Quarterly report

Invasive Pneumococcal Disease Surveillance, 1 April to 30 June 2017

Kate Pennington and the Enhanced Invasive Pneumococcal Disease Surveillance Working Group, for the Communicable Diseases Network Australia

Summary

The number of notified cases of invasive pneumococcal disease (IPD) in the second quarter of 2017 was greater than the previous quarter and also the second quarter of 2016. Following the July 2011 replacement of the 7-valent pneumococcal conjugate vaccine (7vPCV) in the childhood immunisation program with the 13-valent pneumococcal conjugate vaccine (13vPCV), there was an initial relatively rapid decline in disease due to the additional six serotypes covered by the 13vPCV across all age groups, however more recently this rate of decline has slowed. Additionally, over this period the number of cases due to the eleven serotypes additionally covered by the 23-valent pneumococcal polysaccharide vaccine (23vPPV) and also those serotypes not covered by any available vaccine has been increasing steadily across all age groups

Key points

In the second quarter of 2017, there were 495 cases of IPD reported to the National Notifiable Disease Surveillance System (NNDSS). This represented an almost doubling in cases (n=250) compared to the number of cases notified in the previous quarter, however, compared to the same quarter in 2016 there was only a 14% increase in the number of cases (n=436) (Table 1). This increase tended to be consistent with the seasonal increase in cases observed in quarters two and three each year (Figure 1). In the second quarter of 2017, the most common pneumococcal serotypes causing IPD were 3 (14%), 22F (8%) and 19A (6%) (Table 2).

Among non-Indigenous Australians this quarter, the number of notified cases continued to be highest in children aged less than 5 years and older adult age groups, particularly those aged 60 years or older (Table 3). Among Indigenous Australians, cases were highest in children aged less than 5 years, and the 45-59 years age groups. The proportion of cases reported as Indigenous Australians this quarter (8%; 41/495) was lower compared to the proportion observed in the previous quarter (12%; 29/250), and similar compared to the proportion reported in the second quarter of 2016 (7%; 32/436).

In children aged less than 5 years, there were 86 cases of IPD reported, representing 17% of all cases reported in this quarter. The proportion of cases notified in this age group was lower in this reporting period when compared with the previous quarter (19%; 47/250), and similar compared to the proportion reported in the second quarter of 2016 (16%; 70/436). Of those cases with a known serotype reported this quarter, 49% (25/51) were due to a serotype included in the 13vPCV, compared with 33% (11/33) of cases in the previous quarter and 40% (23/57) in the second quarter of 2016 (Figure 2). During this quarter the main serotypes affecting this age group were 3 (27%; 14/51), followed by 19A (10%; 5/51) and 19F (10%; 5/51) (Table 2). All of these serotypes are included in the 13vPCV.

In the first quarter of 2017, there were 21 cases reported in fully vaccinated children aged less than 5 years who were considered to be 13vPCV

failures. These 13vPCV failures were due to serotypes 3 (n=13), 19A (n=5), 19F (n=2) and 18C (n=1) (Table 4).

Among Indigenous Australians aged 50 years and over, there were 18 cases of IPD reported this quarter. Of those cases with a reported serotype (n=15), eight (53%) were due to a serotype included in the 23vPPV and overall there was no particular serotype dominant (Figure 3). The number of notified cases of IPD in this age group was less than the number of cases reported in the previous quarter (n=11), but similar to the number reported in the second quarter of 2016 (n=19).

Among non-Indigenous Australians* aged 65 years and over there were 184 cases of IPD reported this quarter. The number of notified cases of IPD in this age group was more than two-times the number of cases reported in the previous quarter (n=80) and 16% higher than the number reported in the second quarter of 2016 (n=158). Of those cases with a reported serotype (n=169), almost two-thirds (62%; 105/169) were due to a serotype included in the 23vPPV (Figure 4), which was similar to the proportion in the previous quarter (60%; 47/78). For this quarter, serotypes 3 (n=25), 22F (n=22) and 23A (n=16) were the most common serotypes for this population group, noting that only serotypes 3 and 22F are included in the 23vPPV.

During this quarter there were 35 deaths attributed to a variety of IPD serotypes, with serotypes 3 (n=7) and 11A (n=4) the most common. Almost all of the reported deaths (91%; n=32) occurred in non-Indigenous Australians*. The median age of those cases who died was 74 years (range 1 to 94 years).

