Adolescent vaccination

Australian Vaccinology Course

Prof Julia Brotherton

Prof Helen Marshall

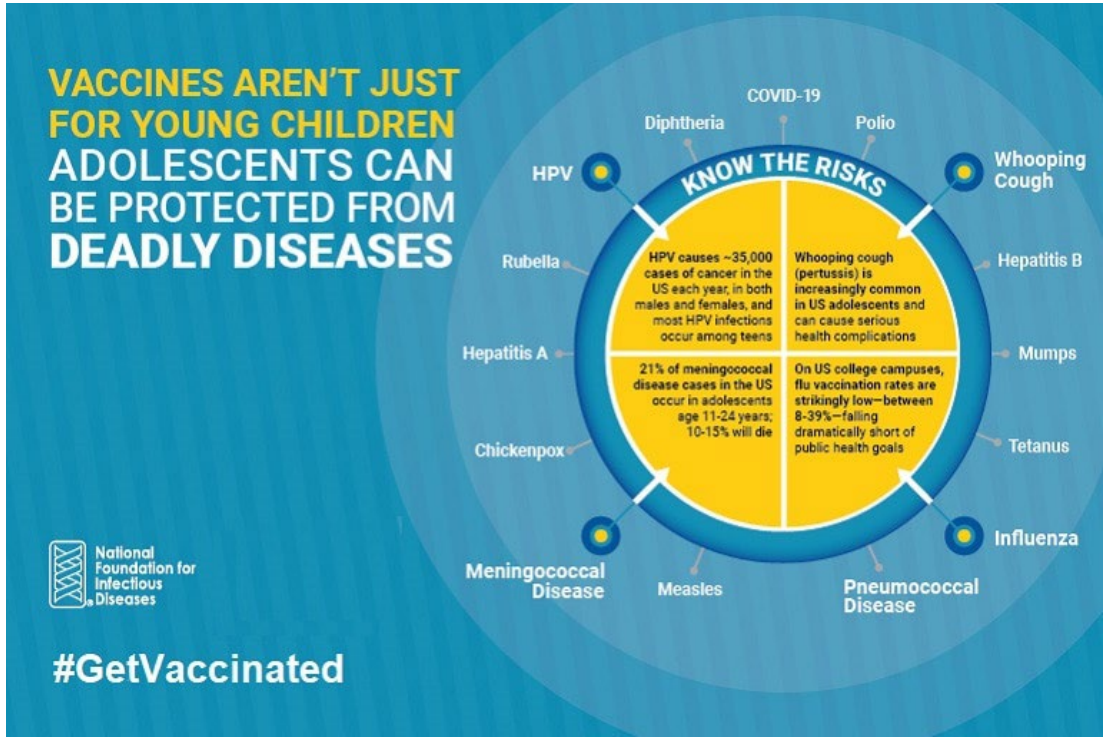
THE UNIVERSITY OF MELBOURNE

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NCIRS National Centre for Immunisation Research and Surveillance Australia

Presentation overview

- Beyond the childhood schedule – why adolescents?
  - Risk, immunology
  - What do adolescents think about vaccines?
- Regional challenges
- Australia's schedule
- Safety and coverage
- Where are adolescents vaccinated in Australia?
- Resources to support adolescent vaccination conversations
- Emerging research in adolescent vaccination



Beyond the childhood schedule – why adolescents?

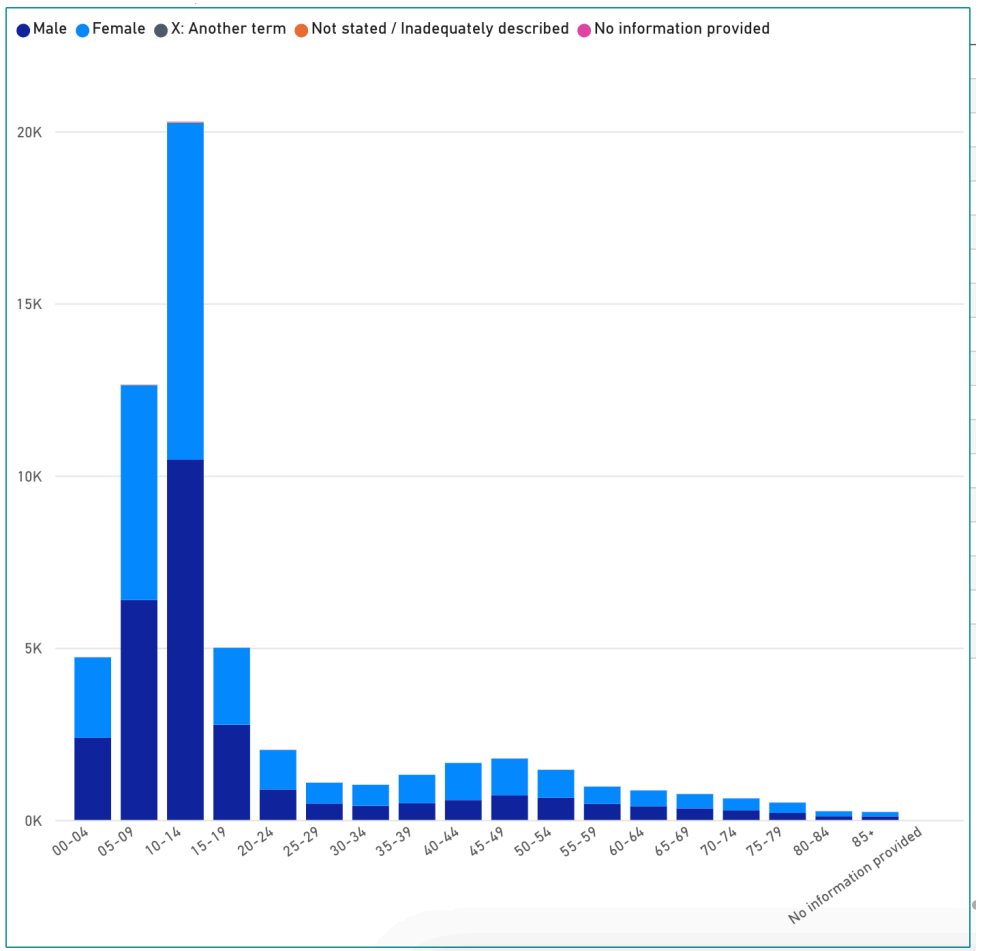
- Adolescents 10-19 yrs are 1/6th of global population = 1.3 billion people
- Adolescence “is a period marked by intensified social interactions and social behaviours that elevate the risk of disease carriage and transmission” (WHO)
- New exposures create new risk of other vaccine preventable diseases (eg HPV, meningococcal disease)





