

## Quarterly report

# Invasive Pneumococcal Disease Surveillance, 1 January to 31 March 2017

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for the Communicable Diseases Network Australia

## Summary

The number of notified cases of invasive pneumococcal disease (IPD) in the first quarter of 2017 was less than the previous quarter, but greater than the number of notified cases in the first quarter of 2016. 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 first quarter of 2017, there were 247 cases of IPD reported to the National Notifiable Disease Surveillance System (NNDSS). This represented a 38% decrease compared to the fourth quarter of 2016 (n=395) and a 35% increase when compared with the same period in 2016 (n=183) (Table 3). In the first quarter of 2017 the most common pneumococcal serotypes causing IPD were 3 (11%), 19F (7%), 22F (6%) and 23B (6%) (Table 2).

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 older (Table 3). In Indigenous Australians, cases were highest in children aged less than 5 years, and the 40-44 and 50-54 years age groups. The proportion of cases reported as Indigenous Australians this quarter (11%; 28/247) was lower compared to the proportion observed in the previous quarter (18%; 45/395), and similar compared to the proportion reported in the first quarter of 2016 (11%; 26/183).

In children aged less than 5 years, there were 46 cases of IPD reported, representing 19% of all cases reported in this quarter. The proportion

of cases notified in this age group was higher in this reporting period when compared with the previous quarter (14%; 54/395), and similar compared to the proportion reported in the first quarter of 2016 (19%; 34/183). Of those cases with a known serotype reported this quarter, 33% (11/33) were due to a serotype included in the 13vPCV compared with 56% (23/41) of cases in the previous and 35% (9/26) in the first quarter of 2016 (Figure 2). During this quarter there were a number of different serotypes affecting this age group with no clear dominance (Table 2). Serotypes 3, 19A and 23B continued to be the common serotypes reported amongst this age group.

In the first quarter of 2017, there were four 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 19A (n=2) and 19F (n=2) (Table 4).

Among Indigenous Australians aged 50 years and over, there were 10 cases of IPD reported this quarter. Of those cases with a reported serotype (n=9), only two were due to a serotype included in the 23-valent pneumococcal polysaccharide vaccine (23vPPV) and overall there was no particular serotype dominant (Figure 3). The number of notified cases of IPD in this

age group were less than the number of cases reported in both the previous quarter (n=14) and the first quarter of 2016 (n=12).

Among non-Indigenous Australians\* aged 65 years and over there were 80 cases of IPD reported this quarter. The number of notified cases of IPD in this age group decreased by 43% when compared to the previous quarter (n=142) but was 40% higher than the number reported in the first quarter of 2016 (n=57). Of those cases with a reported serotype, 61% (46/76) were due to a serotype included in the 23vPPV (Figure 4), which was similar to the proportion in the previous quarter (63%; 86/137). For this quarter, serotypes 3 (n=9), 11A (n=7) and 19F (n=7) were the most common serotypes for this population group, noting that these three serotypes are included in the 23vPPV.

During this quarter there were 19 deaths attributed to a variety of IPD serotypes, with serotype 3 (n=5) predominant. Almost all of the reported deaths (18/19) occurred in non-Indigenous Australians\*. The median age of those cases who died was 78 years (range 1 to 96 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](http://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