Notes

The data in this report are provisional and subject to change as laboratory results and additional case information become available. More detailed data analysis of IPD in Australia and surveillance methodology are described in the IPD annual report series published in *Communicable Diseases Intelligence*.

In Australia, pneumococcal vaccination is recommended as part of routine immunisation for children, individuals with specific underlying conditions associated with increased risk of IPD and older Australians. More information on the scheduling of the pneumococcal vaccination can be found on the Immunise Australia Program website (www.immunise.health.gov.au).

In this report, a 'vaccine failure' is reported when a child aged less than 5 years is diagnosed with IPD due to a serotype found in the 13vPCV and they have received 3 primary scheduled doses of 13vPCV at least 2 weeks prior to disease onset with at least 28 days between doses of vaccine.

There are 3 pneumococcal vaccines available in Australia, each targeting multiple serotypes (Table 5). Note that in this report serotype analysis is generally grouped according to vaccine composition.

Follow-up of all notified cases of IPD is undertaken in all states and territories except New South Wales and Victoria who conduct targeted follow-up of notified cases aged under 5 years, and 50 years or over for enhanced data. Follow-up of notified cases of IPD in Queensland is undertaken in all areas except Metro South and Gold Coast Public Health Units who conduct targeted follow-up of notified cases for those aged under 5 years only. However, in these areas where targeted case follow-up is undertaken, some enhanced data may also be available outside these targeted age groups.

Acknowledgements

Report prepared with the assistance of Mr Mark Trungove and Ms Rachael Corvisy on behalf of the Enhanced Invasive Pneumococcal Disease Surveillance Working Group.

Enhanced Invasive Pneumococcal Disease Surveillance Working Group contributors to this report include (in alphabetical order): Frank

* Non-Indigenous Australians includes cases reported with as non-Indigenous, not stated, blank or unknown.

Beard (National Centre for Immunisation Research and Surveillance), Heather Cook (Northern Territory and Secretariat), Lucinda Franklin (Victoria), Carolien Giele (Western Australia), Robin Gilmour (New South Wales), Michelle Harlock (Tasmania), Ben Howden (Microbiological Diagnostic Unit, University of Melbourne), Sanjay Jayasinghe (National Centre for Immunisation Research and Surveillance), Vicki Krause (Northern Territory, Chair), Shahin Oftadeh (Centre for Infectious Diseases and Microbiology Laboratory Services, New South Wales Health Pathology), Sue Reid (Australian Capital Territory), Vitali Sintchenko (Centre for Infectious Diseases and Microbiology- Public Health, Westmead Hospital), Helen Smith (Queensland Health Forensic and Scientific Services), Janet Strachan (Victoria), Hannah Vogt (South Australia), Angela Wakefield (Queensland).

Author details

Corresponding author: Kate Pennington, Communicable Disease Epidemiology and Surveillance Section , Office of Health Protection, Australian Government Department of Health, GPO Box 9484, MDP 14, Canberra, ACT 2601. Telephone: +61 2 6289 2725. Facsimile: +61 2 6289 1070. Email: cdess@health.gov.au

