third dose of 13-valent PCV. Since 1 April 2018, the definition was changed to include a second or third dose of 13-valent PCV.

^cUp until 30 June 2014, 'fully vaccinated' at 24 months of age was defined as a child having a record of a third dose of DTPa-containing vaccine, third doses 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 vaccinated' at 24 months of age was defined as a child having a record of a third dose of DTPa-containing vaccine, third doses 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.

^eBetween 1 October 2016 and 31 March 2018, 'fully vaccinated' at 24 months of age was defined as a child having a record of a fourth dose of DTPa-containing vaccine, third doses 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. Since 1 April 2018, the definition was changed to include a third dose of 13-valent PCV.

^fBetween 1 October 2007 and 30 June 2017 'fully vaccinated' 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.

^gSince 1 July 2017, 'fully vaccinated' 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 3 April 2022.

2021 (Table 3) and 92.0% or greater for all LHDs except for Northern NSW where coverage was below 90.0% (Table 3).

- Coverage of the fourth dose of DTPa-containing vaccine at 24 months of age was 93.3% at state level in 2021 (0.2 percentage points lower than in 2020), and was

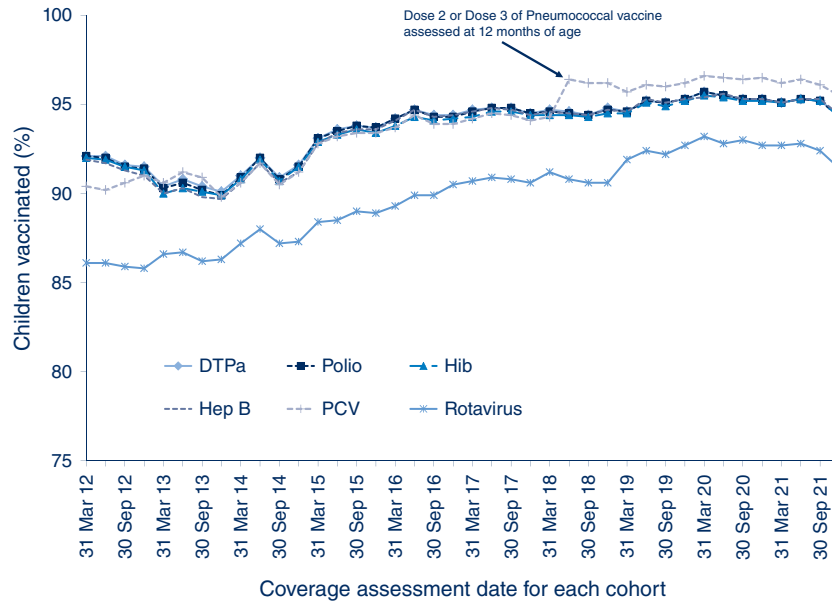


Figure 2. Trends in vaccination coverage at 12 months of age by vaccine/antigen^a, NSW, 2012–2021.

By 3-month birth cohorts born between 1 January 2011 and 31 December 2020. Coverage assessment date was 12 months after the last birth date of each cohort. Vaccination coverage estimates are calculated by quarter and may differ slightly from estimates published elsewhere using rolling annualised data.

The 2021 quarterly data points used the 3-month cohorts born between 1 January 2020–31 December 2020 with vaccines due from mid-2020 through to mid-2021 (6 month doses).

^aThird doses of DTPa-containing, polio-containing, Hib-containing and Hep B-containing vaccines, a third dose of 13-valent PCV (second or third dose as of 1 April 2018) and a second 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 3 April 2022.

92.0% or greater in all LHDs, except for Northern NSW where it was 85.2% (Table 3).

- Coverage of MMR-containing vaccine at 24 months of age was 95.4% for dose 1 and 93.6% for dose 2 at state level in 2021 (both 0.3 of a percentage point lower than in 2020), and was greater than 94.0% for dose 1 and greater than 92.0% for dose 2 in all LHDs except for Northern NSW, where coverage was 88.1% for dose 1 and 86.0% for dose 2 (Table 3).
- At state-level, ‘fully vaccinated’ coverage at the 60-month milestone was 93.8% in 2021 (Table 4), 0.9 percentage points lower than in 2020. ‘Fully vaccinated’ coverage at 60 months of age in 2021 was greater than 93.0% in all LHDs except Northern NSW, Northern Sydney, South Eastern Sydney and Sydney (Table 4).
- At state level, coverage for all vaccines/antigens at the 60-month milestone in 2021 was up to 2.8 percentage points lower than in 2020. In 2021 coverage for all vaccines/antigens at the 60-month milestone was above 93.5% at state level and above 92.5% in all LHDs except Northern NSW, Sydney and South Eastern Sydney (Table 4).
- Although not included in the 60-month ‘fully vaccinated’ coverage algorithm, coverage at state level in 2021 of the fourth dose of *Haemophilus influenzae* type b, the third dose of hepatitis B, the first dose of meningococcal C, the

second dose of MMR, the first dose of varicella and the third dose of 13vPCV was above 95.0% and above 93.3% in all LHDs except Northern NSW (Table 4).

Coverage in Aboriginal children

- ‘Fully vaccinated’ coverage at the state-level for Aboriginal children at the 12-month milestone was 93.6% in 2021, 0.7 of a percentage point lower than non-Aboriginal children at the same age (Table 5). Compared to 2020, coverage in 2021 was 0.7 of a percentage point lower for Aboriginal children and 0.6 of a percentage point lower for non-Aboriginal children.
- ‘Fully vaccinated’ coverage for Aboriginal children at the 12-month milestone in 2021 varied by LHD—ranging from 87.9% in Northern Sydney to 98.8% in Far West, and was higher than non-Aboriginal children in Far West, Mid North Coast, Nepean Blue Mountains and Northern NSW but lower in the other LHDs (Table 5).
- In 2021, coverage at the state-level for all individual vaccines/antigens at the 12-month milestone, excluding rotavirus vaccine, was 93.9% or above for Aboriginal children and 94.8% or above for non-Aboriginal children (Table 6). Compared to 2020, coverage for individual vaccine/antigens at the 12-month milestone for

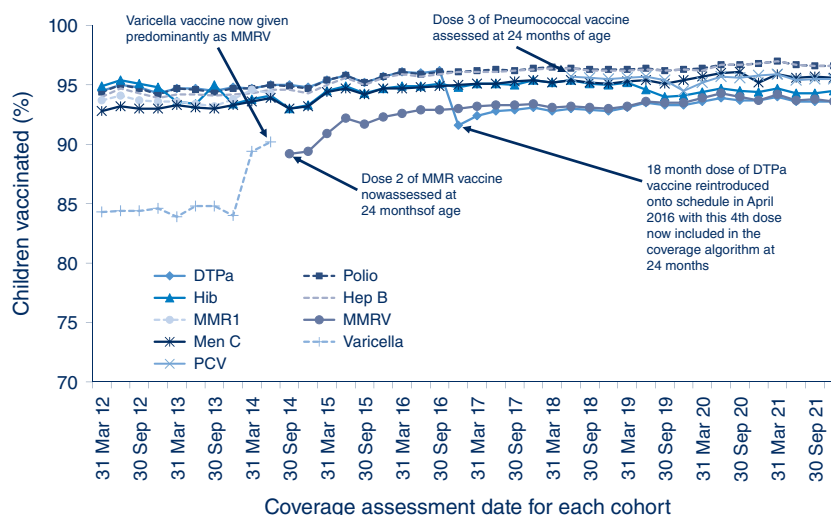


Figure 3. Trends in vaccination coverage at 24 months of age by vaccine/antigen^a, NSW, 2012–2021.

By 3-month birth cohorts born between 1 January 2010 and 31 December 2019. Coverage assessment date was 24 months after the last birth date of each cohort. Vaccination coverage estimates are calculated by quarter and may differ slightly from estimates published elsewhere using rolling annualised data.

The 2021 quarterly data points used the 3-month cohorts born between 1 January 2019–31 December 2019 with vaccines due from mid-2019 (6 month doses) through to mid-2021 (18 month doses).

^aDTPa-containing vaccine (third dose assessed up until 30 September 2016, fourth dose assessed from 1 October 2016), third doses of polio-containing and Hep B-containing vaccines, a fourth dose of Hib-containing vaccine, MMR-containing vaccine (first dose assessed up until 30 June 2014, second dose assessed from 1 July 2014), a first dose of varicella-containing vaccine, a first dose of Men C-containing vaccine, and a third dose of 13-valent PCV (assessed from 1 April 2018).

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.

PCV: pneumococcal conjugate vaccine.

Source: Australian Immunisation Register, data as at 3 April 2022.

- Aboriginal children was 0.4–0.7 of a percentage point lower in 2021 than in 2020.
- Compared to non-Aboriginal children, state level coverage of all individual vaccines/antigens at the 12-month milestone for Aboriginal children in 2021 was lower (by up to one percentage point except for rotavirus vaccine which was 2.5 percentage points lower), except for 13vPCV which was 0.5 of a percentage point higher (Table 6).
- ‘Fully vaccinated’ coverage at the state-level for Aboriginal children at the 24-month milestone in 2021 was 92.3%, 0.2 of a percentage point higher than for non-Aboriginal children at the same age (Table 5). Compared to 2020, coverage in 2021 was 0.5 of a percentage point lower for Aboriginal children but 0.2 of a percentage point higher for non-Aboriginal children.
- ‘Fully vaccinated’ coverage for Aboriginal children at the 24-month milestone in 2021 varied by LHD, ranging from 87.3% in Western Sydney to 98.6% in Network with Victoria, and was higher than for non-Aboriginal children in Central Coast, Mid North Coast, Murrumbidgee, Network with Victoria, Northern NSW, Northern Sydney, South Eastern Sydney and Southern NSW but lower in the other LHDs (Table 5).
- In 2021, coverage at the state-level for all individual vaccines/antigens at the 24-month milestone, was greater than 93.0% for both Aboriginal and non-Aboriginal children (Table 6). Compared to 2020, coverage for individual vaccine/antigens at the 24-month milestone for Aboriginal children was 0.2 of a percentage point–1.0 percentage point lower in 2021.
- Compared to non-Aboriginal children, state-level coverage of all individual vaccines/antigens at the 24-month milestone was 0.2 of a percentage point–1.1 percentage points higher for Aboriginal children in 2021, except for the fourth dose of diphtheria–tetanus–pertussis (acellular)-containing vaccine, which was 0.2 of a percentage point lower, and for varicella vaccine which was the same at 93.7% (Table 6).
- ‘Fully vaccinated’ coverage at the state-level for Aboriginal children at the 60-month milestone was 97.0% in 2021, 3.4 percentage points higher than for non-Aboriginal children at the same age (Table 5). Compared to 2020, coverage in 2021 was 0.5 of a percentage point lower for Aboriginal children and 1.0 percentage point lower for non-Aboriginal children.

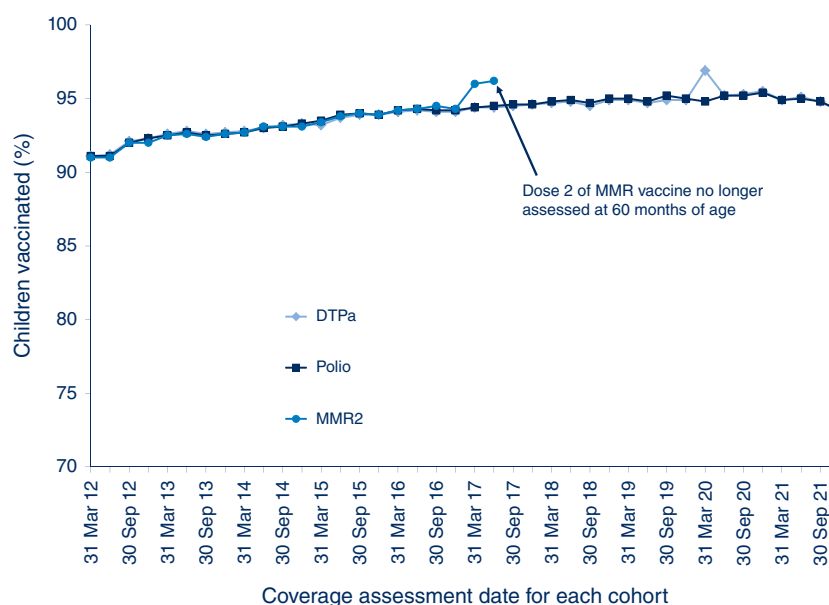


Figure 4. Trends in vaccination coverage at 60 months of age by vaccine/antigen^a, NSW, 2012–2021.

By 3-month birth cohorts born between 1 January 2007 and 31 December 2016. Coverage assessment date was 60 months after the last birth date of each cohort. Vaccination coverage estimates are calculated by quarter and may differ slightly from estimates published elsewhere using rolling annualised data.

The 2021 quarterly data points used the 3-month cohorts born between 1 January 2016 and 31 December 2016 with vaccines due in 2020 (48 month doses).

^aDTPa-containing vaccine (fourth dose assessed up until 30 September 2016, fourth or fifth doses 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 3 April 2022.

Table 2. Percentage of children vaccinated at 12 months of age^a by antigen/dose and local health district, NSW, compared with NSW overall and Australia, 2021

Antigen/Dose	Local Health District ^b																	Australia (%)
	CC (%)	FW (%)	HNE (%)	IS (%)	MN (%)	MM (%)	NBM (%)	NV (%)	NN (%)	NS (%)	SES (%)	SWS (%)	SN (%)	SYD (%)	WN (%)	WS (%)	NSW (%)	
Diphtheria–tetanus–pertussis (acellular) Dose 3	95.0	98.5	95.6	95.4	93.3	96.1	95.1	94.2	87.5	95.9	95.5	93.8	95.3	95.7	96.6	94.6	94.9	94.7
Poliomyelitis Dose 3	95.0	98.5	95.6	95.4	93.3	96.1	95.1	94.2	87.4	95.9	95.5	93.8	95.3	95.7	96.6	94.6	94.9	94.7
<i>Haemophilus influenzae</i> type b Dose 3	95.0	98.5	95.6	95.4	93.4	96.1	95.1	94.1	87.5	95.9	95.5	93.7	95.3	95.7	96.6	94.6	94.8	94.6
Hepatitis B Dose 3	95.0	98.5	95.6	95.3	93.4	96.0	95.0	93.8	87.3	95.7	95.4	93.7	95.1	95.7	96.5	94.5	94.8	94.6
Rotavirus Dose 2	91.9	94.4	93.0	93.1	90.2	93.4	92.5	91.5	82.9	94.2	93.6	90.8	92.9	93.9	94.2	92.2	92.3	91.7
13-valent pneumococcal conjugate Dose 2 or 3 ^c	96.4	99.4	96.6	96.5	94.5	96.7	96.3	95.4	88.9	96.6	96.1	95.2	96.1	96.3	97.8	95.9	95.9	95.9
Fully vaccinated^c	94.6	98.5	95.2	94.9	93.0	95.7	94.6	93.8	86.7	95.2	94.7	93.0	94.8	95.0	96.3	93.9	94.2	94.2
Total number of children	3920	323	10532	4671	2206	2901	5066	692	3022	8693	8997	14540	2203	6493	3541	13906	92089	289324

^aCohort born 1 January 2020–31 December 2020 with vaccines due from mid-2020 through to mid-2021.

