Invasive Pneumococcal Disease Quarterly Report October–December 2018

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.

In addition, 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.

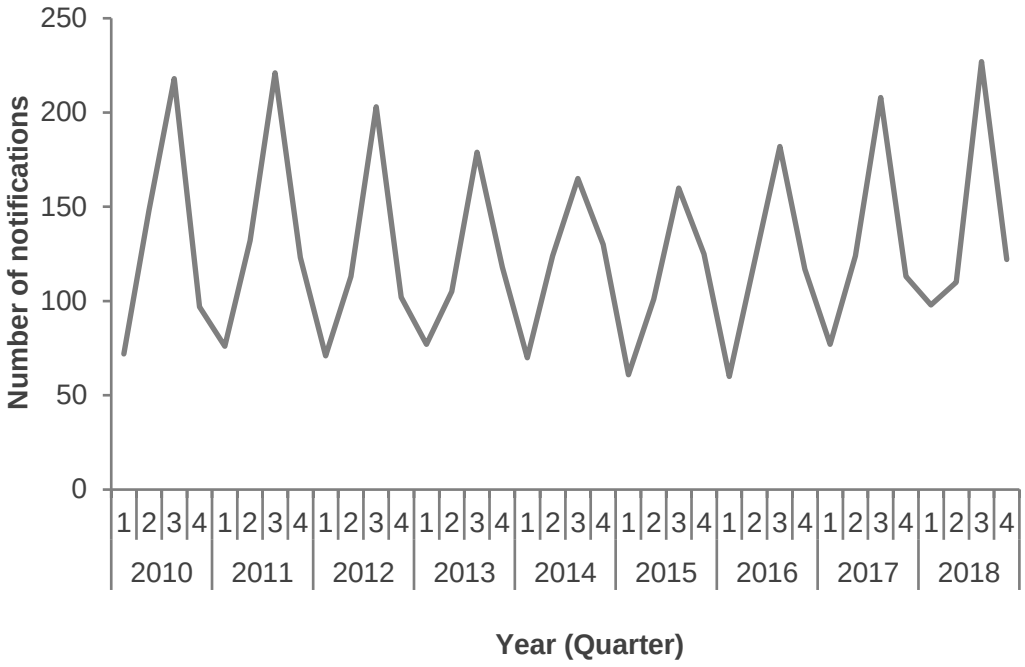
The data presented in this report (except for immunisation status) is based on the information recorded on EpiSurv, the national notifiable disease surveillance system, as at 17 January 2019. Any changes made to EpiSurv data by public health unit staff after this date will not be reflected in this report. 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

There were 122 IPD cases notified in the October−December 2018 quarter, compared with 113 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 December 2018 (11.4 per 100,000 population, 557 cases) was similar to the rate for the 12-month period ending December 2017 (10.9 per 100,000, 522 cases) (Table 1).

Figure 1. Number of cases of invasive pneumococcal disease by quarter reported, January 2010-December 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 ≥65 years age group (31.3 per 100,000 population, 234 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	Oct–Dec 2018	12 months ending Dec 2018		12 months ending Dec 2017	
	Cases	Cases	Rate[a]	Cases	Rate[b]
<2 years	2	28	23.1	23	19.0
2–4 years	2	18	9.7	22	11.9
5–64 years	58	277	7.2	252	6.7
≥65 years	60	234	31.3	225	31.1
Total	**122**	**557**	**11.4**	**522**	**10.9**

[a] Rate is expressed as cases per 100,000 population calculated using the 2018 mid-year population estimates.
[b] 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. The highest rate for the latest 12-month period was in the Midland region (14.1 per 100,000 population, 129 cases). Comparing the latest 12-month period with the previous 12-month period, there were no significant changes in the regions or individual DHBs.

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[a]	Cases	Rate[b]
Northern[c]	40	209	11.3	190	10.5
Midland[d]	33	129	14.1	129	14.4
Central[e]	30	132	12.5	122	11.7
Southern[f]	19	87	9.0	81	8.5
Total	**122**	**557**	**11.4**	**522**	**10.9**

[a] Rate is expressed as cases per 100,000 population calculated using the 2018 mid-year population estimates.
[b] Rate is expressed as cases per 100,000 population calculated using the 2017 mid-year population estimates.
[c] Includes Northland, Waitemata, Auckland and Counties Manukau DHBs.
[d] Includes Waikato, Lakes, Bay of Plenty, Tairawhiti and Taranaki DHBs.
[e] Includes Hawke's Bay, Whanganui, MidCentral, Hutt Valley, Capital & Coast, Wairarapa and Nelson Marlborough DHBs.
[f] Includes West Coast, Canterbury, South Canterbury and Southern DHBs.

Cultures were received at ESR for serotyping from 115 (94.3%) of the 122 cases notified in the October–December 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 3.0% between the last two 12-month periods (168 to 163 cases). In contrast, the number of IPD cases due to non-PCV13 serotypes increased 14.0% (321 to 367 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 (9 to 13 cases).