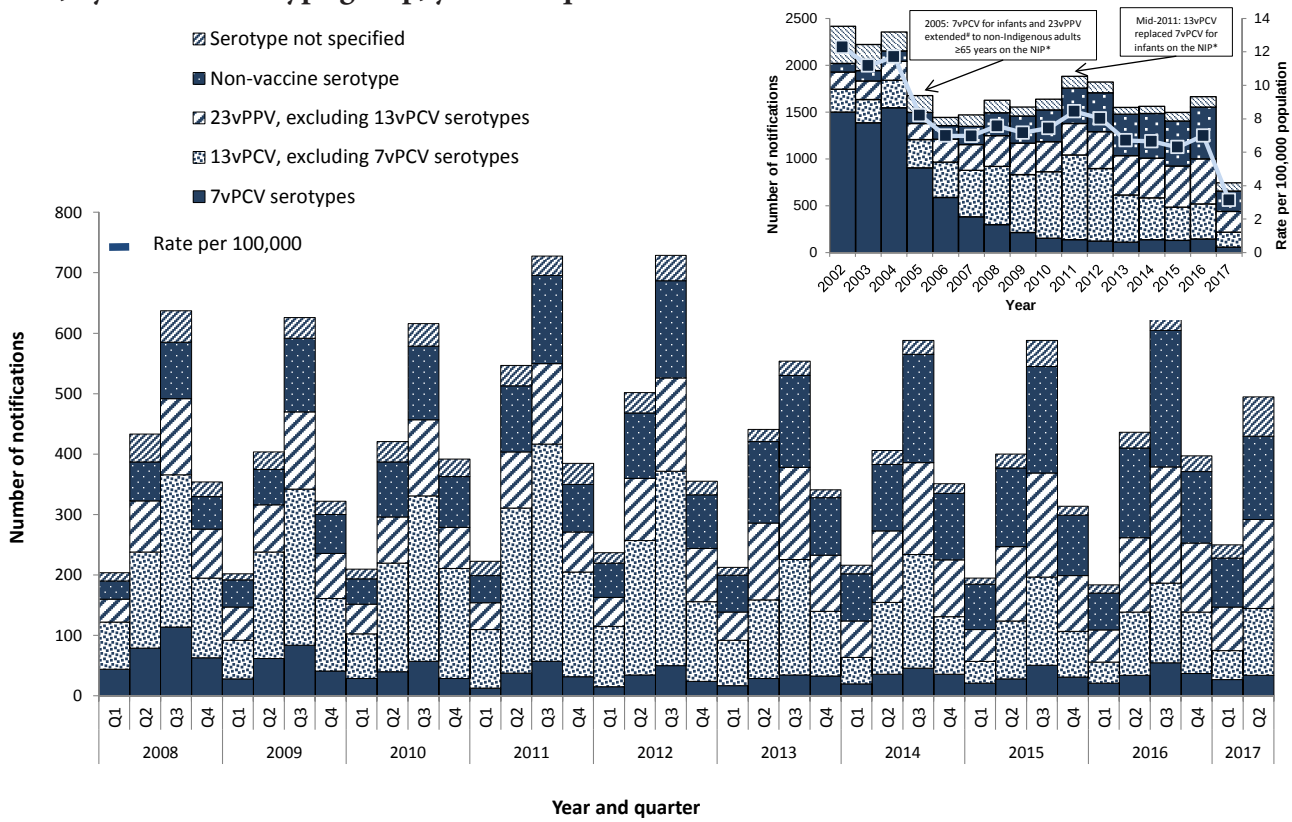
Submit an Article

You are invited to submit your next communicable disease related article to the Communicable Diseases Intelligence (CDI) for consideration.

More information regarding CDI can be found at: http://health.gov.au/cdi.

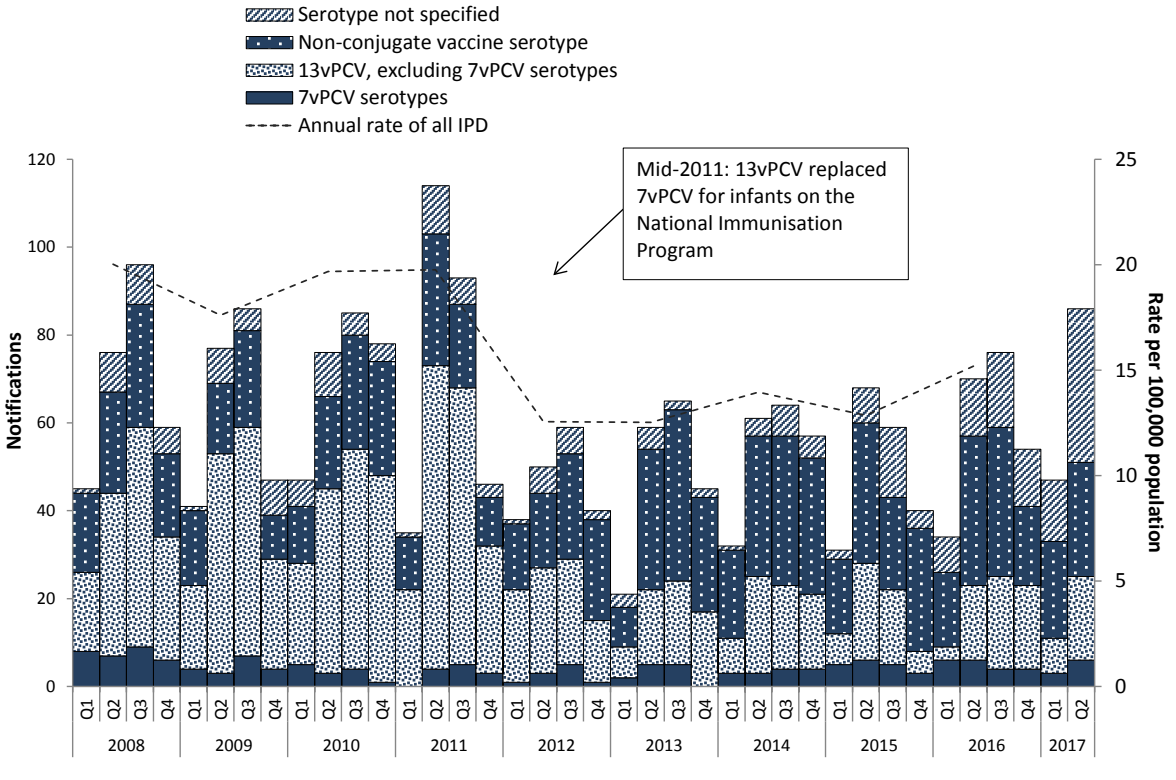
Further enquiries should be direct to: cdi.editor@health.gov.au.

