Government of **Western Australia**
Child and Adolescent Health Service

Changes to the childhood pneumococcal schedule

Prof Chris Blyth

20th November 2025

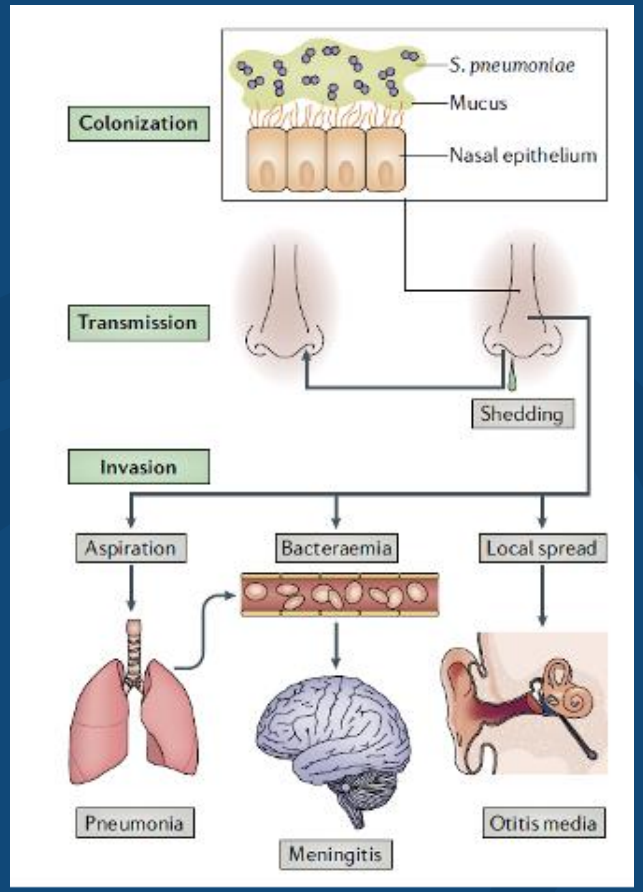
Compassion Excellence Collaboration Accountability Equity Respect

Overview

- Background
- Current epidemiology
- Program changes and updated childhood recommendations
- Transitional arrangements
- Rationale for some key policy decision
- Status on optimal schedule for pneumococcal vaccination for Australian adults

Pathogenesis of pneumococcal disease

Pathogenesis



Source: Weisser et al (2018)

- Causative agent: Bacterium *Streptococcus pneumonia* (Pneumococcus)
- Pneumococci commonly colonise the nasopharynx in children making them the primary carriers/transmitters of the disease.
- Transmission occurs via respiratory droplets
- Pneumococcus has an outer polysaccharide capsule which:
  - is a key virulence factor protecting the bacterium from the hosts immune system
  - defines the serotype (ST) (‘strains’)
  - is the main target for vaccine development
- There are over 100 different STs, however only a few cause most disease and it is these disease causing STs that are included in pneumococcal vaccines.
- Each serotype varies in invasive potential

Pneumococcal disease manifestations

Pneumococcal disease can be invasive or non-invasive:

- Invasive pneumococcal disease can include meningitis, bacteraemic pneumonia, & bacteraemia (severe but less common).
- Non-invasive disease can include pneumonia & otitis media (more common).

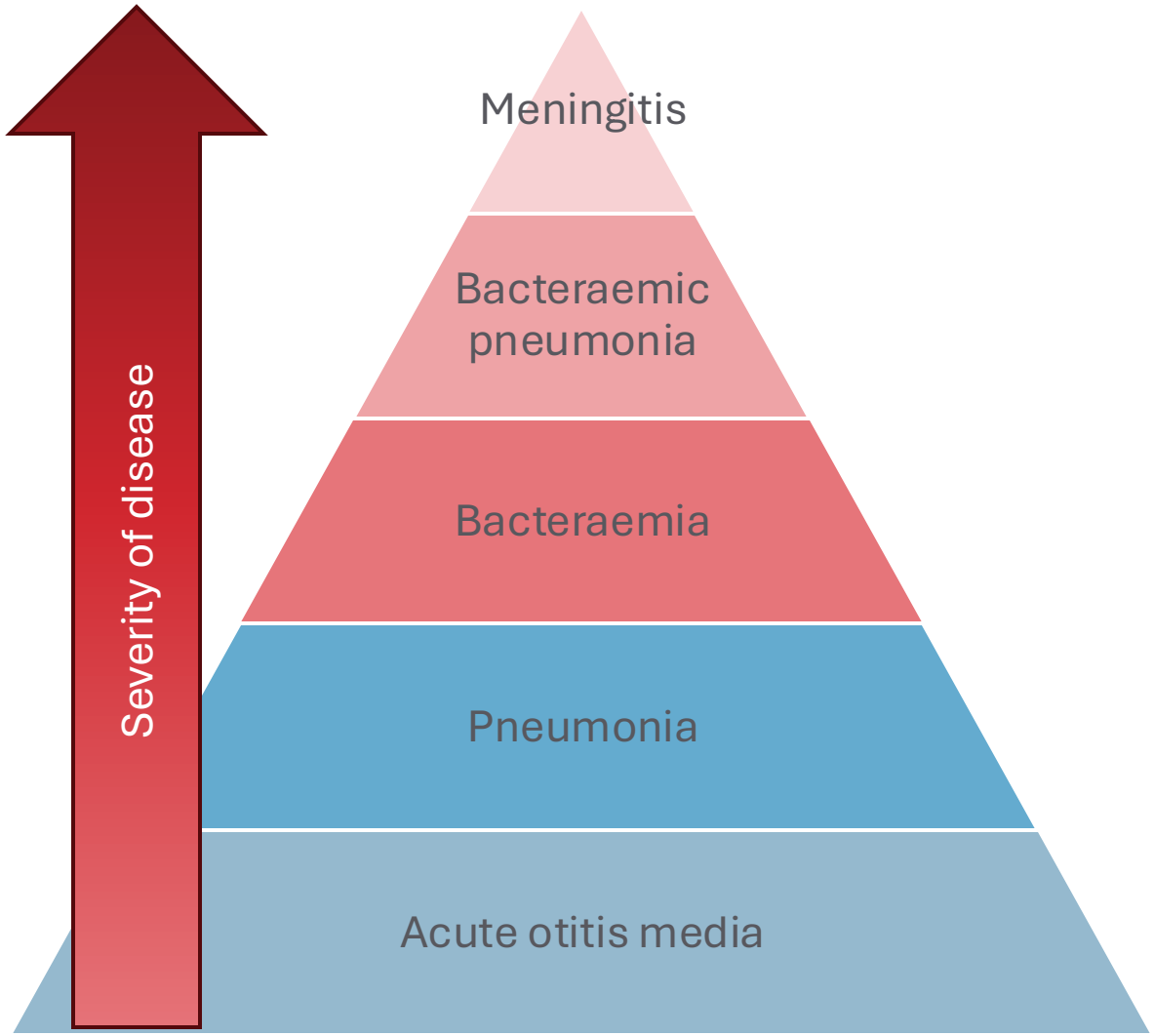
Viral respiratory illnesses and other medical and behavioural risk conditions predispose people to invasive pneumococcal disease (IPD).

Antecedent/concomitant viral infection in 2/3rd of cases in our study (Williams P et al PIDJ 2023)

It generally follows a season pattern with peaks in winter months.

