

## **Introduction**

Since 17 October 2008, invasive pneumococcal disease (IPD) has been notifiable to the local Medical Officer of Health under the Health Act 1956. The pneumococcal conjugate vaccine (PCV) was added to the New Zealand childhood immunisation schedule on 1 June 2008, and has since undergone a number of changes:

- Prevenar® (PCV7) was used from June 2008 to June 2011,
- Synflorix® (PCV10) was used from July 2011 to June 2014,
- Prevenar13® (PCV13) was used from July 2014 to June 2017,
- Synflorix® (PCV10) has been used since July 2017.

PCV10 includes the seven serotypes in PCV7 (4, 6B, 9V, 14, 18C, 19F and 23F) as well as serotypes 1, 5 and 7F, and cross-reactivity to serotype 19A. PCV13 includes the 10 serotypes in PCV10 as well as serotypes 3, 6A and 19A. The recommended schedule is four doses, given at 6 weeks, 3 months, 5 months and 15 months of age.

The 23-valent pneumococcal polysaccharide vaccine (23PPV, Pneumovax 23) is recommended for children aged 2 years and older with medical conditions that increase the risk of IPD. It includes the 13 serotypes of PCV13 as well as serotypes 2, 8, 9N, 10A, 11A, 12F, 15B, 17F, 20, 22F and 33F.

The data presented in this report (except for immunisation status) is based on the information recorded on EpiSurv, the national notifiable disease surveillance system, as at 8 November 2018. Any changes made to EpiSurv data by public health unit staff after this date will not be reflected in this report. Immunisation status of cases that were eligible for PCV vaccination was extracted from the National Immunisation Register (NIR).

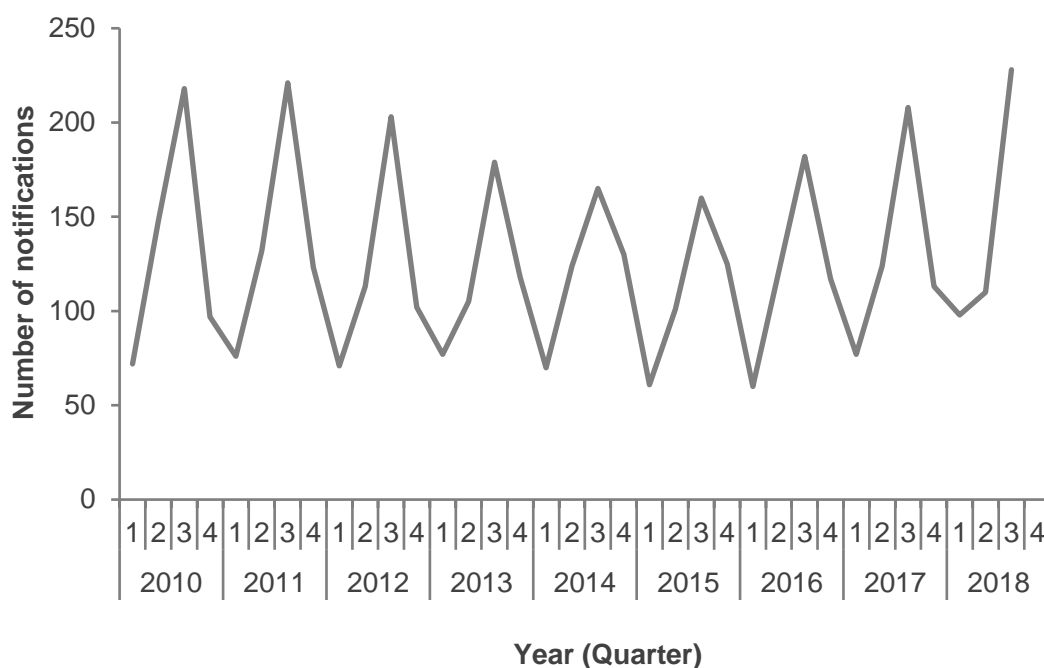
These quarterly reports are part of an enhanced surveillance programme to monitor the impact of PCV vaccination, including the changes in vaccine valency, on the epidemiology of IPD in New Zealand

## **Results**

This report was amended on 18 February 2019.

There were 228 IPD cases notified in the July–September 2018 quarter, compared with 208 cases in the same quarter in 2017. IPD displays a distinct seasonal pattern with a winter peak and summer trough (Figure 1). The notification rate for the latest 12-month period ending September 2018 (11.5 per 100,000 population, 549 cases) was similar to the rate for the previous 12-month period ending September 2017 (11.2 per 100,000, 526 cases) (Table 1).