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

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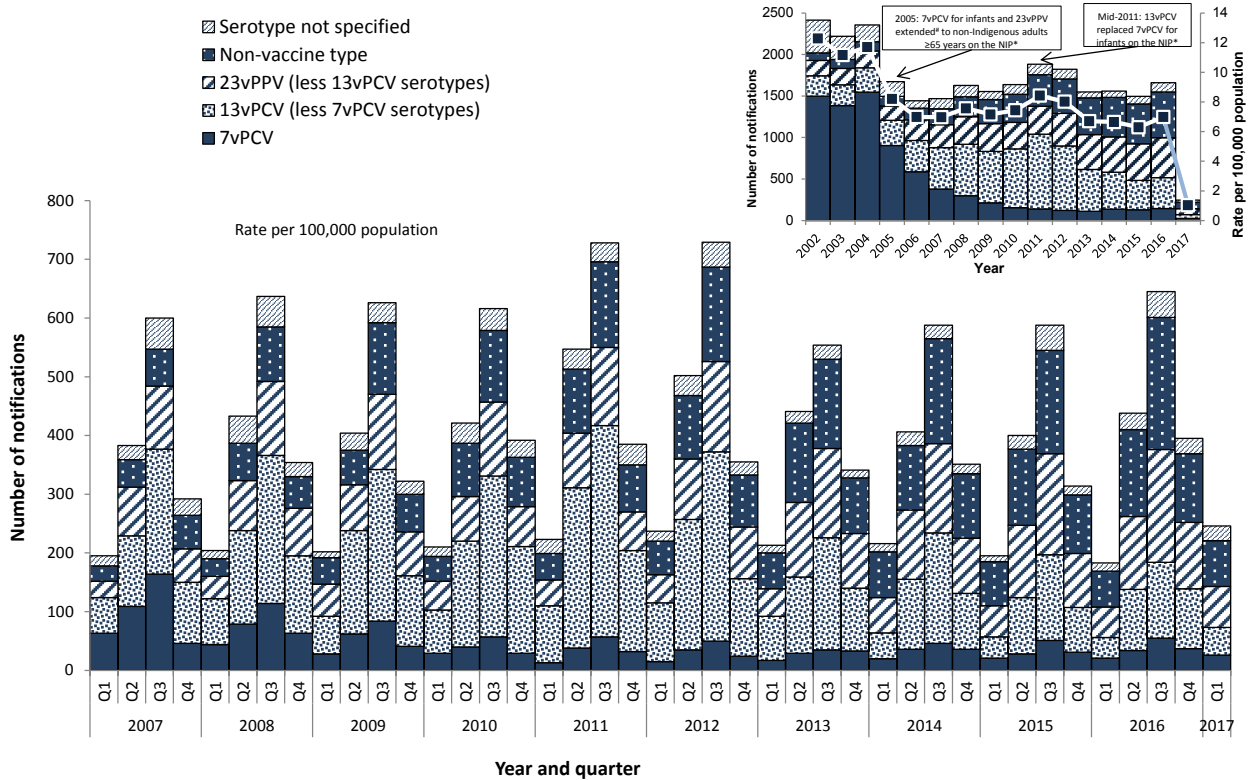
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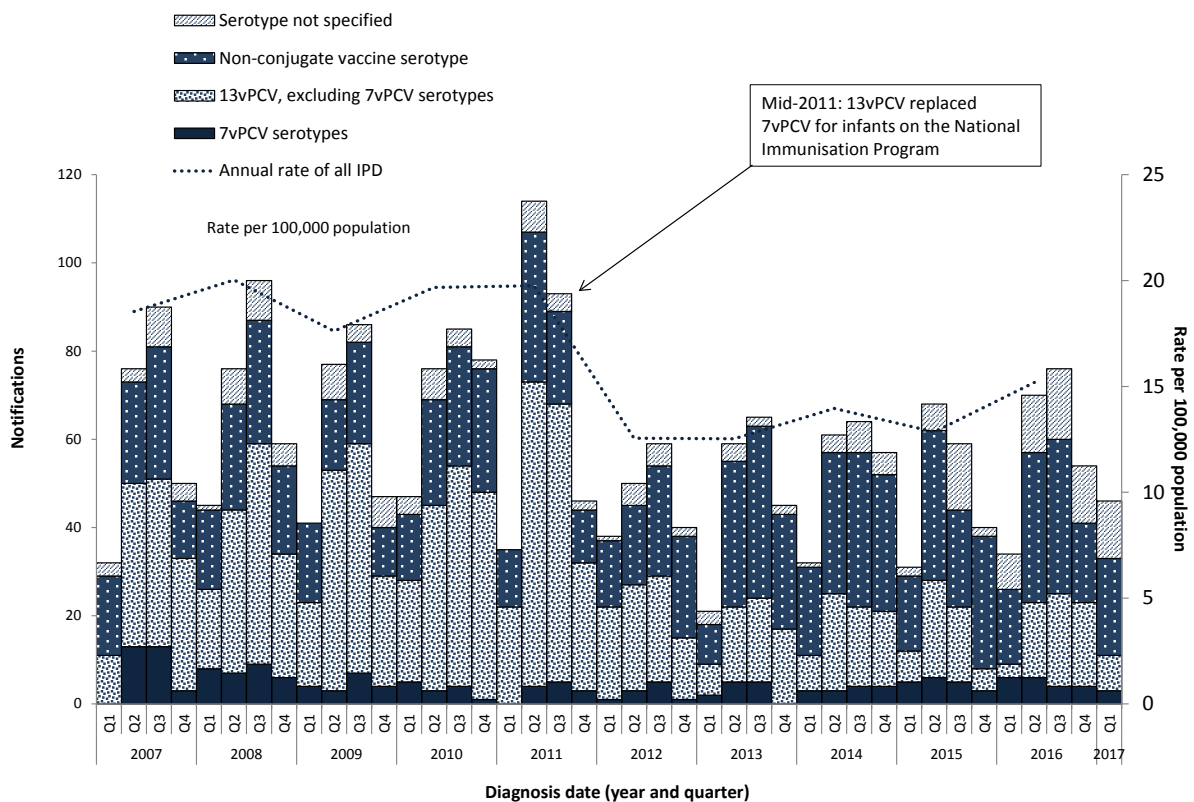
**Figure 1: Notifications of invasive pneumococcal disease, Australia, 1 January 2002 to 31 March 2017, by vaccine serotype group, year and quarter**