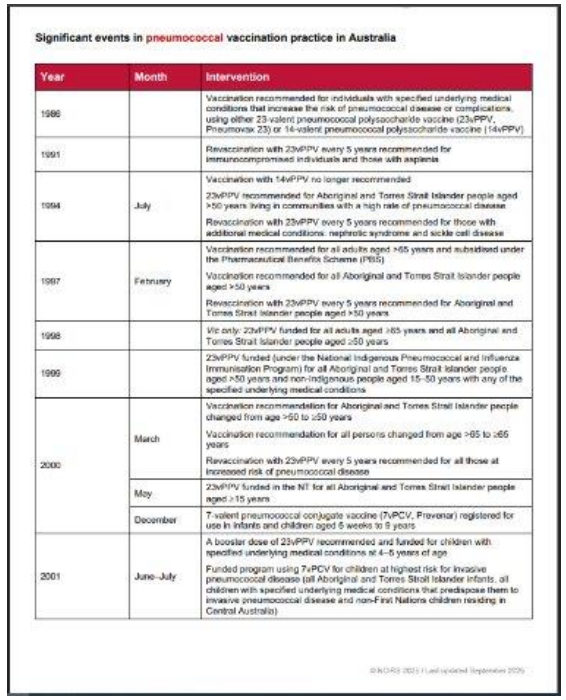
Globally causes around **1 in 10 of all deaths** in children aged less than 5 years.

In adults, it is the most common cause of hospitalisation for community acquired pneumococcal (CAP).



Source: Dagan et al (2021)

Significant events in childhood pneumococcal vaccination program



Significant events in pneumococcal vaccination practice in Australia

Year	Month	Intervention
1988		Vaccination recommended for individuals with specified underlying medical conditions that increase the risk of pneumococcal disease or complications, using either 23-valent pneumococcal polysaccharide vaccine (23vPPV, Pneumovax 23) or 14-valent pneumococcal polysaccharide vaccine (14vPPV)
1991		Revaccination with 23vPPV every 5 years recommended for immunocompromised individuals and those with asplenia
1994	July	Vaccination with 14vPPV no longer recommended 23vPPV recommended for Aboriginal and Torres Strait Islander people aged >50 years living in communities with a high rate of pneumococcal disease Revaccination with 23vPPV every 5 years recommended for those with additional medical conditions: nephrotic syndrome and sickle cell disease
1997	February	Vaccination recommended for all adults aged >65 years and subsidised under the Pharmaceutical Benefits Scheme (PBS) Vaccination recommended for all Aboriginal and Torres Strait Islander people aged >50 years Revaccination with 23vPPV every 5 years recommended for Aboriginal and Torres Strait Islander people aged >50 years
1998		*Vic only:* 23vPPV funded for all adults aged >65 years and all Aboriginal and Torres Strait Islander people aged ≥50 years
1999		23vPPV funded (under the National Indigenous Pneumococcal and Influenza Immunisation Program) for all Aboriginal and Torres Strait Islander people aged >50 years and non-Indigenous people aged 15–50 years with any of the specified underlying medical conditions
2000	March	Vaccination recommendation for Aboriginal and Torres Strait Islander people changed from age >50 to ≥50 years Vaccination recommendation for all persons changed from age >65 to ≥65 years Revaccination with 23vPPV every 5 years recommended for all those at increased risk of pneumococcal disease
	May	23vPPV funded in the NT for all Aboriginal and Torres Strait Islander people aged ≥15 years
	December	7-valent pneumococcal conjugate vaccine (7vPCV, Prevenar) registered for use in infants and children aged 6 weeks to 9 years
2001	June–July	A booster dose of 23vPPV recommended and funded for children with specified underlying medical conditions at 4–5 years of age Funded program using 7vPCV for children at highest risk for invasive pneumococcal disease (all Aboriginal and Torres Strait Islander infants, all children with specified underlying medical conditions that predispose them to invasive pneumococcal disease and non-First Nations children residing in Central Australia)

January 2001

First use of 7vPCV

Aboriginal and Torres Strait Islander children & children with risk conditions

January 2005

Publicly funded universal childhood 7vPCV program

- 3+0 was the schedule for majority of children
- Aboriginal and Torres Strait Islander children and those with risk conditions also received extra PCV and/or 23vPPV
- Over 90% coverage reached rapidly for PCV and maintained

July 2011

13vPCV replaced 7vPCV in childhood program

- 3+0 schedule continued
- Aboriginal and Torres Strait Islander children in certain jurisdictions used a 3+1 schedule
- Over 90% coverage maintained

July 2018

Schedule change from 3+0 to 2+1

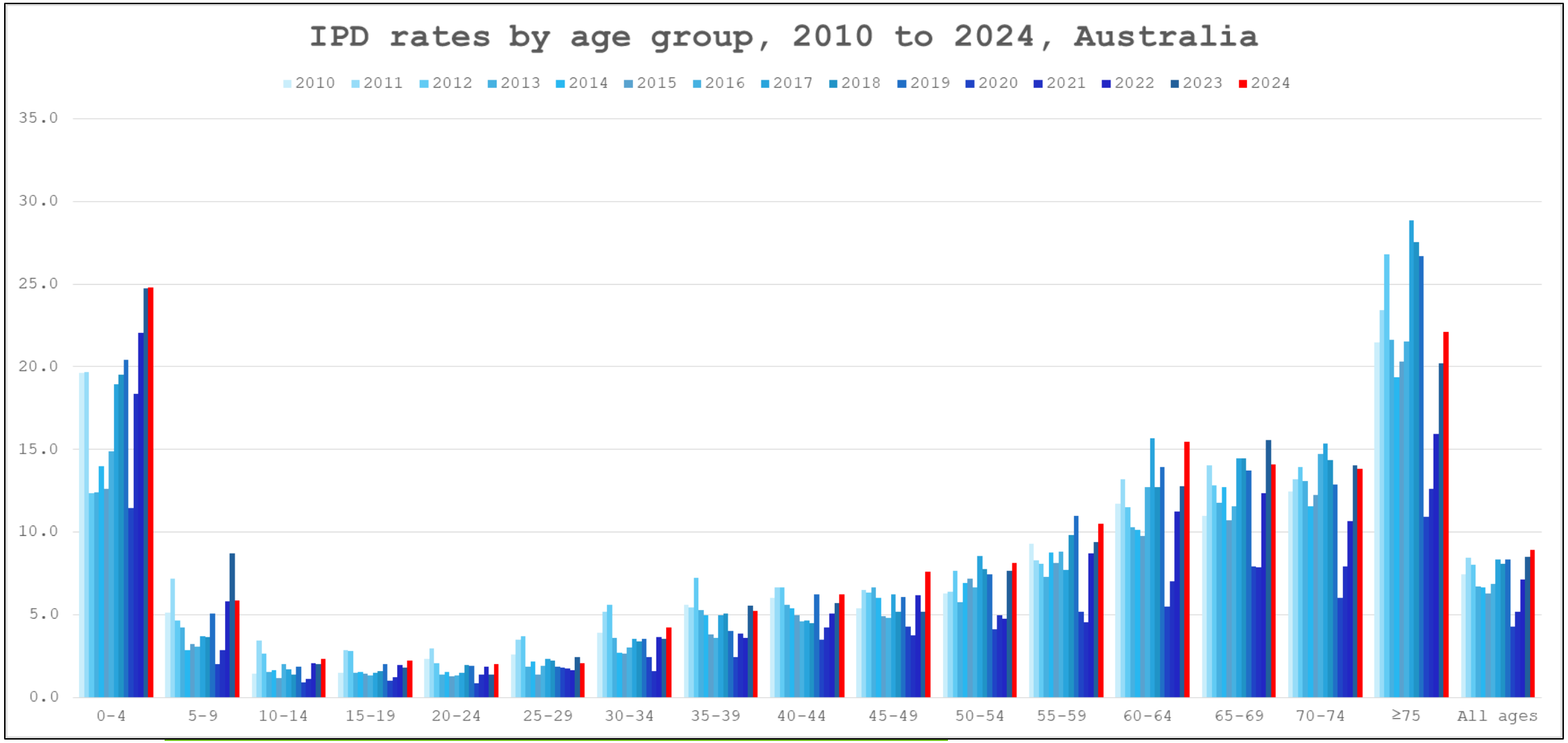
- To improve protection in 2nd year of life & address increasing breakthrough cases
- Better herd protection