- Waning of protection from some childhood immunisations for diseases that occur throughout life (eg pertussis, tetanus)
  - Important for individual protection but also for herd protection eg of infants, elderly

Pertussis notifications, 2024, Australia



Source: NNDS, downloaded 24/8/2025
https://nindss.health.gov.au/pbi-dashboard/

Rarely achieve equivalent vaccine coverage to infant/childhood vaccines

Azzari C et al.. Experts' opinion for improving global adolescent vaccination rates: a call to action. Eur J Pediatr. 2020 Apr;179(4):547-553.

Reasons for low vaccine uptake among adolescents

- Lack of knowledge and poor communication among providers, parents, and adolescents
- Structural barriers in the health system
- Lack of clarity regarding ownership of vaccination
- Lack of primary healthcare visits
- Missed opportunities for vaccination

- Australia has a long history of successful school-based immunisation, including adolescents
- Supported by primary care systems and community vaccination services for catch up of doses missed at school

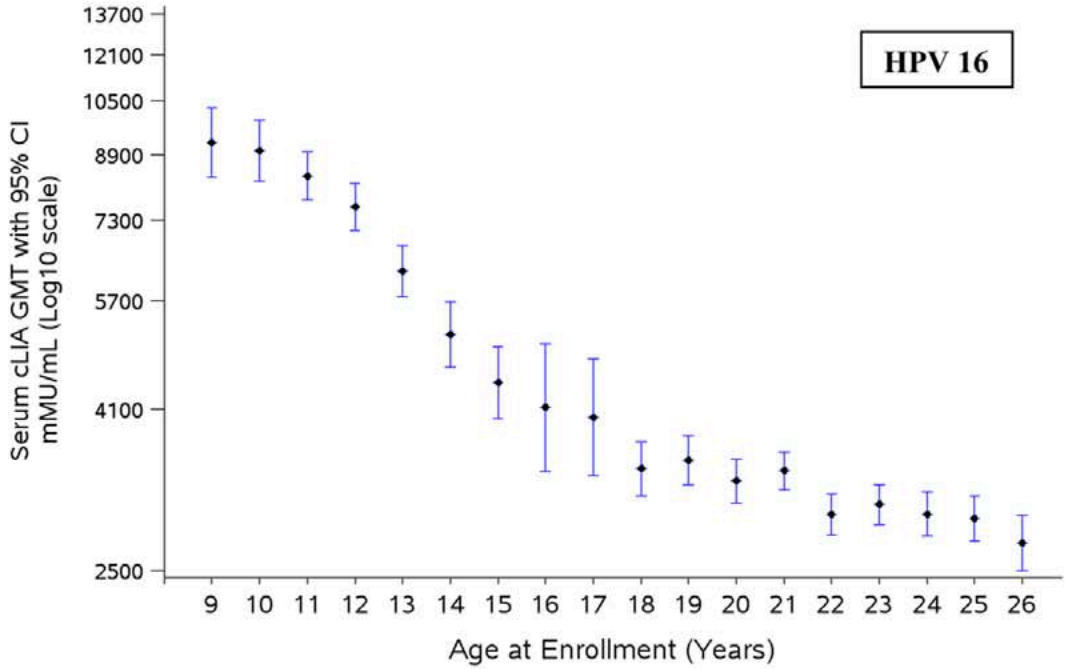
PRACTICE POINTS FOR GPS ON ADOLESCENT VACCINATION

- GPs have an important partnership role in supporting school-based vaccination of adolescents and, more recently, adolescent COVID-19 vaccination
- 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

Source: Davies C, Skinner R. Adolescent vaccination. The importance of GPs. Medicine Today 2022;23(3):14-24

Robust responses to immunisation in adolescence

9vHPV vaccine (primary) – GMT lower with age



Petersen LK, et al. Impact of baseline covariates on the immunogenicity of the 9-valent HPV vaccine - A combined analysis of five phase III clinical trials. Papillomavirus Res. 2017 Jun;3:105-115. doi: 10.1016/j.pvr.2017.03.002.

