Pertussis in older adults

Immunisation Masterclass

9 May 2026

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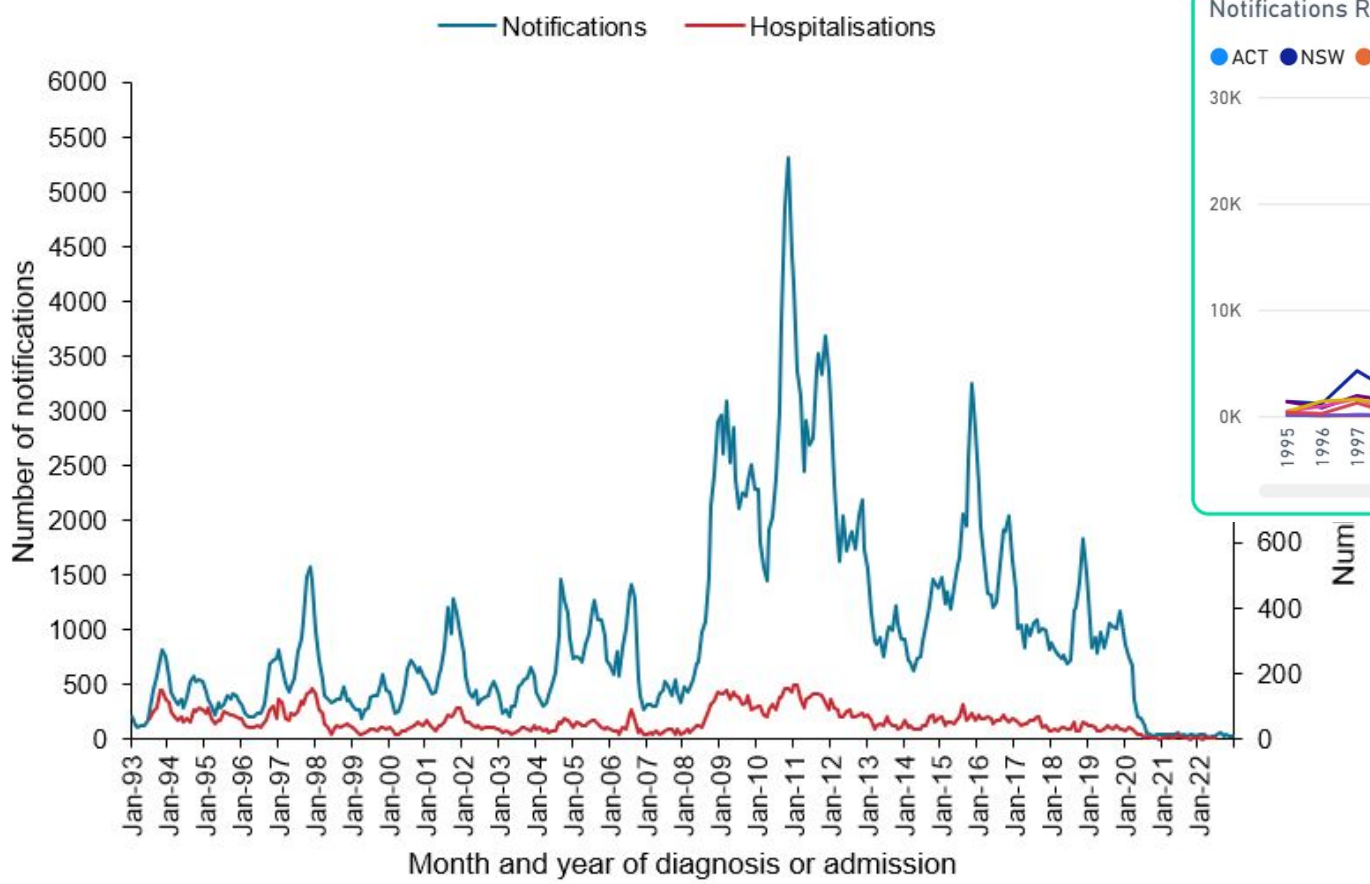
Background