**Figure 1. Number of cases of invasive pneumococcal disease by quarter reported, January 2010-September 2018**



The distribution of IPD cases and rates by age group is presented in Table 1. During the latest 12-month period, the highest rate was in the  $\geq 65$  years age group (30.3 per 100,000 population, 219 cases). Comparing the latest 12-month period with the previous 12-month period, there were no significant changes in the age-specific rates.

**Table 1. Number of cases and rates of invasive pneumococcal disease by age group**

Age group	Jul–Sep 2018	12 months ending Sep 2018		12 months ending Sep 2017	
	Cases	Cases	Rate <sup>a</sup>	Cases	Rate <sup>a</sup>
<2 years	10	32	26.4	25	20.9
2–4 years	9	20	10.8	23	12.4
5–64 years	112	278	7.4	247	6.7
$\geq 65$ years	97	219	30.3	231	33.1
<b>Total</b>	<b>228</b>	<b>549</b>	<b>11.5</b>	<b>526</b>	<b>11.2</b>

<sup>a</sup> Rate is expressed as cases per 100,000 population calculated using the 2017 mid-year population estimates.

The distribution of IPD cases and rates by region is presented in Table 2. Number of cases and rates of invasive pneumococcal disease by region. The highest rate for the latest 12-month period was in the Midland region (13.3 per 100,000 population, 122 cases). Comparing the latest 12-month period with the previous 12-month period, there was a significant change in the Central region only (104 to 137 cases), and in the Hawke's Bay District Health Board (16 to 35 cases)

**Table 2. Number of cases and rates of invasive pneumococcal disease by region**

Region	Jul-Sep 2018	12 months ending Sep 2018		12 months ending Sep 2017	
	Cases	Cases	Rate <sup>a</sup>	Cases	Rate <sup>a</sup>
Northern <sup>b</sup>	86	207	11.2	209	11.6
Midland <sup>c</sup>	50	122	13.3	123	13.7
Central <sup>d</sup>	56	137	12.9	104	10.0
Southern <sup>e</sup>	36	83	8.6	90	9.5
<b>Total</b>	<b>228</b>	<b>549</b>	<b>11.5</b>	<b>526</b>	<b>11.2</b>

<sup>a</sup> Rate is expressed as cases per 100,000 population calculated using the 2017 mid-year population estimates.

<sup>b</sup> Includes Northland, Waitemata, Auckland and Counties Manukau DHBs.

<sup>c</sup> Includes Waikato, Lakes, Bay of Plenty, Tairāwhiti and Taranaki DHBs.

<sup>d</sup> Includes Hawke's Bay, Whanganui, MidCentral, Hutt Valley, Capital & Coast, Wairarapa and Nelson Marlborough DHBs.

<sup>e</sup> Includes West Coast, Canterbury, South Canterbury and Southern DHBs.

A culture was received at ESR for serotyping from 223 (97.8%) of the 228 cases notified in the July-September 2018 quarter. Table 3 shows the number of IPD cases due to each of the serotypes included in PCV7, PCV10 and PCV13, and due to non-PCV13 serotypes.

The number of IPD cases due to PCV13 serotypes decreased 6.7% between the last two 12-month periods (179 to 167 cases). In contrast, the number of IPD cases due to non-PCV13 serotypes increased 11.7% (314 to 355 cases). The increase in IPD due to non-PCV13 types occurred across all age groups, and was greatest in the 2–4 year age group (8 to 14 cases).

The six most prevalent serotypes during the last 12 months were 19A, 8, 12F, 22F, 3 and 7F (Table 3). Between the last two 12-month periods, cases of IPD due to type 19A did not change (70 cases). There were increases in types 8, 12F, 22F and 3: 35% (40 to 54 cases), 176% (17 to 47 cases), 15.4% (39 to 45 cases) and 27.6% (29 to 37 cases), respectively.