Pertussis responses (boosting)

- In a study (UK, Finland, Netherlands) of responses to an acellular pertussis booster in children (7-10 yrs) , adolescents (11-15 yrs), young adults (20-34 yrs) and older adults (60-70yrs):
  - Geometric mean (GMTs) were highest at day 28 in adolescents for:
    - Memory B cell frequencies for pertussis antigens
    - IgG antibody concentrations to pertussis toxin and filamentous haemagglutinin
  - Whereas, pertactin and IgA responses increased with age

Versteegen P et al. Memory B Cell Activation Induced by Pertussis Booster Vaccination in Four Age Groups of Three Countries. Front Immunol. 2022 May 23;13:864674; Versteegen P, et al. Responses to an acellular pertussis booster vaccination in children, adolescents, and young and older adults: A collaborative study in Finland, the Netherlands, and the United Kingdom. EBioMedicine. 2021 Mar;65:103247.

What do adolescents think about vaccines?

Systematic review of qualitative studies n= 59 (54 from HIC, 75% about HPV vaccine)

Adolescents' understanding of vaccines	Vaccine information sources described by adolescents	Vaccine decision-making
Purpose of vaccines: • Understand general purpose, but often unclear about specific vaccines • May be unsure whether vaccines preventative or therapeutic • Tend to think about vaccines in terms of personal rather than public protection	**Parents or caretakers:** • Usually main source of information • Generally perceived by adolescents as being responsible for obtaining and evaluating vaccine information • Vaccines usually discussed at home at the time of vaccine consent	**Lead by parents or caretakers:** • Parents generally required to provide vaccine consent • Adolescents may have pre-formulated opinions about vaccines, but final decision is generally parental, even when adolescent self-consent is an option
Vaccine preventable diseases: • Difficulties understanding and differentiating present and future risk • May be unfamiliar with diseases and disease transmission	**Schools:** • Many adolescents wish for more vaccine information through schools • Vaccine information sheets not sufficient, adolescents wish for interactive sessions	**Lead by adolescents:** • Self-consent often not offered in practice • Sub-groups of adolescents from marginalized and minority groups may exercise higher degree of autonomy when it comes to vaccine decisions
Concerns about vaccines: • Pain with vaccination • Lack of privacy during vaccination • Short and long-term side effects • Questionable effectiveness	**Healthcare providers:** • Trusted information resource, but not all providers initiate vaccine conversations • Adolescents perceive providers address parents rather than adolescents when discussing vaccines	
	Peers: • Not commonly described as key information source • Can be source of support during school vaccine clinics	
	Media • Increasing use of internet and social media • Unclear how adolescents assess and triangulate media information • In-person communication remains important	

Mitchell H, et al (2022) What do adolescents think about vaccines? Systematic review of qualitative studies. PLOS Glob Public Health 2(9):e0001109.

Challenges in our region…

HPV vaccine

Country level introductions by WHO Region…

- **9/10 (90%) of SE Asia Region** (all but N Korea)
- **27/28 (96%) of Western Pacific Region** (Vietnam pending)
- The two countries with highest burden of cervical cancer globally have both just introduced
- India and China – coverage pending

Challenges remain in achieving and maintaining high coverage

- Mean coverage HPVD1 2025 SEARO 72%
- Mean coverage HPVD1 2025 WPRO 70%

Source: WHO HPV dashboard

Meningococcal disease

- Burden of IMD largely unknown, serogroup B predominating in several regions.
- Globally meningitis 9th leading cause of death in adolescents in 2019 –n= 22,000. (70% in young adolescents). 70% in African LMICs – recurring large epidemics in meningitis belt. *Most of rest in SE Asia, West Pacific* and East Mediterranean LMICs.
- Most Asia Pacific countries currently have no meningococcal vaccine programs
- *"Where epidemiological data suggests there is a risk, vaccination efforts for MenB should extend to adolescents and young adults, especially those in densely populated settings, to mitigate the risk of transmission."*

Gang Liu, et al (2025) Joint consensus on reducing the burden of invasive meningococcal disease in the Asia-Pacific region, Human Vaccines & Immunotherapeutics, 21:1, 2477965.
WHO 2023. Global Accelerated Action for the Health of Adolescents (AA-HA!)

Challenges globally

Wide range of vaccines offered to adolescents

Include/have included

- HPV vaccine, tetanus, diphtheria, pertussis, seasonal influenza, cholera, dengue, rabies, typhoid, COVID-19, Meningitis, Polio, Yellow fever
- Likely future vaccines relevant in adolescence eg Chlamydia, malaria, TB

Eg Review of programs in Latin America/Caribbean

- 47 countries include 1+ adolescent vaccine
- (HPV n=45, dip/tet+/-pertussis n=43, polio 18, meninge 10, catchup hepB 17, yellow fever 13)
- *Availability, quality and consistency of coverage data highly variable. Coverage suboptimal for all vaccines.*



WHO Immunisation agenda 2030 strategic priority 4

Life course and integration of vaccines

"Implementation and social and behavioural research will be conducted to generate evidence for effective delivery of integrated, coordinated packages of vaccination services and to identify new contact points for vaccination throughout the life course."

- 2025 review found limited evidence on HPV vaccine integration with adolescent services so far…

Rojas M et al. Characterizing adolescent vaccination in publicly funded national immunization programs in Latin America and the Caribbean : A review of the literature. Hum Vaccin Immunother. 2025 Dec;21(1):2528403.

Jennings MC, et al. Realist review of low- to upper-middle-income country experiences on integration of HPV vaccination with other adolescent health services. Vaccine 2025;50: 126833.