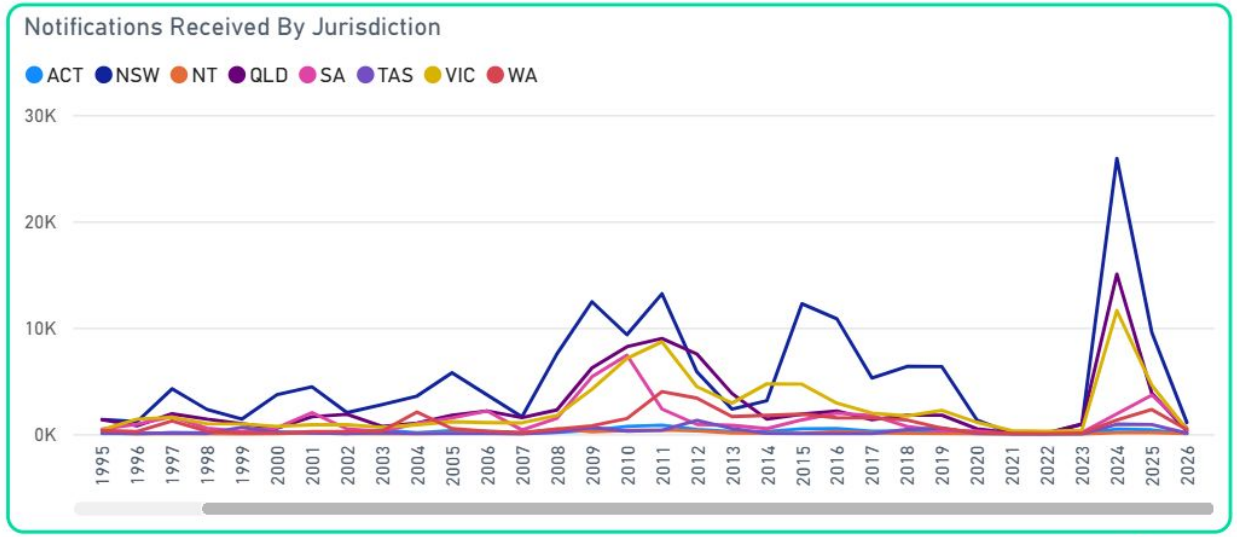
IMMUNISATION COALITION

- Pertussis (whooping cough), caused by *Bordetella pertussis* is a highly contagious respiratory infection
- Characteristic symptom is paroxysms of coughing that may result in vomiting
- Major concern in young babies as potential for fatalities
- Pertussis is vaccine-preventable
- Despite long-standing childhood vaccination programs and high coverage, outbreaks continue to occur

Epidemiology

Figure 1. Pertussis notifications and hospitalisations[a] for all ages, Australia, 1993 to 2022, by month of diagnosis or admission





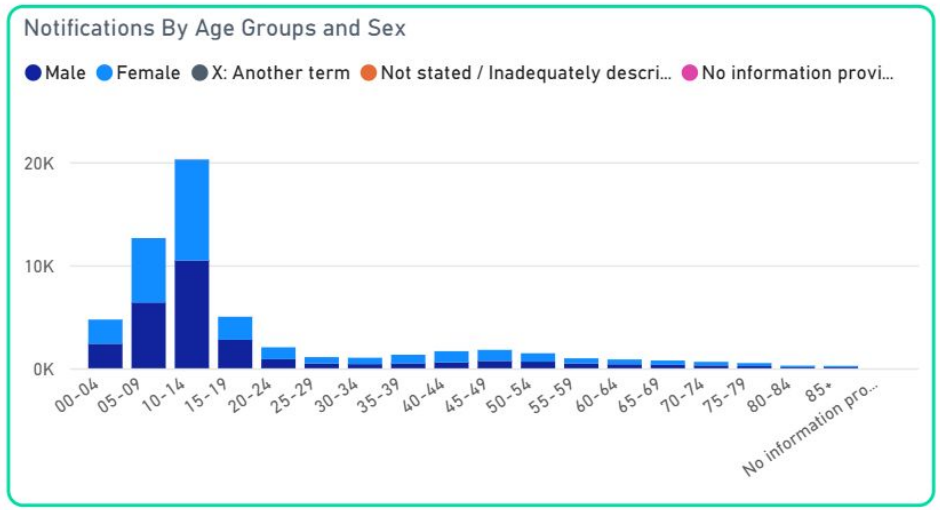
Source: https://nindss.health.gov.au/pbi-dashboard/

Data sources: National Notifiable Diseases Surveillance System for notifications and Australian Institute for Health and Welfare National Hospital Morbidity Database for hospitalisation data.