^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 vaccinated' at 12 months of age was defined as a child having a record on the AIR of a third dose of diphtheria–tetanus–acellular pertussis-containing vaccine, third doses of polio-containing, *Haemophilus influenzae* type b-containing and hepatitis B-containing vaccines and a second or third dose of 13-valent pneumococcal conjugate vaccine.

Source: Australian Immunisation Register, data as at 3 April 2022.

Table 3. Percentage of children vaccinated at 24 months of age^a by antigen/dose and local health district, NSW, compared with NSW overall and Australia, 2021

Antigen/Dose	Local Health District ^b																	Australia (%)
	CC (%)	FW (%)	HNE (%)	IS (%)	MN (%)	MM (%)	NBM (%)	NV (%)	NN (%)	NS (%)	SES (%)	SWS (%)	SN (%)	SYD (%)	WN (%)	WS (%)	NSW (%)	
Diphtheria–tetanus–pertussis (acellular) Dose 4	94.2	96.0	95.3	94.7	92.8	95.2	94.2	95.0	85.2	93.9	93.1	92.0	94.4	93.5	95.5	92.5	93.3	92.2
Poliomyelitis Dose 3	96.8	98.9	97.6	97.2	95.5	97.3	97.1	96.9	89.3	96.9	96.7	96.2	97.3	97.0	98.1	96.2	96.6	96.5
<i>Haemophilus influenzae</i> type b Dose 4	94.9	96.3	95.9	95.4	93.6	95.7	95.0	95.2	86.4	94.4	93.5	92.7	95.0	94.0	96.3	93.1	93.9	93.9
Hepatitis B Dose 3	96.8	98.9	97.5	97.1	95.3	97.2	96.9	96.8	89.1	96.3	96.5	96.1	97.2	96.7	98.1	95.8	96.3	96.3
Meningococcal ACWY Dose 1 ^c	96.0	98.9	96.7	96.6	94.3	96.6	96.3	96.0	87.7	94.2	94.4	94.6	95.9	94.5	97.0	94.0	95.0	95.1
Meningococcal C-containing Dose 1	96.3	98.9	96.9	96.8	94.5	96.8	96.3	96.4	88.1	95.2	95.1	94.9	95.9	95.3	97.2	94.5	95.3	95.4
Measles–mumps–rubella Dose 1 ^c	96.1	98.3	96.9	96.5	94.4	96.7	96.2	96.4	88.1	95.3	95.1	94.9	96.2	95.2	97.6	94.9	95.4	95.5
Measles–mumps–rubella Dose 2	94.5	95.7	95.5	95.1	93.3	95.4	94.5	95.2	86.0	93.8	93.2	92.3	94.5	93.9	95.8	92.8	93.6	93.6
Varicella Dose 1	94.5	95.7	95.5	95.2	93.4	95.5	94.5	95.0	86.1	94.3	93.4	92.3	94.5	93.9	95.9	92.8	93.7	93.6
13-valent pneumococcal conjugate Dose 3	96.1	98.9	96.8	96.5	94.2	96.6	96.1	96.4	87.5	95.6	95.1	94.7	96.0	95.3	97.6	94.7	95.3	95.4
Fully vaccinated^d	93.6	95.1	94.6	93.8	91.8	94.5	93.4	94.6	84.4	92.0	91.9	90.8	93.2	91.7	94.4	90.7	92.1	92.1
Total number of children	3956	347	10897	4701	2445	2987	5187	745	3182	9434	9490	15024	2250	6473	3586	14661	95838	301412

^aCohort born 1 January 2019–31 December 2019 with vaccines due from mid-2019 (6 month doses) through to mid-2021 (18 month doses).
^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.
^cNot included in definition of 'Fully vaccinated' at 24 months of age.
^d'Fully vaccinated' at 24 months of age defined as a child having a record on the AIR of a fourth dose of diphtheria–tetanus–pertussis (acellular)-containing vaccine, third doses 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 influenzae* B conjugate (PRP-T) vaccine if given after 11.5 months of age), a second dose of measles–mumps–rubella-containing vaccine, a first dose of varicella-containing vaccine, a first dose of meningococcal C-containing vaccine and a third dose of 13-valent pneumococcal conjugate vaccine.
Source: Australian Immunisation Register, data as at 3 April 2022.

Table 4. Percentage of children vaccinated at 60 months of age^a by antigen/dose and local health district, NSW, compared with NSW overall and Australia, 2021

Antigen/Dose	Local Health District ^b																	Australia (%)
	CC (%)	FW (%)	HNE (%)	IS (%)	MN (%)	MM (%)	NBM (%)	NV (%)	NN (%)	NS (%)	SES (%)	SWS (%)	SN (%)	SYD (%)	WN (%)	WS (%)	NSW (%)	
Diphtheria–tetanus–pertussis (acellular) Dose 4 or 5	95.6	97.5	96.0	95.7	93.5	96.0	95.3	96.5	89.4	92.7	91.2	94.5	95.7	91.1	96.5	93.7	93.9	94.2
Poliomyelitis Dose 4	95.6	97.8	96.0	95.7	93.4	96.3	95.2	96.5	89.5	93.2	91.6	94.5	95.6	91.6	96.4	94.1	94.1	94.3
<i>Haemophilus influenzae</i> type b Dose 4 ^d	96.9	98.9	97.4	97.3	95.1	97.3	97.2	97.7	91.8	95.8	95.6	96.8	97.6	95.7	98.0	95.9	96.4	96.4
Hepatitis B Dose 3 ^d	97.2	98.1	97.7	97.7	95.3	97.5	97.4	98.2	92.4	95.2	95.9	97.3	97.8	95.9	98.2	95.4	96.4	96.6
Meningococcal C-containing Dose 1 ^d	97.2	98.6	97.7	97.6	95.3	97.6	97.6	98.4	92.2	96.5	96.0	97.3	97.8	96.1	98.3	96.8	96.9	96.9
Measles–mumps–rubella Dose 2 ^{c,d}	97.0	98.9	97.6	97.5	95.2	97.5	97.2	97.7	91.8	96.2	95.3	97.0	97.5	95.5	98.1	96.7	96.6	96.6
Varicella Dose 1 ^d	97.0	98.9	97.5	97.4	95.2	97.5	97.2	97.7	91.8	96.1	95.2	97.0	97.4	95.4	98.1	96.7	96.5	96.6
13-valent pneumococcal conjugate Dose 3 ^d	96.6	97.3	96.7	96.8	93.3	95.9	96.7	95.9	90.2	95.1	95.1	95.2	96.8	94.6	97.4	94.6	95.4	95.4
Fully vaccinated^e	95.5	97.5	95.9	95.6	93.3	95.9	95.1	96.5	89.3	92.5	91.1	94.3	95.5	90.9	96.4	93.5	93.8	94.0
Total number of children	4356	363	11846	5031	2647	3103	5458	739	3582	11284	9741	15672	2368	6552	3923	15899	103163	328290

^aCohort born 1 January 2016–31 December 2016 with vaccines due from mid-2016 (6 month doses) through to end of 2020 (48 month doses).
^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.
^cAs of mid-2017, the second dose of MMR-containing vaccine no longer included in the definition of 'Fully vaccinated' at 60 months of age.
^dNot included in definition of 'Fully vaccinated' at 60 months of age.
^e'Fully vaccinated' at 60 months of age defined as a child having a record on the AIR of a fourth or fifth dose of diphtheria–tetanus–pertussis (acellular)-containing vaccine and a fourth dose of polio-containing vaccine.
Source: Australian Immunisation Register, data as at 3 April 2022.

Table 5. Percentage of children fully vaccinated at 12 months, 24 months and 60 months of age by Aboriginal status and local health district, NSW, compared with NSW overall and Australia, 2021

Child age and Aboriginal status	Local Health District ^a														Australia (%)			
	CC (%)	FW (%)	HNE (%)	IS (%)	MN (%)	MM (%)	NBM (%)	NV (%)	NN (%)	NS (%)	SES (%)	SWS (%)	SN (%)	SYD (%)		WN (%)	WS (%)	NSW (%)
12 months – fully vaccinated^b																		
Aboriginal	93.3	98.8	94.0	92.7	93.9	94.7	95.3	91.9	90.3	87.9	91.7	92.4	93.2	92.4	95.3	92.1	93.6	91.6
Non-Aboriginal	94.8	98.3	95.4	95.2	92.8	95.9	94.6	94.0	86.2	95.3	94.7	93.0	95.0	95.0	96.6	93.9	94.3	94.3
24 months – fully vaccinated^c																		
Aboriginal	95.7	91.4	93.2	90.9	93.2	94.6	92.6	98.6	88.7	93.8	95.0	89.8	93.3	90.3	92.1	87.3	92.3	90.1
Non-Aboriginal	93.4	96.7	94.8	94.1	91.5	94.5	93.5	94.2	83.8	92.0	91.8	90.8	93.2	91.8	95.1	90.8	92.1	92.2
60 months – fully vaccinated^d																		
Aboriginal	98.1	100.0	97.7	96.8	96.0	96.7	95.9	98.4	94.2	95.1	95.7	97.0	97.1	94.1	98.1	95.8	97.0	96.3
Non-Aboriginal	95.3	96.8	95.6	95.4	92.8	95.9	95.1	96.3	88.7	92.5	91.1	94.2	95.4	90.9	96.0	93.5	93.6	93.9

^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.

^bCohort born 1 January 2020–31 December 2020: 'Fully vaccinated' at 12 months of age defined as a child having a record on the AIR of a third dose of diphtheria–tetanus–pertussis (acellular)-containing vaccine, third doses of polio-containing, *Haemophilus influenzae* type b-containing and hepatitis B-containing vaccines, and a second or third dose of 13-valent pneumococcal conjugate vaccine. Vaccines included in this algorithm were due from mid-2020 through to mid-2021.

^cCohort born 1 January 2019–31 December 2019: 'Fully vaccinated' at 24 months of age defined as a child having a record on the AIR of a fourth dose of diphtheria–tetanus–pertussis (acellular)-containing vaccine, third doses 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–rubella-containing vaccine, a first dose of varicella-containing vaccine, a first dose of meningococcal C-containing vaccine and a third dose of 13-valent pneumococcal conjugate vaccine. Vaccines included in this algorithm were due from mid-2019 through to mid-2021.

^dCohort born 1 January 2016–31 December 2016: 'Fully vaccinated' at 60 months of age defined as a child having a record on the AIR of a fourth or fifth dose of diphtheria–tetanus–pertussis (acellular)-containing vaccine and a fourth dose of polio-containing vaccine. Vaccines included in this algorithm were due in 2020.

Source: Australian Immunisation Register, data as at 3 April 2022.

Table 6. Vaccination coverage by age, vaccine/antigen and Aboriginal status, NSW, 2021

Vaccine/Antigen	Milestone age	Aboriginal (%)	Non-Aboriginal (%)
Diphtheria–tetanus–pertussis (acellular)	12 months ^a (Dose 3)	93.9	94.9
	24 months ^b (Dose 4)	93.1	93.3
	60 months ^c (Dose 4 or 5)	97.2	93.8
Poliomyelitis	12 months ^a (Dose 3)	93.9	94.9
	24 months ^b (Dose 3)	97.1	96.5
	60 months ^c (Dose 4)	97.0	94.0
<i>Haemophilus influenzae</i> type b	12 months ^a (Dose 3)	94.0	94.9
	24 months ^b (Dose 4)	94.4	93.9
	60 months ^c (Dose 4)	98.7	96.2
Hepatitis B	12 months ^a (Dose 3)	93.9	94.8
	24 months ^b (Dose 3)	97.0	96.3
	60 months ^c (Dose 3)	98.8	96.3
Measles–mumps–rubella	12 months	NA	NA
	24 months ^b (Dose 1)	96.3	95.3
	24 months ^b (Dose 2)	93.8	93.6
	60 months ^c (Dose 2)	98.6	96.4
Meningococcal C-containing	12 months	NA	NA
	24 months ^b (Dose 1)	96.4	95.3
	60 months ^c (Dose 1)	98.8	96.7
Varicella	12 months	NA	NA
	24 months ^b (Dose 1)	93.7	93.7
	60 months ^c (Dose 1)	98.6	96.4
Pneumococcal conjugate vaccine	12 months ^a (Dose 2 or 3)	96.4	95.9
	24 months ^b (Dose 3)	96.1	95.3
	60 months ^c (Dose 3)	97.5	95.2
Rotavirus	12 months ^a (Dose 2)	90.0	92.5
	24 months	NA	NA
	60 months	NA	NA

^aCohort born 1 January 2020–31 December 2020 with vaccines due from mid-2020 through to mid-2021.
^bCohort born 1 January 2019–31 December 2019 with vaccines due from mid-2019 (6 month doses) through to mid-2021 (18 month doses).
^cCohort born 1 January 2016–31 December 2016 with vaccines due from mid-2016 (6 month doses) through to end of 2020 (48 month doses).
NA: not assessed.
Source: Australian Immunisation Register, data as at 3 April 2022.

- ‘Fully vaccinated’ coverage for Aboriginal children at the 60-month milestone in 2021 was 95% or above in all LHDs except for Northern NSW and Sydney, and was higher than for non-Aboriginal children in all LHDs (Table 5).
- In 2021, coverage at the state-level for all individual vaccines/antigens at the 60-month milestone in 2021 was 97.0% or above for Aboriginal children and 93.8% or above for non-Aboriginal children (Table 6). Compared to 2020, coverage for all individual vaccine/antigens at the 60-month milestone for Aboriginal children was lower in 2021 (by 0.1 of a percentage point–1.4 percentage points), except for 13vPCV which was 0.2 of a percentage point higher.
- Compared to non-Aboriginal children, state level coverage of all individual vaccines/antigens at the 60-month milestone was 2.1–3.4 percentage points higher for Aboriginal children in 2021 (Table 6).
- Meningococcal B vaccine coverage for the first cohort of Aboriginal children in NSW eligible to have received 3 doses of meningococcal B vaccine by 31 December 2021 (under the NIP program implemented 1 July 2020) was 73.3% for their first dose, 69.2% for their second dose and 56.5% for their third dose (Table 7).
- Meningococcal B vaccine coverage varied by LHD—with dose 1 ranging from 54.1% in South Western Sydney to 90.5% in Far West, and dose 3 ranging from 29.1% in South Western Sydney to 85.7% in Far West (Table 7).