National Immunisation Schedule

Department of Health, Disability and Ageing – National Immunisation Program Schedule | 2
National Immunisation Program Schedule current from October 2026

Australian Government
Department of Health, Disability and Ageing

National Immunisation Program
A joint Australian, State and Territory Government Initiative

Adolescent vaccination (also see vaccination for people with medical risk conditions)

Age	Diseases	Vaccine Brand	Notes
All ages (<18)	• Influenza (adolescents with specified medical risk conditions)	Age appropriate	Influenza vaccine: Administer annually. For information on age-appropriate vaccines or specified medical risk conditions refer to the Australian Immunisation Handbook or annual ATAGI advice on seasonal influenza vaccines.
	• Influenza (Aboriginal and Torres Strait Islander adolescents)	Age appropriate	
	• Pneumococcal (adolescents with specified medical risk conditions)	Prevenar 20®	Pneumococcal vaccine: For adolescents with specified medical risk conditions refer to the Australian Immunisation Handbook.
12-13 years (Year 7 or age equivalent)	• Diphtheria, tetanus, pertussis (whooping cough)	Boostrix® or Adacel®	
	• Human papillomavirus (HPV)	Gardasil®9	HPV vaccine: Administer 1 dose. For people aged 12-26 with specified medical risk conditions that increase the risk of HPV, administer 3 doses. Refer to the Australian Immunisation Handbook for eligibility and dose intervals.
14-16 years (Year 10 or age equivalent)	• Meningococcal ACWY	MenQuadfi®	

State and Territory additional scheduled adolescent vaccines

National Immunisation Program

South Australia ADOLESCENT and ADULT Schedule

Updated October 2026

MEDICAL AT RISK: Check at all encounters for additional recommended vaccines. Refer to the Australian Government Department of Health website for detailed information.

ADOLESCENTS

Age	Disease	Vaccine	Route	Important Information
Year 7 students	Diphtheria, tetanus, pertussis (dTpa)	Boostrix® or Adacel®	IM	
	Human papillomavirus (HPV)	Gardasil 9®	IM	1 dose is recommended unless person is immunocompromised
Year 10 students	Meningococcal ACWY	MenQuadfi®	IM	
	Meningococcal B	Bexsero®	IM	2 doses with a minimum 8 week interval

NT Immunisation Schedule

Children and Adolescents up to 19 years

Vaccines funded under the National Immunisation Program/NT Health

July 2026

Ph (08) 8922 8315

Immunisation program | NT Health

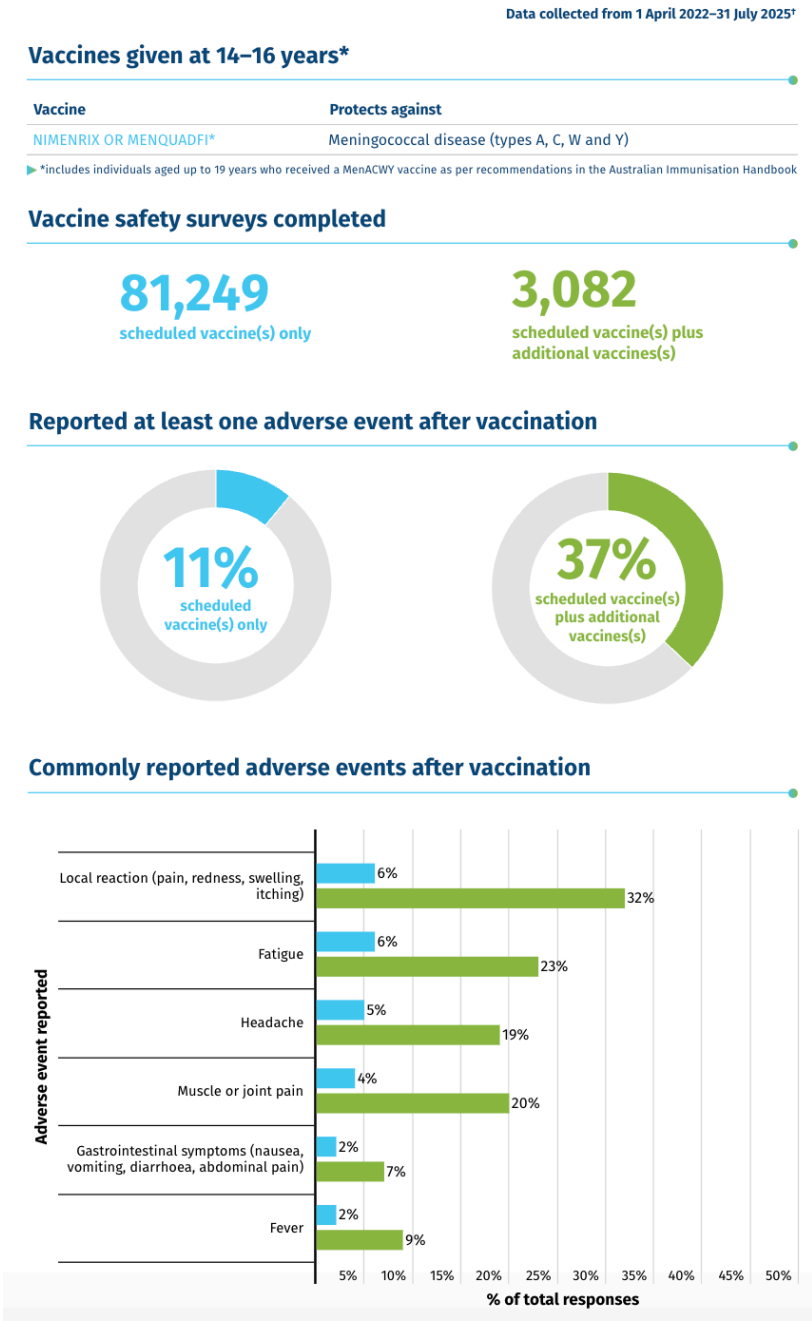
From 12 years or Year 7	Human papillomavirus (HPV)	Gardasil 9® (IM)	1	3 doses for medical risk conditions | HPV |
	Diphtheria, tetanus, pertussis	Boostrix® (IM) or Adacel® (IM)	1	
	Pneumococcal *See NT Pneumococcal Schedule*	Prevenar 20® (IM)	For Aboriginal and Torres Strait Islander children who have not received Prevenar 20®	
14-19 years or Year 9	Meningococcal ACWY	MenQuadfi® (IM)	2	Recommended to receive one dose ≥14 years regardless of previous doses
	Meningococcal B	Bexsero® (IM)	1 & 2	Recommended to receive 2 doses, 8 weeks apart, ≥14 years regardless of previous doses

