

INVASIVE PNEUMOCOCCAL DISEASE SURVEILLANCE, 1 OCTOBER TO 31 DECEMBER 2016

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

Summary

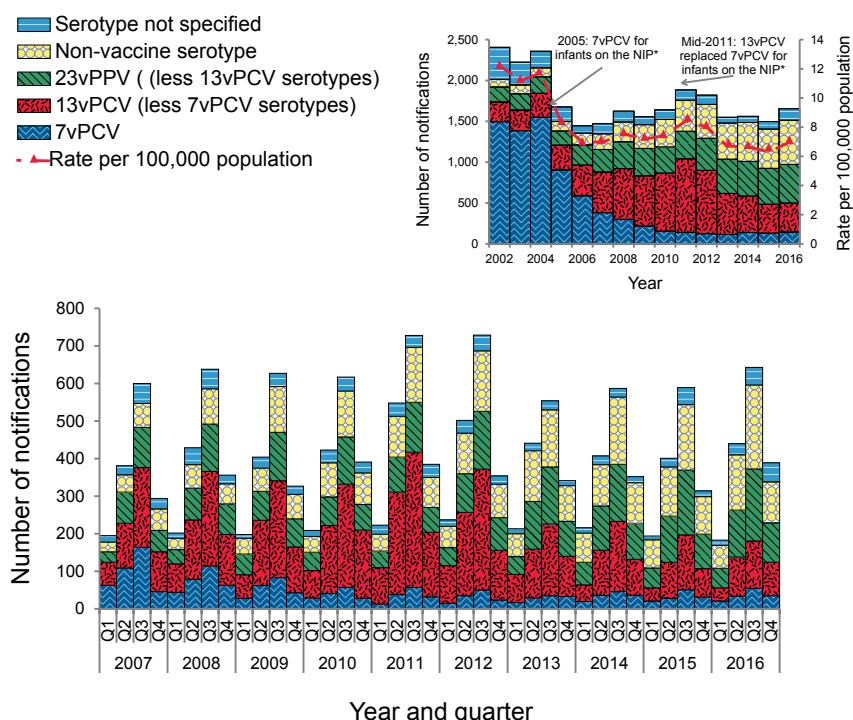
The number of notified cases of invasive pneumococcal disease (IPD) in the 4th quarter of 2016 (n = 389) was less than the previous quarter (n = 643), but more than the number of notified cases in the 4th quarter of 2015 (n = 314). Overall, the decline in disease due to the serotypes targeted by the 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 (Figure 1).

Key points

In the 4th quarter of 2016, there were 389 cases of IPD reported to the National Notifiable Diseases Surveillance System (NNDSS). This represented a 40% decrease compared with the 3rd quarter of 2016 (n = 643) and a 23% increase when compared with the same period in 2015 (n = 314) (Table 1).

For the 2016 calendar year, there were 1,655 notified cases, which was 10% higher when compared with 2015 (n = 1,498). In the 4th quarter of 2016 the most common pneumococcal serotypes causing IPD were 3 (11.3%), 19A (8.2%), 9N (8.0%) and 22F (7.2%) (Table 2). For the reporting quarter and 2016 calendar year, serotypes 3, 19A, 9N and 22F were the most common serotypes, which together accounted for 32% of annual cases (523/1,655). In non-Indigenous Australians this quarter, 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 in the 40–44 years age group. The proportion of cases reported as Indigenous this quarter (11%; 42/389) was lower compared with what was observed in the 4th quarter of 2015 (17%; 53/314), and similar to the proportion reported in the 3rd quarter of 2016 (12%; 74/643).