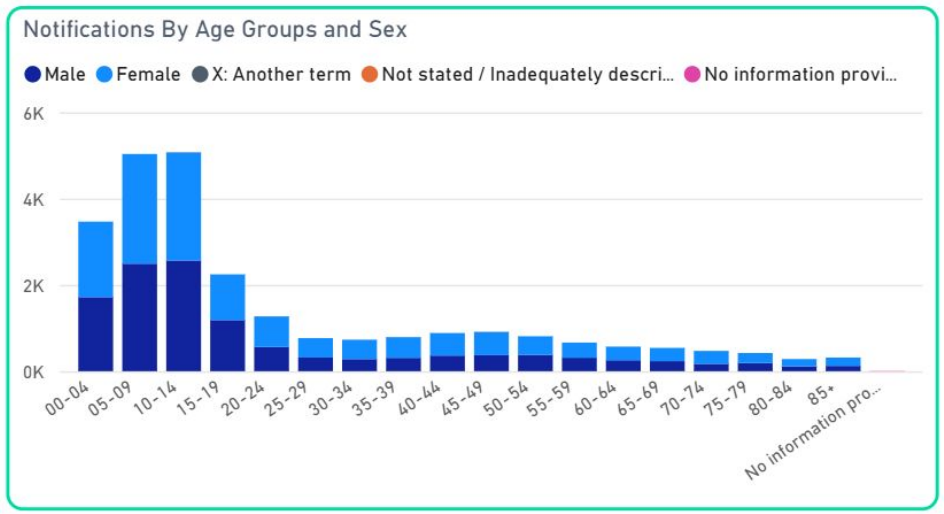
Source: Jackson et al. Comm Dis Intell. *In press*

Epidemiology

2024



2025



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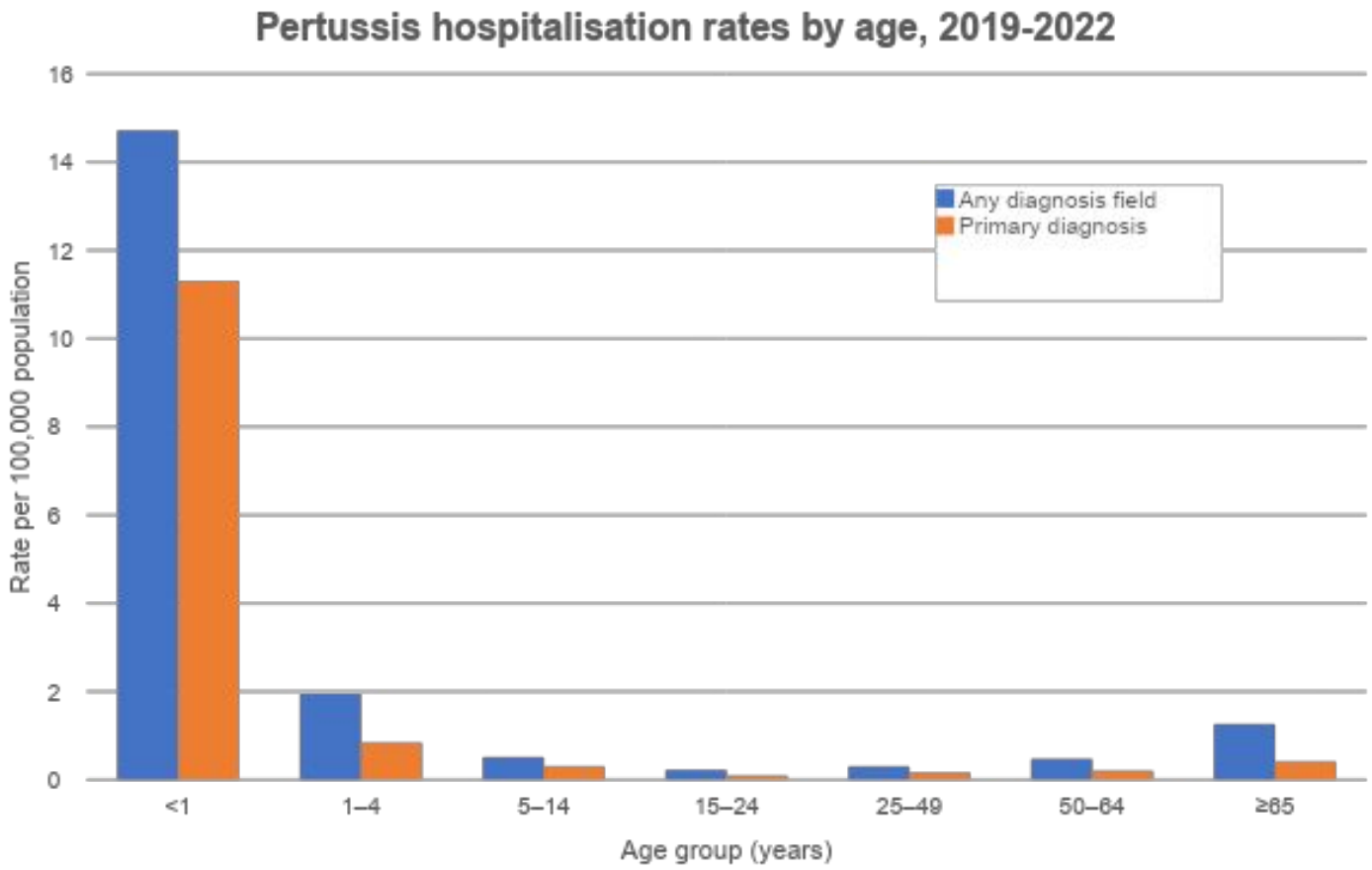