Immunisation Schedule Queensland - Adolescent and Adult Immunisation

Year 10 students (or age equivalent)	Meningococcal ACWY	MenQuadfi	R	IM / DL	Meningococcal ACWY is funded for Year 10 Students (or age equivalent) AND adolescents aged 15–19 years inclusive.
	Meningococcal B	Bexsero		IM / DL	2 doses given a minimum of 8 weeks apart. Meningococcal B is funded for Year 10 students (or age equivalent) AND adolescents aged 15–19 years inclusive.

Safety of adolescent vaccines

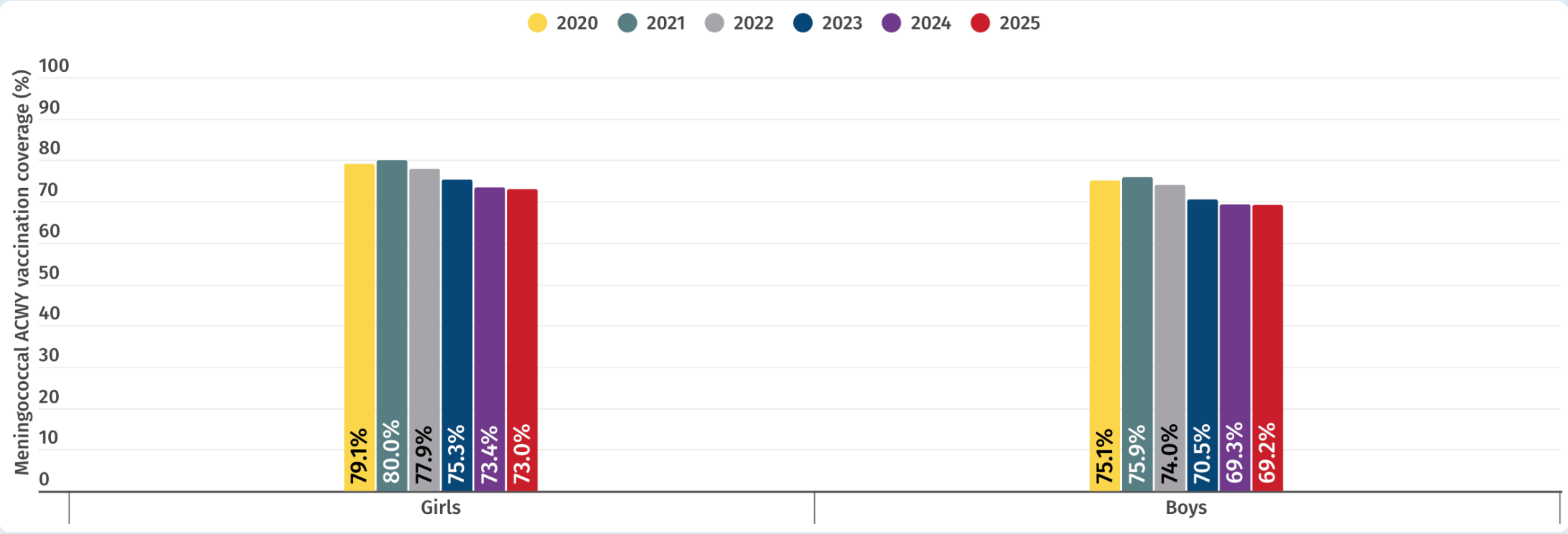
- School immunisation programs have protocols in place to ensure safety of adolescents vaccinated in the school setting (eg to avoid mass reactions)
- Passive Therapeutic Goods Admin (TGA) surveillance
- Active surveillance through AusVaxSafety
- Incident diseases in adolescence differ from those in infancy early childhood
    - Signal investigation often around diseases with new onset or frequent occurrence in adolescence eg autoimmune diseases, migraine



