

Adolescent vaccination

The important role of GPs

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GPs have an important role in supporting adolescent vaccination, including ensuring vaccinations are up to date and in promoting vaccination health literacy among parents and adolescents. It is timely for GPs to consider missed doses and catch-up vaccinations as part of standard preventive health for adolescent patients in general practice.

Australia has achieved high rates of childhood vaccination, which has generally increased over the past 20 years.^{1,2} Much of this success can be attributed to the commitment of GPs and the effective strategies they have implemented. Adolescent

vaccination has become increasingly important and GPs have a central role in delivering recommended vaccines to the Australian adolescent population. Although vaccination coverage for children and adolescents has decreased modestly over recent years, reflecting the impacts of the COVID-19 pandemic,³ there are gaps in vaccination coverage for adolescents compared with younger children and this age group require specific targeted and tailored strategies to achieve higher vaccine uptake.

Vaccines recommended for adolescents include those that are funded through the National Immunisation Program (NIP) and those that are not. Human Papillomavirus (HPV) vaccination is the most widely recognised vaccine for adolescents and has been funded through the NIP since 2007. It has had a substantial impact on HPV-related disease. Other vaccines available for adolescents through the NIP include the pertussis booster (diphtheria-tetanus-acellular

pertussis [dTpa] vaccine) and meningococcal ACWY vaccines. The influenza vaccine is recommended for all adolescents but is only included in the NIP for Aboriginal and Torres Strait Islander adolescents and those with specified medical risk conditions.⁴ Similarly, pneumococcal vaccination (both the conjugate and polysaccharide vaccines) is recommended and included in the NIP for

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KEY POINTS

- Australia has high rates of vaccination in children, which also need to be achieved in adolescents.
- School-based vaccination programs include human papillomavirus (9vHPV), diphtheria–tetanus–acellular pertussis (dTpa) and meningococcal vaccines, and are an effective and cost-efficient means to promote relatively high vaccination coverage for adolescents.
- Providing catch-up vaccinations to low-coverage groups, such as Aboriginal and Torres Strait Islander adolescents, is important.
- GPs should actively assess the immunisation status of adolescents attending their practice for other reasons and opportunistically vaccinate them if needed.
- Recommendation from a health-care provider is the most important driver to increase vaccination uptake; therefore, GPs are in a unique position to help promote health and vaccine literacy among adolescents and parents.

such as influenza and meningococcal B. Disruption to student attendance at school from closures or restrictions during the COVID-19 pandemic may have interrupted vaccination.⁸ Although GPs have always had a crucial role in providing vaccinations to adolescents with anxiety or special needs, as well as those who are Aboriginal or Torres Strait Islander, culturally and linguistically diverse, homeless or not regularly attending school, reviewing all adolescents' vaccination status in general practice has never been more important.

School-based vaccination and vaccination coverage for adolescents

The NIP funds vaccination across the lifespan, with vaccines listed in the

adolescents with specified medical risk conditions. Recommended vaccines not included in the NIP, such as meningococcal B vaccines, are also important and are recommended for all adolescents aged 15 to 19 years.⁵ COVID-19 vaccines are no longer recommended for children and young people under 18 years unless they are severely immunocompromised (Table 1).^{6,7}

As vaccines available through the NIP are primarily given through the school-based vaccination program,³ GPs may not see themselves as playing an important role. However, working alongside the school program, GPs are crucial, not only in achieving the same high coverage that is seen in early childhood vaccination programs for routine vaccines, but also in improving coverage for other vaccines