Timeliness

- Assessing ‘fully vaccinated’ coverage earlier at 9, 15, 21 and 51 months of age (i.e. at 3 months after the last vaccine dose due) to capture aspects of timeliness at the state-level show that coverage was lower for Aboriginal children than non-Aboriginal children at 9, 15 and 21

Table 7. Coverage for the first, second and third dose of meningococcal B vaccine for the first cohort^a of Aboriginal children eligible for vaccination under the National Immunisation Program, by local health district, NSW, and Australia, 2021

	Local Health District ^b																	
	CC (%)	FW (%)	HNE (%)	IS (%)	MN (%)	MM (%)	NBM (%)	NV (%)	NN (%)	NS (%)	SES (%)	SWS (%)	SN (%)	SYD (%)	WN (%)	WS (%)	NSW (%)	AUS (%)
Dose 1	67.7	90.5	81.6	70.2	74.1	75.4	62.4	73.3	62.4	75.0	65.8	54.1	72.5	68.9	82.9	69.0	73.3	78.7
Dose 2	69.2	92.9	77.1	69.8	70.3	71.4	59.2	70.0	57.2	78.1	53.2	45.5	75.2	67.2	78.0	60.2	69.2	75.8
Dose 3	58.5	85.7	65.1	60.8	57.3	62.6	45.1	50.0	45.9	50.0	43.0	29.1	59.6	50.8	63.3	46.8	56.5	63.8

^aCohort born 1 May 2020–31 October 2020. This is the first cohort of Aboriginal children eligible to have received 3 doses of meningococcal B vaccine under the NIP from 1 July 2020 to 31 December 2021. Note: Coverage may be underestimated, particularly for dose 1, due to under-reporting to AIR (e.g. of doses given prior to child being registered on Medicare) and only two doses of meningococcal B vaccine are required if the first dose is administered after 12 months of age.

^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.

Source: Australian Immunisation Register, data as at 3 April 2022.

months of age, with the greatest disparity between Aboriginal and non-Aboriginal coverage seen at 9 months of age (3.3 percentage point differential) (Figure 5).

- ‘Compared to the standard 12-month milestone assessment age, ‘fully vaccinated’ coverage assessed earlier at 9 months of age, was 4.9 percentage points lower for Aboriginal children (88.7% versus 93.6%) and 2.3 percentage points lower for non-Aboriginal children (92.0% versus 94.3%) in NSW (Figure 5).
- Compared to the standard 24-month milestone age, ‘fully vaccinated’ coverage assessed earlier at 21 months of age, was 5.6 percentage points lower for Aboriginal children (86.7% versus 92.3%) and 3.2 percentage points lower for non-Aboriginal children (88.9% versus 92.1%) in NSW (Figure 5).
- At the state-level, ‘fully vaccinated’ coverage was higher in Aboriginal children than in non-Aboriginal children at both the earlier assessment age of 51 months and the standard assessment age of 60 months. However, compared to the standard 60-month milestone age, ‘fully vaccinated’ coverage assessed earlier at 51 months of age was 8.3 percentage points lower for Aboriginal children (88.7% versus 97.0%) compared to 5.8 percentage points lower for non-Aboriginal children (87.8% versus 93.6%) in NSW (Figure 5).
- In 2021, 97.0% of children in NSW who had received a first dose of DTPa-containing vaccine were vaccinated on time (within 30 days of the 6-week schedule point), with on-time vaccination 1.9 percentage points higher for non-Aboriginal (97.2%) than Aboriginal (95.3%) children (Figure 6). Compared to 2020, on-time vaccination for the first dose of DTPa-containing vaccine in all NSW children was 0.7 of a percentage point higher in 2021 and was higher for both Aboriginal and non-Aboriginal children, by 0.5 and 0.9 of a percentage point, respectively.
- In 2021, 92.6% of children in NSW who had received a second dose of 13vPCV vaccine were vaccinated on time (before 5 months of age), with on-time vaccination 6.1 percentage points higher for non-Aboriginal (93.1%) than Aboriginal (87.0%) children, however by 8 months of age, this differential had reduced to less than 1 percentage point (Figure 7). Compared to 2020, on-time vaccination for the second dose of 13vPCV in all NSW children was 0.5 of a percentage point higher in 2021. Whilst on-time vaccination in 2021 was 0.7 of a percentage point higher in non-Aboriginal children than in 2020, it was 0.6 of a percentage point lower for Aboriginal children.
- In 2021, the proportion of children in NSW who had received a third dose of a DTPa-containing vaccine on time (before 7 months of age) was 85.4%, with on-time vaccination 11.1 percentage points higher for non-Aboriginal (86.2%) than Aboriginal (75.1%) children, however by 10 months of age, this differential had reduced to 2.5 percentage points (Figure 8). Compared to 2020, on-time vaccination for the third dose of DTPa-containing vaccine in all NSW children was 0.9 of a percentage point higher than in 2020. Whilst on-time vaccination in 2021 was 1.1 percentage points higher in non-Aboriginal children than in 2020, it was 0.2 of a percentage point lower for Aboriginal children.
- On-time vaccination for the third dose of DTPa-containing vaccine in 2021 varied by LHD, ranging from 80.2% in Northern NSW to 90.6% in Northern Sydney for non-Aboriginal children, and from 69.3% in Northern NSW to 82.1% in Sydney for Aboriginal children (Table 8). Whilst the majority of delayed vaccination for the third dose of DTPa-containing vaccine was in the 1–<3 months delay category across all LHDs for both non-Aboriginal and Aboriginal children, 3.5–8.5% of Aboriginal children had a delay of 3–<7 months, compared to 1.6–4.3% of non-Aboriginal children, and 0.0–2.1% of Aboriginal children had a delay of ≥7 months, compared to 0.3–1.3% of non-Aboriginal children (Table 8).
- In 2021, 81.4% of children in NSW who had received the first dose of an MMR-containing vaccine were vaccinated on time (before 13 months of age), with on-time vaccination 8.6 percentage points higher for non-

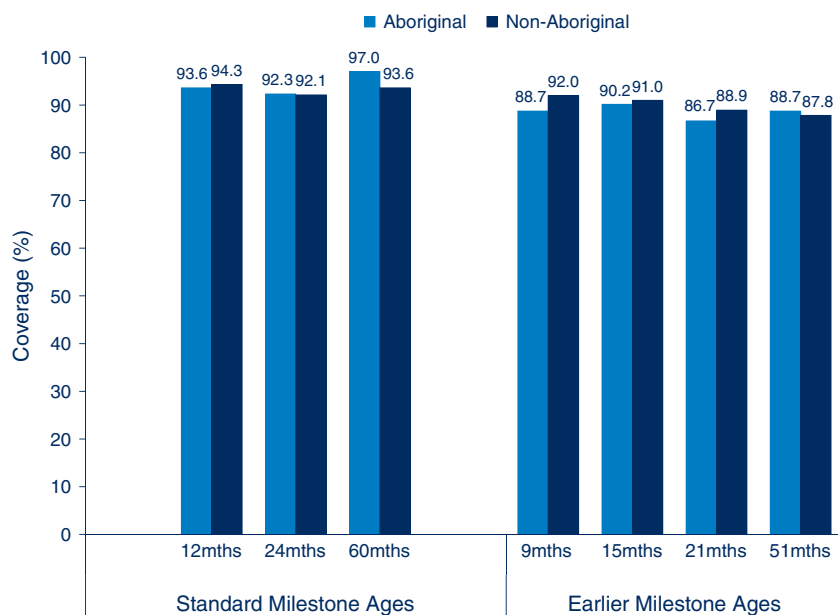


Figure 5. 'Fully vaccinated' coverage assessed at earlier milestone ages (9^a, 15^b, 21^c and 51^d months) versus standard milestone ages (12^a, 24^c and 60^d months) by Aboriginal status, NSW, 2021

^aCohort born 1 January 2020–31 December 2020: 'Fully vaccinated' at 9 and 12 months of age defined as a child having a record on the AIR of a third dose of diphtheria–tetanus–pertussis (acellular)-containing vaccine, third doses of polio-containing, Haemophilus influenzae type b-containing and hepatitis B-containing vaccines, and a second or third dose of 13-valent pneumococcal conjugate vaccine. Vaccines due from mid-2020 through to mid-2021 (6 month doses).

^bCohort born 1 January 2019–31 December 2019: 'Fully vaccinated' at 15 months of age defined as a child having a record on the AIR of a third dose of diphtheria–tetanus–pertussis (acellular)-containing vaccine, third doses of polio-containing and hepatitis B-containing vaccines, a third 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 third dose of 13-valent pneumococcal conjugate vaccine, a first dose of measles–mumps–rubella-containing vaccine, and a first dose of meningococcal C-containing vaccine. Vaccines due from mid-2019 (6 month doses) through to end-2020 (12 month doses).

^cCohort born 1 January 2019–31 December 2019: 'Fully vaccinated' at 21 and 24 months of age defined as a child having a record on the AIR of a fourth dose of diphtheria–tetanus–pertussis (acellular)-containing vaccine, third doses 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 third dose of 13-valent pneumococcal conjugate vaccine, a first dose of meningococcal C-containing vaccine, a second dose of measles–mumps–rubella-containing vaccine and a first dose of varicella-containing vaccine. Vaccines due from mid-2019 (6 month doses) through to mid-2021 (18 month doses).

^dCohort born 1 January 2016–31 December 2016: 'Fully vaccinated' at 51 and 60 months of age defined as a child having a record on the AIR of a fourth or fifth dose of diphtheria–tetanus–pertussis (acellular)-containing vaccine and a fourth dose of polio-containing vaccine. Vaccines due in 2020 (48 month doses).

Source: Australian Immunisation Register, data as at 3 April 2022.

Aboriginal (82.0%) than Aboriginal (73.4%) children, however by 16 months of age, this differential had reduced to 1.5 percentage points (Figure 9). Compared to 2020, on-time vaccination for the first dose of MMR-containing vaccine in all NSW children was 0.5 of a percentage point higher in 2021, and was higher in both non-Aboriginal and Aboriginal children, by 0.5 and 0.4 of a percentage point, respectively.

- In 2021, 70.1% of children in NSW vaccinated with the second dose of MMR-containing vaccine were vaccinated on time (before 19 months of age), with on-time vaccination 12.9 percentage points higher in non-Aboriginal (71.0%) than Aboriginal (58.1%) children, however by 22 months of age, this differential had reduced to 1.6 percentage points (Figure 10). Compared to 2020, on-time vaccination for the second dose of MMR-containing vaccine in all NSW children was 3.1

percentage points lower in 2021 and was lower for both Aboriginal and non-Aboriginal children, by 4.6 and 3.0 percentage points, respectively.

- On-time vaccination for the second dose of MMR-containing vaccine varied by LHD in 2021, ranging from 60.7% in Northern NSW to 75.7% in Northern Sydney for non-Aboriginal children, and from 45.2% in Sydney to 76.1% in Northern Sydney for Aboriginal children (Table 9). Whilst the majority of delayed vaccination for the second dose of MMR-containing vaccine was in the 1–<3 months delay category across all LHDs for both non-Aboriginal and Aboriginal children, 0.0–10.6% of Aboriginal children had a delay of 3–<7 months, compared to 2.6–5.6% of non-Aboriginal children, and 0.0–2.0% of Aboriginal children had a delay of ≥7 months, compared to 0.6–1.1% of non-Aboriginal children (Table 9).

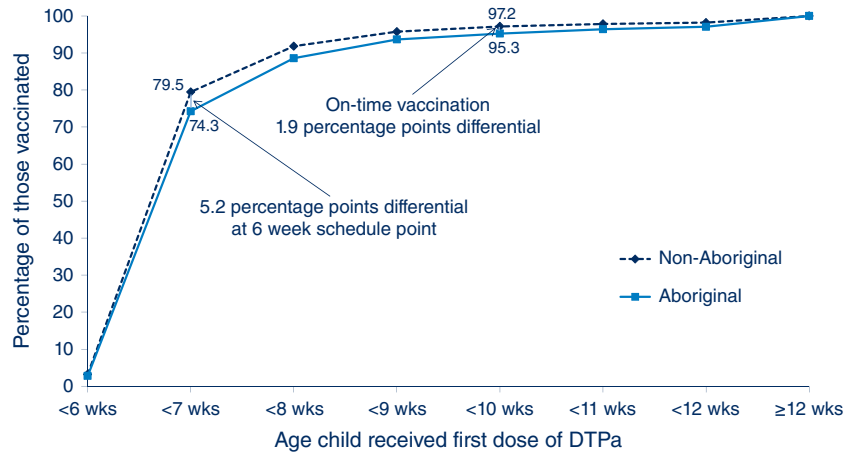


Figure 6. Cumulative percentage of children^a vaccinated with the first dose of DTPa-containing vaccine^b by age in weeks and Aboriginal status, NSW, 2021.

^aCohort born 1 January 2020–31 December 2020 with the first dose of DTPa-containing vaccine due at 6 weeks of age (i.e. from early-2020 through to early-2021).

^bShown as cumulative percentage of children vaccinated (number of children who received vaccine dose at particular age divided by the total number of children who received the vaccine dose, expressed as a percentage).

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

Source: Australian Immunisation Register, data as at 03 April 2022.

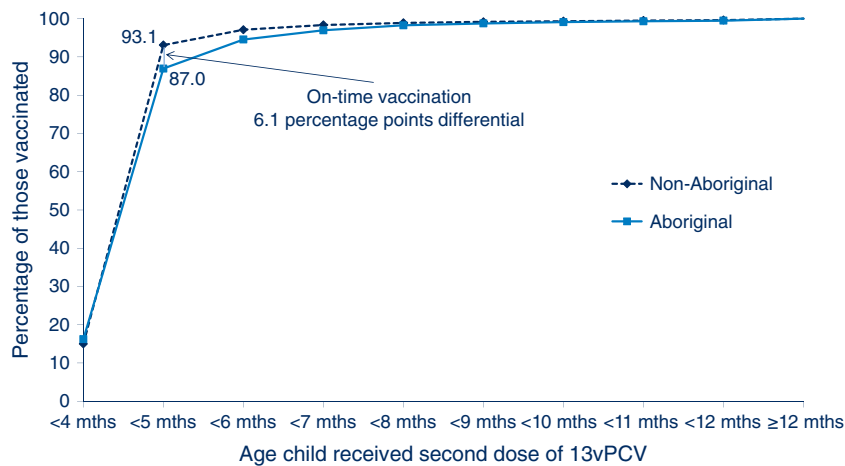


Figure 7. Cumulative percentage of children^a vaccinated with the second dose of 13vPCV^b by age in months and Aboriginal status, NSW, 2021.

^aCohort born 1 January 2020–31 December 2020 with the second dose of 13vPCV due at 4 months of age (i.e. from April 2020 through to April 2021).

^bShown as cumulative percentage of children vaccinated (number of children who received vaccine dose at particular age divided by the total number of children who received the vaccine dose, expressed as a percentage).

13vPCV: 13-valent pneumococcal conjugate vaccine.

Source: Australian Immunisation Register, data as at 3 April 2022.

Small area coverage

- Coverage for rotavirus vaccine by SA3 in 2021 (Figure 11) ranged from 73.7% in Richmond Valley-Coastal to 96.4 in Broken Hill and Far West and was above 95% in 10 SA3s. A further 70 SA3s had rotavirus coverage of 90–<95% and six had rotavirus coverage of 85–<90%. Richmond Valley-Coastal and Tweed Valley were the only SA3s with rotavirus vaccine coverage below 85%.
- Coverage for the fourth dose of DTPa-containing vaccine measured at the 24-month milestone by SA3 in 2021 (Figure 12) ranged from 77.8% in Richmond Valley-Coastal to 98.1% in Tumut-Tumbarumba. Seven SA3s had coverage below 90%, whilst 27 SA3s had coverage above 95%. Richmond Valley-Coastal was the only SA3 with coverage for the fourth dose of DTPa-containing vaccine below 85%.