# 1999 - 23vPPV funded for all Indigenous Australians aged 50 years and over, as well as younger Indigenous Australian adults with risk factors.

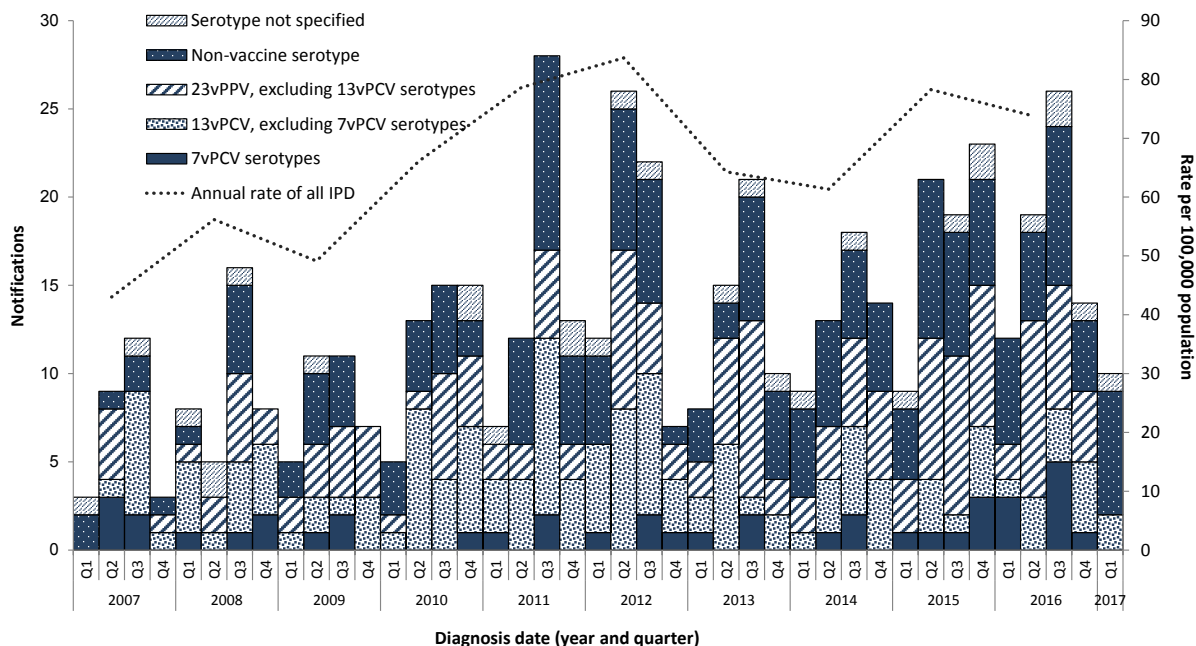
\* NIP - National Immunisation Program.

**Figure 2: Notifications and annual rates\* of invasive pneumococcal disease in children aged less than 5 years, Australia, 1 January 2007 to 31 March 2017, by vaccine serotype group**