Figure 1: Notifications of invasive pneumococcal disease, Australia, 1 January 2002 to 30 June 2017, by vaccine serotype group, year and quarter



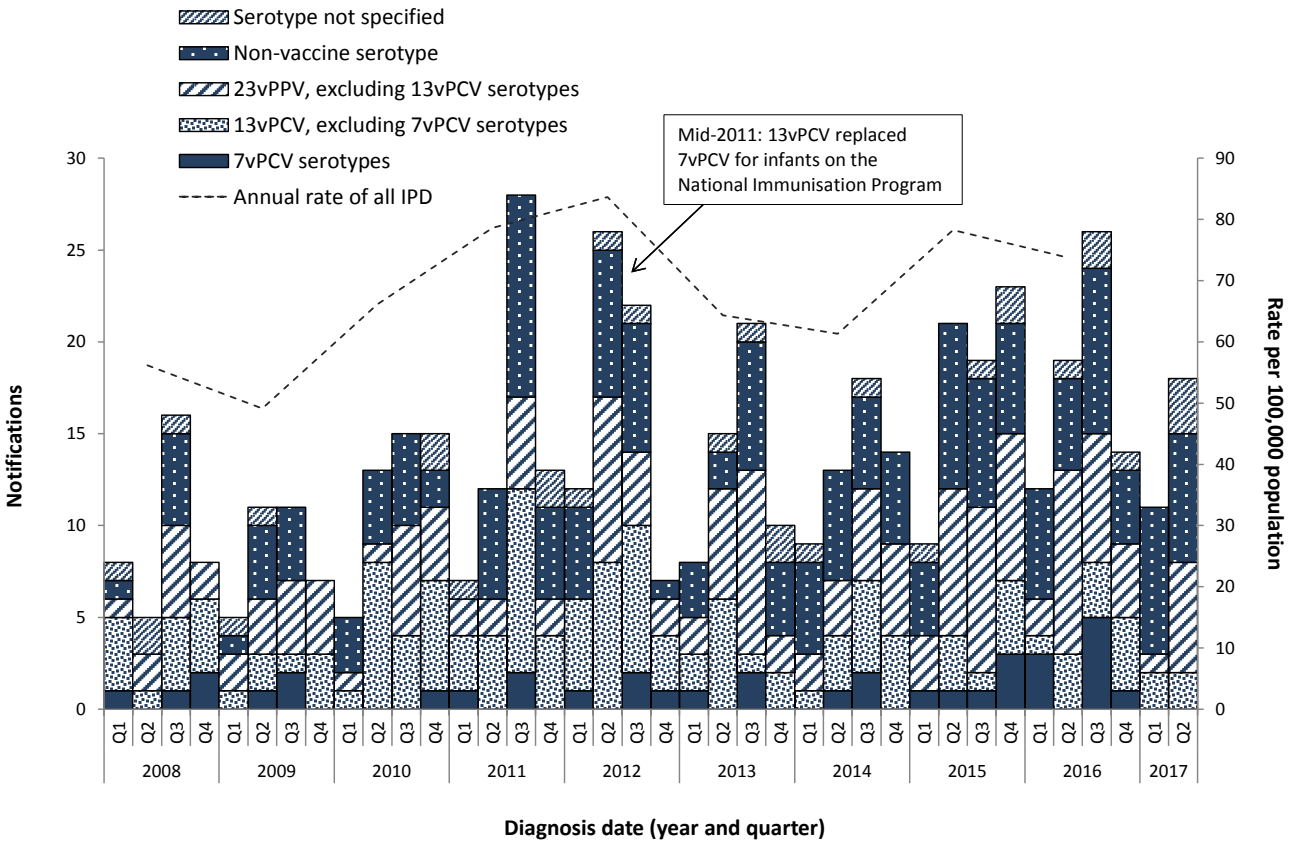
In 1999 the 23vPPV funded for all Indigenous Australians aged 50 years and over, as well as younger Indigenous Australian adults with risk factors.
* NIP - National Immunisation Program.