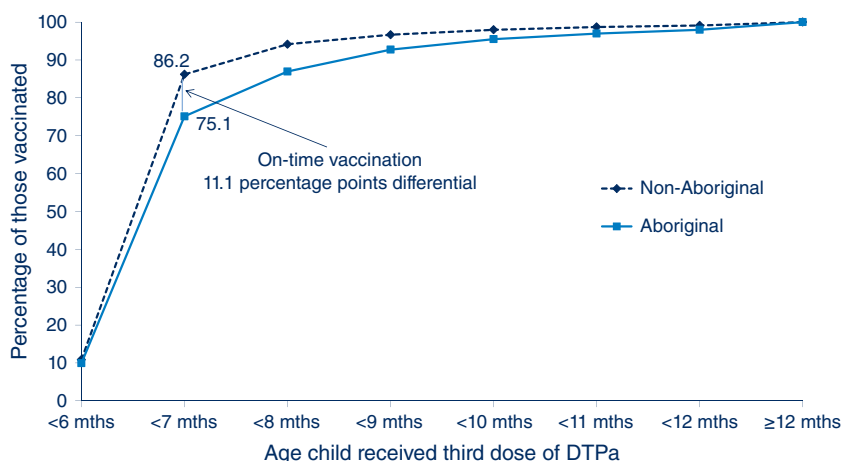


Figure 8. Cumulative percentage of children^a vaccinated with the third dose of DTPa-containing vaccine^b by age in months and Aboriginal status, NSW, 2021.

^aCohort born 1 January 2020–31 December 2020 with the third dose of DTPa-containing vaccine due at 6 months of age (i.e. from mid-2020 through to mid-2021).

^bShown as cumulative percentage of children vaccinated (number of children who received vaccine dose at particular age divided by the total number of children who received the vaccine dose, expressed as a percentage).

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

Source: Australian Immunisation Register, data as at 3 April 2022.

Table 8. Coverage for the third dose of DTPa-containing vaccine due at 6 months of age^a by vaccination delay category, Aboriginal status and local health district, NSW, compared with NSW overall and Australia, 2021

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 (%)	AUS (%)	
No delay^c																			
Aboriginal	75.1	78.6	76.6	78.1	71.4	71.0	78.5	70.7	69.3	76.9	78.1	73.8	74.8	82.1	75.1	72.3	75.1	65.7	
Non-Aboriginal	82.1	80.9	87.9	85.6	84.8	87.5	84.2	84.4	80.2	90.6	88.2	81.9	88.0	89.4	88.4	86.3	86.2	82.5	
1–<3 months late																			
Aboriginal	18.5	17.9	16.9	15.3	22.0	19.5	14.3	25.9	20.7	19.2	15.1	17.8	20.0	12.5	17.0	19.5	17.7	22.9	
Non-Aboriginal	14.0	14.5	9.3	11.3	12.2	9.9	12.3	12.3	14.6	7.4	9.4	13.2	9.9	8.2	8.9	10.1	10.5	13.8	
3–<7 months late																			
Aboriginal	4.3	3.6	5.1	5.8	5.8	7.4	6.5	3.5	8.5	3.9	6.2	7.1	3.8	3.6	7.2	6.8	6.0	9.4	
Non-Aboriginal	3.4	4.3	2.3	2.7	2.4	2.3	2.8	2.3	3.9	1.6	2.0	4.1	1.6	2.0	2.1	3.0	2.7	3.1	
≥7 months late																			
Aboriginal	2.1	0.0	1.5	0.8	0.9	2.1	0.7	0.0	1.4	0.0	0.7	1.3	1.4	1.8	0.7	1.5	1.2	2.0	
Non-Aboriginal	0.5	0.4	0.5	0.4	0.7	0.3	0.7	1.0	1.3	0.4	0.4	0.8	0.5	0.5	0.6	0.7	0.6	0.6	

^aCohort born 1 January 2020–31 December 2020 with the third dose of DTPa-containing vaccine due at 6 months of age (i.e. from mid-2020 through to mid-2021).

^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 before 7 months of age.

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

Source: Australian Immunisation Register, data as at 3 April 2022.

- Coverage for the second dose of MMR-containing vaccine measured at the 24-month milestone by SA3 in 2021 (Figure 13) ranged from 79.1% in Richmond Valley-Coastal to 98.1% in Tumut-Tumbarumba. Six SA3s had coverage below 90%, whilst 30 SA3s were above 95%. Richmond Valley-Coastal was the only SA3 with coverage for the second dose of MMR-containing vaccine below 85%.

Adolescent coverage

School-based program data

- Coverage of the first dose of HPV vaccine delivered through the NSW school-based vaccination program in 2021 to Year 7 students was 82% for girls and 79% for boys (Table 10). Whilst first dose coverage was similar in 2021 and 2020 for both girls and boys, it was 3 percentage points lower than in 2019.

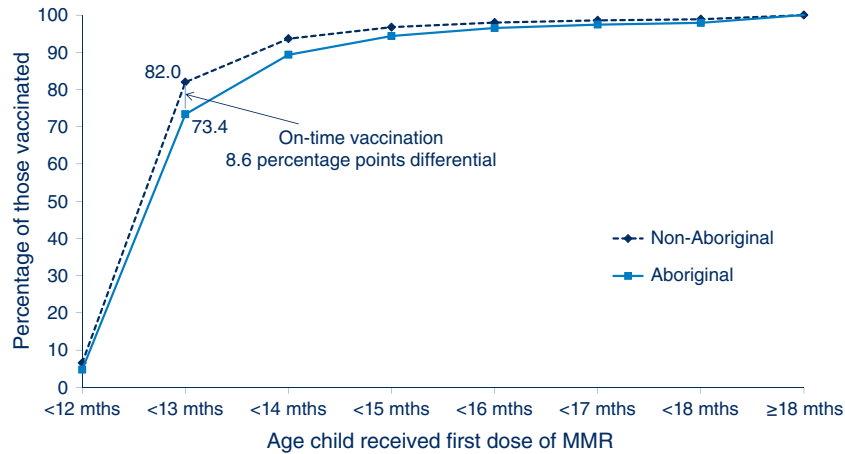


Figure 9. Cumulative percentage of children^a vaccinated with the first dose of MMR-containing vaccine^b by age in months and Aboriginal status, NSW, 2021.

^aCohort born 1 January 2019–31 December 2019 with the first dose of MMR-containing vaccine due at 12 months of age (i.e. in 2020).
^bShown as cumulative percentage of children vaccinated (number of children who received vaccine dose at particular age divided by the total number of children who received the vaccine dose, expressed as a percentage).
 MMR: measles–mumps–rubella.

Source: Australian Immunisation Register, data as at 3 April 2022.

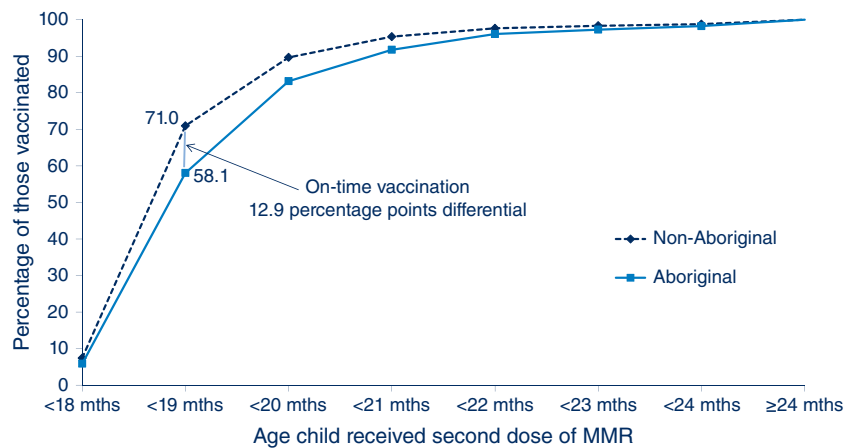


Figure 10. Cumulative percentage of children^a vaccinated with the second dose of MMR-containing vaccine^b by age in months and Aboriginal status, NSW, 2021

^aCohort born 1 January 2019–31 December 2019 with the second dose of MMR-containing vaccine due at 18 months of age (i.e. from mid-2020 through to mid-2021).
^bShown as cumulative percentage of children vaccinated (number of children who received vaccine dose at particular age divided by the total number of children who received the vaccine dose, expressed as a percentage).
 MMR: measles–mumps–rubella.

Source: Australian Immunisation Register, data as at 3 April 2022.

- Only 23% of Year 7 girls and 22% of Year 7 boys completed the 2-dose HPV vaccination schedule delivered through the NSW school-based vaccination program in 2021 (Table 10). However, these data do not include catch-up vaccinations administered in 2022.
- Substantial catch-up vaccination was achieved in 2021 with HPV schedule completion increasing from 57% in 2020 to 77% in 2021 for girls and from 54% in 2020 to 76% in 2021 for boys (Table 10).
- Coverage of the adolescent dTpa booster vaccine given in 2021 to Year 7 students was 78% (Table 10), 3 percentage points lower than the 81% in 2020.
- Coverage of the meningococcal ACWY conjugate vaccine in NSW Year 10 students was 60% in 2021 (Table 10), 13 percentage points lower than the 73% in 2020.

Australian Immunisation Register data

- AIR data (i.e. vaccinations in all settings not just schools) showed that 43,404 female and 43,464 male adolescents

Table 9. Coverage for the second dose of MMR-containing vaccine due at 18 months of age^a by vaccination delay category, Aboriginal status and local health district, NSW, compared with NSW overall and Australia, 2021

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 (%)	AUS (%)	
No delay^c																			
Aboriginal	58.2	49.0	64.6	64.0	53.0	58.3	53.9	66.7	45.3	76.1	66.7	58.6	50.8	45.2	53.3	58.7	58.1	51.0	
Non-Aboriginal	65.2	67.1	72.1	70.7	69.5	72.4	70.0	71.8	60.7	75.7	73.2	65.9	71.5	74.7	73.1	72.1	71.0	68.0	
1–<3 months late																			
Aboriginal	31.7	43.0	27.6	27.5	38.5	34.6	37.9	33.3	43.9	23.9	29.6	32.7	41.5	42.3	39.1	31.0	33.7	37.9	
Non-Aboriginal	30.0	28.7	24.2	25.4	26.2	23.8	25.6	24.7	32.7	20.3	22.4	27.9	25.4	21.3	22.6	23.0	24.4	27.1	
3–<7 months late																			
Aboriginal	8.9	6.0	6.5	6.8	7.8	6.5	7.6	0.0	9.9	0.0	3.7	7.3	6.6	10.6	6.4	8.1	7.1	9.3	
Non-Aboriginal	3.9	3.4	3.2	3.3	3.5	3.3	3.6	2.8	5.6	3.0	3.6	5.1	2.6	3.2	3.4	3.9	3.8	4.1	
≥7 months late																			
Aboriginal	1.2	2.0	1.3	1.8	0.7	0.6	0.6	0.0	0.9	0.0	0.0	1.4	1.1	1.9	1.2	2.1	1.2	1.9	
Non-Aboriginal	1.0	0.8	0.6	0.7	0.8	0.6	0.8	0.8	1.0	1.0	0.8	1.1	0.6	0.9	0.9	1.1	0.9	0.9	

^aCohort born 1 January 2019–31 December 2019 with the second dose of MMR-containing vaccine due at 18 months of age (i.e. from mid-2020 through to mid-2021).

^b CC: 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 No delay = second dose of MMR-containing vaccine given before 19 months of age.

MMR: measles–mumps–rubella.

Source: Australian Immunisation Register, data as at 3 April 2022.

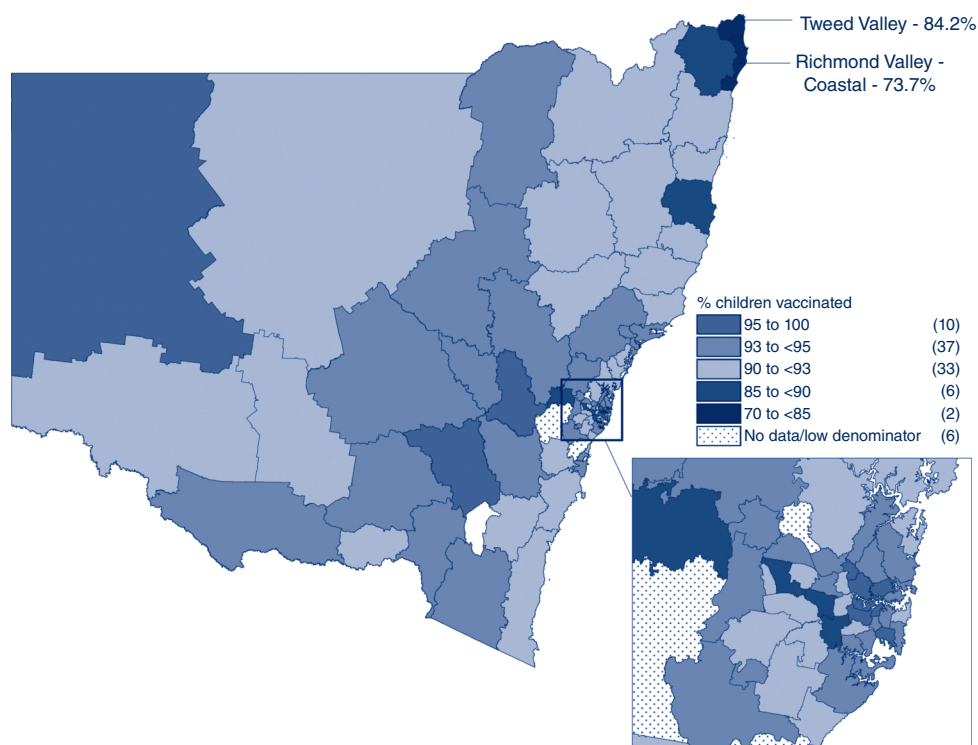


Figure 11. Coverage for second dose of rotavirus vaccine at 12 months of age^a by Statistical Area level 3^b, NSW, 2021.

^aCohort born 1 January 2020–31 December 2020 with the second dose of rotavirus vaccine due at 4 months of age (i.e. from April 2020 through to April 2021).

^bNumbers in brackets = number of Statistical Area 3s in each coverage category.

Source: Australian Immunisation Register, data as at 3 April 2022.