September 2025

20vPCV replaced 13vPCV in childhood program

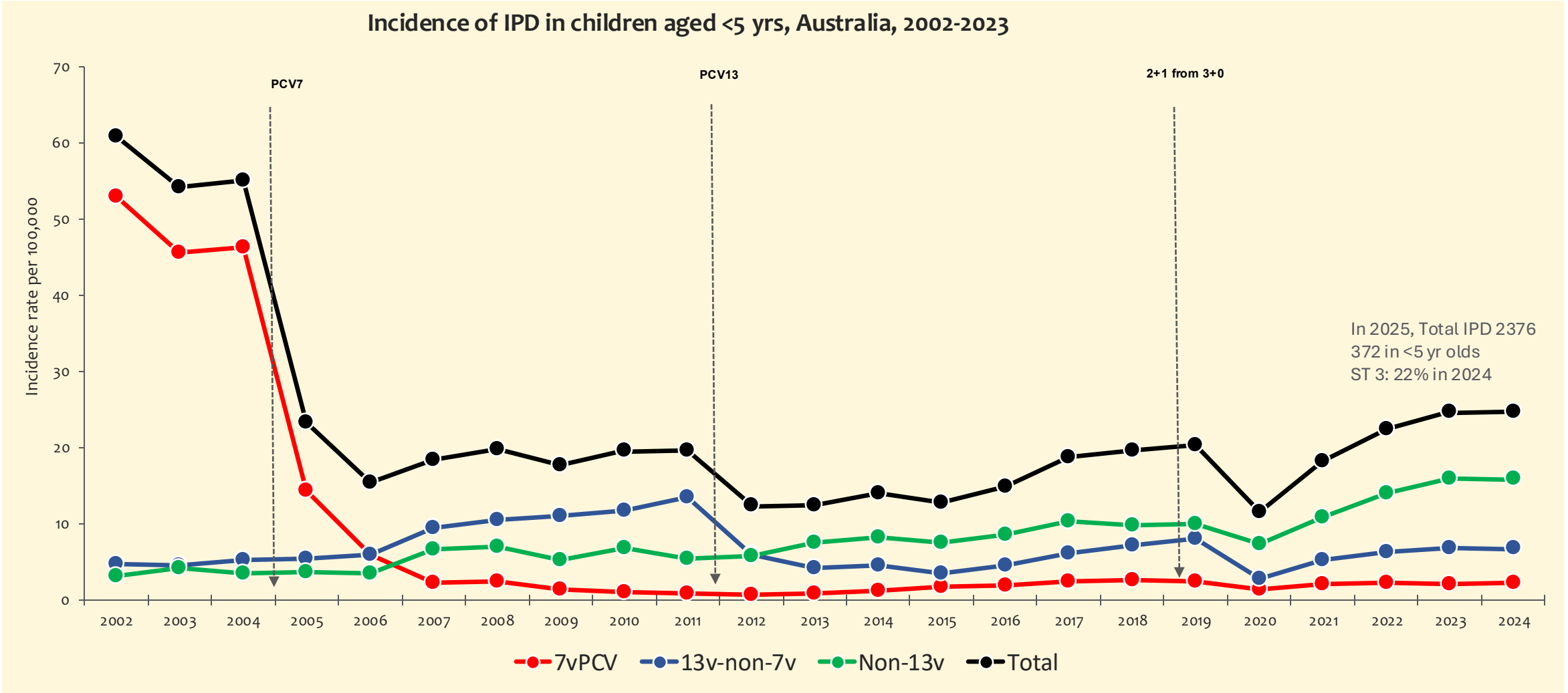
- To increase serotype coverage of protection

Pneumococcal disease risk varies by age



Source: NNDSS IPD notifications data

Impact: successive PCV programs on IPD in children in Australia



NNDSS IPD DATA 2015-2024 received on 29 May 2025

Risk factors for IPD

Risk Factor	IPD Incidence		HR	
	Count	Rate per 100,000 PY (95% CI)	Unadjusted (95% CI)	Adjusted (95% CI)
None identified	996	14.3 (13.4–15.2)	Reference	Reference
Respiratory disease	141	56.6 (48.0–66.8)	1.33 (1.03–1.71)	5.29 (4.02–6.97)
Heart disease	58	66.1 (51.1–85.5)	4.14 (3.18–5.39)	1.07 (0.78–1.47)
Kidney disease	26	47.0 (32.0–69.0)	2.78 (1.89–4.10)	1.61 (1.07–2.42)
Liver disease	17	441.2 (274.3–709.7)	24.04 (14.90–38.80)	12.78 (7.78–21.01)
Diabetes	2	32.4 (8.10–129.54)	1.41 (0.35–5.65)	Not calculated*
Immunosuppression	32	585.3 (413.9–827.7)	31.67 (22.29–44.99)	19.69 (13.47–28.79)
Asplenia or splenic dysfunction	14	494.6 (292.9–835.1)	27.88 (16.47–47.22)	26.41 (15.48–45.08)
Breach in CSF barrier	8	201.2 (100.6–402.3)	10.62 (5.30–21.89)	19.87 (9.83–40.16)
Down syndrome	11	173.2 (95.9–312.8)	10.68 (5.90–19.34)	2.36 (1.25–4.47)
Born less than 28 weeks gestation	6	20.3 (9.1–45.3)	1.12 (0.50–2.49)	Not calculated*
Previous IPD	9	104.4 (54.3–200.7)	6.59 (3.42–12.69)	3.51 (1.80–6.83)
Any risk factor	255	60.6 (53.6–68.6)	Not applicable	4.21 (3.59–4.94)

*Not included in multivariate model.

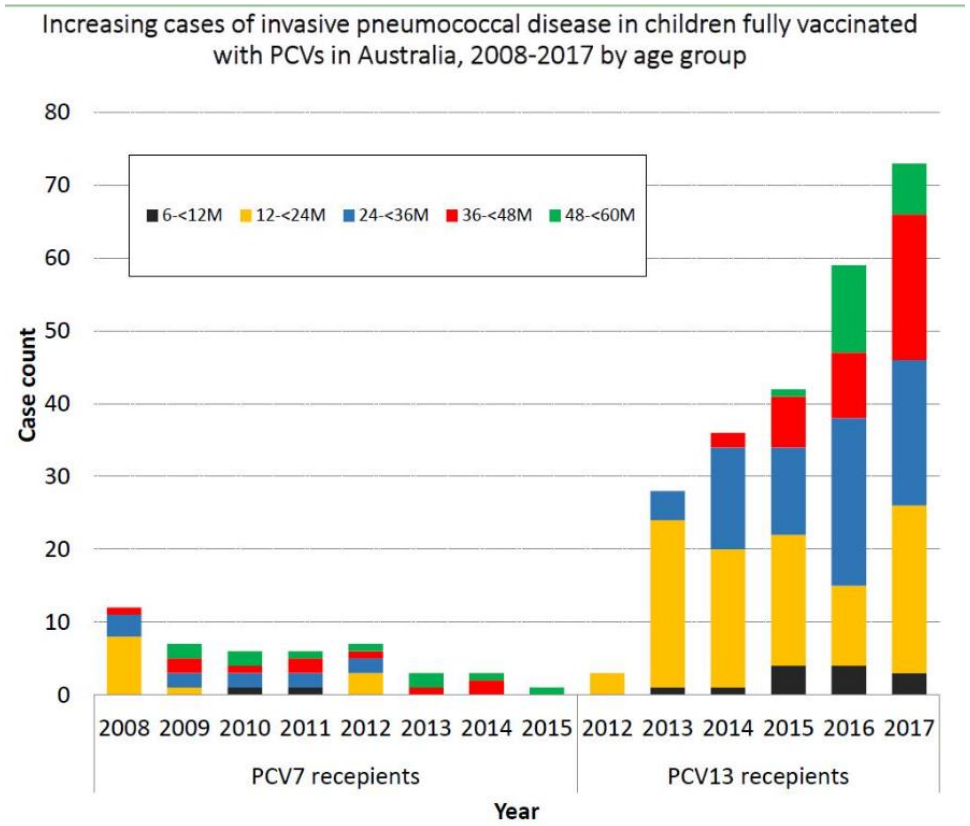
In NSW from 2001–2012, the prevalence of risk factors for pneumococcal disease in children was 6.8%.