Figure 1: Notifications of invasive pneumococcal disease, Australia, 2002 to 2016, year and quarter, by vaccine serotype group



NIP = National Immunisation Program

Table 1: Notified cases of invasive pneumococcal disease, Australia, 1 October to 31 December 2016, by Indigenous status, serotype completeness and state or territory

Indigenous status									Total	Total	Total	Year to date 2016
	ACT	NSW	NT	Qld	SA	Tas.	Vic.	WA	4th qtr 2016	3rd qtr 2016	4th qtr 2015	
Indigenous	0	4	13	6	2	0	1	16	42	74	53	174
Non-Indigenous	5	87	3	50	33	15	69	30	292	509	233	1,314
Not stated / Unknown	0	25	0	0	1	0	29	0	55	60	28	167
Total	5	116	16	56	36	15	99	46	389	643	314	1,655
Indigenous status completeness* (%)	100	78	100	100	97	100	71	100	86	91	91	90
Indigenous status completeness in targeted groups ** (%)	100	86	100	100	96	92	86	100	91	97	100	96
Serotype completeness‡ (%)	100	81	94	93	61	93	93	96	87	93	96	92

* 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 follow-up by almost all jurisdictions and public health units are cases aged less than 5 years and 50 years or over.

‡ Serotype completeness is the proportion of all cases of invasive pneumococcal disease that were reported with a serotype or reported as non-typable. 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 October to 31 December 2016, by age group

Serotype	Vaccine type	Age groups			Serotype total
		Under 5 years	5–64 years	Over 65 years	
19F	7vPCV	2	9	7	18
4	7vPCV	–	6	–	6
3	13vPCV non-7vPCV	9	16	19	44
19A	13vPCV non-7vPCV	8	14	10	32
7F	13vPCV non-7vPCV	–	11	1	12
9N	23vPPV non-13vPCV	1	16	14	31
22F	23vPPV non-13vPCV	1	17	10	28
33F	23vPPV non-13vPCV	3	5	6	14
11A	23vPPV non-13vPCV	1	6	5	12
8	23vPPV non-13vPCV	–	6	4	10
23A	Non-vaccine type	1	7	15	23
23B	Non-vaccine type	2	12	3	17
6C	Non-vaccine type	–	5	9	14
35B	Non-vaccine type	–	5	7	12
15A	Non-vaccine type	2	3	7	12
15C	Non-vaccine type	3	5	1	9
16F	Non-vaccine type	1	3	1	5
31	Non-vaccine type	–	3	2	5
Unknown	–	14	25	12	51
Other	–	5	18	11	34
Total		53	192	144	389

* 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 October to 31 December 2016, by Indigenous status and age group

Age group	Indigenous status			Total
	Indigenous	Non-Indigenous	Not reported*	
0-4	6	46	1	53
5-9	2	5	4	11
10-14	1	3	1	5
15-19	5	2	2	9
20-24	1	1	1	3
25-29	1	1	3	5
30-34		6	3	9
35-39	3	7	4	14
40-44	9	9	6	24
45-49	3	12	7	22
50-54	1	20	3	24
55-59	4	23	3	30
60-64	2	31	3	36
69-69	2	25	6	33
70-74	1	27	5	33
75-79		19	4	23
80-84		19		19
85+	1	35		36
Total	42	291	56	389