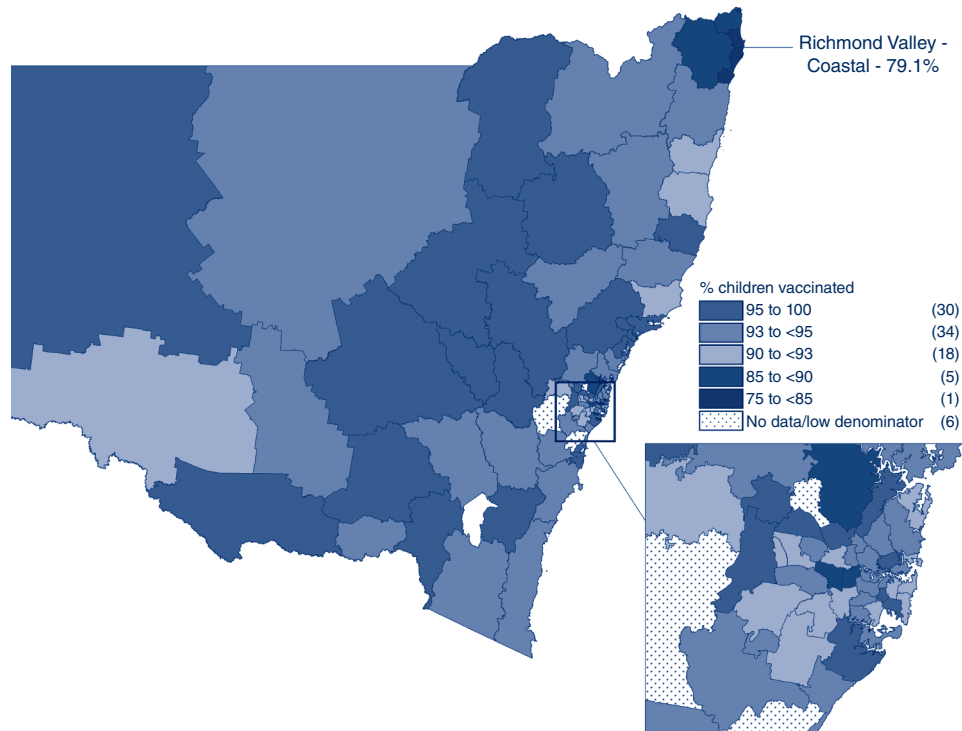


Figure 12. Coverage for the fourth dose of DTPa-containing vaccine at 24 months of age^a by Statistical Area level 3^b, NSW, 2021.

^aCohort born 1 January 2019–31 December 2019 with the fourth dose of DTPa-containing vaccine due at 18 months of age (i.e. from mid-2020 through to mid-2021).

^bNumbers in brackets = number of Statistical Area 3s in each coverage category.

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

Source: Australian Immunisation Register, data as at 3 April 2022.

aged 11–14 years received a first dose of HPV vaccine in 2021 (Table 11). Of these, only 32.0% of girls and 30.5% of boys also received their second dose in 2021 (Table 11). This proportion was substantially lower than the proportion of adolescents who completed the course within 2020 (71.6% of girls and 69.1% of boys) and within 2019 (87.4% of girls and 85.4% of boys).

- The proportion of adolescents aged 11–14 years who commenced and completed the 2-dose schedule in 2021 varied substantially by LHD (Table 11). Metropolitan LHDs had lower proportions completing the course than regional LHDs and ranged from 5.9% (girls) and 6.5% (boys) in South Western Sydney to 76.3% (girls) and 75.5% (boys) in Western NSW (Table 11).
- In 2021, the proportion of Aboriginal and non-Aboriginal girls in NSW completing the two doses within the same calendar year was 21.0 and 36.3 percentage points lower, respectively, than in 2020. Of the 2,548 Aboriginal and 40,856 non-Aboriginal girls aged 11–14 years who received a first dose of HPV vaccine in 2021, only 34.5% and 31.8%, respectively, received a second dose by 31 December 2021 (Table 12). However, catch-up vaccinations administered in 2022 are not yet included. In 2020, 2,579 Aboriginal and 41,497 non-Aboriginal girls aged 11–14 years received a first dose of HPV vaccine in NSW. Of these, 55.5% and 68.1%, respectively, also received a second dose by 31 December 2020, with a further 29.2% and 25.6%, respectively, having received the second dose as a catch-up vaccination in 2021 (Table 12).
- In 2021, the proportion of Aboriginal and non-Aboriginal boys in NSW completing the two doses within the same calendar year was 20.1 and 35.0 percentage points lower, respectively, than in 2020. Of the 2,341 Aboriginal and 41,123 non-Aboriginal boys aged 11–14 years who received a first dose of HPV vaccine in 2021, only 32.6% and 30.4%, respectively, received the second dose by 31 December 2021 (Table 12). However, catch-up vaccinations administered in 2022 are not yet included. In 2020, 2,451 Aboriginal and 42,605 non-Aboriginal boys aged 11–14 years received a first dose of HPV vaccine in NSW. Of these, 52.7% and 65.4%, respectively, also received a second dose by 31 December 2020, with a further 31.0% and 27.4%, respectively, having received the second dose as a catch-up vaccination in 2021 (Table 12).
- At the state-level, overall HPV vaccination coverage for girls and boys by 15 years of age in 2021 was 87.7% and 85.3% for dose 1 and 83.5% and 80.1% for dose 2, respectively (Table 13), and either similar or up to 0.9 of a percentage point lower than coverage in 2020. HPV vaccination coverage for both dose 1 and dose 2 varied by LHD in 2021 and was higher for NSW than Australia for both girls and boys (Table 13).

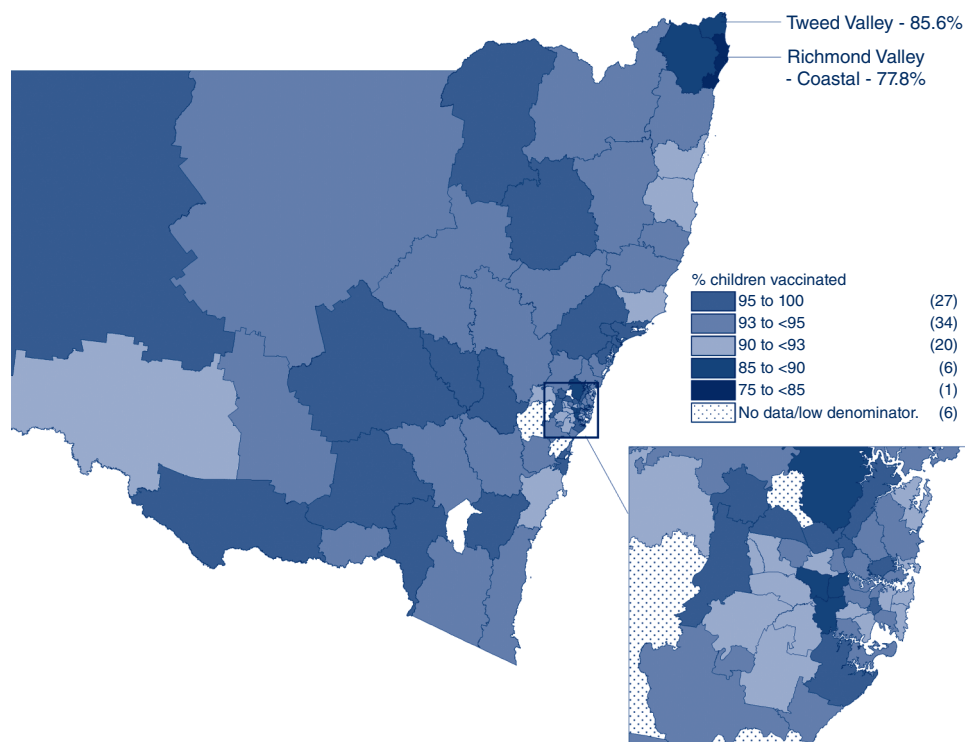


Figure 13. Coverage for the second dose of MMR-containing vaccine at 24 months of age^a by Statistical Area level 3^b, NSW, 2021.

^aCohort born 1 January 2019–31 December 2019 the second dose of MMR-containing vaccine due at 18 months of age (i.e. from mid-2020 through to mid-2021).

^bNumbers in brackets = number of Statistical Area 3s in each coverage category.

MMR: measles–mumps–rubella.

Source: Australian Immunisation Register, data as at 3 April 2022.

Table 10. Adolescent vaccination coverage and doses given, for individual vaccines, NSW, 2017–2021^a

Gender	Vaccine	2021 Coverage ^b (%)	2021 Doses given	2020 Coverage (%)	2020 Doses given	2019 Coverage (%)	2019 Doses given	2018 Coverage (%)	2018 Doses given	2017 Coverage (%)	2017 Doses given
Girls	HPV schedule initiated ^{c,d}	82	39 530	82	39 709	85	40 185	85	38 961	86	37 692
	HPV schedule completed ^{c,e}	23	11 071	77	37 295	81	38 377	82	37 421	82	35 941
Boys	HPV schedule initiated ^{c,d}	79	39 584	80	40 716	82	40 880	83	39 983	84	38 610
	HPV schedule completed ^{c,e}	22	11 059	76	38 646	79	39 249	80	38 575	79	36 657
	dTpa ^c	78	76 530	81	80 889	84	81 218	85	79 333	85	76 531
	Varicella ^c	na	na	na	na	na	na	na	na	66	59 721
	Men ACWY ^f	60	54 806	73	66 555	75	67 157	70	61 797	na	na
	Men ACWY ^{f,g}	na	na	na	na	na	na	70	58 114	73	58 615
	Men ACWY ^{f,h}	na	na	na	na	na	na	na	na	76	55 638

^aAdolescent coverage presented in this table are for school attendees only who were vaccinated through the NSW School Vaccination Program in the listed school year. Doses administered by other immunisation providers in non-school settings (e.g. general practice) are not included. Doses and coverage for 2017–2020 include catch-up vaccinations given through the NSW School Vaccination Program in the following year.

^bVaccination coverage in 2021 is provisional and does not include catch-up vaccinations offered in 2022. Due to the COVID-19 pandemic, schools were closed for part of 2021 leading to a substantial disruption of the NSW School Vaccination Program with significant catch-up expected in 2022.

^cYear 7 school attendees.

^dSchedule initiated = the percentage of Year 7 students receiving their first dose of HPV vaccine.

^eSchedule completed = the percentage of Year 7 students completing the HPV vaccine schedule. Completion of HPV vaccination schedule required 3 doses up to end of 2016. In 2017 NSW adopted a 2-dose HPV schedule in line with the World Health Organization recommendations. HPV vaccination coverage includes the students who received the HPV vaccine in Year 7 in the year of interest, as well catch-up vaccination offered to students in Year 8 in Terms 1–4 of the following year.

^fYear 10 school attendees.

^gYear 11 school attendees.

^hYear 12 school attendees.

dTpa: diphtheria–tetanus–pertussis (acellular)–formulation for individuals aged ≥ 10 years; HPV: human papillomavirus;

Men ACWY: meningococcal ACWY vaccine; na: not applicable.

Source: NSW School Vaccination Program. Data as at 28 July 2022.

Table 11. HPV vaccines^a given to adolescents aged 11–14 years, by gender, local health district, NSW and Australia, 2021

Gender	Vaccine Dose	Local Health District ^b																	
		CC	FW	HNE	IS	MN	MM	NBM	NV	NN	NS	SES	SWS	SN	SYD	WN	WS	NSW	AUS
Girls	HPV Dose 1 received in 2021 (n)	1971	152	5161	2253	1230	1488	2186	300	1578	5280	4053	6080	1112	2593	1717	5897	43404	137072
	HPV Dose 2 (% of 2021 Dose 1 recipients)	60.7	54.6	13.9	9.7	53.9	69.8	35.3	73.7	67.2	51.8	46.3	5.9	33.7	14.3	76.3	13.2	32.0	59.2
Boys	HPV Dose 1 received in 2021 (n)	2020	114	5127	2307	1218	1525	2206	321	1569	5423	4122	5985	1122	2466	1685	5918	43464	140349
	HPV Dose 2 (% of 2021 Dose 1 recipients)	57.2	43.0	12.3	8.1	51.3	70.1	30.5	71.3	60.7	45.3	46.4	6.5	32.3	15.2	75.5	14.2	30.5	57.5

^aVaccines given 1 January–31 December 2021.

^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.

HPV: human papillomavirus.

Source: Australian Immunisation Register, data as at 3 April 2022.

Table 12. HPV vaccines^a given to NSW adolescents aged 11–14 years, by gender and Aboriginal status, NSW 2020–2021

	Girls		Boys	
	Aboriginal	Non-Aboriginal	Aboriginal	Non-Aboriginal
HPV Dose 1 (n) received in 2020	2579	41497	2451	42605
HPV Dose 2 received in 2020 (% of adolescents who received dose 1 in 2020)	55.5	68.1	52.7	65.4
HPV Dose 2 catch-up received in 2021 (% of adolescents who received dose 1 in 2020)	29.2	25.6	31.0	27.4
Total HPV Dose 2 received in 2020 or 2021 (% of adolescents who received dose 1 in 2020)	84.7	93.7	83.7	92.8
HPV Dose 1 (n) received in 2021	2548	40856	2341	41123
HPV Dose 2 received in 2021 (% of adolescents who received dose 1 in 2021)	34.5	31.8	32.6	30.4

^aVaccines given 1 January–31 December 2020 and/or 1 January–31 December 2021.

HPV: human papillomavirus.

Source: Australian Immunisation Register, data as at 3 April 2022.

- In 2021, overall state level dTpa vaccination coverage by 15 years of age was 89.5% for girls (compared to 88.1% in 2020) and 87.5% for boys (compared to 86.1% in 2020), varied by LHD, and was 1.4 and 1.0 percentage points higher for NSW than Australia for girls and boys, respectively, in 2021 (Table 13).
- In 2021, overall state level meningococcal ACWY vaccination coverage by 17 years of age was 79.2% for girls (compared to 78.7% in 2020) and 72.9% for boys (compared to 71.5% in 2020), with coverage varying by LHD (Table 13). Coverage in 2021 was 0.9 of a percentage point higher for NSW than Australia for girls, but 1.0 percentage point lower for boys (Table 13).
- Coverage for HPV dose 1 vaccination by 15 years of age in 2021 was 3.2 percentage points higher for Aboriginal girls (90.8%), than non-Aboriginal girls (87.6%), and was 1.4 percentage points higher for Aboriginal boys (86.6%), than non-Aboriginal boys (85.2%) (Figure 14). Compared to 2020, coverage for HPV dose 1 in 2021 was 1.3 percentage points lower for Aboriginal girls, 0.1 of a percentage point higher for non-Aboriginal girls, and was lower in both Aboriginal and non-Aboriginal boys, by 1.5 percentage points and 0.4 of a percentage point, respectively.
- Coverage for HPV dose 2 vaccination by 15 years of age in 2021 was 2.7 percentage points lower for Aboriginal girls (81.0%), than non-Aboriginal girls (83.7%), and was 5.4 percentage points lower for Aboriginal boys (75.0%), than non-Aboriginal boys (80.4%) (Figure 14). Coverage for HPV dose 2 in 2021 was lower than in 2020 for Aboriginal girls and boys (by 3.3 and 3.0 percentage points, respectively), as well as for non-Aboriginal girls and boys (by 0.1 and 0.8 of a percentage point, respectively).
- Coverage for dTpa booster vaccinations by 15 years of age in 2021 was 1.8 percentage points higher for Aboriginal girls (91.2%), than non-Aboriginal girls (89.4%), and was equal at 87.5% for Aboriginal and non-Aboriginal boys (Figure 14). Compared to 2020, coverage for dTpa booster vaccination was higher in 2021 for

Table 13. Coverage for the first and second dose of HPV vaccine and the booster dose of dTpa by 15 years^a and the adolescent dose of Meningococcal ACWY vaccine by 17 years^b by gender, local health district, NSW and Australia, 2021

Gender	Vaccine	Local Health District ^c																	
		CC (%)	FW (%)	HNE (%)	IS (%)	MN (%)	MM (%)	NBM (%)	NV (%)	NN (%)	NS (%)	SES (%)	SWS (%)	SN (%)	SYD (%)	WN (%)	WS (%)	NSW (%)	AUS (%)
Girls	HPV Dose 1	89.4	90.5	91.7	89.9	85.1	92.0	89.3	89.0	79.3	85.4	86.8	87.0	88.3	85.9	89.7	87.9	87.7	86.2
	HPV Dose 2	85.9	82.3	86.9	85.3	79.1	86.5	83.8	81.6	74.6	82.3	83.9	82.4	81.8	83.0	84.3	84.3	83.5	80.3
	dTpa	91.8	88.2	92.8	91.4	86.9	93.4	91.1	92.3	82.9	87.1	88.2	89.4	89.7	86.8	90.7	89.6	89.5	88.1
	Men ACWY	81.5	71.1	78.9	80.3	73.7	83.0	75.6	75.6	67.5	81.8	81.1	79.1	77.5	80.0	76.3	81.4	79.2	78.3
Boys	HPV Dose 1	87.8	90.2	88.5	88.3	82.6	89.3	85.1	86.2	76.8	83.7	83.5	85.1	85.6	82.4	87.3	85.8	85.3	84.4
	HPV Dose 2	83.3	81.0	82.2	81.7	75.3	83.1	78.5	76.0	70.9	80.6	79.8	80.0	79.1	79.2	80.7	80.7	80.1	77.2
	dTpa	90.0	93.3	90.4	90.5	84.5	91.4	87.2	88.5	81.6	86.4	86.1	87.0	87.1	84.4	88.7	87.8	87.5	86.5
	Men ACWY	77.3	64.4	72.6	74.4	61.2	76.9	67.0	67.5	60.6	78.9	74.9	71.9	68.6	73.9	68.8	75.1	72.9	73.9

^aHPV and dTpa vaccine coverage assessed in cohort born 1 January–31 December 2006 for vaccinations received after 11th birthday and before 15th birthday. In NSW, HPV and dTpa are typically given in Year 7 as part of the school-based vaccination program, usually around 12–13 years of age and as such vaccines were due in early 2018 to late 2019 for this birth cohort.