Children with risk factors accounted for 1 in 5 cases of IPD (i.e. 20% of IPD cases had at least one RF).

The greatest risk was in those with immunosuppression, asplenia or had a breach in their CSF barrier.

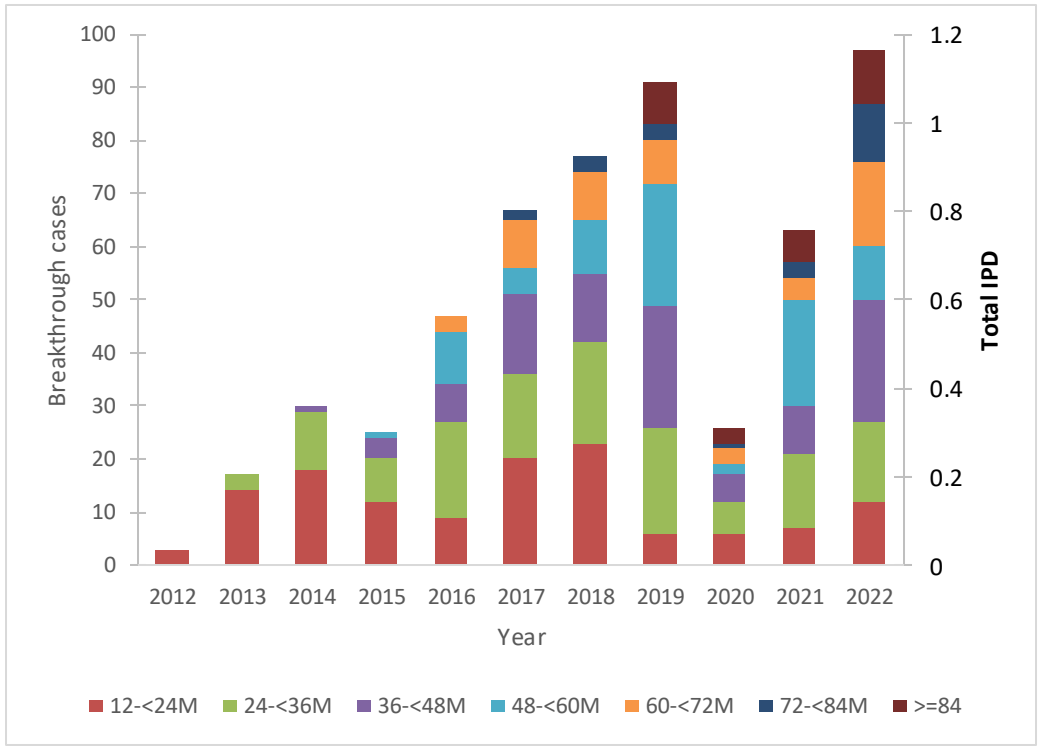
Source: Jayasinghe et al 2019

Impact of 2018 PCV schedule change from 3+0 to 2+1



- The majority of PCV13 vaccine failures occurred in older children
- There were 241 PCV13 failures from 2012 to 2017, and the **main serotypes responsible were 3 (n = 96 [40%]), 19A (n = 93 [39%]), and 19F (n = 46 [19%]).**

Blyth C et al *Clinical Infectious Diseases* (2020)



- Incidence rate of breakthrough IPD cases (when ST 3 was excluded) declined by 50% in 2+1 schedule eligible children compared to 3 +0 schedule eligible.
- **Most marked reduction was in 19A**

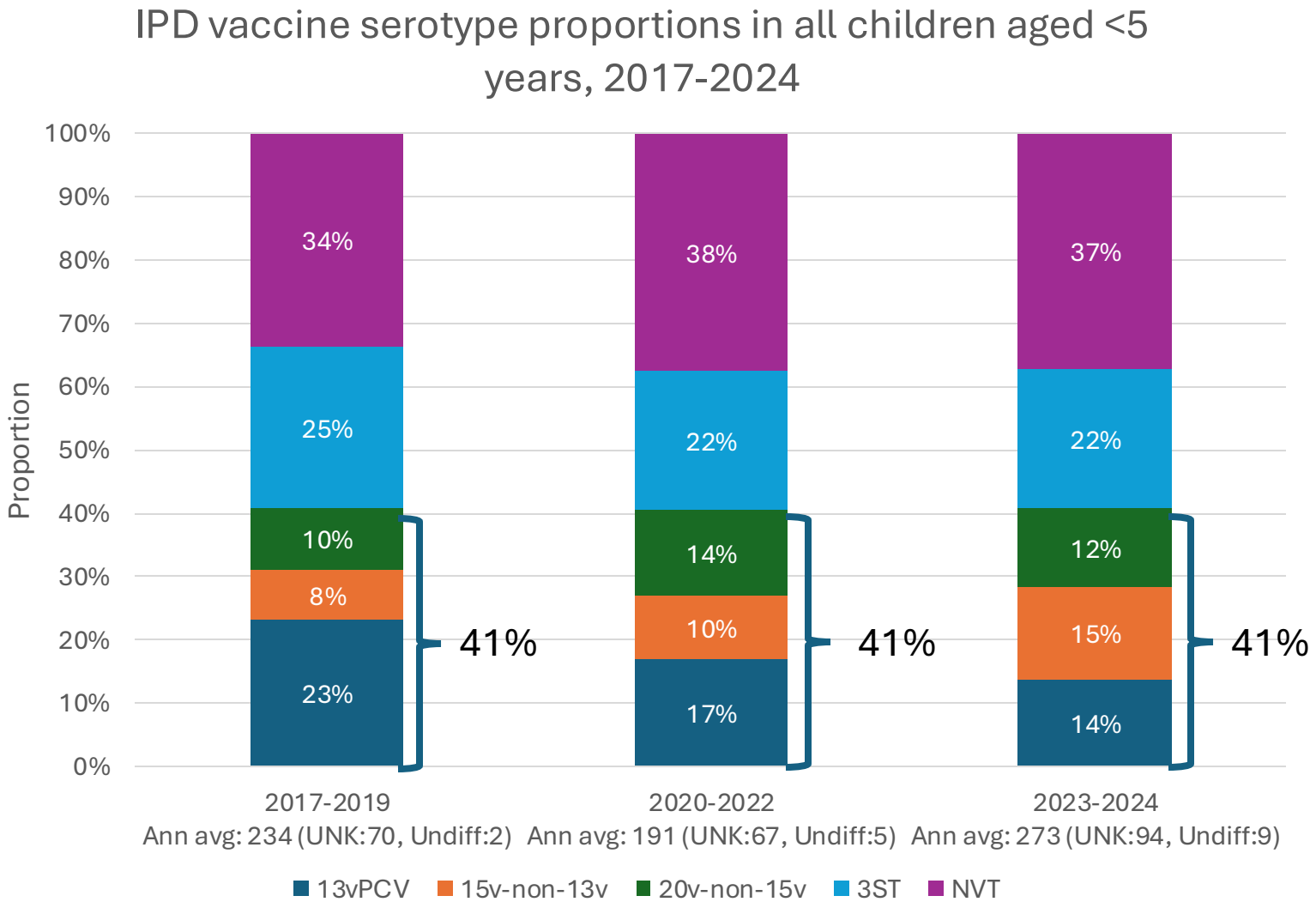
Jayasinghe S et al *Clinical Infectious Diseases* (2024)

Rationale for change from 13vpcv to 20vpcv

20vPCV covers 7 more serotypes than 13vPCV:

- In 2023-2023, 14% of IPD cases were covered by 13vPCV serotypes (excl. ST3) in children aged <5 years compared to 41% covered by 20vPCV (excl. ST3)
- In 2023-2024 would have been an additional 27% of cases potentially prevented by 20vPCV compared to 13vPCV

In those children who have already commenced their PCV schedule with 13vPCV, studies show it is safe to complete it with 20vPCV.