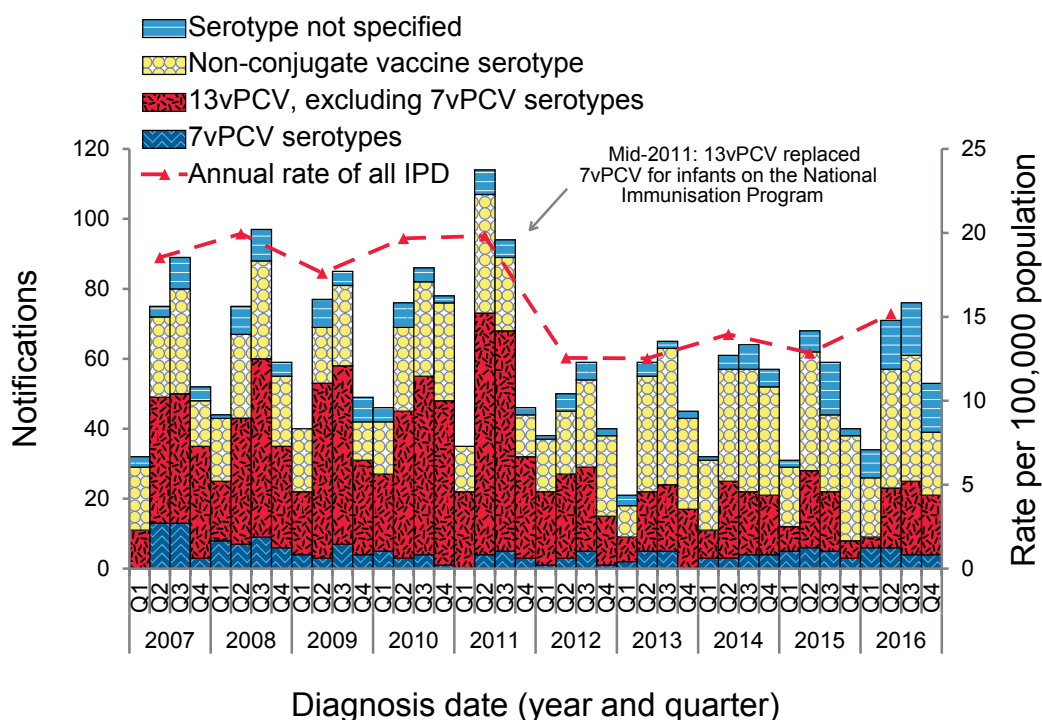
* Not reported is defined as not stated, blank or unknown Indigenous status.

In children aged less than 5 years, there were 53 cases of IPD reported, representing 14% of all cases reported in this quarter. The proportion of cases notified in this age group was similar in this reporting period when compared with the 4th quarter of 2015 (13%; 40/314). Of those cases with a known serotype, 54% (21/39) were due to a serotype included in the 13vPCV compared with 22% (36/40) of cases in the 4th quarter of 2015 (Figure 2). Serotypes 3 and 19A were the most common serotypes affecting this age group in this quarter, noting that both of these serotypes are included in the 13vPCV (Table 2).

In the 4th quarter of 2016, there were 13 cases reported in fully vaccinated children aged less than 5 years who were considered to be 13vPCV failures. Serotype 3 (n=4) was the most common serotype associated with 13vPCV failure reported this quarter (n=7), followed by serotype 19A (n=4) (Table 4).

Among Indigenous Australians aged 50 years or over, there were 11 cases of IPD reported this quarter. Of those cases with a reported serotype, whilst no particular serotype was dominant, 80% (8/10) were due to a serotype included in the 23-valent pneumococcal polysaccharide vaccine (23vPPV) (Figure 3). The number of notified cases of IPD in this age group were less than half of the number reported in the previous quarter (n=26) and

Figure 2: Notifications and annual rates* of invasive pneumococcal disease in children aged less than 5 years, Australia, 2007 to 2016, by vaccine serotype group



* Annual rates are shown on the 2nd quarter.

the 4th quarter of 2015 (n=23). Compared with the previous quarter, the proportion of cases in this population group that were due to serotypes included in the 23vPPV increased markedly from 63% to 80% among cases with a known serotype.