^bMenACWY vaccine coverage assessed in cohort born 1 January–31 December 2003 for vaccinations received after 13th birthday and before 17th birthday. In NSW, MenACWY vaccine is typically given in Year 10 as part of the school-based vaccination program, usually around 15–16 years of age and as such was due in early 2018 to late 2019 for this birth cohort.

^cCC: 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.

HPV: human papillomavirus; dTpa: diphtheria–tetanus–pertussis (acellular)–formulation for individuals aged ≥10 years; Men ACWY: meningococcal ACWY vaccine.

Source: Australian Immunisation Register, data as at 3 April 2022.

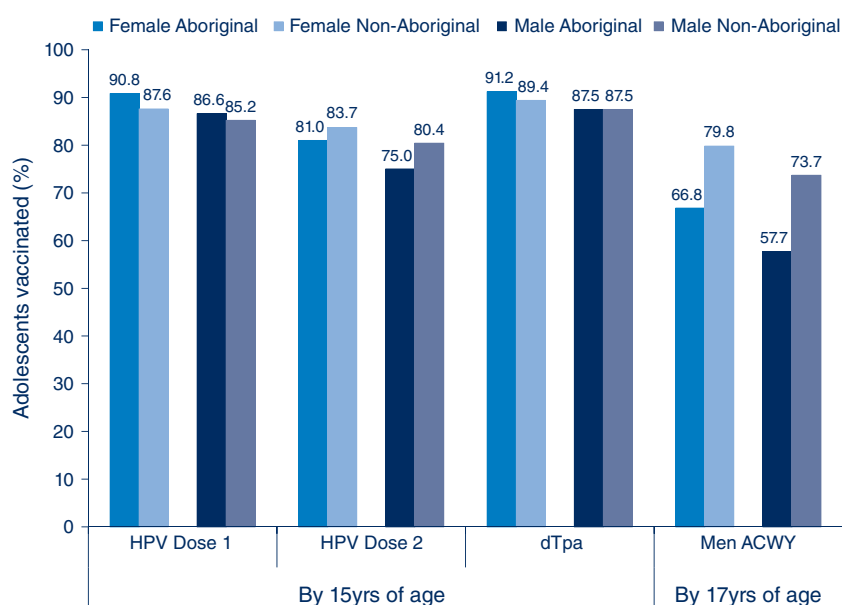


Figure 14. Coverage for the first and second dose of HPV vaccine and the booster dose of dTpa at age 15 years^a and the adolescent dose of MenACWY vaccine by 17 years^b by gender and Aboriginal status, NSW, 2021.

^aHPV and dTpa vaccination coverage assessed in cohort born 1 January–31 December 2006 for vaccinations received after 11th birthday and before 15th birthday. In NSW, HPV and dTpa vaccines are typically given in Year 7 as part of the school-based vaccination program, usually around 12–13 years of age and as such vaccines were due in early 2018 to late 2019 for this birth cohort.

^bMenACWY vaccination coverage assessed in cohort born 1 January–31 December 2003 for vaccinations received after 13th birthday and before 17th birthday. In NSW, MenACWY vaccine is typically given in Year 10 as part of the school-based vaccination program, usually around 15–16 years of age and as such this vaccine was due in early 2018 to late 2019 for this birth cohort. HPV: human papillomavirus; dTpa: diphtheria–tetanus–pertussis (acellular) – formulation for individuals aged ≥10 years; Men ACWY: meningococcal ACWY vaccine.

Source: Australian Immunisation Register, data as at 3 April 2022.

Aboriginal girls and boys (by 0.6 of a percentage point and 2.3 percentage points, respectively), as well as for non-Aboriginal girls and boys (both by 1.4 percentage points).

- Coverage for adolescent meningococcal ACWY vaccination by 17 years of age in 2021 was 13.0 percentage points lower for Aboriginal girls (66.8%), than non-Aboriginal girls (79.8%), and was 16.0 percentage points lower for Aboriginal boys (57.7%), than non-Aboriginal boys (73.7%) (Figure 14). Compared to 2020, coverage for adolescent meningococcal ACWY vaccination in 2021 was lower for both Aboriginal girls and boys, by 3.6 and 5.1 percentage points, respectively, whilst it was higher for both non-Aboriginal girls and boys (by 0.7 of a percentage point and 1.7 percentage points, respectively).

Adult coverage

- At state level, zoster vaccine coverage in 2021 for all adults aged 70–<71 years was 2.9 percentage points higher than in 2020 (27.2% versus 24.3%).
- Zoster vaccine coverage in Aboriginal adults aged 70–<71 years was 24.8% in 2021, up from 23.9% in 2020, and was 2.4 percentage points and 0.4 of a percentage point lower than in non-Aboriginal adults in 2021 and 2020, respectively (Figure 15).
- At state level, zoster vaccine coverage in 2021 for all adults aged 71–<80 years was 4.8 percentage points higher than in 2020 (43.7% versus 38.9%).

- Zoster vaccine coverage in Aboriginal adults aged 71–<80 years was 44.0% in 2021, up from 40.8% in 2020, and was 2.0 and 1.9 percentage points higher than in non-Aboriginal adults in 2021 and 2020, respectively (Figure 15).
- 13vPCV coverage for all NSW adults aged 70–<71 years was 14.9% in 2021, 12.7 percentage points higher than in 2020.
- In Aboriginal adults, 13vPCV coverage in 70–<71 year olds was 16.7% in 2021, up from 2.3% in 2020, and was 1.8 percentage points and 0.1 of a percentage point higher than in non-Aboriginal adults in 2021 and 2020, respectively (Figure 15).
- In adults aged 71–<80 years, 13vPCV vaccine coverage in NSW was 16.7% in 2021, 8.4 percentage points higher than in 2020.
- In Aboriginal adults, 13vPCV coverage in 71–<80 year olds was 21.0% in 2021, up from 10.8% in 2020, and was 4.3 and 2.5 percentage points higher than in non-Aboriginal adults in 2021 and 2020, respectively (Figure 15).
- In younger Aboriginal adults (i.e. those aged 50–<70 years), 13vPCV coverage in NSW was 10.4%.

Influenza vaccination coverage

Australian Immunisation Register data

- In 2021, influenza vaccine uptake commenced in the last week of March. The weekly uptake was highest

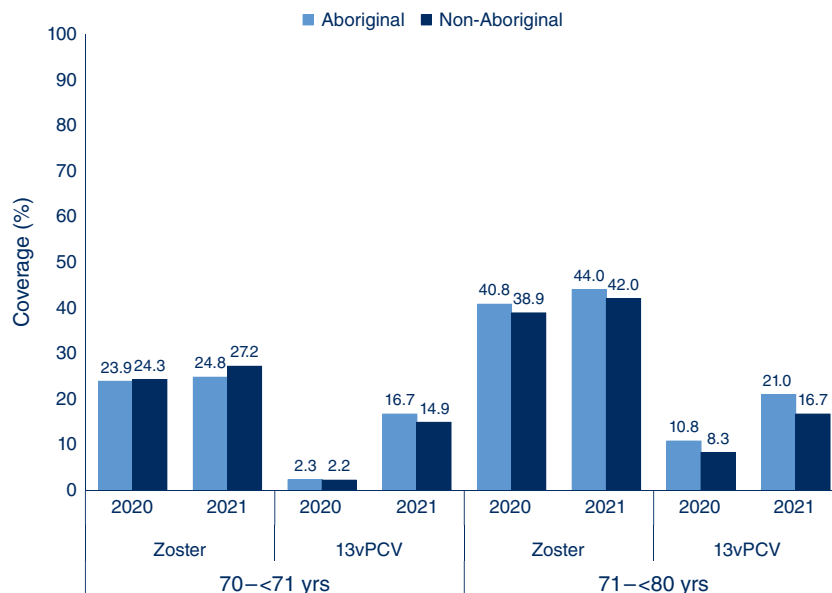


Figure 15. Zoster^a and 13vPCV vaccination coverage in adults aged 70–<71 years^b and 71–<80 years^c by Aboriginal status, NSW, 2020 and 2021.

^aZoster coverage = receipt of 1 dose of Zostavax or 2 doses of Shingrix by 31 December in calendar year of interest but also includes people who may have received a dose in earlier years.

^bCohorts for adults aged 70–<71 years born 1 January 1949–31 December 1949 for 2020 coverage and 1 January 1950–31 December 1950 for 2021 coverage. Coverage calculations also includes vaccinations given <70 years.

^cCohorts for adults aged 71–<80 years born 1 January 1941–31 December 1948 for 2020 coverage and 1 January 1942–31 December 1949 for 2021 coverage. Coverage calculations also includes vaccinations given <70 years.

Source: Australian Immunisation Register, data as at 3 April 2022.

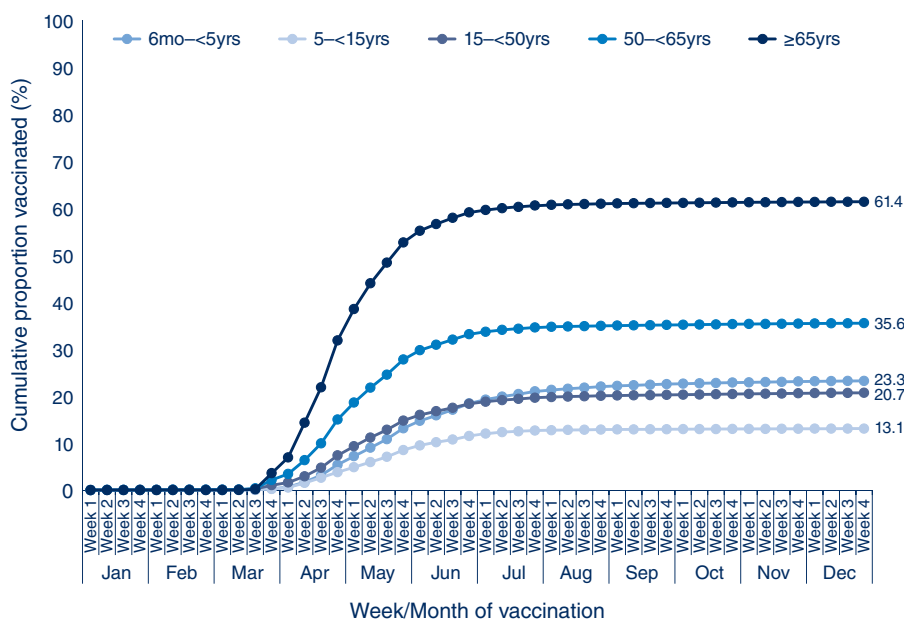


Figure 16. Weekly cumulative uptake of at least one dose of influenza vaccine by age group, NSW, 2021. Source: Australian Immunisation Register, data as at 03 April 2022 for vaccines given 1 January–31 December 2021.

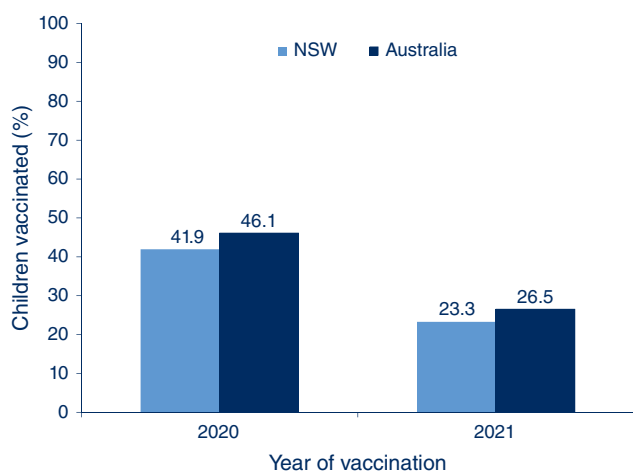


Figure 17. Percentage of children aged 6 months to <5 years vaccinated with at least one dose of influenza vaccine^a, NSW and Australia, 2020 versus 2021.

^aVaccines given 1 January–31 December in calendar year of interest.

Source: Australian Immunisation Register, data as at 31 March 2021 (for 2020 data) and as at 03 April 2022 (for 2021 data). Note: 2020 coverage has been revised using AIR population denominators based on age groups where age assessed at 30 June 2020).

for all age groups between the first week of April and the last week of May with the steepest trajectory of uptake in adults aged ≥ 65 years, and least steep in children/adolescents aged 5 to <15 years (Figure 16). Uptake commenced later in 2021 than in 2020, where it was highest for all age groups between the last week of March and the first week of May (data not shown).