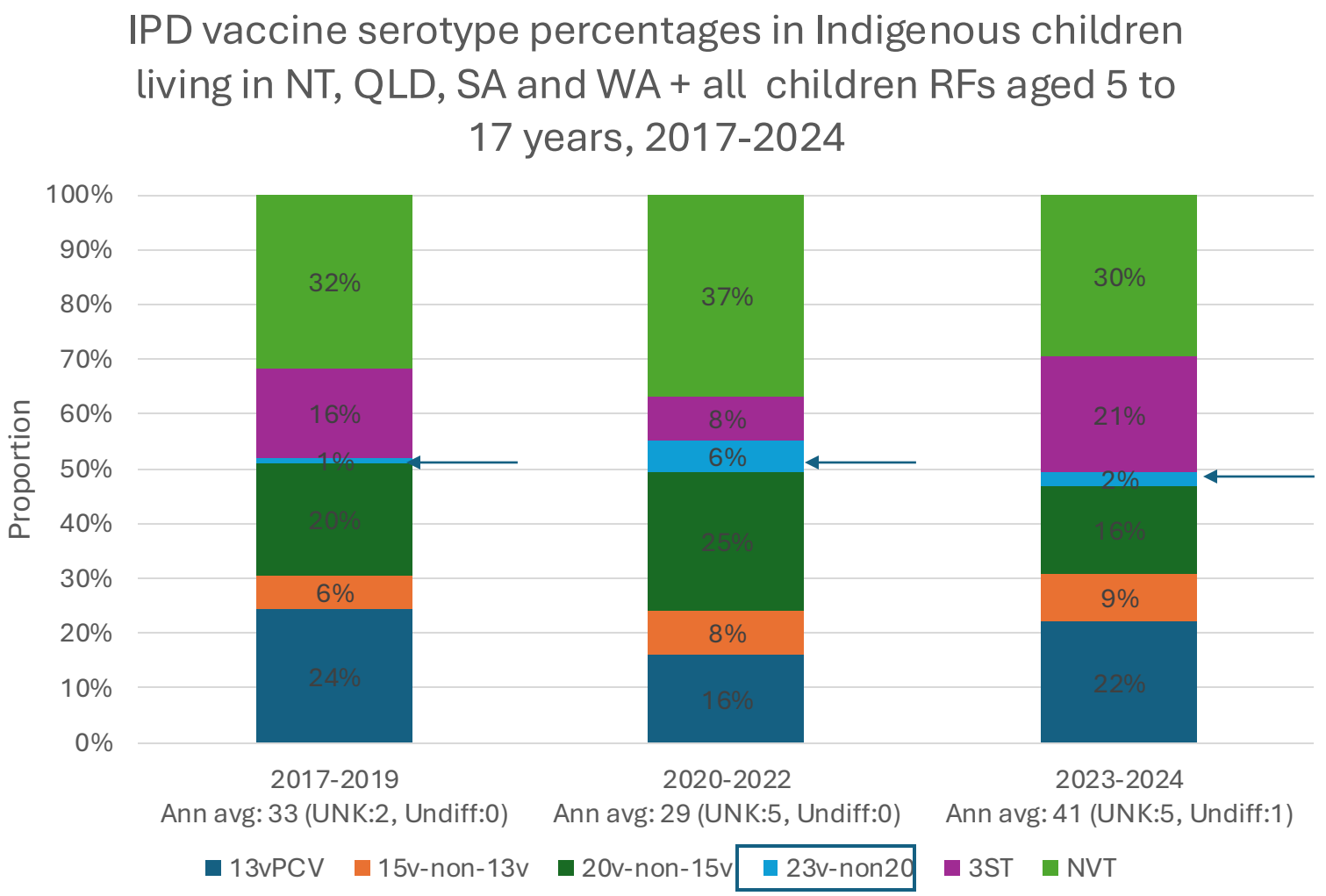


Source: analysis as presented by Dr Sanjay Jayasinghe (NNDSS IPD DATA 2015-2024 received on 29 May 2025)

Rationale for removal of 23vPPV from schedule

The proportion of additional cases due to the serotypes in 23vPPV and not in 20vPCV has remained small.

A single vaccine for all populations is also programmatically simpler.



Source: analysis as presented by Dr Sanjay Jayasinghe (NNDSS IPD DATA 2015-2024 received on 29 May 2025)

Pneumococcal childhood schedule changes: 13vPCV/23vPPV replaced by 20vPCV

The only pneumococcal vaccine for children aged less than 18 years is 20vPCV.

From 1 September 2025, all doses of PCV given to children should be 20vPCV.

13vPCV and 23vPPV are only to be used in people aged 18 years and over.

Pneumococcal childhood schedule changes: 13vPCV/23vPPV replaced by 20vPCV

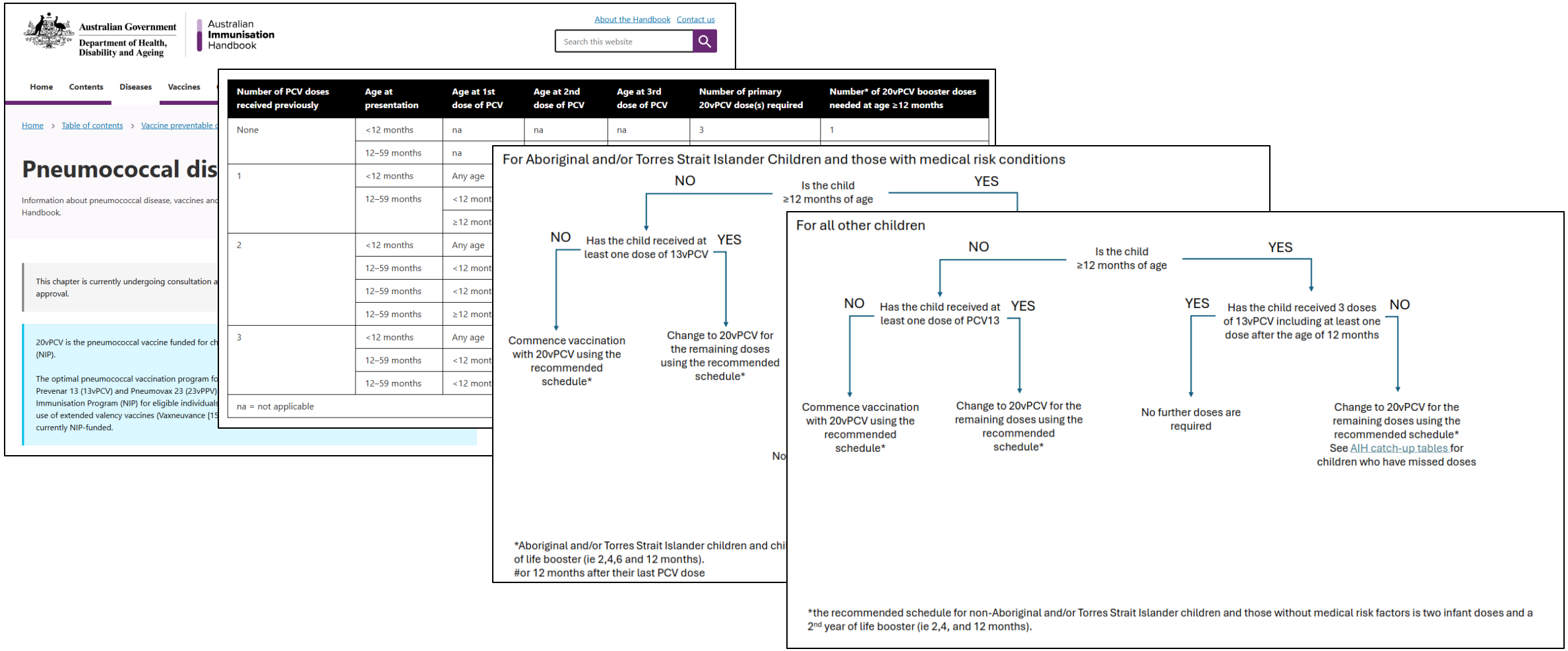
The booster dose of 20vPCV (the one given after 12 months of age) is the most important dose for sustained protection