COVERAGE IN ADOLESCENCE IS FALLING

Meningococcal ACWY vaccine

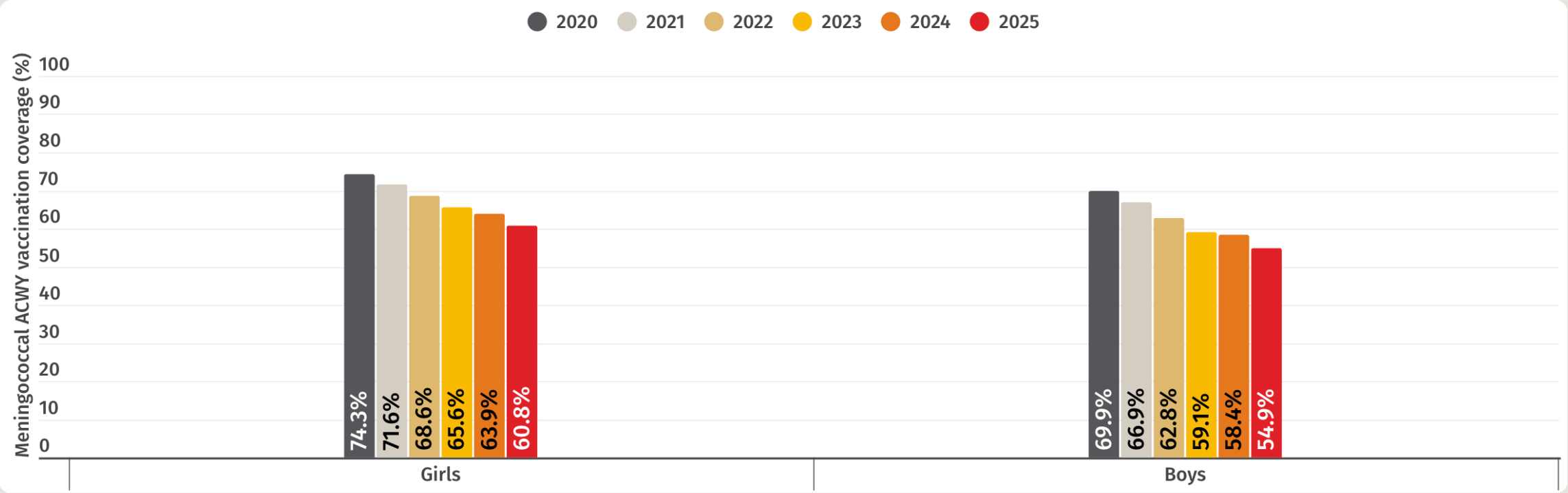
Meningococcal ACWY vaccination coverage in adolescents turning 17 years of age remained lower than for other adolescent vaccinations, with coverage in 2025 below 75% for girls and below 70% for boys.



COVERAGE IN ADOLESCENCE IS FALLING

Meningococcal ACWY vaccine

Meningococcal ACWY vaccination coverage in Aboriginal and Torres Strait Islander adolescents turning 17 years of age continued to decrease and was lower than for other adolescent vaccines. In 2025, coverage was below 65% for girls and below 55% for boys.



HPV vaccine rates are trending down

- HPV vaccine coverage peaked in Australia in 2020 at 85.7% by age 15 (target 90%)
  - 86.6% females, 84.9% male
- In 2025 overall coverage rate for 15 year olds fallen to 77.1%
  - 78.7% in females, 75.6% in males
  - Modelling predicts that a sustained coverage of at least 80% is required for local elimination of HPV in a both sex HPV vaccine program *(Brisson et al, Lancet Pub Health 2016)*
  - Widening disparities
- Also seen, and ongoing, in similar countries – USA, Canada, UK

Data from Hull et al. NCIRS Annual Immunisation coverage report 2025. Unpublished Brotherton J, Smith M, et al., 2026 Cervical Cancer Elimination Progress Report: Australia's progress towards the elimination of cervical cancer as a public health problem. In press, Melbourne, Australia,

NHMRC Centre of Research Excellence in Cervical Cancer Control

Why is coverage falling? Interviews with senior immunisation program staff

Interviews with JIC members (11 from all 8 S&Ts) in Sept 2024 discussing experience and impact of change to single dose HPV vaccine in 2023 and current program operations post COVID.

1) Kids at school less, more anxious

"I think the whole change in schedule wasn't the cause of our rates going down. ..you know, I really think that there's such a bigger problem.....

We have to start thinking outside the square. I think we're just doing the same thing, but we've got a different cohort coming through that have different needs."

- Jurisdictional immunisation coordinator Sept 2024

Source: ACARA data

Steffens M, Bolsewicz K, Prokopovich K, Beard F, Brotherton JML. Immunisation program managers' experiences of implementing the change from a two dose to a single dose course of HPV vaccination in Australia's school-based program. Vaccine. 2026; 76: 128300. Published online February 6, 2026. doi:10.1016/j.vaccine.2026.128300

Why? Observations from senior immunisation program staff

2) Consent processes are challenging (mix of electronic and paper, reliant on school systems)

Yes, consent has dropped overall, but ...we need to decide whether it's because... the link [to our online consent system] hasn't made it to parents, and the hard copy... hasn't made it to parents. Or if parents don't want to consent online because of cyber security concerns.

3) Education/schools overwhelmed – staffing challenges and hands full. Limited resources/engagement

It's not necessarily that all of the people that didn't send the form back are anti vaccination. I think it's the process as well. I'll be quite honest. You know, just having done it with my own children...it is clunky.

4) Loss of/difficulty maintaining second visit in Year 7

"If anyone said well, is it access or acceptability? It's definitely access, by far"

5)Parents ?hesitancy – overwhelmed, disengaged from vaccination, antigovernment

There's ever increasing numbers of consent forms that aren't returned. And, you know, potentially more 'no's', but not a huge amount more 'no's', but a lot of just people not engaging.