Source: Jackson et al. Comm Dis Intell. *In press*

Pertussis in older adults

Pertussis infection is less well recognised in adults

- atypical or non-specific persistent cough
- may be confused with pre-existing chronic respiratory conditions (e.g. asthma, COPD)
- delayed presentation – also presents diagnostic challenges

Complications can include pneumonia, insomnia, apnoea, weight loss, urinary incontinence, syncope, rib fracture

Studies suggest that 5% of adults aged >45 years with pertussis required hospitalisation.

Older adults and adults with pre-existing respiratory diseases or overweight are more likely to suffer severe disease requiring hospitalisation

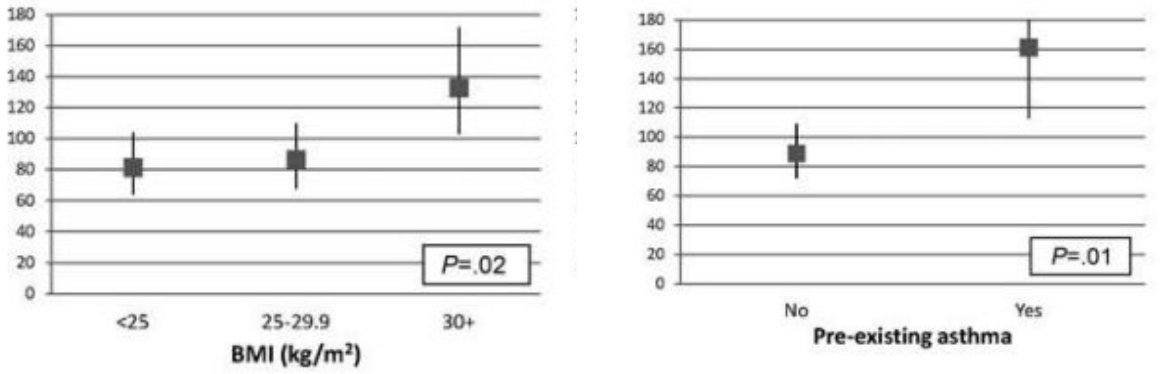

Figure 1. Incidence of pertussis per 100 000 person-years according to various characteristics.[1]

Consideration of a pertussis diagnosis in older adults with cough is important

- Sensitivity of testing (PCR/culture)
- Antibiotic treatment can reduce transmission and complications

Source: Moa A. et al. Vaccines 2025
Leong RN. et al. Vaccine 2021
MacIntyre et al. Hum Vaccin Immunother 2024
Liu et al. Clin Infect Dis 2012
Karki et al. Vaccine 2015

Pertussis prevention in older adults

IMMUNISATION COALITION

In 2000 first adult/adolescent formulation of dTpa vaccine registered for use in Australia

Two formulations in Australia, both combined with tetanus and diphtheria: Adacel and Boostrix

Excluding pregnancy immunisation, adult pertussis vaccination not currently funded under National Immunisation Program

Adults

- Adults who want to reduce their likelihood of becoming ill with pertussis may consider receiving a pertussis-containing vaccine
- Adults who need a tetanus-containing vaccine are recommended to receive dTpa vaccine rather than dT vaccine
- Adults aged ≥65 years are recommended to receive pertussis-containing vaccine if their last dose was more than 10 years ago

Pertussis vaccination coverage in older adults

Pertussis vaccine coverage is low in older adults and decreases with increasing age

Pertussis uptake is low relative to tetanus/diphtheria

Research letter

Tetanus, pertussis, and diphtheria vaccination coverage in older adults, Australia, 2023: analysis of Australian Immunisation Register data

Alexandra J Hendry[1], Helen E Quinn[1,2], Kristine Macartney[1,2], Frank H Beard[1,2]

Numbers of adults aged 50 years or older who were up-to-date for tetanus, pertussis, and diphtheria vaccination, Australia, 2023, by age group*

	Age group (years)					
Vaccination	50–64	65–74	75–84	85 or older	50 or older	65 or older
Medicare-registered adults	5 282 953	2 758 338	1 694 345	640 090	10 375 726	5 092 773
Tetanus	1 540 895 (29.2%)	906 629 (32.9%)	511 210 (30.2%)	176 926 (27.6%)	3 135 660 (30.2%)	1 594 765 (31.3%)
Pertussis	1 105 402 (20.9%)	659 490 (23.9%)	301 724 (17.8%)	86 416 (13.5%)	2 153 032 (20.8%)	1 047 630 (20.6%)
Diphtheria	1 536 450 (29.1%)	903 747 (32.8%)	508 753 (30.0%)	175 944 (27.5%)	3 124 894 (30.1%)	1 588 444 (31.2%)

* Source: Australian Immunisation Register, 2 February 2024.