The transitional recommendations are temporary – ie use of 23vPPV and a preschool booster is being phased out

Use the handbook, AIH tables and WA health flow charts for catch up programs

KEY PRINCIPLES

Pneumococcal childhood schedule changes: 13vPCV/23vPPV replaced by 20vPCV



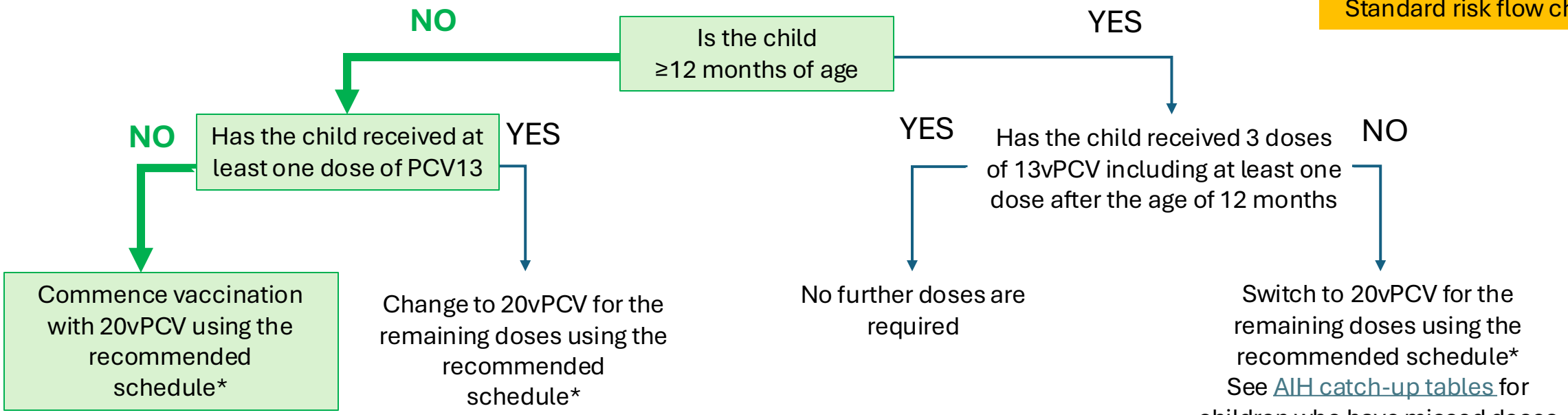
Pneumococcal childhood schedule changes: non-Indigenous children without risk conditions

Population	Previous recommendation	Current recommendation	Recommended interval
Non-Indigenous children without risk conditions	3 doses of PCV	3 doses of PCV	2, 4, and 12 months

Pneumococcal childhood schedule changes: non-Indigenous children without risk conditions

Population	Previous recommendation	Current recommendation	Recommended interval
Non-Indigenous children without risk conditions	3 doses of PCV	3 doses of PCV	2, 4, and 12 months

Standard risk flow chart



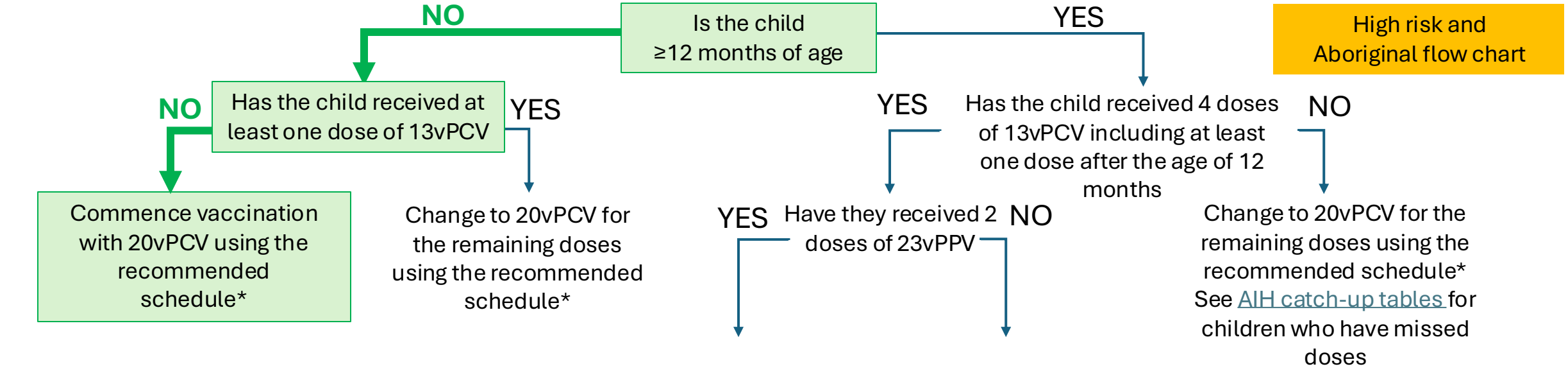
*the recommended schedule for non-Aboriginal and/or Torres Strait Islander children and those without medical risk factors is two infant doses and a 2nd year of life booster (ie 2,4, and 12 months).

Pneumococcal childhood schedule changes: Aboriginal and Torres Strait Islander children

Population	Previous recommendation	Current recommendation	Recommended interval
Aboriginal and Torres Strait Islander children in NT, QLD, WA and SA	4 doses of PCV	4 doses of PCV	2, 4, 6 and 12 months

Pneumococcal childhood schedule changes: Aboriginal and Torres Strait Islander children

Population	Previous recommendation	Current recommendation	Recommended interval
Aboriginal and Torres Strait Islander children in NT, QLD, WA and SA	4 doses of PCV	4 doses of PCV	2, 4, 6 and 12 months



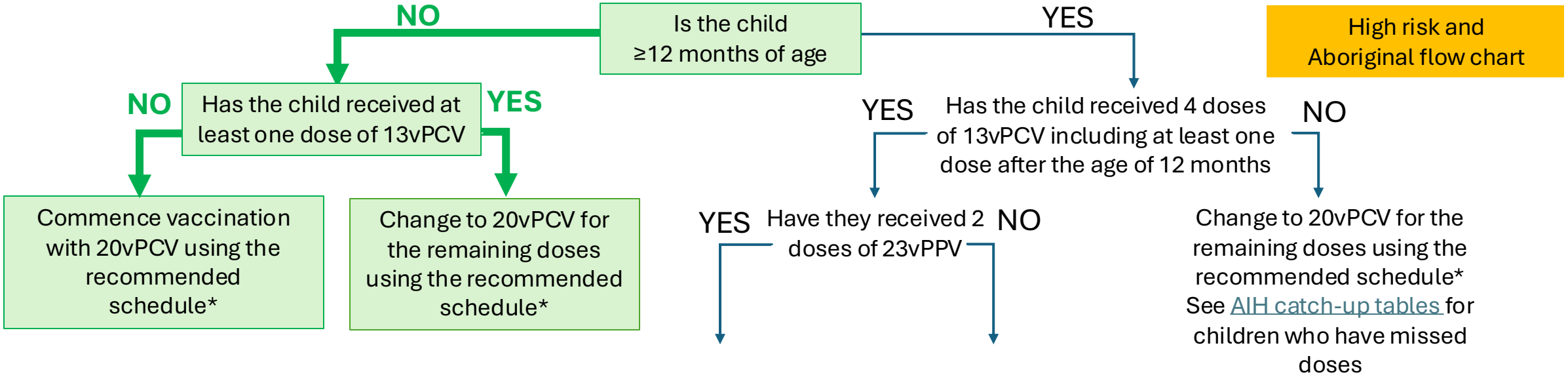
*Aboriginal and/or Torres Strait Islander children and children with medical risk factors, the recommended schedule is three infant doses and a 2nd year of life booster (ie 2,4,6 and 12 months).
#or 12 months after their last PCV dose