TABLE 1. RECOMMENDED ADOLESCENT VACCINATIONS IN AUSTRALIA^{6*}

Group	Vaccine	Number of doses	Funded by NIP?
Year 7 (12 to 13 years)	Human papillomavirus (9vHPV)	<ul style="list-style-type: none"> One dose (for adolescents and young adults aged 9–25 years). Not required if previously received. If dose was missed and not previously received, a catch-up is available up to and including 25 years of age People with immunocompromising conditions need three doses of HPV vaccine, regardless of their age 	Yes
	Diphtheria–tetanus–acellular pertussis (dTpa)	<ul style="list-style-type: none"> One dose 	Yes
Year 10 (14 to 16 years)	Meningococcal ACWY	<ul style="list-style-type: none"> One dose (for healthy adolescents aged 15–19 years) 	Yes
Healthy adolescents aged 15 to 19 years	Meningococcal B	<ul style="list-style-type: none"> This group can receive either meningococcal B vaccine: <ul style="list-style-type: none"> two doses of recombinant multicomponent meningococcal serogroup B vaccine (MenB-MC; Bexsero) with 8 weeks between doses,[‡] or two doses of recombinant lipidated factor H binding protein meningococcal serogroup B vaccine (MenB-fHBP; Trumenba) with 6 months between doses There is no preference for either MenB-MC or MenB-fHBP for people aged ≥10 years who wish to receive a meningococcal B vaccine MenB-MC and MenB-fHBP are not interchangeable; the same vaccine should be used for both doses 	No [§]
Additional vaccines for Aboriginal and Torres Strait Islander and medically at-risk adolescents			
All Aboriginal and Torres Strait Islander adolescents	Influenza	<ul style="list-style-type: none"> One dose annually 	Yes
Aboriginal and Torres Strait Islander adolescents aged 10 to 19 years	Meningococcal B	<ul style="list-style-type: none"> A course of meningococcal B vaccine is strongly recommended for this group The dose schedule depends on the specific meningococcal B vaccine and the person's age when starting the vaccine course People aged ≥10 years can receive either meningococcal B vaccine: <ul style="list-style-type: none"> two doses of MenB-MC, with 8 weeks between doses,[‡] or two doses of MenB-fHBP, with 6 months between doses There is no preference for either MenB-MC or MenB-fHBP for people aged ≥10 years MenB-MC and MenB-fHBP are not interchangeable; the same vaccine should be used for both doses 	No
Adolescents with a medical risk factor	Influenza	<ul style="list-style-type: none"> Annual influenza vaccination is strongly recommended for adolescents with medical conditions associated with an increased risk of influenza disease and severe outcomes[†] 	Yes
Adolescents who are severely immunocompromised	COVID-19	<ul style="list-style-type: none"> Vaccination is recommended for children aged 6 months to 18 years who are severe immunocompromised or have other medical conditions that may increase their risk of severe disease from COVID-19 Individuals who are severely immunocompromised aged 5 to 17 years can consider a dose every 12 months. Individuals who are not severely immunocompromised aged 5 to 17 years are not recommended to receive further doses 	No (government funded)
Adolescents with specified medical risk conditions	Pneumococcal	<ul style="list-style-type: none"> For people with specified medical risk conditions administer a dose of 13vPCV at diagnosis followed by two doses of 23vPPV 	Yes

Abbreviations: COVID-19 = coronavirus disease 2019; NIP = National Immunisation Program.

* Recommendations are taken from the *Australian Immunisation Handbook*.⁶ State and territory immunisation programs may vary and should also be checked.

[†] See: List. Specified medical conditions associated with increased risk of influenza disease and severe outcomes, <https://immunisationhandbook.health.gov.au/resources/handbook-tables/list-specified-medical-conditions-associated-with-increased-risk-of-0>.⁶

[‡] This is the most up-to-date advice from the *Australian Immunisation Handbook* (updated 2022). The Product Information for Bexsero states that adolescents from the age of 11 years at the start of the vaccine course should receive two doses, with an interval of at least one month between doses (<https://www.ebs.tga.gov.au/ebs/picmi/picmirepository.nsf/pdf?OpenAgent&id=CP-2013-PI-02131-1&d=202103111016933>).

[§] Meningococcal B vaccine is state-funded in South Australia for Year 10 students.

schedule provided free for target groups. Unlike other populations, adolescents are primarily vaccinated en masse at school after parental consent is obtained.⁹ School-based vaccination has proven an effective and cost-efficient means to promote relatively high vaccination coverage for adolescents.¹⁰⁻¹³ In 2022, when the nonavalent HPV vaccine schedule required two doses, 85.3% of girls aged 15 years and 83.1% of boys aged 15 years had received the first dose of the vaccine.² Of Aboriginal and Torres Strait Islander girls and boys aged 15 years, 83.0% and 78.1% received the first dose, respectively.² In 2022, coverage for a dose of dTpa vaccine during adolescence was 73.0% for those turning 13 years of age, 83.8% for those turning 14 years, and 86.9% for those turning 15 years.² In the same year, coverage in Aboriginal and Torres Strait Islander girls and boys turning 13 years was 12 percentage points lower. This disparity decreased with increasing age, reaching less than a percentage point lower than the general population turning 18 and 19 years of age.²

Coverage for a dose of meningococcal ACWY vaccination for adolescents in 2022 was 75.9% for those turning 17 years, 79.1% for those turning 18 years, and 78.8% for those turning 19 years of age.² Coverage in Aboriginal and Torres Strait Islander adolescents was several percentage points higher than their non-Indigenous peers in those turning 15 years, but lower in older age cohorts, ranging from 12.5 percentage points lower at 16 years to 6.4 percentage points lower at 19 years.² Coverage for influenza vaccination in adolescents aged 10 to 14 years and 15 to 20 years increased by 9 and 7.2 percentage points, respectively, between 2021 and 2022, to 22.3% in both age groups. For Aboriginal and Torres Strait Islander adolescents aged both 10 to 15 years and 15 to 20 years, coverage increased by 3.6 percentage points, between 2021 and 2022, to 19% and 20.1%, respectively.² By January 2023, 79.5% of adolescents aged 12 to 15 years

had received a first dose of COVID-19 vaccine and 74.5% had received a second dose.²

It is important to provide catch-up vaccinations, particularly to priority groups such as Aboriginal and Torres Strait Islander adolescents, given their higher risk of many vaccine-preventable diseases,¹⁴ lower vaccination completion rates and longer time to completion across most adolescent vaccines.^{2,15} As Aboriginal and Torres Strait Islander women have twice the incidence and four times the mortality rate of cervical cancer as other Australian women, recommending HPV vaccination to Aboriginal and Torres Strait Islander adolescents represents an opportunity to reduce this health disparity.^{2,16,17}

Although school programs aimed at adolescents generally result in relatively high vaccination uptake, coverage for adolescent vaccinations remains more than 10 percentage points lower than that achieved for childhood vaccinations.¹ Ideally, vaccination coverage rates in adolescents should be higher; for example, the World Health Organization (WHO) has called for coverage of 90% to eliminate cervical cancer.¹⁸ GPs are an essential part of the solution for achieving this goal (Box).