[1] National Centre for Immunisation Research and Surveillance, the Children's Hospital at Westmead, Sydney, NSW. [2] The University of Sydney, Sydney, NSW. frank.beard@sydney.edu.au
doi: 10.5694/mja2.52389

Pertussis vaccine efficacy and effectiveness in older adults

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- Pertussis vaccines highly efficacious in children
- Some waning of immunity has been described particularly in relation to acellular vaccines
- Largest RCT in people aged 15-65 years
- N=2781
- Ages 15-65 yrs (mean 35 yrs)
- 2.5 years follow-up
- Strict primary case definition

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 OCTOBER 13, 2005 VOL. 353 NO. 15

Efficacy of an Acellular Pertussis Vaccine among Adolescents and Adults

Joel I. Ward, M.D., James D. Cherry, M.D., Swei-Ju Chang, M.S., Susan Partridge, R.N., M.B.A., Hang Lee, Ph.D., John Treanor, M.D., David P. Greenberg, M.D., Wendy Keitel, M.D., Stephen Barenkamp, M.D., David I. Bernstein, M.D., Robert Edelman, M.D., and Kathryn Edwards, M.D., for the APERT Study Group*

Table 4. Vaccine Efficacy with Use of Various Case Definitions.*

Pertussis Case Definition†	Acellular Pertussis Vaccine Group (2421 person-yr)		Hepatitis A Vaccine Group (2444 person-yr)		Vaccine Efficacy (95% CI)	
	No. of Cases by Category	Cumulative No. of Cases for Successive Categories‡	No. of Cases by Category	Cumulative No. of Cases for Successive Categories‡	Unadjusted	Adjusted§
Primary						
With positive culture or PCR assay only	0	0	5	5	100 (NA)¶	100 (NA)¶
With positive culture, PCR assay, and serologic analysis	1	1	4	9	89 (19 to 99)	92 (32 to 99)
Secondary	0	1	0	9	89 (19 to 99)	92 (32 to 99)
Tertiary	3	4	1	10	60 (−40 to 91)	67 (−9 to 90)
Quaternary	1	5	1	11	54 (−42 to 88)	63 (−11 to 87)

Source: Van Damme. et al. Vaccines 2011

Pertussis vaccine effectiveness in older adults

IMMUNISATION COALITION

Effectiveness of pertussis vaccines for adolescents and adults: case-control study

OPEN ACCESS

Roger Baxter *codirector*, Joan Bartlett *analyst/programmer*, Ali Rowhani-Rahbar *vaccine safety fellow*, Bruce Fireman *statistician*, Nicola P Klein *codirector*

BMJ 2013;347:f4249 doi: 10.1136/bmj.f4249 (Published 17 July 2013)

Case-control
N=668 cases (PCR positive)
Ages 11+ yrs (mean 24 years)

Vaccine effectiveness 53% (42-62) – 64% (55-71)

Table 2| **Effectiveness of Tdap (reduced acellular pertussis) vaccination in preventing polymerase chain reaction (PCR) confirmed pertussis in selected subgroups defined by childhood pertussis vaccination history**

Childhood pertussis vaccination history and comparison group for PCR positive cases	No of cases	No of controls	Vaccine effectiveness (%) (95% CI)	P value
Pre-vaccine era:				
PCR negative controls*	61	1887	24.1 (−58.7 to 63.7)	0.464
KPNC controls	61	2725	26.7 (−65.4 to 67.5)	0.455
All whole cell vaccines:				
PCR negative controls*	129	4300	68.3 (45.8 to 81.5)	<0.001
KPNC controls	129	4970	63.6 (37.3 to 78.9)	<0.001
All acellular vaccines:				
PCR negative controls*	181	822	57.6 (34.1 to 72.7)	<0.001
KPNC controls	181	4776	74.4 (60.4 to 83.4)	<0.001