**Table 3. Number of invasive pneumococcal disease cases by serotype and age group**

Serotypes	Age group											
	<2 years			2–4 years			≥5 years			Total		
	Q3 2018	12 months ending		Q3 2018	12 months ending		Q3 2018	12 months ending		Q3 2018	12 months ending	
		Sep 2018	Sep 2017		Sep 2018	Sep 2017		Sep 2018	Sep 2017		Sep 2018	Sep 2017
4	0	0	1	0	0	0	2	7	18	2	7	19
6B	0	0	0	0	0	0	0	1	2	0	1	2
9V	0	0	0	0	0	1	1	2	3	1	2	4
14	0	0	0	0	0	1	1	1	2	1	1	3
18C	0	0	0	0	0	0	1	1	1	1	1	1
19F	0	0	0	0	0	0	5	7	17	5	7	17
23F	0	0	0	0	0	0	0	2	1	0	2	1
<b>Total PCV7</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>10</b>	<b>21</b>	<b>44</b>	<b>10</b>	<b>21</b>	<b>47</b>
1	0	1	0	0	0	0	1	6	0	1	7	0
5	0	0	0	0	0	0	0	0	0	0	0	0
7F	0	0	1	0	0	0	11	28	31	11	28	32
<b>Total PCV10</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>22</b>	<b>55</b>	<b>75</b>	<b>22</b>	<b>56</b>	<b>79</b>
3	1	2	4	0	0	2	12	35	23	13	37	29
6A	0	0	0	0	0	0	2	4	1	2	4	1
19A <sup>a</sup>	1	1	1	2	3	4	31	66	65	34	70	70
<b>Total PCV13</b>	<b>2</b>	<b>4</b>	<b>7</b>	<b>2</b>	<b>3</b>	<b>8</b>	<b>67</b>	<b>160</b>	<b>164</b>	<b>71</b>	<b>167</b>	<b>179</b>
10A	0	2	2	0	0	0	7	16	10	7	18	12
11A	0	0	0	0	0	0	2	11	17	2	11	17
12F	1	4	2	1	2	0	23	41	15	25	47	17
15A	2	3	0	1	2	1	3	11	16	6	16	17
15B	0	1	2	1	1	0	8	13	13	9	15	15
16F	0	0	0	0	0	0	8	15	14	8	15	14
22F	1	2	2	0	2	2	24	41	35	25	45	39
23A	1	2	0	0	0	1	4	10	12	5	12	13
23B	0	0	1	1	2	0	5	20	15	6	22	16
31	0	0	0	0	0	0	3	5	8	3	5	8
33F	0	1	1	0	1	2	9	16	14	9	18	17
38	0	4	0	0	0	0	1	5	10	1	9	10
6C	0	0	0	0	1	1	3	12	14	3	13	15
8	0	1	1	0	0	0	17	53	39	17	54	40
9N	0	0	1	0	0	0	7	16	15	7	16	16
Other types <sup>b</sup>	2	4	3	3	4	1	14	31	44	19	29	48
<b>Total non-PCV13</b>	<b>7</b>	<b>24</b>	<b>15</b>	<b>7</b>	<b>15</b>	<b>8</b>	<b>138</b>	<b>316</b>	<b>291</b>	<b>152</b>	<b>355</b>	<b>314</b>

<sup>a</sup> The indications for PCV10 include cross-protection against 19A disease.

<sup>b</sup> Any of these other types accounted for <5 IPD cases during the 12 months ending 30 September 2018.

Table 4 shows the immunisation status for cases notified in the July–September 2018 quarter in children who were age-eligible for PCV (i.e. cases born after 1 January 2008 and aged  $\geq 6$  weeks). There were 29 cases in children who were eligible for PCV, of which one was due to serotype 3, five were due to 19A and 21 were due to non-PCV serotypes. Serotype information was not available for two cases. Two 19A cases were recorded as having four doses of PCV7 and therefore were not covered for this serotype. A third 19A case, aged less than five months at illness onset, had received two doses of PCV10. The fourth case, aged 4 years, had received three doses of PCV10 and one dose of PCV13 which is considered a vaccine failure. The fifth case, aged 3 years, had received four doses of PCV13 and is also considered a vaccine failure, however, information on underlying health conditions is not yet available.

**Table 4. Immunisation status of the invasive pneumococcal disease cases notified in the July–September 2018 quarter in children who were eligible for PCV**

Number of doses received <sup>a</sup>	Cases due to PCV7 serotypes: 4, 6B, 9V, 14, 18C, 19F or 23F <sup>b</sup>	Cases due to additional PCV10 serotypes: 1, 5, 7F <sup>b</sup>	Cases due to additional PCV13 serotypes: 3, 6A, 19A <sup>b</sup>	Cases due to non-PCV13 serotypes <sup>b</sup>	Total <sup>b,c</sup>
	Number	Number	Number	Number	Number
0	0	0	0	0	0
1	0	0	1	1	2
2	0	0	0	2	2
3	0	0	1 <sup>d</sup>	2	3
$\geq 4$	0	0	4 <sup>d</sup>	16	22
<b>Total</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>21</b>	<b>29</b>

<sup>a</sup> Number of doses received prior to 14 days before onset of IPD. Onset of IPD was determined using the earliest episode date available from onset of illness date, hospitalised date or date case notified to the public health unit.

<sup>b</sup> Only IPD cases eligible for PCV as part of the childhood immunisation schedule (ie, cases born after 1 January 2008 and aged  $\geq 6$  weeks) are presented.

<sup>c</sup> The total number of cases includes two cases for whom serotype information was not available.

<sup>d</sup> Due to serotype 19A.

Note: Immunisation status is based on information recorded in the National Immunisation Register (NIR).