Pneumococcal childhood schedule changes: Children and adolescents with risk conditions

Population	Previous recommendation	Current recommendation	Recommended interval
Children aged <12 months with a risk condition	4 doses of PCV	4 doses of PCV	2, 4, 6 and 12 months

Pneumococcal childhood schedule changes: Children and adolescents with risk conditions

Population	Previous recommendation	Current recommendation	Recommended interval
Children aged <12 months with a risk condition	4 doses of PCV	4 doses of PCV	2, 4, 6 and 12 months



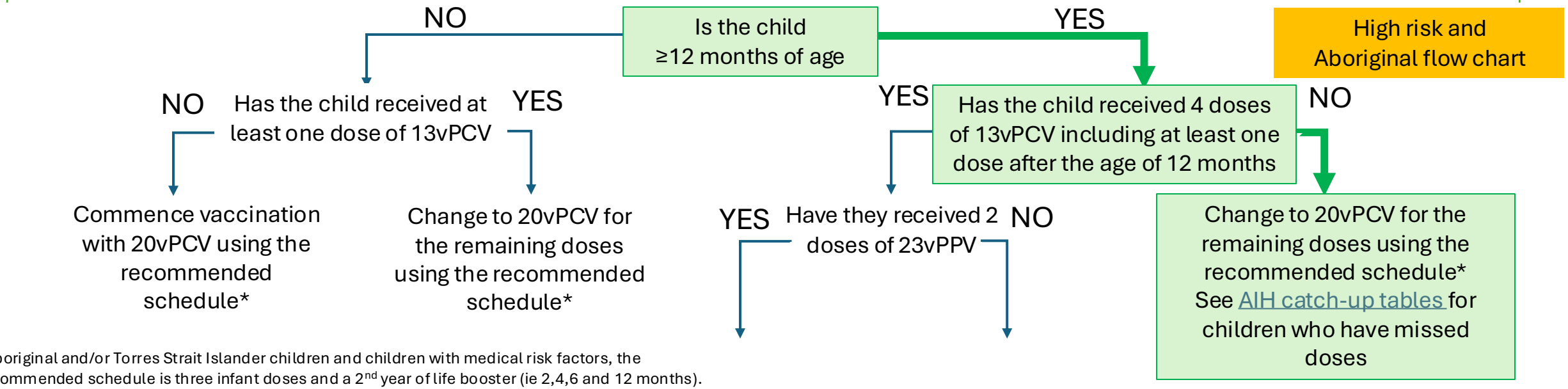
*Aboriginal and/or Torres Strait Islander children and children with medical risk factors, the recommended schedule is three infant doses and a 2nd year of life booster (ie 2,4,6 and 12 months).
#or 12 months after their last PCV dose

Pneumococcal childhood schedule changes: Children and adolescents with risk conditions

Population	Previous recommendation	Current recommendation	Recommended interval
Children and adolescents aged ≥12 months to <18 years	A dose of PCV at diagnosis	A dose of PCV at diagnosis	If PCV → PCV, then ≥2 months If PPV → PCV, then ≥12 months

Pneumococcal childhood schedule changes: Children and adolescents with risk conditions

Population	Previous recommendation	Current recommendation	Recommended interval
Children and adolescents aged ≥12 months to <18 years	A dose of PCV at diagnosis	A dose of PCV at diagnosis	If PCV → PCV, then ≥2 months If PPV → PCV, then ≥12 months



*Aboriginal and/or Torres Strait Islander children and children with medical risk factors, the recommended schedule is three infant doses and a 2nd year of life booster (ie 2,4,6 and 12 months).
#or 12 months after their last PCV dose

Catch up schedule for 20vPCV for Aboriginal and Torres Strait Islander children and all children with risk conditions for pneumococcal disease

Number of PCV doses received previously	Age at presentation	Age at 1st dose of PCV	Age at 2nd dose of PCV	Age at 3rd dose of PCV	Number of primary 20vPCV doses required	Number of 20vPCV booster doses needed at age ≥ 12 months
None	<12 months	na	na	na	3	1
	12-59 months	na	na	na	1	1
1	<12 months	Any age	na	na	2	1
	12-59 months	<12 months	na	na	1	1
		≥12 months	na	na	None	1
2	<12 months	Any age	Any age	na	1	1
	12-59 months	<12 months	<12 months	na	1	1
	12-59 months	<12 months	≥12 months	na	None	1
	12-59 months	≥12 months	≥12 months	na	None	None*
3	<12 months	Any age	Any age	Any age	None	1
	12-59 months	<12 months	<12 months	Any age	None	1
	12-59 months	<12 months	≥12 months	≥12 months	None	None*

*see flow chart

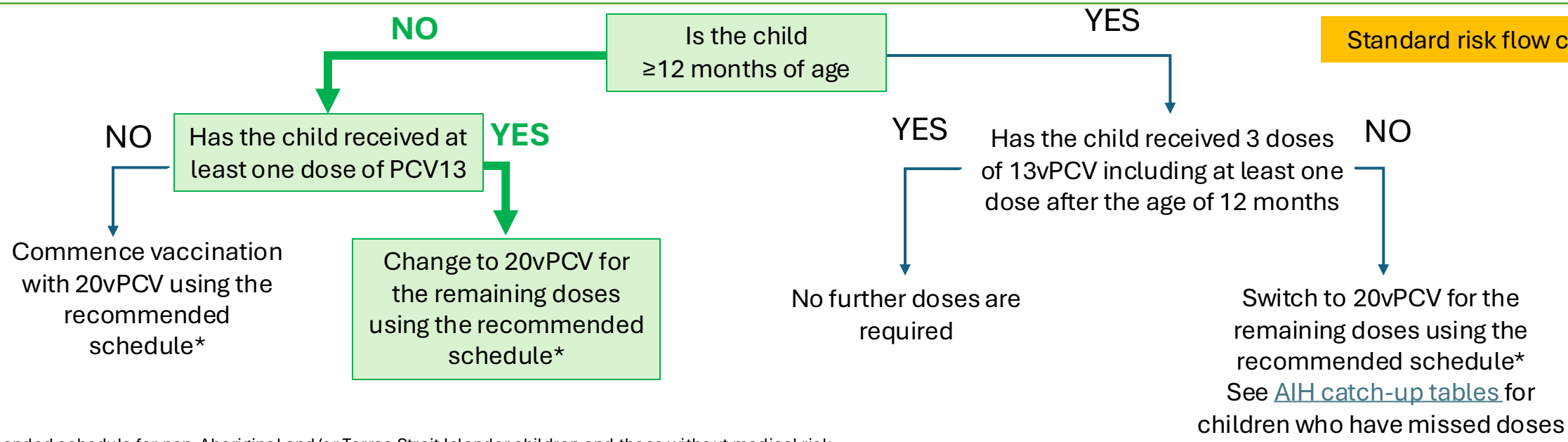
Pneumococcal childhood schedule transitional arrangements: 20vPCV replacing 13vPCV

Population	Previous pneumococcal vaccine/s	Recommended dose	Recommended interval	Is the dose NIP-funded?
Non-Indigenous children without risk conditions	Have not completed their 2+1 or 3+1 dose PCV schedule	**Current recommendation:** Replace future doses of 13vPCV with 20vPCV	2,4 and 12 months or 2, 4, 6 and 12 months	Yes
Aboriginal and Torres Strait Islander children				
Children with a risk condition				

Pneumococcal childhood schedule transitional arrangements: 20vPCV replacing 13vPCV

Population	Previous pneumococcal vaccine/s	Recommended dose	Recommended interval	Is the dose NIP-funded?
	Have <u>not</u> completed their 2+1 or 3+1 dose PCV schedule	**Current recommendation:** Replace future doses of 13vPCV with 20vPCV	2,4 and 12 months or 2, 4, 6 and 12 months	Yes

