

INVASIVE PNEUMOCOCCAL DISEASE SURVEILLANCE, 1 APRIL TO 30 JUNE 2016

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Summary

The number of notified cases of invasive pneumococcal disease (IPD) in the 2nd quarter of 2016 was substantially more than the previous quarter and marginally more than the number of notified cases in the 2nd 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 2nd quarter of 2016, there were 442 cases of IPD reported to the National Notifiable Disease Surveillance System, a 10% increase when compared with the same period in 2015 (n=401) (Table 1). The observed increase in notifications in the 2nd quarter of 2016 was attributable to the 65 years or over age group, in which case numbers increased by 30% (n=167) when compared with the same reporting period of 2015 (n=127). In the 2nd quarter of 2016 the most common pneumococcal serotypes causing IPD were 3 (9.3%), 19A (8.4%), 22F (6.5%) and 23B (5.4%) (Table 2). Compared

with the 1st quarter of 2016, these proportions were similar for serotypes 3 (9.3%) and 22F (6.0%), but higher for serotype 19A (6.0%).

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 65 years or over (Table 3). In Indigenous Australians, case numbers were highest in children aged less than 5 years and the 50–54 years age group. The proportion of cases reported as Indigenous this quarter (8%; 34/442) was less than the proportion observed in the 2nd quarter of 2015 (15%; 60/401), and the proportion reported in the 1st quarter of 2016 (14%; 26/182).

In children aged less than 5 years, there were 71 cases of IPD reported, representing 16% of all cases reported in this quarter. The number of cases notified in this age group was similar in this reporting period when compared with the 2nd quarter of 2015 (68/401). Of those cases with known serotype, 37% (20/54) were due to a serotype included in the 13vPCV compared with 45% (28/62) of cases in the 2nd quarter of 2015 (Figure 1). Serotypes 3, 19A and 23B were the most common serotypes affecting this age group in this quarter, noting that serotype 3 and 19A are included in the 13vPCV (Table 2).

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

| Indigenous status | ACT | NSW | NT | Qld | SA | Tas. | Vic. | WA | Total 2nd qtr 2016 | Total 1st qtr 2016 | Total 2nd qtr 2015 |
|-------------------------------------|----------|------------|-----------|-----------|-----------|-----------|------------|-----------|--------------------|--------------------|--------------------|
| Indigenous | 0 | 5 | 7 | 6 | 2 | 3 | 3 | 8 | 34 | 26 | 60 |
| Non-Indigenous | 7 | 112 | 4 | 70 | 31 | 14 | 85 | 30 | 353 | 141 | 299 |
| Not stated / Unknown | 0 | 30 | 0 | 1 | 0 | 0 | 23 | 1 | 55 | 15 | 42 |
| Total | 7 | 147 | 11 | 77 | 33 | 17 | 111 | 39 | 442 | 182 | 401 |
| Indigenous status completeness* (%) | 100 | 80 | 100 | 99 | 100 | 100 | 79 | 97 | 88 | 92 | 90 |
| Serotype completeness† (%) | 100 | 80 | 100 | 92 | 3 | 94 | 92 | 90 | 81 | 92 | 95 |

* 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.

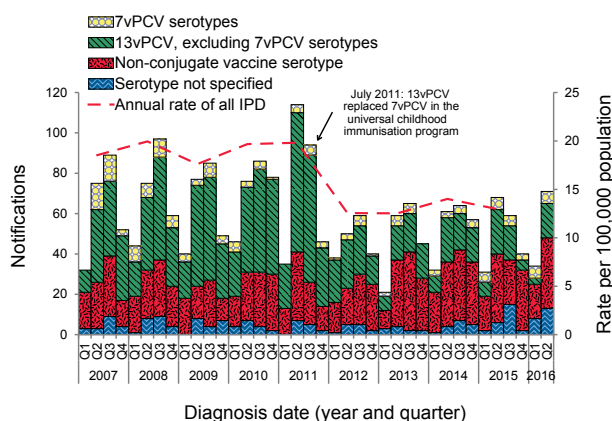
Table 2: Distribution of serotypes causing invasive pneumococcal disease in notified cases, Australia, 1 April to 30 June 2016, by age group