Mean age= 68.5 years

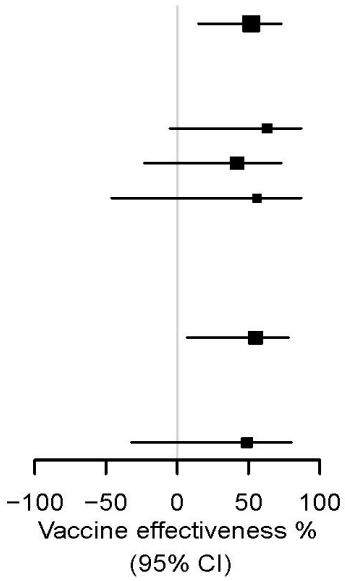
Clinical Infectious Diseases

MAJOR ARTICLE

Effectiveness of Acellular Pertussis Vaccine in Older Adults: Nested Matched Case-control Study

Bette C. Liu,[1] Wen-Qiang He,[1] Anthony T. Newall,[1] Helen E. Quinn,[2,3] Mark Bartlett,[4] Andrew Hayen,[5] Vicky Sheppeard,[6] Nectarios Rose,[6] C Raina MacIntyre,[7] and Peter McIntyre[2,8]

	Cases N	Controls* N	Unadjusted OR	Adjusted+ OR	Adjusted vaccine effectiveness (%) (95%CI)	P value
Overall						
Unvaccinated	152	214	Ref	Ref	Ref	
Vaccinated	20	52	0.54	0.48	52 (15 to 73)	0.01
By time since vaccination						
Unvaccinated	152	214	Ref	Ref	Ref	
<2 years	5	16	0.44	0.37	63 (−5 to 87)	0.06
2–5 years	11	26	0.60	0.58	42 (−23 to 73)	0.16
≥5 years	4	10	0.56	0.44	56 (−46 to 87)	0.18
By age at diagnosis/index date						
<65 years						
Unvaccinated	107	156	Ref	Ref	Ref	
Vaccinated	12	34	0.51	0.45	55 (7 to 78)	0.03
≥65 years						
Unvaccinated	45	58	Ref	Ref	Ref	
Vaccinated	8	18	0.57	0.51	49 (−32 to 80)	0.17

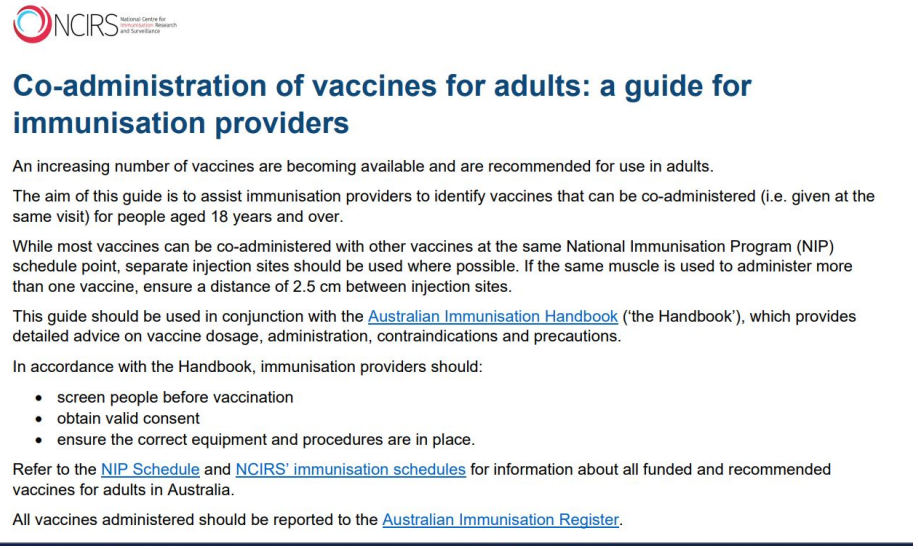


*Matched on recruitment date, age and sex

+Adjusted for contact with children and region of residence

Improving immunisation coverage

- Data from Australian Immunisation Register suggests low coverage for pertussis containing vaccines in older adults
- Healthcare provider recommendations are known to increase uptake of vaccines
- dTpa vaccine can be given instead of Td where Td is indicated
- dTpa vaccine is safe to administer with other adult vaccines (e.g. influenza, Shingrix)
- Pertussis vaccines can be administered to adults at pharmacies across Australia



NCIRS National Centre for Immunisation Research and Surveillance

Co-administration of vaccines for adults: a guide for immunisation providers

An increasing number of vaccines are becoming available and are recommended for use in adults.

The aim of this guide is to assist immunisation providers to identify vaccines that can be co-administered (i.e. given at the same visit) for people aged 18 years and over.

While most vaccines can be co-administered with other vaccines at the same National Immunisation Program (NIP) schedule point, separate injection sites should be used where possible. If the same muscle is used to administer more than one vaccine, ensure a distance of 2.5 cm between injection sites.