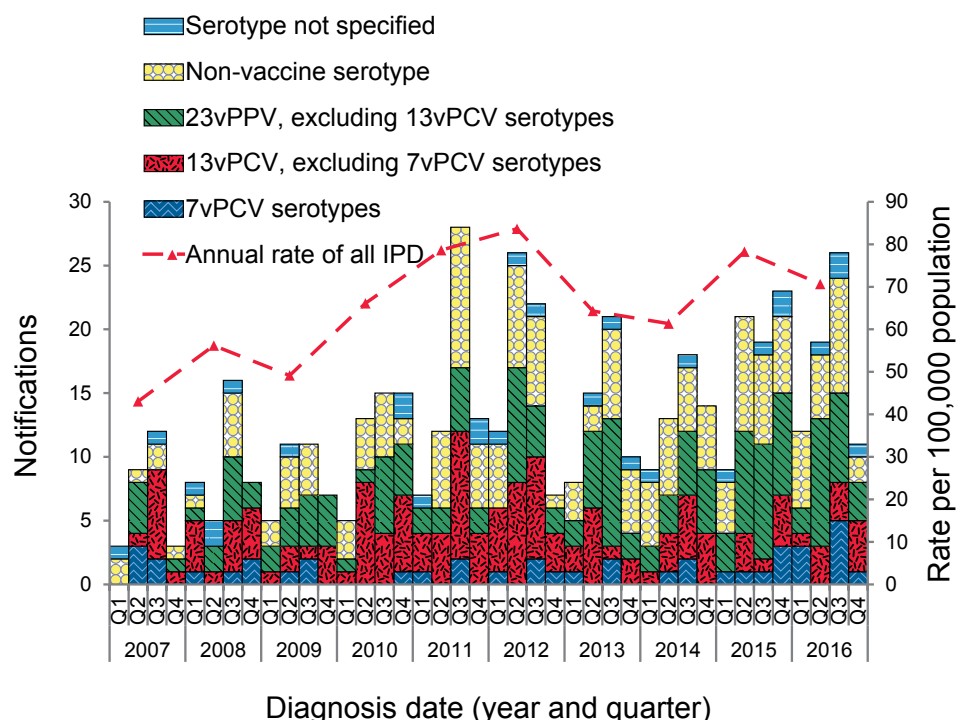
Among non-Indigenous Australians* aged 65 years or over there were 140 cases of IPD reported this quarter. The number of notified cases of IPD in this age group decreased by 40% when compared with the previous quarter (n=232) but was 25% higher than the number reported in the 4th quar-

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

Table 4: Characteristics of 13vPCV failures in children aged less than 5 years, Australia, 1 October to 31 December 2016

Age	Indigenous status	Serotype	Clinical category	Risk factor/s
10 months	Non-Indigenous	3	Pneumonia	Childcare attendee
1 year	Non-Indigenous	19A	Bacteraemia	No data available
1 year	Non-Indigenous	3	Pneumonia	No data available
1 year	Non-Indigenous	19A	Pneumonia	Childcare attendee
2 years	Non-Indigenous	19F	Bacteraemia	No risk factor identified
2 years	Indigenous	3	Pneumonia	Other
2 years	Non-Indigenous	14	Pneumonia and other (other sterile site)	Childcare attendee
2 years	Non-Indigenous	19A	Pneumonia	Other
2 years	Non-Indigenous	3	Pneumonia	Childcare attendee
3 years	Non-Indigenous	3	Pneumonia and other (pleural empyema)	Childcare attendee
3 years	Non-Indigenous	19A	Pneumonia	Other
3 years	Non-Indigenous	3	Pneumonia	No data available
4 years	Non-Indigenous	3	Meningitis	Childcare attendee

Figure 3: Notifications and annual rates* of all invasive pneumococcal disease in Indigenous Australians aged 50 years or over, Australia, 2007 to 2016, by vaccine serotype group



* Annual rates are shown on the 2nd quarter.

ter of 2015 (n=112). Of those cases with a reported serotype, 63% (80/128) were due to a serotype included in the 23vPPV (Figure 4), which represented an increase of 50% when compared with the previous quarter (114/227). For this quarter, serotypes 3 (n=18), 23A (n=15) and 9N (n=14) were the predominant serotypes for this population group, noting that serotype 23A is not included in the 23vPPV.

During this quarter there were 18 deaths attributed to a variety of IPD serotypes, with serotypes 3 (n=6) and 35B (n=3) predominant. Almost all of the reported deaths (17/18) occurred in non-Indigenous Australians. The median age of those who died was 71 years (range 0 to 97 years). Two deaths were reported in children aged less than 5 years, which were associated with serotypes 3 and 10A.