- Influenza vaccination coverage in children aged 6 months to <5 years reached 23.3% in NSW and 26.5% Australia-wide, both approximately half the uptake in 2020 (Figure 17). Substantial reductions in coverage in 2021 compared to 2020 were seen across all NSW LHDs in both non-Aboriginal and Aboriginal children (Table 14).
- In 2021, influenza vaccination coverage at the state-level in children aged 6 months to <5 years continued to be higher in non-Aboriginal than Aboriginal children (23.5% versus 19.9%) (Table 14).
- Influenza vaccination coverage for children aged 6 months to <5 years in 2021 varied by LHD, ranging from 12.9% in Western Sydney to 28.8% in Northern Sydney for Aboriginal children, and from 13.2% in Northern NSW to 36.2% in Far West for non-Aboriginal children (Table 14).
- At the state-level, influenza vaccination coverage was 1.2–18.7 percentage points lower in 2021 than in 2020 for Aboriginal and non-Aboriginal people in the 6 months–<5 years, 5–<15 years and 15–<50 years age groups (Figure 18).
- Compared to 2020, influenza vaccination coverage at the state-level in adults aged 50 to <65 years and ≥ 65 years in 2021 was 4.7–11.2 percentage points lower for Aboriginal adults but was 1.9–2.7 percentage points higher for non-Aboriginal adults (Figure 18).
- Influenza vaccination coverage at the state-level in adults aged ≥ 65 years was 61.4% in 2021, 2.6 percentage points higher than in 2020 (Table 15). Coverage varied by LHD, ranging from 47.3% in Sydney to 72.1% in Hunter New England and 73.0 in Network with Victoria in 2021 (Table 15).

Table 14. Percentage of children aged 6 months to <5 years vaccinated with at least one dose of influenza vaccine^a by Aboriginal status and local health district, NSW, compared with NSW overall and Australia, 2020 versus 2021

	Local Health District ^b																NSW (%)	Australia (%)
	CC (%)	FW (%)	HNE (%)	IS (%)	MN (%)	MM (%)	NBM (%)	NV (%)	NN (%)	NS (%)	SES (%)	SWS (%)	SN (%)	SYD (%)	WN (%)	WS (%)		
Aboriginal status and year vaccine received																		
Aboriginal																		
2020	39.3	47.8	41.8	31.0	36.9	41.2	32.4	45.8	28.1	52.2	38.9	27.5	37.1	36.1	44.2	31.1	37.8	43.0
2021	20.4	22.8	25.5	13.7	16.0	20.8	15.8	24.8	13.0	28.8	15.5	14.1	21.9	14.2	23.7	12.9	19.9	22.5
Non-Aboriginal																		
2020	42.5	54.3	51.4	40.0	29.7	47.0	36.4	50.4	29.4	52.6	45.8	29.7	45.5	48.0	52.9	39.1	42.2	46.3
2021	21.5	36.2	31.3	21.7	13.9	28.1	19.1	29.8	13.2	29.3	23.5	15.4	28.3	28.4	35.4	22.0	23.5	26.8

^aVaccines given 1 January–31 December in calendar year of interest.

^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.

Source: Australian Immunisation Register, data as at 31 March 2021 (for 2020 data) and as at 03 April 2022 (for 2021 data). Note: 2020 coverage has been revised using AIR population denominators based on age groups with age assessed at 30 June 2020).

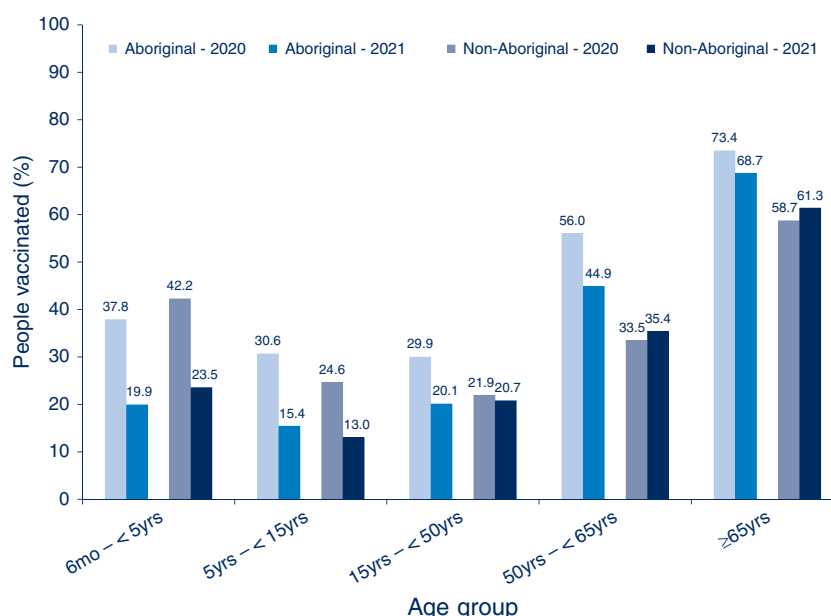


Figure 18. Percentage of all persons aged ≥6 months vaccinated with at least one dose of influenza vaccine^a by age group and Aboriginal status, 2020 versus 2021.

^aVaccines given 1 January–31 December in calendar year of interest.

Source: Australian Immunisation Register, data as at 31 March 2021 (for 2020 data) and as at 03 April 2022 (for 2021 data). Note: 2020 coverage has been revised using AIR population denominators based on age groups where age assessed at 30 June 2020).

NSW Population Health Survey data

- The 2021 adult influenza vaccination coverage is based on 2,579 NSW Population Health Survey respondents aged ≥65 years, compared to 6,304 respondents in 2020.
- In 2021, the proportion of surveyed adults reporting vaccination for influenza in the previous 12 months at the state-level was 84.3%, compared to 83.1% in 2020.
- Self-reported influenza vaccination coverage in adults aged ≥65 years in NSW overall for the combined 2020-2021 period was 83.7%, up 4.5 percentage points

- from 79.2% for the combined 2019–2020 period (Table 16).
- Self-reported influenza vaccination coverage in adults aged ≥65 years by LHD for the combined 2020–2021 period ranged from 73.4% in Northern NSW to 89.1% in Murrumbidgee (Table 16).
- Compared to the 2019–2020 period, self-reported coverage in the 2020–2021 period was higher in all LHDs (ranging from 0.6 of a percentage point higher in Far West LHD to 8.9 percentage points higher in Sydney LHD) except Northern NSW, where it was 0.4 of a percentage point lower (Table 16).

Table 15. Percentage of adults aged ≥65 years vaccinated with at least one dose of influenza vaccine^a by local health district, compared with NSW overall and Australia, 2020 versus 2021

Year	Local Health District ^b																	
	CC (%)	FW (%)	HNE (%)	IS (%)	MN (%)	MM (%)	NBM (%)	NV (%)	NN (%)	NS (%)	SES (%)	SWS (%)	SN (%)	SYD (%)	WN (%)	WS (%)	NSW (%)	AUS (%)
2020	68.8	66.4	70.5	64.7	66.2	70.2	60.0	69.2	64.7	56.2	48.7	50.0	65.5	43.7	67.1	53.0	58.8	61.9
2021	69.3	63.4	72.1	69.6	68.2	71.6	62.0	73.0	63.9	58.1	52.9	54.8	68.4	47.3	68.5	55.9	61.4	64.9

^aVaccines given 1 January–31 December in calendar year of interest.
^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.
 Source: Australian Immunisation Register, data as at 31 March 2021 (for 2020 data) and as at 03 April 2022 (for 2021 data). Note: 2020 coverage has been revised using AIR population denominators based on age groups where age assessed at 30 June 2020.

Table 16. Percentage of older adults self-reporting influenza vaccination^a by local health district, 2019–2020 vs 2020–2021

Year reporting influenza vaccination	Local Health District ^b																	
	CC (%)	FW (%)	HNE (%)	IS (%)	MN (%)	MM (%)	NBM (%)	NN (%)	NS (%)	SES (%)	SWS (%)	SN (%)	SYD (%)	WN (%)	WS (%)	NSW (%)		
2019–2020 ^c	80.8	79.9	82.8	83.6	76.5	81.6	76.0	73.8	79.8	78.8	76.3	78.6	76.8	82.2	77.9	79.2		
2020–2021 ^d	85.9	80.5	85.5	87.6	82.2	89.1	83.6	73.4	84.7	83.0	79.7	81.1	85.7	86.5	83.4	83.7		

^aInfluenza vaccination coverage based on survey respondents aged ≥65 years 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; MN: Mid North Coast; MM: Murrumbidgee; NBM: Nepean Blue Mountains; 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.
^cData as at 5 August 2021.
^dData as at 8 September 2022.
 Source: New South Wales Population Health Survey (SAPHaRI). Centre for Epidemiology and Evidence, NSW Ministry of Health.

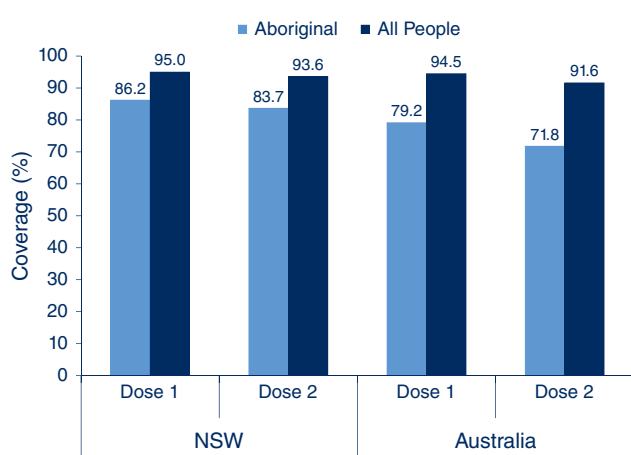


Figure 19. Coverage (%) of a COVID-19 vaccine in all people aged ≥16 years by Aboriginal status, NSW and Australia 2021. Source: Australian Department of Health, as at 4 January 2022.²¹

COVID-19 vaccination coverage

- By the end of 2021, 95.0% of all people aged ≥16 years in NSW had received a first dose of a COVID-19 vaccine and 93.6% had received a second dose, both higher than coverage at the national level (Figure 19). Compared to

all people aged ≥16 years in NSW, COVID-19 vaccine coverage of the first and second dose was 8.8 and 9.9 percentage points lower in Aboriginal people at 86.2% and 83.7%, respectively. However, these figures were higher than in Aboriginal people at the national level (7.0 and 11.9 percentage points higher for dose 1 and dose 2 coverage, respectively) (Figure 19).

- At state level, 81.4% of adolescents aged 12–15 years had received a first dose of a COVID-19 vaccine and 78.0% had received a second dose by the end of 2021 (Figure 20). Coverage of both first and second dose of a COVID-19 vaccine increased by age group, ranging from 92.0% and 90.3% in people aged 16–49 years for first and second dose coverage, respectively, to above 99% for both doses in people aged ≥70 years (Figure 20).

Discussion

Children

Annual ‘fully vaccinated’ coverage of all children in NSW was 0.6–0.9 of a percentage point lower in 2021 than in 2020 at the 12-month (94.2%) and 60-month (93.8%) milestones, but 0.2 of a percentage point higher at the 24-month milestone (92.1%). Quarterly ‘fully vaccinated’

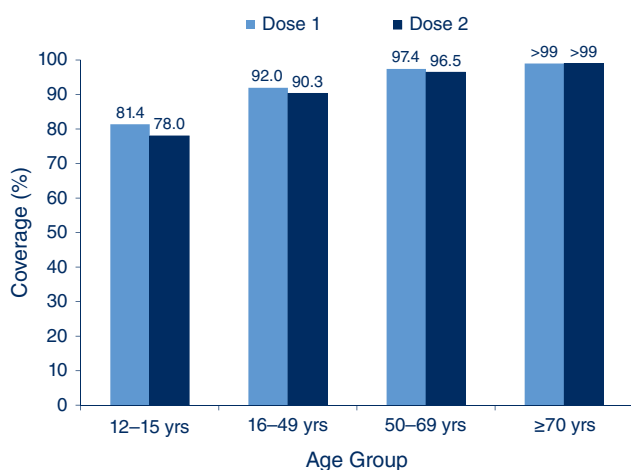


Figure 20. Coverage (%) of a COVID-19 vaccine in all people by age group, NSW 2021.

Source: Adapted from Australian Department of Health, as at 4 January 2022.²¹

coverage decreased by 0.4–0.8 of a percentage point between March 2021 and December 2021 for each of the three milestone ages. Due to the lag time involved in assessing childhood vaccination coverage, the ‘fully vaccinated’ coverage figures presented in this 2021 report predominantly reflect vaccinations due in 2020 and hence show a small impact on childhood coverage in the first year of the COVID-19 pandemic. This impact is much lower than what has been seen in other countries.^{22–26}

Whilst childhood coverage of the assessed individual vaccines/antigens in 2021 was lower than in 2020, coverage has remained high in NSW (between 92.3% and 96.9% for all children and 90.0% and 98.8% for Aboriginal children). In the context of Australia’s 95% coverage target, this has been met in NSW for 13vPCV vaccine at 12 months, polio, hepatitis B, meningococcal C/ACWY, first dose of MMR and 13vPCV at 24 months, and *Haemophilus influenzae* type b, hepatitis B, meningococcal C, first and second doses of MMR, varicella and 13vPCV at 60 months. With the reopening of international borders in 2022, after having been closed since early 2020 due to the COVID-19 pandemic, maintaining high vaccination coverage is crucial. As vaccination coverage in other countries around the world has dropped since the start of the pandemic,²⁷ there is now an increased risk of disease importation into Australia, with polio and measles of particular concern.

The NSW AIHCW program, funded by NSW Health,¹⁷ has helped improve the immunisation status of Aboriginal children across NSW since its implementation in July 2012. The first year of the COVID-19 pandemic has had a small impact with ‘fully vaccinated’ coverage of Aboriginal children in NSW at the three milestone ages, marginally lower in 2021 than in 2020. However, ‘fully vaccinated’ coverage for Aboriginal children remained

higher than non-Aboriginal children at 24 and 60 months of age in 2021. Following implementation of the meningococcal B vaccination program for Aboriginal children in July 2020, relatively high coverage of the first and second doses, 73.3% and 69.2%, respectively, was achieved in NSW in 2021. Coverage of the third dose was lower, at 56.5%, although as this only includes vaccinations given by 31 December 2021, eventual coverage with late doses factored in will likely be higher.

Aboriginal children are at higher risk of severe disease at a young age. Whilst they do eventually reach similar, or higher vaccination coverage than non-Aboriginal children, a larger proportion are vaccinated in a less timely manner. ‘Fully vaccinated’ coverage at earlier milestones (i.e. 3 months after the due date of the last scheduled vaccine) was 4.9–8.3 percentage points lower for Aboriginal children than at the standard milestones in 2021. In contrast, coverage for non-Aboriginal children was only 2.3–5.8 percentage points lower at the earlier milestones than at the standard milestones. On-time vaccination (within 30 days of the recommended age) was also lower in Aboriginal than non-Aboriginal children, ranging from 1.9 to 12.9 percentage points lower for the vaccines/antigens assessed.

Influenza vaccination coverage in children aged 6 months to <5 years dropped to 23.3% in NSW in 2021, approximately half what it was in 2020 although in the context of very low levels of circulating influenza due to COVID-19 pandemic-related public health measures.²⁹ Annual influenza vaccination for this age group has been funded on the NIP for Aboriginal children since 2015 and for all children since 2020 (state-funded in NSW from 2018).²⁸ However, despite their higher risk, influenza vaccination coverage in Aboriginal children in NSW in 2021 was even lower at only 19.9%.