The six most prevalent serotypes during the last 12 months were 19A, 12F, 22F, 8, 3 and 7F (Table 3).

Between the last two 12-month periods, the most significant increase was of type 12F, which increased by 136% (22 to 52 cases). There were also increases in types 19A, 22F, and 3: 25.0% (60 to 75 cases), 40% (35 to 49 cases) and 3% (32 to 33 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		
	Q4 2018	12 months ending		Q4 2018	12 months ending		Q4 2018	12 months ending		Q4 2018	12 months ending	
		Dec 2018	Dec 2017		Dec 2018	Dec 2017		Dec 2018	Dec 2017		Dec 2018	Dec 2017
4	0	0	1	0	0	0	1	4	18	1	4	19
6B	0	0	0	0	0	0	1	2	1	1	2	1
9V	0	0	0	0	0	1	1	3	3	1	3	4
14	0	0	0	0	0	1	1	2	1	1	2	2
18C	0	0	0	0	0	0	0	1	1	0	1	1
19F	0	0	0	0	0	0	1	6	14	1	6	14
23F	0	0	0	0	0	0	0	2	1	0	2	1
Total PCV7	**0**	0	1	**0**	0	2	5	20	39	5	20	42
1	0	1	0	0	0	0	0	4	2	0	5	2
5	0	0	0	0	0	0	0	0	0	0	0	0
7F	0	0	0	0	0	0	6	27	30	6	27	30
Total PCV10	**0**	1	1	**0**	0	2	11	51	71	11	52	74
3	0	2	3	0	0	1	5	31	28	5	33	32
6A	0	0	0	0	0	0	0	3	2	0	3	2
19A[a]	0	1	0	1	3	4	11	71	56	12	75	60
Total PCV13	**0**	4	4	**1**	3	7	27	156	157	28	163	168
10A	0	2	2	0	0	0	0	14	9	0	16	11
11A	0	0	0	0	0	0	5	12	20	5	12	20
12F	0	3	3	0	2	0	10	47	19	10	52	22
15A	0	3	0	1	2	2	4	12	18	5	17	20
15B	0	1	1	0	1	0	2	13	14	2	15	15
16F	0	0	0	0	0	0	2	14	15	2	14	15
17F	0	0	1	0	0	0	4	8	4	4	8	5
22F	0	2	1	0	0	3	13	47	31	13	49	35
23A	1	3	0	0	0	1	5	13	11	6	16	12
23B	1	1	1	0	2	0	5	20	16	6	23	17
31	0	0	0	0	0	0	1	5	7	1	5	7
33F	0	0	1	0	1	1	7	20	14	7	21	16
38	0	2	2	0	0	0	0	3	12	0	5	14
6C	0	0	0	0	1	1	2	12	12	2	13	13
8	0	1	1	0	0	0	11	47	48	11	48	49
9N	0	0	0	0	0	0	8	22	12	8	22	12
Non-typeable	0	1	2	0	1	0	1	6	4	1	8	6
Other types[b]	0	2	1	0	3	1	3	18	30	3	23	32
Total non-PCV13	2	21	16	**1**	13	9	82	333	296	86	367	321

[a] The indications for PCV10 include cross-protection against 19A disease.

[b] Any of these other types accounted for <5 IPD cases during the 12 months ending 31 December 2018.

Table 4 shows the immunisation status for cases notified in the October−December 2018 quarter in children who were age-eligible for PCV (i.e. cases born after 1 January 2008 and aged ≥6 weeks). There were 8 cases in children who were eligible for PCV, of which one was due to serotype 3, one was due to serotype 19A, and 4 were due to non-PCV serotypes. Serotype information was not available for two cases. The serotype 3 case had received four doses of PCV10 which does not cover serotype 3. The 19A case had received three doses of PCV13 and one dose of PCV10, and may be considered a vaccine failure, although information on their underlying health condition or immune status are currently recorded as unknown.

Table 4. Immunisation status of the invasive pneumococcal disease cases notified in the October−December 2018 quarter in children who were age-eligible for PCV

Number of doses received[a]	Cases due to PCV7 serotypes: 4, 6B, 9V, 14, 18C, 19F or 23F[b]	Cases due to additional PCV10 serotypes: 1, 5, 7F[b]	Cases due to additional PCV13 serotypes: 3, 6A, 19A[b]	Cases due to non-PCV13 serotypes[b]	Total[b,c]
	Number	Number	Number	Number	Number
0	0	0	0	1	1
1	0	0	0	0	0
2	0	0	0	1	1
3	0	0	0	0	0
≥4	0	0	2[d]	2	6
Total	**0**	**0**	**2**	**4**	**8**

[a] 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.

[b] Only IPD cases eligible for PCV as part of the childhood immunisation schedule (ie, cases born after 1 January 2008 and aged ≥6 weeks) are presented.

[c] The total number of cases includes two cases for whom serotype information was not available.

[d] One serotype 19A and one serotype 3

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