| Serotype | Age group | | | Serotype total |
|----------|---------------|------------|---------------|----------------|
| | Under 5 years | 5–64 years | Over 65 years | |
| 3 | 7 | 20 | 14 | 41 |
| 19A | 8 | 20 | 9 | 37 |
| 22F | 5 | 11 | 13 | 29 |
| 23B | 7 | 9 | 8 | 24 |
| 9N | 3 | 14 | 6 | 23 |
| 15A | 2 | 8 | 7 | 17 |
| 19F | 4 | 5 | 7 | 16 |
| 16F | 2 | 7 | 6 | 15 |
| 11A | 3 | 6 | 5 | 14 |
| 15C | 4 | 6 | 3 | 13 |
| 23A | 1 | 6 | 6 | 13 |
| 33F | 1 | 6 | 5 | 12 |
| 6C | – | 6 | 6 | 12 |
| 7F | – | 7 | 5 | 12 |
| 10A | 2 | 4 | 4 | 10 |
| 8 | – | 6 | 3 | 9 |
| 15B | 2 | 2 | 4 | 8 |
| 38 | – | 2 | 4 | 6 |
| 35B | – | 1 | 4 | 5 |
| Other* | 3 | 27 | 14 | 44 |
| Unknown† | 17 | 32 | 33 | 82 |
| Total | 71 | 205 | 166 | 442 |

* 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'.

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



* Annual rates are shown on Q2, excluding 2016.

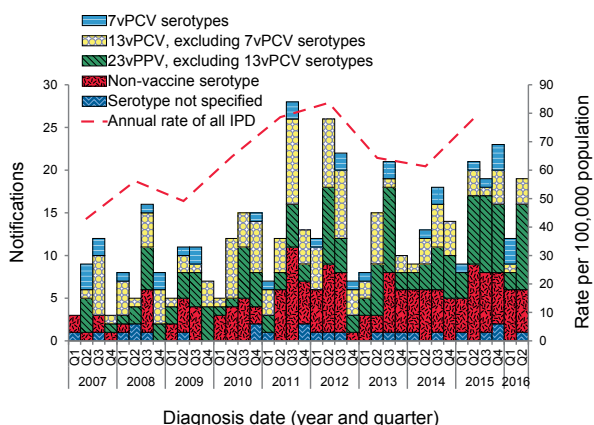
In the 2nd quarter of 2016, there were 14 cases reported in fully vaccinated children aged less than 5 years who were considered to be 13vPCV failures. Serotype 19A was reported as the cause of disease in 6 of these cases, followed by serotype 3 with 5 cases (Table 4).

Among Indigenous Australians aged 50 years or over, there were 20 cases of IPD reported this quarter. Of those cases with a reported serotype, 67% (12/18) 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 66% compared with the number reported in the previous quarter (n=12), but was similar to the 2nd quarter of 2015 (n=21). Compared with the previous quarter, the proportion of cases due to serotypes included in the 23vPPV increased from 50% to 67% among cases with a known serotype.

Additionally, there was no apparent predominance of any serotype reported among this population group this quarter.

Among non-Indigenous Australians aged 65 years and over there were 161 cases of IPD reported this quarter. The number of notified cases of IPD in this age group almost tripled compared with the number reported in the previous quarter (n=55)

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



* Annual rates are shown on Q2, excluding 2016.