Role of GPs in adolescent vaccination

Addressing missed opportunities for vaccination in general practice

Missed vaccination opportunities during consultations in healthcare settings are common during childhood and adolescence. Adolescents who have missed vaccinations offered in the school program because of school absences or other reasons are usually provided with a letter and recommendation to visit a GP or council clinic to catch up on the vaccine doses missed. Given the decline in the frequency of visits to GPs in adolescence compared with childhood, this often does not eventuate.¹⁹ Young people aged 15 to 25 years have the lowest proportion of

PRACTICE POINTS FOR GPs ON ADOLESCENT VACCINATION

- GPs have an important role in recommending and providing all vaccines recommended for adolescents. They also have a key partnership role in supporting school-based vaccination of adolescents, especially missed doses.
- Catch-up vaccination should be opportunistically undertaken when adolescents present for any routine health issue.
- Catch-up vaccination should also be achieved through auditing patient records and issuing reminders, as is routine practice for childhood vaccination.
- A tailored approach is required when vaccinating adolescents in primary care.
- Parental vaccine decision-making for adolescents is most strongly influenced by doctor recommendation.

face-to-face time spent with GPs in Australia.²⁰

Unlike in some countries, such as the United States, where reimbursements are provided for preventive primary care visits in adolescence, during which HEEADSSS (home environment, education/employment, eating habits, activities, drugs, sex/sexuality, suicide/depression and safety) screening and vaccinations routinely take place, there is no Medicare rebate for GP preventive health care visits for adolescents and young adults in Australia.^{21,22} This means that GPs need to actively consider assessing the immunisation status of adolescents attending their practice for other reasons and opportunistically vaccinate them when it is clear they have missed a vaccine dose in the school program (Table 2). Adolescence is also an opportune time to ensure catch-up of missed doses of childhood vaccines.^{6,23}

Providing a strong recommendation

GPs also play a key role in facilitating adolescent vaccination through the

TABLE 2. RECOMMENDING ADOLESCENT VACCINATIONS IN A CLINICAL SETTING

Barrier or facilitator	Recommended practice
Cost	<ul style="list-style-type: none"> • Bulk bill to reduce cost
Youth-friendly environment	<ul style="list-style-type: none"> • Have opening hours after school and on weekends • Make plain language vaccination resources available • Display age-appropriate posters • Have signs of diversity (e.g. gender, sexuality, ethnic/cultural background, different abilities) visible • Make practice accessible to those with diverse abilities • Have friendly reception staff
Opportunistic recommendation	<ul style="list-style-type: none"> • Recommend missed vaccinations for adolescents when they present for any routine health issue • Integrate vaccination recommendation into HEEADSSS screening • Check for missed childhood vaccinations and implement catch-up plan if required
Strength of recommendation	<ul style="list-style-type: none"> • Equally emphasise the importance of each vaccination
Urgency of recommendation	<ul style="list-style-type: none"> • Recommend same-day vaccination
Timeliness of recommendation	<ul style="list-style-type: none"> • Deliver recommendation for HPV and dTpa vaccinations by age of 12 to 13 years • Deliver recommendation for meningococcal ACWY vaccination by age of 14 to 16 years • Deliver recommendations for appropriate vaccinations for vulnerable groups
Universal recommendation	<ul style="list-style-type: none"> • Deliver recommendations to all adolescents, not just those perceived to be at risk
Adolescent groups vulnerable to underimmunisation (e.g. Aboriginal and Torres Strait Islander people, refugees, those with additional needs)	<ul style="list-style-type: none"> • Routinely ask patients whether they are Aboriginal and/or Torres Strait Islander, as there are additional vaccinations recommended and freely available for these patients • Ensure availability of appropriate resources (e.g. culturally appropriate, plain language, in a diverse range of languages) to assist with patient vaccination decision-making • Be aware that certain groups may have different vaccination requirements based on risk status
Prevention message	<ul style="list-style-type: none"> • Emphasise disease prevention for each vaccination (e.g. cancer prevention for HPV vaccination)
Adolescent experience	<ul style="list-style-type: none"> • Gain assent of adolescent (and consent from parent/guardian) • Ensure the adolescent understands the importance of being vaccinated • Manage needle-related anxiety using distraction
Multiple vaccinations due	<ul style="list-style-type: none"> • Recommend administration of vaccinations as a 'package' at the same time and in the same way.
Systematic reporting practices	<ul style="list-style-type: none"> • Ensure vaccinations are reported to the AIR to reduce the impact of lag on vaccination status
Monitoring adverse events after consultation	<ul style="list-style-type: none"> • Undertake 15-minute observation directly after vaccination • Check for adverse events via text message within 24 hours after vaccination