Adolescents

The NSW School Vaccination Program has continued to be successfully implemented in 2021 despite major disruptions caused by the COVID-19 pandemic. The proportion of Year 7 students receiving the first dose of HPV vaccine in 2021 (82% for girls and 79% for boys) was similar to 2020, however course completion of the 2-dose schedule within 2021 was much lower than in 2020 for both girls (23% compared to 57%) and boys (22% compared to 54%). This likely reflects impacts of public health response measures, including the widespread closures of NSW schools in Terms 3 and 4 of 2021 (when the second HPV dose was due to be given) due to the Delta strain outbreak. Substantial catch-up of the second dose will be required in 2022, similar to that achieved in 2021. With 2021 catch-up vaccinations included, the proportion of the 2020 year 7 student cohort completing the 2-dose HPV schedule increased by 20–22 percentage points to reach 77% for girls and 76% for boys, both only 3–4 percentage points lower than pre-pandemic levels. It will also be important to monitor catch-up

vaccination in 2022 for the Year 7 dTpa vaccine and Year 10 meningococcal ACWY vaccine, as the proportion of students receiving these were 6 and 15 percentage points lower, respectively, compared to pre-pandemic levels in 2019.

Adolescent vaccination coverage data from the AIR showed broadly similar findings but with somewhat higher coverage, as it includes doses given both in and outside of the school-based vaccination program. Of NSW adolescents aged <15 years recorded on AIR to have commenced HPV vaccination in 2021, only 31% completed the course within the same calendar year, down from 66% in 2020 and 85% in 2019. The proportion completing the course remained lower in boys than girls, and lower in Aboriginal than non-Aboriginal adolescents.

In 2021, coverage of dTpa vaccine by 15 years of age and meningococcal ACWY by 17 years of age was higher than in 2020 for both sexes, with dTpa coverage higher in both sexes by 1.4 percentage points at 89.5% (girls) and 87.5% (boys), and meningococcal ACWY coverage higher by 0.5 of a percentage point in girls (at 79.2%) and by 1.4 percentage points in boys (at 72.9%). Coverage by 15 years of age of the first dose of HPV remained stable in 2021 (at 87.7%) for girls but for boys was 85.3%, 0.3 of a percentage point lower than in 2020, whilst coverage of the second dose of HPV vaccine was lower for both sexes (by 0.3 of a percentage point at 83.5% for girls and by 0.9 of a percentage point at 80.1% for boys). Coverage in Aboriginal adolescent girls and boys was 1.3–5.1 percentage points lower in 2021 than in 2020 for the first and second doses of HPV and meningococcal ACWY vaccine, but was higher for dTpa (0.6 of a percentage point higher for girls and 2.3 percentage points higher for boys). For non-Aboriginal adolescent girls and boys, coverage of the assessed vaccines in 2021 ranged from 0.8 of a percentage point lower to 1.7 percentage points higher than in 2020. Compared to non-Aboriginal adolescents, coverage in 2021 was higher (or the same) in Aboriginal adolescent girls and boys for the first dose of HPV vaccine and dTpa vaccine, but lower for the second dose of HPV and meningococcal ACWY vaccines. It is important to note that these adolescent figures, assessing coverage by 15 or 17 years of age, predominantly reflect vaccinations given prior to the pandemic as HPV and dTpa vaccines are given in Year 7 (i.e. 12–13 years of age) and meningococcal ACWY vaccine in Year 10 (i.e. 15–16 years).

COVID-19 vaccination for adolescents aged 12–15 years commenced in September 2021 and as such coverage of both one dose and two doses was substantially lower than the older age groups.

Adults

Adult zoster and 13vPCV vaccination coverage are included for the first time in this series of reports. Zoster vaccine coverage in 2021 was 27% in adults aged 70 years, the

primary NIP target group, but increased to 42% in those aged 71–79 years, reflecting ongoing catch-up vaccination. Greater focus on promoting timely vaccination at 70 years is required, particularly as the NIP-funded catch-up zoster program for adults aged 71–79 years is currently scheduled to finish on 31 October 2023.³⁰ Zoster coverage in Aboriginal adults in 2021 was 2.4 percentage points lower than non-Aboriginal adults in those aged 70 years, but 2.0 percentage points higher in those aged 71–79 years. Coverage of 13vPCV, introduced onto the NIP in July 2020 for all adults aged 70 years and over and Aboriginal adults aged 50 years and over,³¹ was higher in Aboriginal than non-Aboriginal adults in 2021 (by 1.8 percentage points at 14.9% in those aged 70 years and by 4.3 percentage points at 16.7% in those aged 71–79 years). Although 13vPCV is funded for Aboriginal adults from 50 years of age, coverage in 2021 was only 10.4% in Aboriginal adults aged 50–69 years. The lower coverage of 13vPCV than zoster vaccine in adults may be due to its more recent introduction onto the NIP. True coverage of zoster vaccine and 13vPCV is likely higher as under-reporting of adult vaccinations to AIR has been previously documented,^{32,33} and mandatory reporting of all NIP vaccines to the AIR was not introduced until July 2021.⁶

In the context of historically low levels of circulating influenza (due to COVID-19 pandemic-related public health measures),²⁹ influenza vaccine uptake was considerably lower in 2021 than in 2020, except for non-Aboriginal adults aged 50 years and over, although this could partly reflect increased completeness of data following introduction of mandatory reporting of influenza vaccination to AIR in March 2021.^{6,34,35} Whilst influenza vaccine coverage was relatively high in older Aboriginal adults, at 68.7% for those aged 65 years and over, it was under 45% for those aged 50–64 years, and 20% or less for those under 50 years. Further efforts to increase uptake amongst Aboriginal adults are required given that all Aboriginal people aged 6 months and over are eligible for annual influenza vaccination under the NIP due to their increased risk of severe disease.

By the end of 2021, following the commencement of the phased COVID-19 vaccination program roll-out in late February 2021, 95% of all people aged 16 years and over in NSW had received one dose of a COVID-19 vaccine, and 93.6% had received two doses. Despite the increased risk of severe disease, coverage of both one dose and two doses was substantially lower in Aboriginal people compared to all people in NSW, however this disparity was not as marked as at the national level.

Conclusion

This report demonstrates that despite the major disruptions associated with the COVID-19 pandemic, vaccine coverage in NSW remained relatively high in 2021. It will however be important to ensure that catch-up vaccination occurs and to monitor coverage to establish that the

pandemic-related dips in uptake documented here are reversed. A strengthened focus on adult vaccination is needed with coverage in 2021 at suboptimal levels. With the reporting of all NIP vaccinations mandatory since July 2021, this should enhance the usefulness of AIR in monitoring delivery of vaccinations across the age spectrum throughout NSW.

References

- Hull B., Deeks S., Menzies R., McIntyre P. Immunisation coverage annual report, 2007. *Communicable Diseases Intelligence* 2009; 33: 170–87.
- National Centre for Immunisation Research and Surveillance. History of vaccination in Australia. Available from: <http://www.ncirs.org.au/health-professionals/history-immunisation-australia> (Accessed 25 June 2020).
- Hull B. P., McIntyre P. B., Heath T. C., Sayer G. P. Measuring immunisation coverage in Australia: a review of the Australian Childhood Immunisation Register. *Australian Family Physician* 1999; 28: 55–60.
- Hull B. P., Deeks S. L., McIntyre P. B. The Australian Childhood Immunisation Register—a model for universal immunisation registers? *Vaccine* 2009; 27: 5054–60.
- Australian Government Federal Register of Legislation. Australian Immunisation Register (Consequential and Transitional Provisions) Bill. 2015. Available from: <https://www.legislation.gov.au/Details/C2015B00147/Explanatory%20Memorandum/Text> (Accessed 25 June 2020).
- Australian Government Department of Health and Aged Care. Mandatory reporting of National Immunisation Program vaccines to the Australian Immunisation Register began on 1 July 2021. 2021. Available from: <https://www.health.gov.au/news/mandatory-reporting-of-national-immunisation-program-vaccines-to-the-australian-immunisation-register-began-on-1-july-2021#:~:text=when%20to%20report%3A%20within%2024,details%2C%20date%20of%20birth%2C%20gender> (Accessed 28 September 2022).
- Australian Technical Advisory Group on Immunisation (ATAGI). Australian Immunisation Handbook. Canberra: Australian Government Department of Health and Ageing; 2018. Available from: <https://immunisationhandbook.health.gov.au/> (Accessed 26 July 2020).
- Australian Government Department of Health. No Jab, No Pay - New Immunisation Requirements for Family Assistance Payments: Fact sheet for vaccination providers. 2016. Available from: <https://www.health.gov.au/sites/default/files/no-jab-no-pay-fsheet.pdf> (Accessed 25 July 2020).
- Australian Government Services Australia. Australian Immunisation Register (AIR) - Immunisation medical exemption form (IM011). Available from: <https://www.service.saustralia.gov.au/organisations/health-professionals/forms/im011> (Accessed 24 August 2020).
- Rank C., Menzies R. I. How reliable are Australian Childhood Immunisation Register coverage estimates for Indigenous children? An assessment of data quality and coverage. *Communicable Diseases Intelligence* 2007; 31: 283–7.
- Australian Bureau of Statistics. Australian Statistical Geography Standard (ASGS). 2011. Available from: <http://www.abs.gov.au/websitedbs/d3310114.nsf/home/australian+statistical+geography+standard+%28asgs%29> (Accessed 17 April 2020).
- MapInfo. MapInfo Pro version 15.0. Stamford, Connecticut, USA. 2015.
- Australian Bureau of Statistics. Australian Statistical Geography Standard (ASGS): Correspondences, July 2016. 2018. Available from: <https://data.gov.au/dataset/ds-dga-23fe168c-09a7-42d2-a2f9-fd08fbd0a4ce/details> (Accessed 3 August 2020).
- O'Brien E. D., Sam G. A., Mead C. Methodology for measuring Australia's childhood immunisation coverage. *Communicable Diseases Intelligence* 1998; 22: 36–7.
- Hull B. P., McIntyre P. B. Immunisation coverage reporting through the Australian Childhood Immunisation Register—an evaluation of the third-dose assumption. *Australian and New Zealand Journal of Public Health* 2000; 24: 17–21.
- Hull B. P., Lawrence G. L., MacIntyre C. R., McIntyre P. B. Estimating immunisation coverage: is the 'third dose assumption' still valid? *Communicable Diseases Intelligence* 2003; 27: 357–61.
- Hendry A. J., Beard F. H., Dey A. et al. Closing the vaccination coverage gap in New South Wales: the Aboriginal Immunisation Healthcare Worker Program. *Medical Journal of Australia* 2018; 209: 24–8.
- Australian Government Department of Health. HPV vaccination records are moving to the Australian Immunisation Register. 2018. Available from: <https://www.health.gov.au/news/hpv-vaccination-records-are-moving-to-the-australian-immunisation-register> (Accessed 19 July 2020).
- World Health Organization. Human papillomavirus (HPV) vaccine coverage monitoring manual. Licence: CC BY-NC-SA 3.0 IGO.2020. Available from: <https://apps.who.int/iris/bitstream/handle/10665/331807/9789240002746-eng.pdf?ua=1> (Accessed 24 August 2020).
- NSW Health Centre for Epidemiology and Evidence. NSW Adult Population Health Survey - Overview. Available from: <https://www.health.nsw.gov.au/surveys/adult/Pages/overview-of-survey.aspx> (Accessed 26 June 2020).
- Australian Government Department of Health. COVID-19 vaccination daily rollout update - 5 January 2022. 2021. Available from: <https://www.health.gov.au/sites/default/files/documents/2022/01/covid-19-vaccine-rollout-update-5-january-2022.pdf> (Accessed 17 August 2022).
- MacDonald S. E., Paudel Y. R., Kiely M. et al. Impact of the COVID-19 pandemic on vaccine coverage for early childhood vaccines in Alberta, Canada: a population-based retrospective cohort study. *BMJ Open* 2022; 12: e055968.
- Moreno-Montoya J., Ballesteros S. M., Rojas Sotelo J. C. et al. Impact of the COVID-19 pandemic on routine childhood immunisation in Colombia. *Archives of Disease in Childhood* 2022; 107: e4.
- Public Health England. Impact of COVID-19 on childhood vaccination counts to week 43, and vaccine coverage to September 2020 in England: interim analyses. 2020. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/933545/hpr2120_chldhd-vc_wk43.pdf (Accessed 16 September 2022).

25. Santoli J. M., Lindley M. C., DeSilva M. B. et al. Effects of the COVID-19 Pandemic on Routine Pediatric Vaccine Ordering and Administration - United States. *Morbidity and Mortality Weekly Report (MMWR)* 2020; 69: 591–3.
26. World Health Organization. WHO and UNICEF warn of a decline in vaccinations during COVID-19. Geneva: 2020. Available from: <https://www.who.int/news/item/15-07-2020-who-and-unicef-warn-of-a-decline-in-vaccinations-during-covid-19> (Accessed 16 September 2022).
27. World Health Organization, UNICEF. COVID-19 pandemic fuels largest continued backslide in vaccinations in three decades. Geneva/New York: 2022. Available from: <https://www.who.int/news/item/15-07-2022-covid-19-pandemic-fuels-largest-continued-backslide-in-vaccinations-in-three-decades> (Accessed 16 September 2022).
28. National Centre for Immunisation Research and Surveillance. Significant events in influenza vaccination practice in Australia. 2021. Available from: <https://www.ncirs.org.au/sites/default/files/2021-07/Influenza-history-July%202021.pdf> (Accessed 28 September 2022).
29. Australian Government Department of Health and Aged Care. Australian Influenza Surveillance Report - No 16 - fortnight ending 07 November 2021. 2021. Available from: <https://www1.health.gov.au/internet/main/publishing.nsf/Content/ozflu-surveil-no16-21.htm> (Accessed 16 September 2022).
30. Australian Government Department of Health and Aged Care. National Immunisation Program: Shingles vaccination catch-up program extended. 2021. Available from: <https://www.health.gov.au/news/national-immunisation-program-shingles-vaccination-catch-up-program-extended#:~:text=The%20catch%20dup%20program%20for,to%20get%20vaccinated%20against%20shingles> (Accessed 16 September 2022).
31. National Centre for Immunisation Research and Surveillance. Significant events in pneumococcal vaccination practice in Australia. Available from: <https://ncirs.org.au/sites/default/files/2020-07/Pneumococcal-history-July-2020.pdf> (Accessed 28 September 2022).
32. Lin J., Wood J., Stocks C. B., Liu N., B. Herpes zoster vaccine coverage in Australia before and after introduction of a national vaccination program. *Vaccine* 2020; 38: 3646–52.
33. Rashid H., Dey A., Manocha R. et al. Australia’s national zoster vaccination program: Knowledge, attitudes and behaviour of general practitioners. *Communicable Diseases Intelligence* 2020; 44.
34. Beard F., Hendry A., Macartney K. Influenza vaccination uptake in Australia in 2020: impact of the COVID-19 pandemic? *Communicable Diseases Intelligence* 2021; 45. doi:10.33321/cdi.2021.45.10
35. Ministers Department of Health. Building a stronger Australian Immunisation Register. 2021. Available from: <https://www.health.gov.au/ministers/the-hon-greg-hunt-mp/media/building-a-stronger-australian-immunisation-register> (Accessed 9 September 2022).