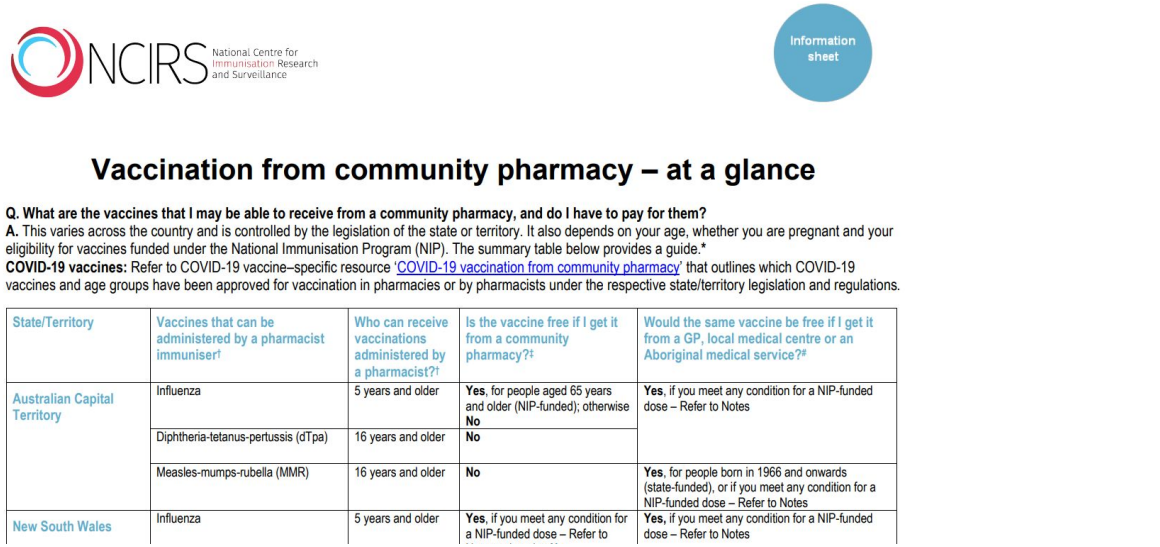
This guide should be used in conjunction with the Australian Immunisation Handbook ('the Handbook'), which provides detailed advice on vaccine dosage, administration, contraindications and precautions.

In accordance with the Handbook, immunisation providers should:

- screen people before vaccination
- obtain valid consent
- ensure the correct equipment and procedures are in place.

Refer to the NIP Schedule and NCIRS' immunisation schedules for information about all funded and recommended vaccines for adults in Australia.

All vaccines administered should be reported to the Australian Immunisation Register.



NCIRS National Centre for Immunisation Research and Surveillance

Information sheet

Vaccination from community pharmacy – at a glance

Q. What are the vaccines that I may be able to receive from a community pharmacy, and do I have to pay for them?
A. This varies across the country and is controlled by the legislation of the state or territory. It also depends on your age, whether you are pregnant and your eligibility for vaccines funded under the National Immunisation Program (NIP). The summary table below provides a guide.*
COVID-19 vaccines: Refer to COVID-19 vaccine–specific resource 'COVID-19 vaccination from community pharmacy' that outlines which COVID-19 vaccines and age groups have been approved for vaccination in pharmacies or by pharmacists under the respective state/territory legislation and regulations.

State/Territory	Vaccines that can be administered by a pharmacist immuniser†	Who can receive vaccinations administered by a pharmacist?†	Is the vaccine free if I get it from a community pharmacy?‡	Would the same vaccine be free if I get it from a GP, local medical centre or an Aboriginal medical service?‡
Australian Capital Territory	Influenza	5 years and older	**Yes**, for people aged 65 years and older (NIP-funded); otherwise **No**	**Yes**, if you meet any condition for a NIP-funded dose – Refer to Notes
	Diphtheria-tetanus-pertussis (dTpa)	16 years and older	**No**	
	Measles-mumps-rubella (MMR)	16 years and older	**No**	**Yes**, for people born in 1966 and onwards (state-funded), or if you meet any condition for a NIP-funded dose – Refer to Notes
New South Wales	Influenza	5 years and older	**Yes**, if you meet any condition for a NIP-funded dose – Refer to	**Yes,** if you meet any condition for a NIP-funded dose – Refer to Notes