Abbreviations: AIR = Australian Immunisation Register; COVID-19 = coronavirus disease 2019; dTpa = diphtheria-tetanus-acellular pertussis; HEEADSSS = home environment, education/employment, eating habits, activities, drugs, sex/sexuality, suicide/depression and safety; HPV = human papillomavirus.

school program, with multiple studies showing that a recommendation from a healthcare provider is the most important driver to increase vaccination uptake.^{24,25} Parental vaccination decision-making on behalf of adolescents is influenced by physician recommendation, government recommendation, perceived benefits of the vaccine, and concerns about side effects and vaccine safety.^{24,26-28} Social determinants of health, including socioeconomic status

and ethnicity, and factors relating to patient engagement have also been found to influence vaccination uptake, although to a lesser extent in school-based programs.^{29,30} Parental barriers to adolescent vaccination include not receiving a provider's recommendation, lack of information about vaccination, concerns about timing of vaccination (e.g. adolescent's age for HPV vaccination) and misconceptions about efficacy and safety.³¹

Offering vaccines as a package

It is important to present adolescent vaccinations that may have been missed as a 'package'.^{32,33} If more than one vaccination has been missed, more than one should be offered at the same time. If an appointment is made to complete the course on another day, there is an increased risk of noncompletion. For example, emphasising cancer prevention benefits and discussing HPV vaccination at the same time as recommending dTpa

vaccination is more likely to result in higher uptake of both vaccinations.

Promoting vaccine health literacy among adolescents and their parents

GPs have a unique opportunity to overcome health and vaccine literacy deficits among adolescents and parents. Parents' health literacy is positively correlated with adolescent health literacy and health.^{34,35} Providing recommendations and education to parents and adolescents about vaccination as a prevention strategy to reduce disease burden and promote health and wellbeing is crucial. Challenges may include specific cultural and religious beliefs, low literacy generally, misinformation and inequities, such as reduced access to health services and diminished ability to seek help with the vaccine decision-making process.²⁹ These factors should be considered when dealing with parent and adolescent queries and concerns about vaccines; well-designed resources, such as the Sharing Knowledge About Immunisation 'Is the HPV vaccine really safe?' factsheet, can be used to support conversations.³⁶

Providers face challenges in discussing vaccination with adolescents and their parents. These include discomfort with talking about sexual behaviour (e.g. with HPV vaccination), lack of time or incentive for patient education, and lack of a system that issues reminders about vaccine status and whether multiple doses are needed.^{37,38} Overcoming these barriers, such as by using automated systems for reminders, can directly affect adolescent vaccination uptake.

Overcoming incomplete vaccination of adolescents

Assessing the vaccination history of all adolescents in the practice

Young people aged 10 to 19 years require an assessment of their immunisation history to ascertain any missing childhood or adolescent vaccinations and to develop

a catch-up schedule. The vaccination records of all adolescent patients in the practice can be reviewed by checking their records in the Australian Immunisation Register (AIR), including checking that any previous vaccines were administered in the recommended dosing intervals and at the correct age.²³ Appointments should be scheduled to complete vaccinations for patients who are clearly behind on the schedule.

Assessing the vaccination history of adolescents presenting as new patients

An adolescent presenting to the practice as a new patient for any reason should be asked about vaccination, ideally when undertaking a HEEADSSS assessment, but any time is appropriate. As parents and adolescents may not have accurate records or knowledge of vaccination status, GPs can identify whether vaccinations are up to date using Health Professional Online Services (<https://www.servicesaustralia.gov.au/hpos>) or by calling the AIR enquiries line (1800 653 809).⁶

If a vaccination may have been administered but is not recorded on the AIR, the relevant immunisation provider for that vaccine should be contacted.⁶ If doses cannot be confirmed because of incomplete documentation, it should be assumed that they have not been administered. Serological testing is not routinely recommended.²³ There are no risks associated with giving additional doses of most vaccines when they may have already been received, apart from a possible increase in local adverse events with frequent doses of some vaccines.²³ All vaccine doses administered should be reported to the AIR, and data will need to be entered directly if the general practice software does not automatically report vaccinations.

Missing out or being late for vaccinations listed in the NIP may have financial ramifications for families who will be

unable to receive their appropriate child-care and Family Tax Benefit payments on time.