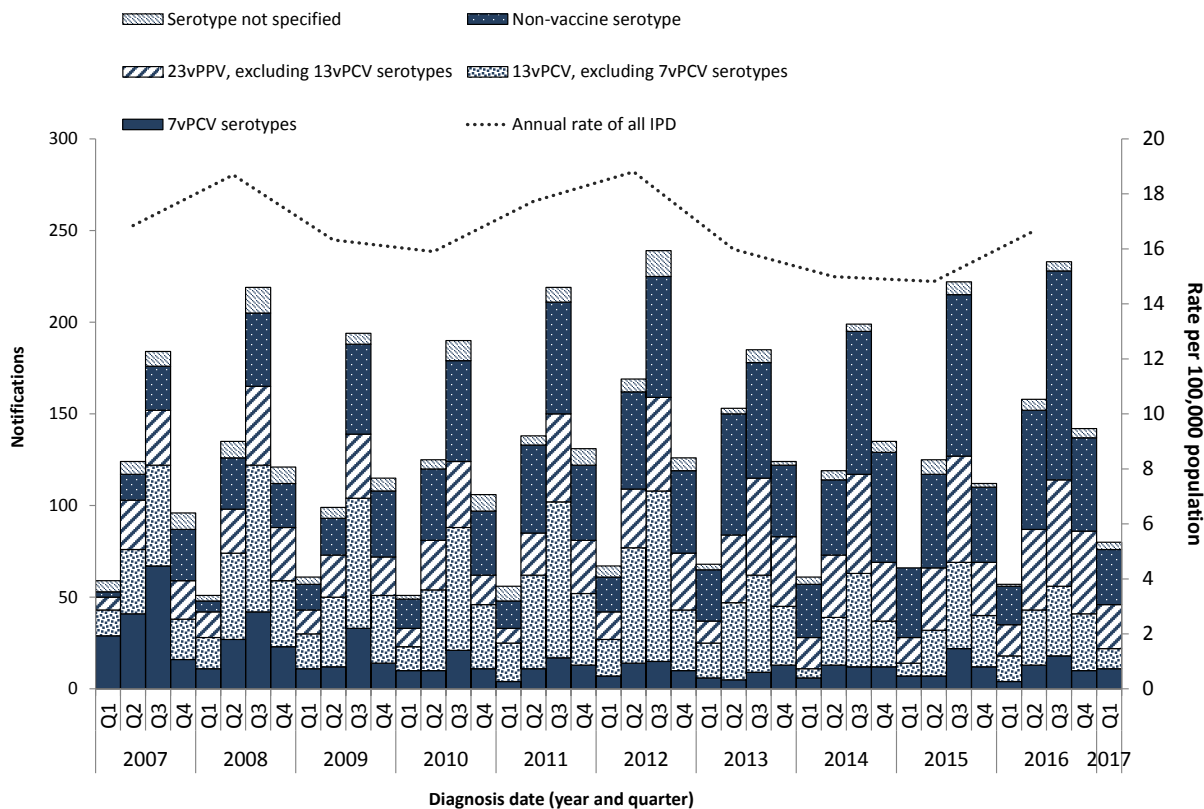
\* Annual rates are shown on quarter 2, excluding 2017.

**Figure 3: Notifications and annual rates\* of all invasive pneumococcal disease in Indigenous Australians aged 50 years or over, Australia, 1 January 2007 to 31 March 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 2007 to 31 March 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 January to 31 March 2017, by Indigenous status, serotype completeness and state or territory**

| Indigenous status  | ACT      | NSW       | NT       | Qld       | SA        | Tas      | Vic       | WA        | Total 1st qtr 2017 | Total 4th qtr 2016 | Total 1st qtr 2016 | Year to date 2017 |
|--|----------|-----------|----------|-----------|-----------|----------|-----------|-----------|--------------------|--------------------|--------------------|-------------------|
| Indigenous   | 0        | 8         | 4        | 6         | 2         | 0        | 1         | 7         | 28                 | 45                 | 26                 | 28                |
| Non-Indigenous   | 2        | 59        | 1        | 35        | 25        | 7        | 37        | 20        | 186                | 308                | 144                | 186               |
| Not stated / Unknown                                     | 0        | 12        | 0        | 0         | 0         | 0        | 20        | 1         | 33                 | 42                 | 13                 | 33                |
| <b>Total</b>   | <b>2</b> | <b>79</b> | <b>5</b> | <b>41</b> | <b>27</b> | <b>7</b> | <b>58</b> | <b>28</b> | <b>247</b>         | <b>395</b>         | <b>183</b>         | <b>247</b>        |
| Indigenous status completeness* (%)                      | 100      | 85        | 100      | 100       | 100       | 100      | 66        | 96        | 87                 | 89                 | 93                 | 87                |
| Indigenous status completeness in targeted groups ** (%) | 100      | 87        | 100      | 100       | 100       | 100      | 90        | 94        | 93                 | 96                 | 99                 | 93                |
| Serotype completeness † (%)                              | 100      | 90        | 100      | 98        | 52        | 86       | 98        | 93        | 89                 | 93                 | 92                 | 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 January to 31 March 2017, by age group**

