

INVASIVE PNEUMOCOCCAL DISEASE SURVEILLANCE, 1 JULY TO 30 SEPTEMBER 2016

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Summary

The number of notified cases of invasive pneumococcal disease (IPD) in the 3rd quarter of 2016 was substantially more than the previous quarter and marginally more than the number of notified cases in the 3rd quarter of 2015. Overall, the decline in disease due to the serotypes targeted by the 13-valent pneumococcal conjugate vaccine (13vPCV) has been maintained across all age groups since the 13vPCV replaced the 7-valent pneumococcal conjugate vaccine (7vPCV) in the childhood immunisation program from July 2011.

Key points

In the 3rd quarter of 2016, there were 637 cases of IPD reported to the National Notifiable Disease Surveillance System, an 8% increase when compared with the same period in 2015 (n=589) (Table 1). In the 3rd quarter of 2016 the most common pneumococcal serotypes causing IPD were 3 (8.9%), 9N (7.5%), 19A (6.1%) and 23A (6.0%) (Table 2). Compared with the 2nd quarter of 2016, there was a slight decrease in serotypes 3 (9.3%) and 19A (8.4%) and an increase in serotypes 9N (5.2%) and 23A (2.9%).

In non-Indigenous Australians, the number of notified cases was highest in children aged less than 5 years and older adult age groups, especially those aged 60 years or over (Table 3). In Indigenous Australians, cases were highest in children aged less than 5 years and the 40–44 years age group. The proportion of cases reported as Indigenous this quarter (11%; 72/637) was the same as that observed in the 3rd quarter of 2015 (11%; 63/589), and higher than the proportion reported in the 2nd quarter of 2016 (7%; 32/439).

In children aged less than 5 years, there were 73 cases of IPD reported, representing 11% of all cases reported in this quarter. The number of cases notified in this age group was slightly higher in this reporting period when compared with the 3rd quarter of 2015 (10%; 58/589). Of those cases with known serotype, 35% (18/52) were due to a serotype included in the 13vPCV compared with 50% (22/44) of cases in the 3rd quarter of 2015 (Figure 1). Serotypes 3, 19A, 19F and 23B were the most common serotypes affecting this age group in this quarter, noting that serotype 3, 19A and 19F are included in the 13vPCV (Table 2).

In the 3rd quarter of 2016, there were 10 cases reported in fully vaccinated children aged less than 5 years who were considered to be 13vPCV failures.

Table 1: Notified cases of invasive pneumococcal disease, Australia, 1 July to 30 September 2016, by Indigenous status, serotype completeness and state or territory

Indigenous status	ACT	NSW	NT	Qld	SA	Tas.	Vic.	WA	Total 3rd qtr 2016	Total 2nd qtr 2016	Total 3rd qtr 2015
Indigenous	0	11	11	19	5	0	0	26	72	32	63
Non-Indigenous	14	155	2	86	50	12	115	67	501	368	455
Not stated / Unknown	0	38	0	0	0	0	26	0	64	39	71
Total	14	204	13	105	55	12	141	93	637	439	589
Indigenous status completeness* (%)	100	81	100	100	100	100	82	100	90	91	88
Serotype completeness† (%)	100	91	92	97	64	92	89	94	90	93	93

* Indigenous status completeness is defined as the reporting of a known Indigenous status, excluding the reporting of not stated or unknown Indigenous status.

† Serotype completeness is the proportion of all cases of invasive pneumococcal disease that were reported with a serotype or reported as non-typeable. Serotype incompleteness may include when 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; the isolate was not referred to the reference laboratory or was not viable; 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 July to 30 September 2016, by age group