SARS-CoV-2 and COVID-19 vaccination for adolescents

Most adolescents with COVID-19 have mild symptoms, including fever, cough, sore throat, blocked or runny nose, sneezing, muscle aches and fatigue, or no symptoms at all.³⁹ Less common symptoms include changes in smell or taste and diarrhoea or vomiting.³⁹ Severe COVID-19 symptoms such as pneumonia with respiratory distress may require admission to hospital or intensive care, although these are uncommon in children and adolescents and very rarely cause death.³⁹⁻⁴¹

GPs should keep up to date with emerging evidence on COVID-19 vaccines. The COVID-19 primary course advice was updated in February 2024.^{42,43} Children and adolescents aged under 18 years are not routinely recommended a primary dose.⁴² All people aged 18 years and over are recommended a single-dose primary course. People with severe immunocompromising conditions over 6 months of age are recommended two primary doses and are eligible for a third primary dose based on an individual risk-benefit assessment.⁷ Comirnaty Omicron XBB.1.5 (tozinameran; dark grey cap) and Spikevax Omicron XBB.1.5 (andusomeran; as a pre-filled syringe) vaccinations are preferred for adolescents and adults aged 12 years and over. Comirnaty original/Omicron bivalent BA.4-5 (tozinameran/famtozinameran) can also be used in this age group but is not preferred.^{44,7}

All currently available COVID-19 vaccines are anticipated to benefit eligible people. However, the monovalent Omicron XBB.1.5 (raxtozinameran) vaccines are preferred over other vaccines for use in children aged 5 to 11 years.⁷ COVID-19 vaccines can be co-administered with other vaccines in people aged 5 years or over.⁷

Vaccine side effects

SARS-CoV-2 infection is associated with an increased risk of myocarditis, pericarditis and cardiac arrhythmia.⁴⁵ Messenger RNA vaccines have also been associated with a small increased risk of pericarditis and myocarditis, mostly in young men. Cases have also been reported in male and female adults of all ages and after any dose of a COVID-19 vaccine.^{7,46,47} Myocarditis and pericarditis are rare conditions that occur more often in young men, and most commonly after the second vaccine dose.^{48,49} The cause of myocarditis in the absence of a vaccine is often unknown, but can be an immune response to an infectious agent, toxin or autoimmune disorder.

Myocarditis and pericarditis are seen much less often after vaccination than as a result of SARS-CoV-2 infection.⁵⁰ Most people who have developed myocarditis or pericarditis after vaccination have made a complete recovery within a short time, although no data exists as yet on long-term follow up.^{48,49} The Australian Technical Advisory Group on Immunisation (ATAGI) advises that pre-existing cardiac conditions are not a contraindication to mRNA COVID-19 vaccination.⁴⁸ It is recommended that all COVID-19 vaccine recipients be made aware of the potential signs and symptoms of myocarditis or pericarditis and be counselled about when to seek medical attention.⁷ For more information, including reporting rates for individual vaccines, refer to the Australian Technical Advisory Group on Immunisation Guidance on myocarditis and pericarditis after COVID-19 vaccines and Therapeutic Goods Administration COVID-19 vaccine safety reports.^{46,47}

Communicating with adolescents and parents about vaccination

Trust can be built with adolescents and parents through open and respectful communication, underpinned by evidence-based information on vaccination risks

and benefits. At the same time, it is important that clear recommendations to vaccinate are provided and that opportunities to vaccinate are not missed. Regardless of the reason for a consultation, when vaccinations are outstanding, using language such as 'I recommend you receive these vaccinations today', rather than 'What would you like to do about these vaccinations?', can influence parent and adolescent decision-making.³²

Given that policies in the education environment mean that parents usually consent to vaccinating adolescents under 18 years of age in the school vaccination program, there are ethical considerations in balancing emerging adolescent autonomy and their desire to also be involved in vaccine decision-making.⁵¹ All states and territories have medical consent policies that recognise the competency of mature minors. This means that adolescents under the age of 18 years can provide their consent to vaccination if they are assessed as Gillick competent by the practitioner. Generally, healthy adolescents aged at least 14 years have the capacity to consent to a low-risk intervention, such as vaccination.⁵²

Adolescents do not always make connections between their behaviour (e.g. sexual activity or smoking) and their current or future health outcomes, and they can experience difficulty assessing the quality of health information, which they most frequently access online. Nuanced messaging targeted at specific age groups may be needed, recognising that different barriers may exist to receiving HPV vaccination for a younger adolescent compared with barriers to receiving meningococcal ACWY vaccination for an older adolescent.

Younger adolescents are less able to moderate their needle-related fear and anxiety because of incomplete cognitive maturation.⁵³ Vasovagal syncope is the most common severe adverse event experienced with vaccination in

adolescence.⁵⁴ Needle-related anxiety can affect an adolescent's choice of whether to have a vaccine, despite parental consent. Using youth-friendly language and resources to explain vaccination benefits and side effects can promote adolescent vaccination literacy, facilitate discussion with parents and involvement in vaccination decision-making, as well as help mitigate needle-related anxiety.^{53,55} The WHO has produced an excellent resource to assist vaccination providers in managing this anxiety.^{56,53} Explanations of exactly what will happen and what the needle will feel like, along with appropriate distraction methods, can also assist younger adolescents in coping with needle-related anxiety.⁵⁷ Communicating successes achieved through vaccination programs can assist in counteracting concerns about vaccine efficacy and safety and mitigate vaccine hesitancy.