Notes

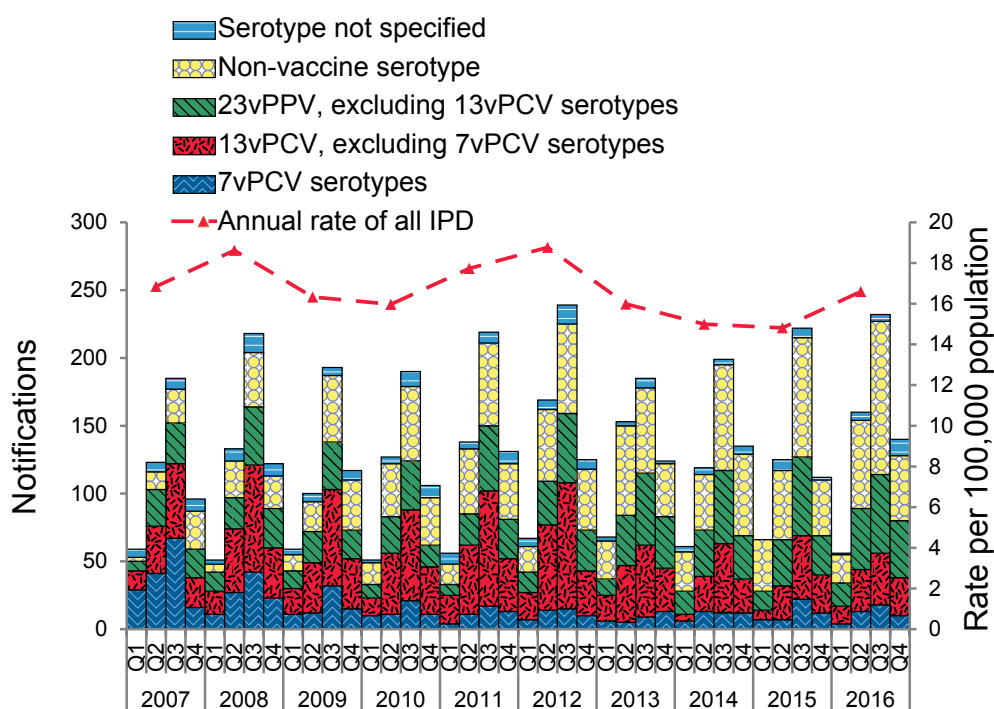
The data in this report are provisional and subject to change as laboratory results and additional case information become available. More detailed data analysis of IPD in Australia and surveillance methodology are described in the IPD annual report series published in *Communicable Diseases Intelligence*.

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.

Figure 4: Notifications and annual rates* of all invasive pneumococcal disease in non-indigenous Australians† aged 65 years or over, Australia, 2007 to 2016, by vaccine serotype group



* Annual rates are shown on quarter 2.

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

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				✓

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.

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Enhanced Invasive Pneumococcal Disease Surveillance Working Group contributors to this report include (in alphabetical order): Frank Beard (NCIRS), Heather Cook (NT and secretariat),

Lucinda Franklin (Vic.), Carolien Giele (WA), Robin Gilmour (NSW), Michelle Harlock (Tas.), Sanjay Jayasinghe (NCIRS), Vicki Krause (Chair), Kerryn Lodo (Tas.), Shahin Oftadeh (Centre for Infectious Diseases and Microbiology– Public Health, Westmead Hospital), Sue Reid (ACT), Vitali Sintchenko (Centre for Infectious Diseases and Microbiology– Public Health, Westmead Hospital), Helen Smith (Queensland Health Forensic and Scientific Services), Janet Strachan (Microbiological Diagnostic Unit, University of Melbourne), Hannah Vogt (SA), Angela Wakefield (Qld).

Author details

Corresponding author: MS Kate Pennington, Vaccine Preventable Diseases 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: vpds@health.gov.au