Figure 2: Notifications and annual rates* of invasive pneumococcal disease in children aged less than 5 years, Australia, 1 January 2008 to 30 June 2017, by vaccine serotype group



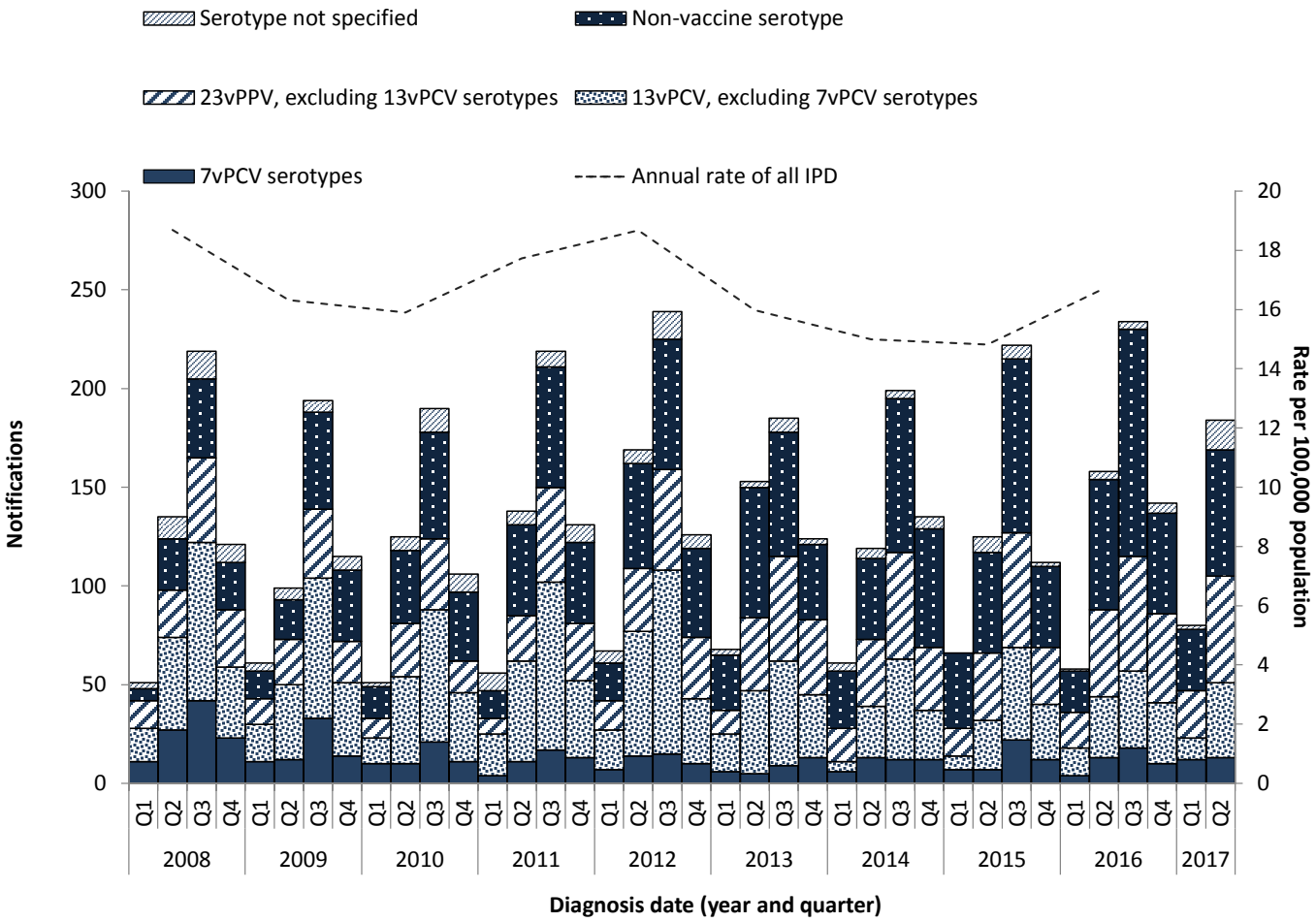
* Annual rates are shown on quarter 2, excluding 2017.