Serotype	Age groups			Serotype total
	Under 5 years	5–64 years	Over 65 years	
3	9	26	22	57
9N	3	32	13	48
19A	4	20	15	39
23A	2	14	22	38
22F	–	20	17	37
19F	4	15	16	35
6C	1	7	22	30
23B	4	12	10	26
8	–	22	4	26
15A	2	9	11	22
11A	2	10	8	20
33F	2	13	4	19
16F	–	9	9	18
35B	3	5	9	17
7F	–	15	2	17
15B	1	4	6	11
17F	1	8	2	11
10A	1	5	4	10
24F	2	2	4	8
31	–	4	4	8
15C	2	1	4	7
38	1	2	4	7
9V	–	6	1	7
10F	1	5	–	6
24	2	1	2	5
35F	1	1	3	5
4	–	4	1	5
7C	1	1	3	5
Unknown	21	34	10	65
Other	3	15	10	28
Total	73	322	242	637

* Serotypes that only occur in less than 5 cases per quarter are grouped as 'Other' and include 'non-typeable' isolates this quarter.

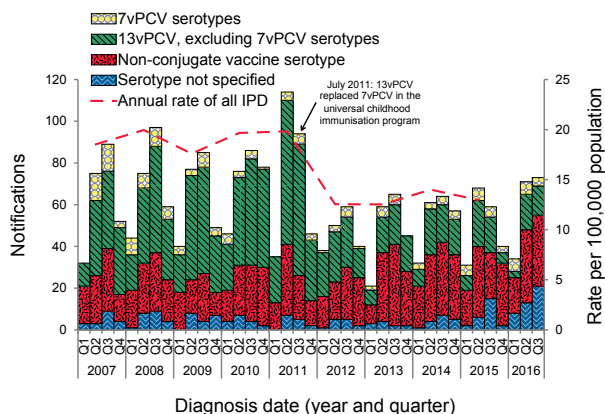
† 'Serotype unknown' includes those serotypes reported as 'no isolate', 'not referred', 'not viable', 'typing pending' and 'untyped'.

Serotype 19A was the most common serotype associated with 13vPCV failure reported this quarter (n=4), followed by serotypes 3 and 19F (n=3 each; Table 4).

Among Indigenous Australians aged 50 years or over, there were 25 cases of IPD reported this quarter. Of those cases with a reported serotype, 61% (14/23) were due to a serotype included in the 23-valent polysaccharide pneumococcal vaccine (23vPPV) (Figure 2). The number of notified

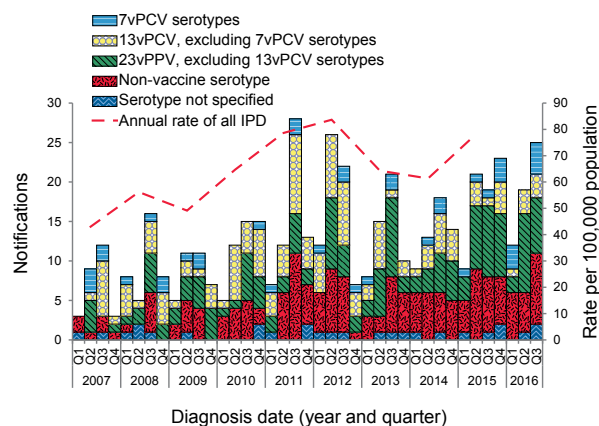
cases of IPD in this age group increased by 32% compared with the number reported in the previous quarter (n=19) and the 3rd quarter of 2015 (n=19). Compared with the previous quarter, the proportion of cases due to serotypes included in the 23vPPV decreased from 72% to 61% among cases with a known serotype. The most common serotypes causing disease in this group this quarter were serotypes 3 and 8 (n=3 each); these serotypes are included in the 23vPPV.

Figure 1: Notifications and annual rates* of invasive pneumococcal disease in children aged less than 5 years, Australia, 2007 to 30 September 2016, by vaccine serotype group



* Annual rates are shown on Q2, excluding 2016.

Figure 2: Notifications and annual rates* of all invasive pneumococcal disease in Indigenous Australians aged 50 years or over, Australia, 2007 to 30 September 2016 by vaccine serotype group



* Annual rates are shown on Q2, excluding 2016.