Steffens M, Bolsewicz K, Prokopovich K, Beard F, Brotherton JML. Immunisation program managers' experiences of implementing the change from a two dose to a single dose course of HPV vaccination in Australia's school-based program. Vaccine. 2026; 76: 128300. doi:10.1016/j.vaccine.2026.128300

ISSUE	IMPACTS	EXAMPLES OF SOLUTIONS UNDERWAY 2026
Removal of routine second school visit in Year 7 *(HPV single dose change related)*	Only one chance to vaccinate child at school in calendar year	**WA**- SMS to parents of overdue kids from DoEd list, increased outreach, enhanced access team for Aboriginal students; **Multiple jurisdictions** working with pharmacies **NT** in school catch up vax all year levels in 2026 (3 visits in 2027), pop up clinics after hours and school hols in libraries etc, ACCHOS/comm health to check vax at every visit, phone/SMS parents with vax appts. **SA** working with youth and universities for catch up promotion, **Tas** encouraging councils to offer catch up in other school grades
Reduced school attendance	Coverage lowest in poorest attenders eg remote, male Indigenous	**NSW**- expanded authority for Aboriginal HPs to give adolescent vaccines **NT**- updated recall system for remote students **Tas**- encouraging vax in first two terms as less absences
Staffing challenges, limited resourcing	Both health and education impacted – lack of continuity/resourcing in schools	**WA, NT-** adolescent toolkit for schools **Qld** – RV of funding model and governance. **NT** - vax focused games created for post vaccine wait
Cumbersome consent processes. Not all States can access class lists (variable legislation/ MOU)	Comms and reminders to parents are school comms system dependent. Mix of paper and electronic consent in use. Inability to chase up consent forms.	**WA** – consent form included in Dept of Ed Year 7 enrolment pack; **NSW** – reviewing online consent system; **ACT**- streamlined consent system and revised forms, telephone consent option; **NT** consent form simplified; **Qld**- Public Health Act amendment to access class lists, scoping integration of consent with school platforms **SA**- promotional campaign consent return **Tas**- new vaccine management, booking, consent platform with SMS/email reminders
Health and education cross sector cooperation Lack of education buy in	Viewed as inconvenience/disruption Local relationship dependent Lack of vax education in curricula and for teachers.	**WA** – developing lesson plans for teachers, nurse presentation materials, will notify DoE of low consent return schools and send principals summary data; **Qld**- working with DoEd at officer level, engaged distance ed/home schooling/school youth health nurses **Tas**- developing materials for teachers and school nurses
Community/parent/ student attitudes have changed	Range of disengaged, overwhelmed or anxious, greater information needs, small % antigov or antivax	**WA**- targeted social media campaign; multiple states developing adolescent resources **Qld** developing Year 7 lesson plan on health misinformation with immunization as example. **SA** – CALD community champions. **Tas** – Year 6 information provision

What about catch up in older teens and young adults?

- Coverage does increase past age 15, peaking at age 19 years
- But incremental declines in population coverage as cohorts age up into 20s (due to net immigration)
- By age 25, 1 in 5 women remain unvaccinated as entering cervical screening
- Capacity to benefit is still substantial due to herd protection

Figure from Hull et al. NCIRS Annual Immunisation coverage report 2025. Unpublished

AUSTRALIAN IMMUNISATION REGISTER (AIR)

Adolescent Immunisation, Diphtheria-tetanus-pertussis (2026)

Doses Administered

Australian Government
Department of Health, Disability and Ageing

Human Papillomavirus	Diphtheria-tetanus-pertussis	Meningococcal ACWY
249,280	418,050	251,310
Doses administered (HPV)	Doses administered (DTP)	Doses administered (MCY)

Doses administered | %

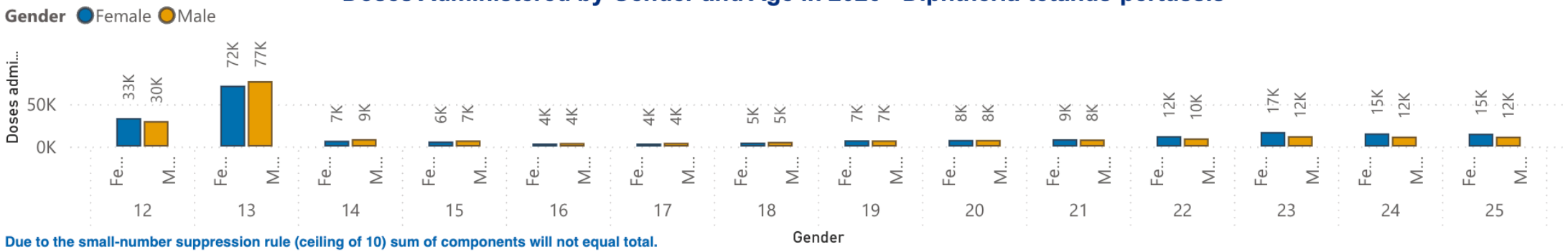
Doses Administered by State and Provider for 2026 - Diphtheria-tetanus-pertussis

Provider Type	New South Wales	Victoria	Queensland	South Australia	Western Australia	Tasmania	Northern Territory	Australian Capital Territory	Other Territories	**Total**
Council	450	49,820	6,580	9,220	100	4,000	60	20		**70,220**
State Health / PHU	59,230	280	870	120	1,680	30	2,630	100	10	**64,920**
GP	40,430	37,430	33,510	8,320	12,670	2,960	1,760	1,830	30	**138,890**
Community Health	1,990	970	27,930	1,560	24,060	120	1,060	1,010	10	**58,670**
Public Hospital	15,430	7,370	9,490	2,550	1,970	790	900	1,070	30	**39,560**
Pharmacy	10,690	7,080	9,230	2,770	4,650	1,060	210	830	10	**36,480**
Aboriginal Health	610	220	420	420	800	70	2,890	40	10	**5,440**
Total	**129,360**	**103,710**	**88,980**	**25,440**	**47,030**	**9,040**	**9,540**	**4,920**	**70**	**418,050**

When one or more SA3 are selected the aggregate for those SA3 are shown under the respective state column header

Pharmacy
8.7%

Doses Administered by Gender and Age in 2026 - Diphtheria-tetanus-pertussis



Due to the small-number suppression rule (ceiling of 10) sum of components will not equal total.

https://www.health.gov.au/topics/immunisation/immunisation-dashboards?language=en

How do we effectively combat the online mis/disinformation environment?