Figure 3: Notifications and annual rates* of all invasive pneumococcal disease in Indigenous Australians aged 50 years or over, Australia, 1 January 2008 to 30 June 2017, by vaccine serotype group



* Annual rates are shown on quarter 2, excluding 2017.

Figure 4: Notifications and annual rates* of all invasive pneumococcal disease in non-indigenous Australians# aged 65 years or over, Australia, 1 January 2008 to 30 June 2017, by vaccine serotype group



* Annual rates are shown on quarter 2, excluding 2017.

Non-Indigenous Australians includes cases reported with as non-Indigenous, not stated, blank or unknown.

Table 1: Notified cases of invasive pneumococcal disease, Australia, 1 April to 30 June 2017, by Indigenous status, serotype completeness and state or territory

Indigenous status	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Total 2nd qtr 2017	Total 1st qtr 2017	Total 2nd qtr 2016	Year to date 2017
Indigenous	0	3	11	10	6	0	2	9	41	29	32	70
Non-Indigenous	6	137	4	61	53	6	69	40	376	188	367	564
Not stated / Unknown	0	24	0	0	0	1	52	1	78	33	37	111
Total	6	164	15	71	59	7	123	50	495	250	436	745
Indigenous status completeness* (%)	100	85	100	100	100	86	58	98	84	87	92	85
Indigenous status completeness in targeted groups *† (%)	100	91	100	100	100	83	70	97	89	93	99	91
Serotype completeness ‡ (%)	100	82	93	96	64	86	98	92	87	92	96	89

* Indigenous status completeness is defined as the reporting of a known Indigenous status, excluding the reporting of not stated or unknown Indigenous status.
† Targeted groups for followup by almost all jurisdictions and public health units are cases aged less than 5 years and 50 years and over.
‡ Serotype completeness is the proportion of all cases of invasive pneumococcal disease that were reported with a serotype or reported as non-typable. Incomplete serotype data can occur in cases when (i) no isolate was available as diagnosis was by polymerase chain reaction and no molecular typing was attempted or was not possible due to insufficient genetic material; (ii) the isolate was not referred to the reference laboratory or was not viable; (iii) typing was pending at the time of reporting, or no serotype was reported by the notifying jurisdiction to the National Notifiable Diseases Surveillance System.

Table 2: Distribution of serotypes causing invasive pneumococcal disease in notified cases, Australia, 1 April to 30 June 2017, by age group

Serotype	Vaccine type	Age groups			Serotype total
		Under 5 years	5-64 years	Over 65 years	
3	13vPCV non-7vPCV	14	29	25	68
22F	23vPPV non-13vPCV	3	14	22	39
19A	13vPCV non-7vPCV	5	15	10	30
9N	23vPPV non-13vPCV	1	19	7	27
19F	7vPCV	5	8	10	23
23A	Non-vaccine type	-	6	16	22
23B	Non-vaccine type	3	11	7	21
11A	23vPPV non-13vPCV	1	12	7	20
15A	Non-vaccine type	1	7	11	19
8	23vPPV non-13vPCV	-	15	3	18
35B	Non-vaccine type	3	4	7	14
6C	Non-vaccine type	2	6	6	14
16F	Non-vaccine type	-	7	6	13
7F	13vPCV non-7vPCV	-	10	2	12
33F	23vPPV non-13vPCV	1	6	4	11
15B	23vPPV non-13vPCV	3	2	5	10
10A	23vPPV non-13vPCV	1	7	1	9
17F	23vPPV non-13vPCV	2	2	4	8
35F	Non-vaccine type	-	3	4	7
Other	-	8	23	16	39
Unknown	-	33	14	16	26
Total		**86**	**220**	**189**	**495**

* Serotypes that only occur in less than 5 cases per quarter are grouped as 'Other' and include 'non-typable' isolates this quarter.
† 'Serotype unknown' includes those serotypes reported as 'no isolate', 'not referred', 'not viable', 'typing pending' and 'untyped'.