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

Age group	Indigenous status			Total
	Indigenous	Non-Indigenous	Not reported*	
00-04	12	60	1	73
05-09	2	16	3	21
10-14	–	8	1	9
15-19	4	5	2	11
20-24	3	7	2	12
25-29	1	6	8	15
30-34	7	13	7	27
35-39	3	15	7	25
40-44	10	9	11	30
45-49	5	11	7	23
50-54	3	33	2	38
55-59	7	32	1	40
60-64	6	60	5	71
65+	9	226	7	242
Total	72	501	64	637

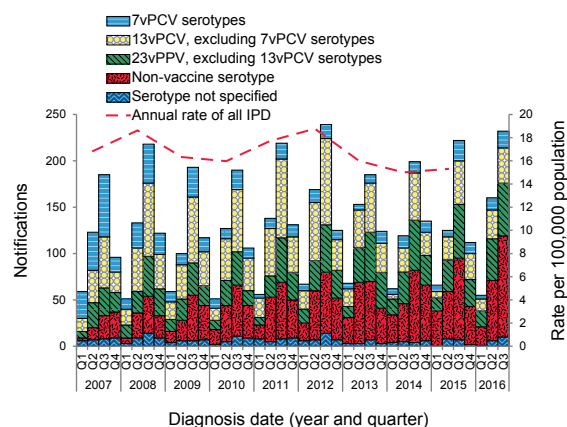
* Not reported is defined as not stated or unknown Indigenous status.

Among non-Indigenous Australians aged 65 years or over there were 233 cases of IPD reported this quarter. The number of notified cases of IPD in this age group increased by 46% when compared with the previous quarter (n=160) but was similar to the number reported in the 3rd quarter of 2015 (n=222). Of those cases with a reported serotype,

51% (113/222) were due to a serotype included in the 23vPPV (Figure 3), which was a small reduction when compared with the previous quarter (58%). For this quarter, serotypes 6C (n=22), 3 (n=21) and 23A (n=21) were the predominant serotypes for this population group.

During this quarter there were 49 deaths attributed to a variety of IPD serotypes. Of these deaths, 44 occurred in non-Indigenous Australians, with a median age of 69 years (range 0–95 years). A total of 5 deaths occurred in Indigenous Australians.

Figure 3: Notifications and annual rates* of all invasive pneumococcal disease in non-indigenous Australians† aged 65 years or over, Australia, 2007 to 30 September 2016, by vaccine serotype group



* Annual rates are shown on Q2, excluding 2016.

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

Table 4: Characteristics of 13vPCV failures in children aged less than 5 years, Australia, 1 July to 30 September 2016

Age	Indigenous status	Serotype	Clinical category	Risk factor/s
7 months	Indigenous	19A	Other, septic arthritis	No data available
1 year	Indigenous	19A	Bacteraemia	No data available
1 year	Non-Indigenous	19F	Unknown	No risk factor identified
1 year	Non-Indigenous	19F	Bacteraemia	No data available
2 years	Non-Indigenous	3	Pneumonia	No data available
2 years	Non-Indigenous	3	Pneumonia	Other
2 years	Non-Indigenous	19A	Pneumonia	No risk factor identified
2 years	Non-Indigenous	19F	Pneumonia	Premature (<37 weeks gestation), Chronic illness, Childcare attendee
3 years	Indigenous	19A	Bacteraemia	Immunocompromised, Chronic illness, Other
4 years	Non-Indigenous	3	Pneumonia	No risk factor identified

There were 2 deaths reported in children less than 5 years of age, which were associated with serotype 6C and serotype 11A. One of these cases was under the age of 2 months and therefore not eligible for vaccination.

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](http://www.immunise.health.gov.au) (www.immunise.health.gov.au).

In this report, a 'vaccine failure' is where a fully vaccinated child is diagnosed with IPD due to a serotype covered by the administered vaccine. 'Fully vaccinated' describes cases that have completed the primary course of the relevant vaccine(s) required for their age according to the most recent edition of *The Australian Immunisation Handbook*, at least 2 weeks prior to disease onset with at least 28 days between doses of vaccine. NB: A young child who has had all the required doses for their age but is not old enough to have completed the primary course would not be classified as fully vaccinated.

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 in notified cases of IPD is undertaken in Queensland 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.

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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				✓

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