Conclusion

GPs are key players in parents' and adolescents' decisions to have vaccinations. They can opportunistically prioritise vaccination during routine consultations and ensure the adolescent is up to date with recommended vaccinations. The partnership between GPs and the school-based vaccination program is essential for achieving a high uptake of NIP vaccines for adolescents. It is vital that we increase adolescent vaccine coverage to similar levels for young children, addressing health inequities amongst priority population groups. GPs are also crucial to improving uptake in marginalised adolescent populations with persisting low vaccination coverage. MT

References

A list of references is included in the online version of this article (www.medicinetoday.com.au).

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References

1. Australian Government Department of Health. Current coverage data tables for all children. Available online at: <https://www.health.gov.au/topics/immunisation/immunisation-data/childhood-immunisation-coverage/current-coverage-data-tables-for-all-children> (accessed April 2024).
2. National Centre for Immunisation and Research Surveillance. Annual Immunisation Coverage Report 2022, Westmead, NSW, Australia. Available online at: <https://ncirs.org.au/sites/default/files/2024-01/NCIRS%20Annual%20immunisation%20coverage%20report%202022.pdf> (accessed April 2024).
3. Hull BP, Hendry A, Dey A, et al. Annual immunisation coverage report, 2022. Sydney: National Centre For Immunisation Research and Surveillance; 2023. Available online at: <https://ncirs.org.au/sites/default/files/2024-01/NCIRS%20Annual%20immunisation%20coverage%20report%202022.pdf>
4. Australian Government, Department of Health and Aged Care. Australian Immunisation Handbook. Australian Government, Department of Health and Aged Care. Available online at: <https://immunisationhandbook.health.gov.au/contents/vaccine-preventable-diseases/influenza-flu>.
5. Australian Government, Department of Health and Aged Care. Meningococcal disease. Australian Government, Department of Health and Aged Care. Available online at: <https://immunisationhandbook.health.gov.au/contents/vaccine-preventable-diseases/meningococcal-disease#:~:text=Healthy%20adolescents%20aged%2015-19,with%206%20months%20between%20doses> (accessed April 2024).
6. Australian Technical Advisory Group on Immunisation (ATAGI). Australian immunisation handbook. Canberra: Australian Government Department of Health; 2018. Available online at: <https://immunisationhandbook.health.gov.au> (accessed April 2024).
7. Australian Government, Department of Health and Aged Care. COVID-19. Australian Government, Department of Health and Aged Care. Available online at: <https://immunisationhandbook.health.gov.au/contents/vaccine-preventable-diseases/covid-19> (accessed April 2024).
8. Australian Health Protection Principal Committee. Australian Health Protection Principal Committee (AHPCC) advice to National Cabinet on 25 March 2020: a statement from the Australian Health Protection Principal Committee about school immunisation programs and dental services. Available online at: <https://www.health.gov.au/news/australian-health-protection-principal-committee-ahppc-advice-to-national-cabinet-on-25-march-2020> (accessed April 2024).
9. Davies C, Skinner SR, Stoney T, et al. 'Is it like one of those infectious kind of things?': the importance of educating young people about HPV and HPV vaccination at school. *Sex Educ* 2017; 17: 256-275.
10. Paul P, Fabio A. Literature review of HPV vaccine delivery strategies: considerations for school- and non-school based immunization program. *Vaccine* 2014; 32: 320-326.
11. Skinner SR, Cooper Robbins SC. Voluntary school-based human papillomavirus vaccination: an efficient and acceptable model for achieving high vaccine coverage in adolescents. *J Adolesc Health* 2010; 47: 215-218.