Table 3: Notified cases of invasive pneumococcal disease, Australia, 1 April to 30 June 2017, by Indigenous status and age group

Age group	Indigenous status			Total
	Indigenous	Non-Indigenous	Not reported*	
00-04	7	76	3	86
05-09	0	11	2	13
10-14	1	1	0	2
15-19	1	2	1	4
20-24	0	2	4	6
25-29	3	3	5	11
30-34	2	6	3	11
35-39	3	6	3	12
40-44	1	7	7	15
45-49	5	10	10	25
50-54	6	25	7	38
55-59	4	24	4	32
60-64	3	42	6	51
65-69	1	41	3	45
70-74	2	24	1	27
75-79	0	32	4	36
80-84	1	24	7	32
85+	1	40	8	49
Total	41	376	78	495

* Not reported is defined as not stated, blank or unknown Indigenous status.

Table 4: Characteristics of 13vPCV failures in children aged less than 5 years, Australia, 1 April to 30 June 2017

Age	Indigenous status	Serotype	Clinical category	Risk factor/s
8 months	Indigenous	19A	Pneumonia	Other
1 year	Non-Indigenous	19A	Bacteraemia	No data available
1 year	Non-Indigenous	3	Pneumonia and other (pleural effusion)	No risk factor identified
1 year	Non-Indigenous	3	Pneumonia and other (pleural effusion)	Premature (<37 weeks gestation)
1 year	Non-Indigenous	3	Pneumonia and other (pleural effusion)	No risk factor identified
1 year	Non-Indigenous	19A	Bacteraemia	No data available
1 year	Non-Indigenous	19A	Pneumonia	Childcare attendee
1 year	Non-Indigenous	3	Pneumonia and other (pleural effusion)	No data available
2 years	Non-Indigenous	3	Pneumonia and other (pleural effusion)	No data available
2 years	Non-Indigenous	19A	Bacteraemia	No risk factor identified
2 years	Non-Indigenous	3	Pneumonia and other (pleural effusion)	Childcare attendee
2 years	Non-Indigenous	3	Pneumonia	No data available
2 years	Non-Indigenous	3	Pneumonia and other (pleural effusion)	No data available
3 years	Non-Indigenous	3	Pneumonia	Childcare attendee
3 years	Non-Indigenous	3	Pneumonia	Other
3 years	Non-Indigenous	3	Pneumonia	No data available
3 years	Non-Indigenous	19F	No data provided	Other
3 years	Non-Indigenous	19F	Bacteraemia	No data available
3 years	Non-Indigenous	3	Pneumonia and other (pleural effusion)	No data available
3 years	Non-Indigenous	18C	Bacteraemia	No data available
4 years	Non-Indigenous	3	Pneumonia and other (pleural empyema)	No risk factor identified

Table 5: *Streptococcus pneumoniae* serotypes targeted by pneumococcal vaccines

Serotypes	7-valent pneumococcal conjugate vaccine (7vPCV)	10-valent pneumococcal conjugate vaccine (10vPCV)	13-valent pneumococcal conjugate vaccine (13vPCV)	23-valent pneumococcal polysaccharide vaccine (23vPPV)
1		✓	✓	✓
2				✓
3			✓	✓
4	✓	✓	✓	✓
5		✓	✓	✓
6A			✓	
6B	✓	✓	✓	✓
7F		✓	✓	✓
8				✓
9N				✓
9V	✓	✓	✓	✓
10A				✓
11A				✓
12F				✓
14	✓	✓	✓	✓
15B				✓
17F				✓
18C	✓	✓	✓	✓
19A			✓	✓
19F	✓	✓	✓	✓
20				✓
22F				✓
23F	✓	✓	✓	✓
33F				✓