Standard risk flow chart

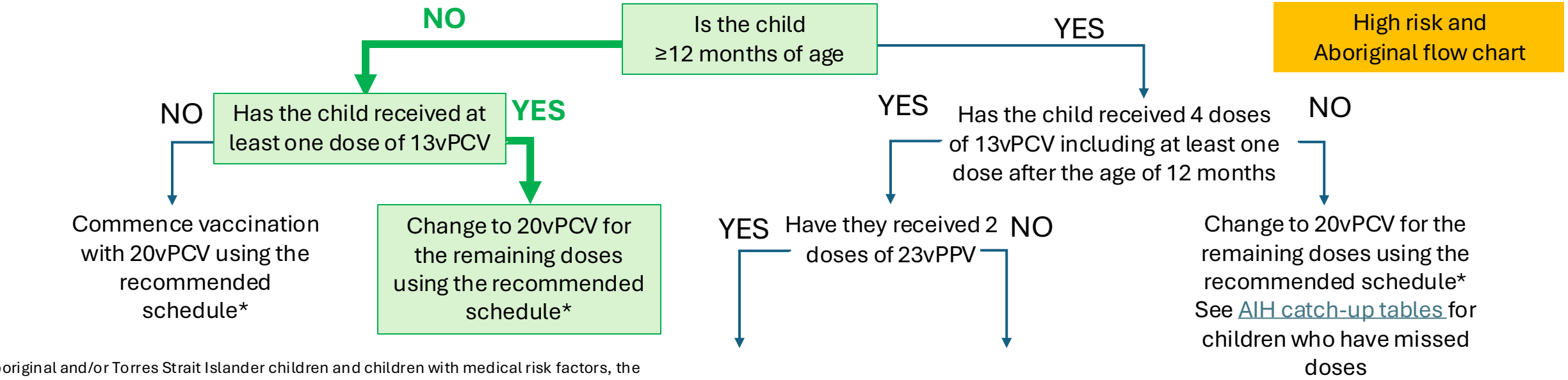


*the recommended schedule for non-Aboriginal and/or Torres Strait Islander children and those without medical risk factors is two infant doses and a 2nd year of life booster (ie 2,4, and 12 months).

KEY PRINCIPLES

Pneumococcal childhood schedule transitional arrangements: 20vPCV replacing 13vPCV

Population	Previous pneumococcal vaccine/s	Recommended dose	Recommended interval	Is the dose NIP-funded?
	Have <u>not</u> completed their 2+1 or 3+1 dose PCV schedule	**Current recommendation:** Replace future doses of 13vPCV with 20vPCV	2,4 and 12 months or 2, 4, 6 and 12 months	Yes



*Aboriginal and/or Torres Strait Islander children and children with medical risk factors, the recommended schedule is three infant doses and a 2nd year of life booster (ie 2,4,6 and 12 months).
#or 12 months after their last PCV dose

Pneumococcal childhood schedule transitional arrangements: 20vPCV replacing 13vPCV

Population	Previous pneumococcal vaccine/s	Recommended dose	Recommended interval	Is the dose NIP-funded?
Aboriginal and Torres Strait Islander children in NT, QLD, WA and SA	Completed their PCV schedule with 13vPCV or 15vPCV	**Previous recommendation:** dose 1 of 2 doses of 23vPPV **Current recommendation:** a single dose of 20vPCV and then their schedule will be complete	At 4 years of age or 12 months after their PCV dose, whichever is later	Yes
Children with a risk condition				

Pneumococcal childhood schedule transitional arrangements: 20vPCV replacing 13vPCV

Population	Previous pneumococcal vaccine/s	Recommended dose	Recommended interval	Is the dose NIP-funded?
Aboriginal and Torres Strait Islander children in NT, QLD, WA and SA	Completed their PCV schedule with 13vPCV or 15vPCV and **already received a single dose of 23vPPV**	**Previous recommendation:** dose 2 of 2 doses of 23vPPV A single dose of 20vPCV and then their schedule will be complete	At least 5 years after the 23vPPV dose or12 months after their PCV dose, whichever is later	Yes
Children with a risk condition				

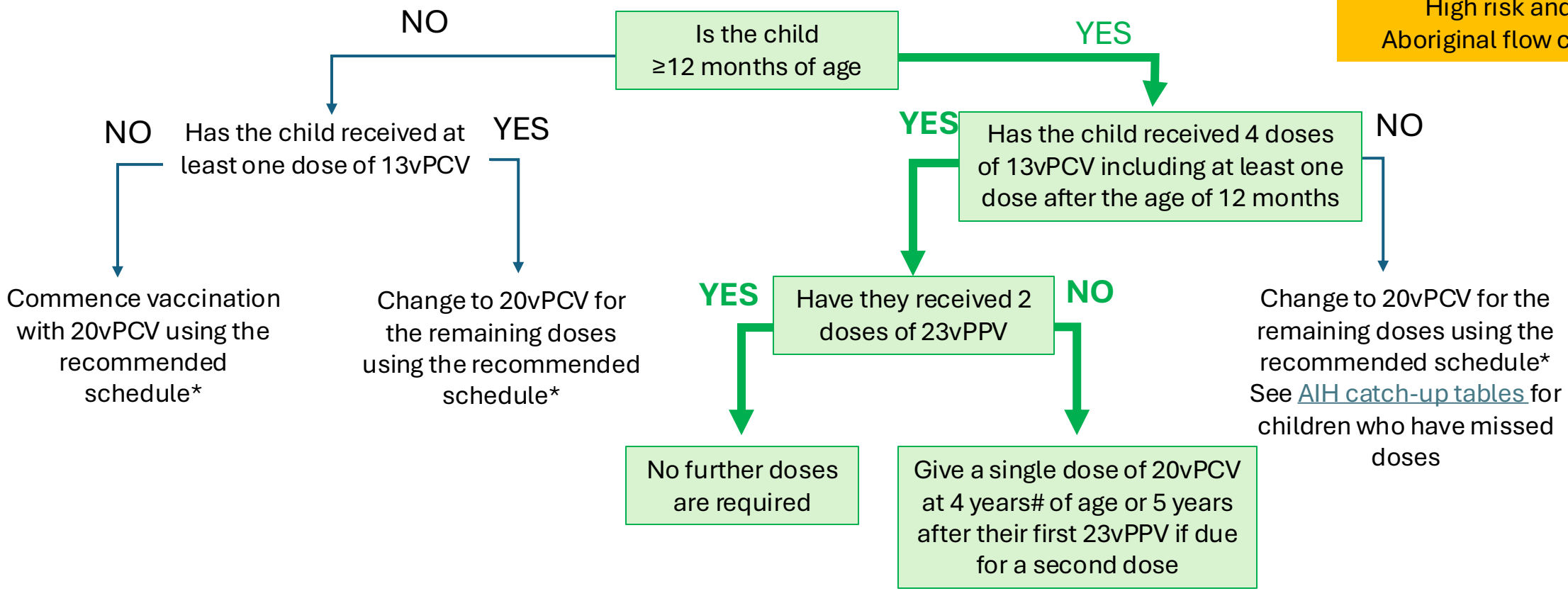
Pneumococcal childhood schedule transitional arrangements: 20vPCV replacing 13vPCV

Population	Previous pneumococcal vaccine/s	Recommended dose	Recommended interval	Is the dose NIP-funded?
Aboriginal and Torres Strait Islander children in NT, QLD, WA and SA	Completed their PCV schedule with 13vPCV or 15vPCV and 2 doses of 23vPPV	**None** – no supplementary doses of 20vPCV are recommended	N/A	N/A
Children with a risk condition				
Aboriginal and Torres Strait Islander children in NSW, ACT, Vic and Tas	Completed their PCV schedule with 13vPCV or 15vPCV			

KEY PRINCIPLES

Pneumococcal childhood schedule transitional arrangements: 20vPCV replacing 13vPCV

High risk and Aboriginal flow chart




141

The KIDS RESEARCH INSTITUTE AUSTRALIA

WESFARMERS CENTRE OF VACCINES & INFECTIOUS DISEASES

2025 Retreat