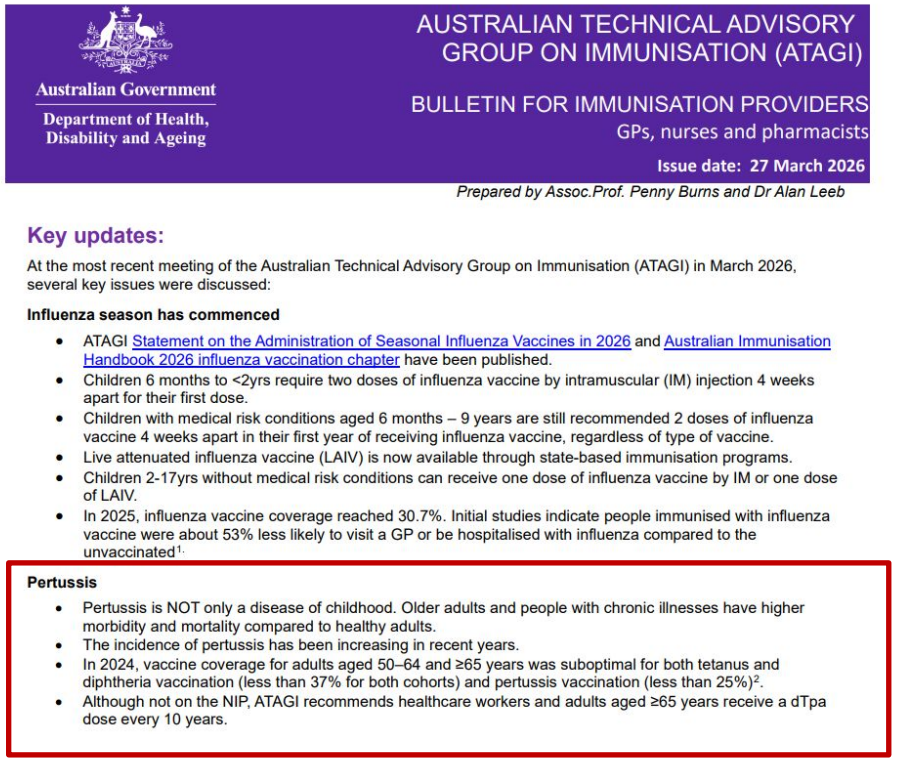
https://ncirs.org.au/sites/default/files/2025-03/Co-administration%20of%20vaccines%20for%20adults_March%202025.pdf

https://ncirs.org.au/sites/default/files/2023-02/NCIRS%20Information%20Sheet-%20Vaccines%20from%20community%20pharmacy_AtAGlance_Jan2023.pdf

Summary

IMMUNISATION COALITION

- There has been increased circulation of pertussis particularly since 2024
- Pertussis has significant morbidity in older adults; early diagnosis can reduce transmission and complications
- Pertussis vaccine is effective in preventing infection in older adults
- Pertussis vaccine is recommended for older adults if it has been more than 10 years since their last vaccine but is not funded on the NIP
- Uptake of pertussis containing vaccines in older adults is low (and less than Td vaccines)
- If indicated, health practitioners should consider offering pertussis vaccination to older adults at every opportunity to prevent infections and complications



Australian Government
Department of Health, Disability and Ageing

AUSTRALIAN TECHNICAL ADVISORY GROUP ON IMMUNISATION (ATAGI)

BULLETIN FOR IMMUNISATION PROVIDERS
GPs, nurses and pharmacists

Issue date: 27 March 2026

Prepared by Assoc.Prof. Penny Burns and Dr Alan Leeb

Key updates:

At the most recent meeting of the Australian Technical Advisory Group on Immunisation (ATAGI) in March 2026, several key issues were discussed:

Influenza season has commenced

- ATAGI Statement on the Administration of Seasonal Influenza Vaccines in 2026 and Australian Immunisation Handbook 2026 influenza vaccination chapter have been published.
- Children 6 months to <2yrs require two doses of influenza vaccine by intramuscular (IM) injection 4 weeks apart for their first dose.
- Children with medical risk conditions aged 6 months – 9 years are still recommended 2 doses of influenza vaccine 4 weeks apart in their first year of receiving influenza vaccine, regardless of type of vaccine.
- Live attenuated influenza vaccine (LAIV) is now available through state-based immunisation programs.
- Children 2-17yrs without medical risk conditions can receive one dose of influenza vaccine by IM or one dose of LAIV.
- In 2025, influenza vaccine coverage reached 30.7%. Initial studies indicate people immunised with influenza vaccine were about 53% less likely to visit a GP or be hospitalised with influenza compared to the unvaccinated[1].

Pertussis

- Pertussis is NOT only a disease of childhood. Older adults and people with chronic illnesses have higher morbidity and mortality compared to healthy adults.
- The incidence of pertussis has been increasing in recent years.
- In 2024, vaccine coverage for adults aged 50–64 and ≥65 years was suboptimal for both tetanus and diphtheria vaccination (less than 37% for both cohorts) and pertussis vaccination (less than 25%)[2].
- Although not on the NIP, ATAGI recommends healthcare workers and adults aged ≥65 years receive a dTpa dose every 10 years.