12. Patel C, Brotherton JML, Pillsbury A, et al. The impact of 10 years of human papillomavirus (HPV) vaccination in Australia: what additional disease burden will a nonavalent vaccine prevent? *Euro Surveill* 2018; 23: 1700737.
13. Feldstein LR, Fox G, Sifer A, Conklin LM, Ward K. School-based delivery of routinely recommended vaccines and opportunities to check vaccination status at school, a global summary, 2008–2017. *Vaccine* 2020; 38: 680-689.
14. Australian Government, Department of Health and Aged Care. 2023 Commonwealth of Australia. Communicable Diseases Intelligence. Vaccine Preventable Diseases and Vaccination Coverage in Aboriginal and Torres Strait Islander People, Australia, 2016–2019. Available online at: [https://www1.health.gov.au/internet/main/publishing.nsf/content/8FA6078276359430CA257BF0001A4C42/\\$File/vaccine_preventable_diseases_and_vaccination_coverage_in_aboriginal_and_torres_strait_islander_people_australia_2016_2019.pdf](https://www1.health.gov.au/internet/main/publishing.nsf/content/8FA6078276359430CA257BF0001A4C42/$File/vaccine_preventable_diseases_and_vaccination_coverage_in_aboriginal_and_torres_strait_islander_people_australia_2016_2019.pdf) (accessed April 2024).
15. Brotherton JM, Davies C, IPVS Policy Committee. IPVS policy statement. Equity in cervical cancer prevention: for all and not just for some. *Papillomavirus Res* 2020; 9: 100192.
16. Lawton B, Heffernan M, Wurtak G, et al. IPVS policy statement addressing the burden of HPV disease for Indigenous peoples. *Papillomavirus Res* 2020; 9: 100191.
17. Brotherton JML, Winch KL, Chappell G, et al. HPV vaccination coverage and course completion rates for Indigenous Australian adolescents, 2015. *Med J Aust* 2019; 211: 31-36.
18. World Health Organization. To eliminate cervical cancer in the next 100 years, implementing an effective strategy is critical. 4 February 2020. Available online at: <https://www.who.int/news/item/04-02-2020-to-eliminate-cervical-cancer-in-the-next-100-years> (accessed April 2024).
19. Cummings M, Kang M. Youth health services: improving access to primary care. *Aust Fam Physician* 2012; 41: 339-341.
20. Garland S, Skinner SR, Brotherton JML. Adolescent and young adult HPV vaccination in Australia: achievements and challenges. *Prev Med* 2011; 53 Suppl 1: S29-S35.
21. Sawyer SM. Psychosocial assessments after COVID-19. *J Adolesc Health* 2021 Jan 8; S1054-139X(20)30836-3 [online ahead of print].
22. Goldenring J, Rosen DS. Getting into adolescent heads: an essential update. *Contemp Pediatr* 2004; 21: 64-90.
23. Australian Technical Advisory Group on Immunisation (ATAGI). National Immunisation Program. Free catch-up vaccines for all individuals aged 10 to 19 years: factsheet for vaccination providers. Available online at: <https://immunisationhandbook.health.gov.au/contents/catch-up-vaccination> (accessed April 2024).
24. Newman PA, Logie CH, Lacombe-Duncan A, et al. Parents' uptake of human papillomavirus vaccines for their children: a systematic review and meta-analysis of observational studies. *BMJ Open* 2018; 8: e019206.
25. Gilkey MB, Calob WA, Moss JL, Shah PD, Marciniak MW, Brewer NT. Provider communication and HPV vaccination: the impact of recommendation quality. *Vaccine* 2016; 34: 1187-1192.
26. Robbins SC, Bernard D, McCaffery K, Brotherton JML, Skinner SR. "I just signed": factors influencing decision-making for school-based HPV vaccination of adolescent girls. *Health Psychol* 2010; 29: 618-625.
27. Burgess T, Braunack-Mayer A, Tooher R, et al. Optimizing intersectoral collaboration between health and education: the Health Bridges study. *J Public Health (Oxf)* 2016; 38: e430-e437.
28. Netfa F, Tashani M, Booy R, King C, Rashid H, Skinner SR. Knowledge, attitudes and perceptions of immigrant parents towards human papillomavirus (HPV) vaccination: a systematic review. *Trop Med Infect Dis* 2020; 5(2): 58.