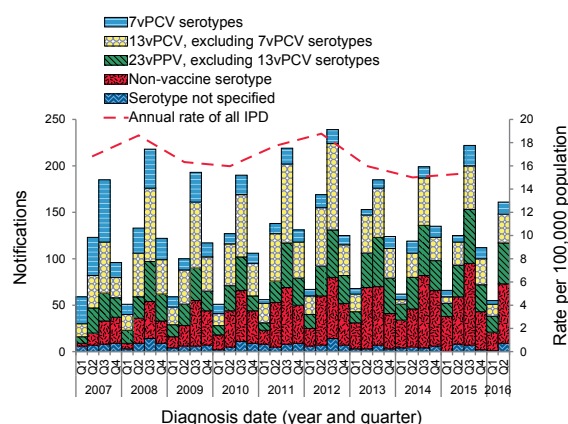
Table 3: Notified cases of invasive pneumococcal disease, Australia 1 April to 30 June 2016, by Indigenous status and age group

| Age group | Indigenous status | | | Total |
|-----------|-------------------|----------------|---------------|-------|
| | Indigenous | Non-Indigenous | Not reported* | |
| 00-04 | 6 | 63 | 2 | 71 |
| 05-09 | 1 | 6 | 4 | 11 |
| 10-14 | 1 | 7 | 3 | 11 |
| 20-24 | 1 | 1 | 2 | 4 |
| 25-29 | 1 | 4 | 3 | 8 |
| 30-34 | — | 7 | 6 | 13 |
| 35-39 | 1 | 7 | 2 | 10 |
| 40-44 | 2 | 6 | 5 | 13 |
| 45-49 | 1 | 10 | 13 | 24 |
| 50-54 | 10 | 22 | 1 | 33 |
| 55-59 | 5 | 35 | 2 | 42 |
| 60-64 | — | 36 | — | 36 |
| 65+ | 5 | 149 | 12 | 166 |
| Total | 34 | 353 | 55 | 442 |

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

and was 28% higher than the 2nd quarter of 2015 (n=125); however, the overall proportion of cases remained similar. Of those cases with a reported serotype, 60% (76/127) were due to a serotype included in the 23vPPV (Figure 3), which was a small reduction when compared with the previous quarter (63%). For this quarter, serotypes 3 (n=33) and 19A (n=31) were the predominant serotypes for this population group, noting that serotype 3 and 19A are included in the 23vPPV.

Figure 3: Notifications and annual rates* of all invasive pneumococcal disease in non-Indigenous Australians† aged 65 years or over, Australia, 2007 to 30 June 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.

During this quarter there were 24 deaths attributed to a variety of IPD serotypes. Of these deaths, 22 occurred in non-Indigenous Australians, with a median age of 64 years (range 0 to 94 years) and 2 occurred in Indigenous Australians. There were 2 deaths reported in children less than 5 years of age, which were associated with serotype 3 and serotype 11A. Both of these cases were 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*.

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

| Age | Indigenous status | Serotype | Clinical category | Risk factor/s |
|-----------|-------------------|----------|--|---------------------------------------|
| 11 months | Non-Indigenous | 3 | Pneumonia and other (pleural empyema) | No risk factor identified |
| 1 year | Non-Indigenous | 3 | Pneumonia | Other |
| 1 year | Non-Indigenous | 19A | Pneumonia | No data available |
| 2 years | Non-Indigenous | 19A | Pneumonia | Other |
| 2 years | Non-Indigenous | 19A | Pneumonia | Childcare attendee |
| 2 years | Non-Indigenous | 19A | Bacteraemia | Childcare attendee |
| 2 years | Indigenous | 19F | Bacteraemia | Congenital or chromosomal abnormality |
| 2 years | Unknown | 19F | Bacteraemia | Immunocompromised |
| 2 years | Non-Indigenous | 3 | Pneumonia and other (pleural effusion) | No risk factor identified |
| 3 years | Non-Indigenous | 3 | Pneumonia | No data available |
| 3 years | Non-Indigenous | 19A | Pneumonia and other (other sterile site) | Childcare attendee |
| 3 years | Non-Indigenous | 19A | Bacteraemia | Childcare attendee |
| 3 years | Non-Indigenous | 3 | Pneumonia | Childcare attendee |
| 4 years | Non-Indigenous | 19F | Other(other sterile site) | No data available |

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 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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