AAP FactCheck
14 September ·

A viral video that claims contracting an HPV infection is a common side effect of the HPV vaccine is "utterly ignorant of the science", experts say.

Image from https://www.aap.com.au/factcheck/viral-clip-spreads-misinformation-on-australian-developed-hpv-vaccines



A video clip sharing the false claim has been viewed hundreds of thousands of times on social media. (Facebook/AAP)



We need to get much better at social listening, pre and debunking and recommending at the community and individual clinical level

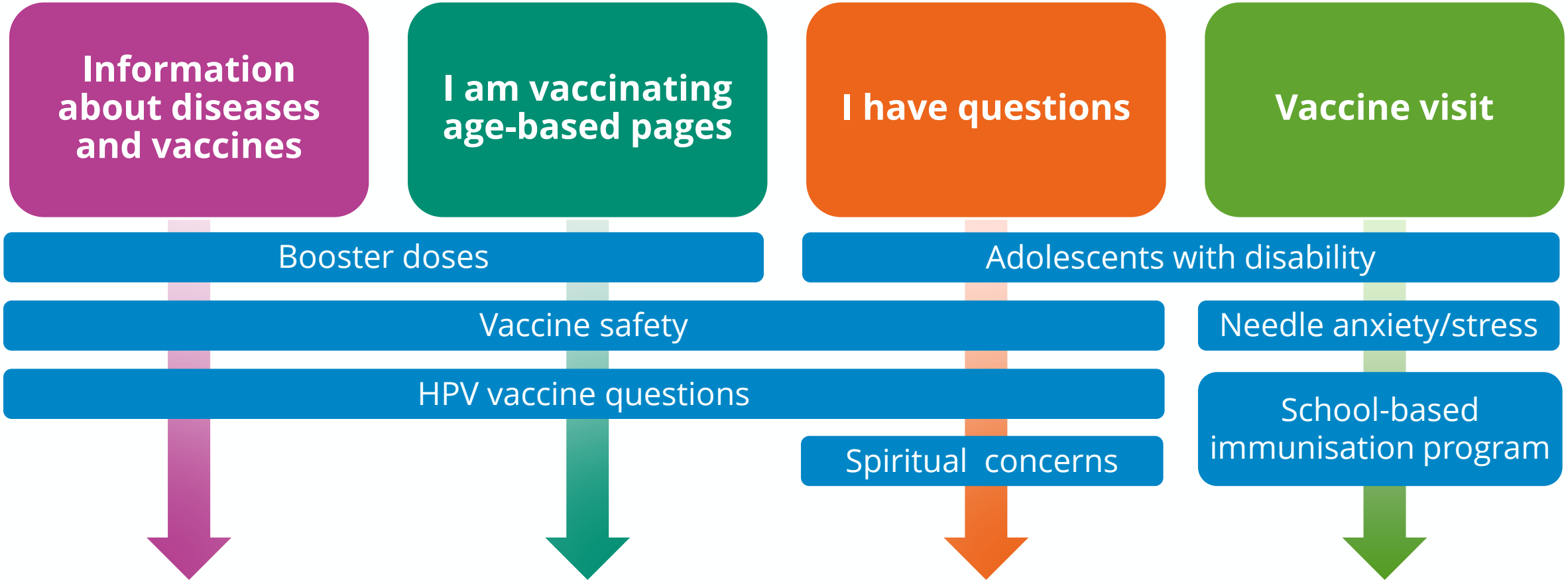
SKAI Adolescent: empowering conversations about adolescent immunisation



Providing practical guidance and answers to common questions related to:

- human papillomavirus (HPV) vaccination
- diphtheria-tetanus-pertussis (dTpa)m booster vaccination
- meningococcal B and meningococcal ACWY vaccination
- influenza vaccination
- vaccination for adolescents with medical risk factors
- vaccination for adolescents with disability

SKAI Adolescent: meeting the need for quality vaccination information



SKAI Adolescent: website content map

I am vaccinating

- Vaccinations at 12–13 years
- Vaccinations at 14–16 years
- Annual flu (influenza) vaccination
- Meningococcal B vaccination
- Vaccinations for adolescents with medical risk conditions

I have questions

- How do I know the vaccines are safe?
- How do vaccines affect immunity?
- What about side effects?
- What are the symptoms of infectious diseases?
- What is in the vaccines?
- What happens if I choose not to vaccinate?
- What happens if my adolescent chooses not to be vaccinated?
- What about adolescents with disability?
- Why does my adolescent need a human papillomavirus (HPV) vaccine?
- How can my adolescent's spiritual and cultural observances be respected?

Information about diseases and vaccines

- Diphtheria
- Tetanus
- Whooping cough (pertussis)
- Human papillomavirus (HPV)
- Meningococcal disease
- Influenza (flu)
- Pneumococcal disease
- COVID-19

Your adolescent's vaccine visit

- Preparing for your adolescent's visit
- After your adolescent's visit



What does an adolescent centred immunisation service look like?

Image from
https://www.health.wa.gov.au/Articles/A_E/campaign-adolescent-immunisation