29. Blagden S, Hungerford D, Limmer M. Meningococcal vaccination in primary care amongst adolescents in North West England: an ecological study investigating associations with general practice characteristics. *J Public Health (Oxf)* 2019; 41: 149-157.
30. Barbaro B, Brotherton JML. Assessing HPV vaccine coverage in Australia by geography and socioeconomic status: are we protecting those most at risk? *Aust N Z J Public Health* 2014; 38: 419-423.
31. Davies C, Stoney T, Hutton, H., et al. for the HPV.edu Study Group (2021). School-based HPV vaccination positively impacts parents' attitudes toward adolescent vaccination. *Vaccine* 39: 4190-4198.
32. Azzari C, Diez-Domingo J, Eisenstein E, et al. Experts' opinion for improving global adolescent vaccination rates: a call to action. *Eur J Pediatr* 2020; 179: 547-553.
33. Davies, C, Marshall, H.S., Zimet, G., et al. for the HPV.edu Study Group (2021). Effect of adolescent education about the Human Papillomavirus Vaccine on Psychological outcomes: a cluster randomized controlled trial, *JAMA Network Open*, 4(11):e2129057.
34. Bröder J, Okan O, Bauer U, et al. Health literacy in childhood and youth: a systematic review of definitions and models. *BMC Public Health* 2017; 17: 361.
35. Davies C, Burns K. HPV vaccination literacy in sexualities education. *Sex Educ* 23: 315-323.
36. Chad N, Leask J. Is the HPV vaccine really safe? Sydney: Sharing Knowledge About Immunisation (SKAI), National Centre for Immunisation Research and Surveillance; 2020. Available online at: <https://www.health.gov.au/sites/default/files/documents/2020/10/is-the-hpv-vaccine-really-safe-fact-sheet-is-the-hpv-vaccine-really-safe-fact-sheet.pdf> (accessed April 2024).
37. Espinosa CM, Marshall G, Woods CR, et al. Missed opportunities for human papillomavirus vaccine initiation in an insured adolescent female population. *J Pediatric Infect Dis Soc* 2017; 6: 360-365.
38. Davies C, Robinson KH, Metcalf A, et al. Australians of diverse sexual orientations and gender identities. In: Dune T, McLeod K, Williams R, eds. *Culture, diversity and health in Australia: towards culturally safe health care*. Sydney: Allen and Unwin; 2021.
39. Murdoch Children's Research Institute (MCRI). Research brief COVID-19 and child and adolescent health. Version 1. Melbourne: MCRI; 2021. Available online at: <https://www.mcric.edu.au/sites/default/files/media/documents/covid-19-and-child-and-adolescent-health-140921.pdf> (accessed April 2024).
40. World Health Organization (WHO). COVID-19 Clinical management: living guidance, 25 January 2022. Geneva: WHO; 2021. Available online at: <https://apps.who.int/iris/handle/10665/338882> (accessed April 2024).
41. Ledford H. Deaths from COVID 'incredibly rare' among children. *Nature News* 2021; 595: 639.
42. COVID-19 vaccination. Available online at: <https://www.health.gov.au/sites/default/files/2024-03/covid-19-vaccines-in-australia-a3-poster.pdf> (accessed April 2024).
43. Australian Government, Department of Health and Aged Care. ATAGI statement on the administration of COVID-19 vaccines in 2024. Available online at: <https://www.health.gov.au/resources/publications/atagi-statement-on-the-administration-of-covid-19-vaccines-in-2024> (accessed April 2024).
44. National Centre for Immunisation Research and Surveillance. COVID-19 vaccines: Frequently asked questions (FAQs). Available online at: <https://ncirs.org.au/covid-19/covid-19-vaccines-frequently-asked-questions-faqs>
45. Patone M, Mei XW, Handunnetthi L, et al. Risks of myocarditis, pericarditis, and cardiac arrhythmias associated with COVID-19 vaccination or SARS-CoV-2 infection. *Nat Med* 2022; 28: 410-422.
46. Australian Government Department of Health and Aged Care Therapeutic Goods Administration. COVID-19 vaccine safety report - 23-03-2023. 2023. Available online at: <https://www.tga.gov.au/news/covid-19-vaccine-safety-reports/covid-19-vaccine-safety-report-23-03-2023#myocarditis-and-pericarditis-after-covid19-vaccination> (accessed April 2024).
47. Rout A, Suri S, Vorla M, Kalra DK. Myocarditis associated with COVID-19 and its vaccines-a systematic review. *Prog Cardiovasc Dis* 2022; 74: 111-121.
48. Australian Government Department of Health. Guidance on myocarditis and pericarditis after mRNA COVID-19 vaccines. Canberra: Australian Government Department of Health, 2021. Available online at: <https://www.health.gov.au/resources/publications/covid-19-vaccination-guidance-on-myocarditis-and-pericarditis-after-mrna-covid-19-vaccines> (accessed April 2024).
49. Oster ME, Shay DK, Su JR, et al. Myocarditis cases reported after mRNA-based COVID-19 vaccination in the US from December 2020 to August 2021. *JAMA* 2022; 327: 331-340.
50. Paediatric Research in Emergency Departments International Collaborative (PREDICT). Australian and New Zealand guideline for assessment of possible vaccine-induced pericarditis / myocarditis in children and adolescents presenting to the ED. Melbourne: PREDICT; 2021. Available online at: <https://www.predict.org.au/mrna-chest-pain-guideline/> (accessed April 2024).
51. Skinner SR, Davies C, Marino J, Botfield J, Lewis L. Sexual health of adolescent girls. In: Ussher JM, Chrisler JC, Perz J, eds. *Routledge international handbook of women's sexual and reproductive health*. New York: Routledge; 2020. p. 393-411.
52. Corporate Governance and Risk Management, NSW Health. Section 8: Minors. In: *Consent to medical and healthcare treatment manual*. Sydney: NSW Health; 2020. Available online at: <https://www.health.nsw.gov.au/policies/manuals/Documents/consent-section-8.pdf> (accessed April 2024).
53. Davies C, Marshall HS, Zimet G, et al. for the HPV.edu Study Group. Effect of adolescent education about the Human Papillomavirus Vaccine on Psychological outcomes: a cluster randomized controlled trial, *JAMA Network Open* 2021; 4: e2129057.
54. Phillips A, Patel C, Pillsbury A, Brotherton JML, Macartney K. Safety of human papillomavirus vaccines: an updated review. *Drug Saf* 2018; 41: 329-346.
55. Davies C, Skinner, SR, Stoney T, et al, for the HPV.edu Study Group. 'Is it like one of those infectious kind of things?': The importance of educating young people about HPV and HPV vaccination at school', *Sex Education* 2017; 17(3): 256-275.
56. World Health Organization. Immunization stress-related response: a manual for program managers and health professionals to prevent, identify and respond to stress-related responses following immunization. Geneva: WHO; 2019. Available online at: <https://apps.who.int/iris/handle/10665/330277> (accessed April 2024).
57. Davies C, Skinner SR, Odgers HL, Khut GP, Morrow A. The use of mobile and new media technologies in a health intervention about HPV and HPV vaccination in schools. In: Grealy L, Driscoll C, Hickey-Moody A, eds. *Youth, technology, governance, experience: adults understanding young people*. London: Routledge; 2018. p. 175-195.