| Serotype     | Vaccine type      | Age groups    |            |               | Serotype total |
|--------------|-------------------|---------------|------------|---------------|----------------|
|              |                   | Under 5 years | 5-64 years | Over 65 years |                |
| 3            | 13vPCV non-7vPCV  | 4             | 13         | 9             | 26             |
| 19F          | 7vPCV             | 3             | 8          | 7             | 18             |
| 22F          | 23vPPV non-13vPCV | 2             | 8          | 5             | 15             |
| 23B          | Non-vaccine type  | 4             | 6          | 4             | 14             |
| 19A          | 13vPCV non-7vPCV  | 4             | 5          | 3             | 12             |
| 9N           | 23vPPV non-13vPCV | -             | 9          | 2             | 11             |
| 11A          | 23vPPV non-13vPCV | -             | 2          | 7             | 9              |
| 23A          | Non-vaccine type  | 1             | 4          | 4             | 9              |
| 15A          | Non-vaccine type  | 3             | 1          | 4             | 8              |
| 7F           | 13vPCV non-7vPCV  | -             | 8          | -             | 8              |
| 8            | 23vPPV non-13vPCV | -             | 6          | 2             | 8              |
| 15B          | 23vPPV non-13vPCV | 4             | 1          | 1             | 6              |
| 16F          | Non-vaccine type  | -             | 4          | 2             | 6              |
| 33F          | 23vPPV non-13vPCV | -             | 5          | 1             | 6              |
| 6C           | Non-vaccine type  | 1             | 2          | 3             | 6              |
| 10A          | 23vPPV non-13vPCV | 1             | 1          | 3             | 5              |
| 12F          | 23vPPV non-13vPCV | 1             | 2          | 2             | 5              |
| 15C          | Non-vaccine type  | 2             | 2          | 1             | 5              |
| 35B          | Non-vaccine type  | -             | 2          | 3             | 5              |
| Other        | -                 | 3             | 21         | 15            | 39             |
| Unknown      | -                 | 13            | 9          | 4             | 26             |
| <b>Total</b> |                   | <b>46</b>     | <b>119</b> | <b>82</b>     | <b>247</b>     |

\* 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 January to 31 March 2017, by Indigenous status and age group**

| Age group    | Indigenous status |                |                           | Total      |
|--------------|-------------------|----------------|---------------------------|------------|
|              | Indigenous        | Non-Indigenous | Not reported <sup>*</sup> |            |
| 00-04        | 4                 | 40             | 2                         | 46         |
| 05-09        | 0                 | 4              | 1                         | 5          |
| 10-14        | 1                 | 1              | 0                         | 2          |
| 15-19        | 1                 | 1              | 1                         | 3          |
| 20-24        | 1                 | 3              | 1                         | 5          |
| 25-29        | 1                 | 2              | 3                         | 6          |
| 30-34        | 3                 | 4              | 2                         | 9          |
| 35-39        | 1                 | 8              | 1                         | 10         |
| 40-44        | 5                 | 3              | 5                         | 13         |
| 45-49        | 1                 | 6              | 6                         | 13         |
| 50-54        | 6                 | 13             | 0                         | 19         |
| 55-59        | 1                 | 12             | 0                         | 13         |
| 60-64        | 1                 | 17             | 3                         | 21         |
| 65-69        | 0                 | 10             | 1                         | 11         |
| 70-74        | 1                 | 15             | 3                         | 19         |
| 75-79        | 1                 | 20             | 1                         | 22         |
| 80-84        | 0                 | 5              | 1                         | 6          |
| 85+          | 0                 | 22             | 2                         | 24         |
| <b>Total</b> | <b>28</b>         | <b>186</b>     | <b>33</b>                 | <b>247</b> |

\* 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 January to 31 March 2017**

| Age     | Indigenous status | Serotype | Clinical category | Risk factor/s             |
|---------|-------------------|----------|-------------------|---------------------------|
| 2 years | Non-Indigenous    | 19A      | Pneumonia         | Other                     |
| 3 years | Non-Indigenous    | 19F      | Pneumonia         | No risk factor identified |
| 3 years | Non-Indigenous    | 19F      | Pneumonia         | Childcare attendee        |
| 3 years | Non-Indigenous    | 19A      | Bacteraemia       | Childcare attendee        |



**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       |   |   |   | ✓  |