Invasive Pneumococcal Disease
Quarterly Report

January–March 2015

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by
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Introduction

Since 17 October 2008, invasive pneumococcal disease (IPD) has been notifiable to the local Medical Officer of Health under the Health Act 1956. On 1 June 2008, pneumococcal conjugate vaccine (PCV) was added to the New Zealand childhood immunisation schedule. Initially the 7-valent conjugate vaccine (PCV7), Prevenar®, was used. In July 2011, Prevenar® was replaced on the schedule with the 10-valent conjugate vaccine (PCV10), Synflorix®. In July 2014, Synflorix® was replaced by the 13-valent conjugate vaccine (PCV13), Prevenar13®.

PCV10 covers the seven serotypes in PCV7 (4, 6B, 9V, 14, 18C, 19F and 23F) as well as serotypes 1, 5 and 7F. PCV13 covers 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.

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.

Methods

The data presented in this report is based on the information recorded on EpiSurv, the national notifiable disease surveillance system, as at 21 April 2015. Any changes made to EpiSurv data by public health unit staff after this date will not be reflected in this report.

Denominator data used to determine all disease rates in this report was derived from the 2014 mid-year population estimates published by Statistics New Zealand. Rates have not been calculated where there are fewer than five notified cases in any category.

The Fisher's exact test was used to determine statistical significance. Results are considered statistically significant when the *P* value is ≤ 0.05.

Streptococcus pneumoniae isolates are serotyped at ESR by the capsular antigen reaction (Neufeld test) using the Danish system of nomenclature and sera obtained from the Statens Serum Institut. Methods have not been established at ESR to identify the strain type when only pneumococcal DNA, rather than an isolate, is available. Therefore, serotype can only be determined for culture-positive IPD cases. Serotype data for invasive isolates of *S. pneumoniae* was matched with the relevant IPD case notification.

Case definition

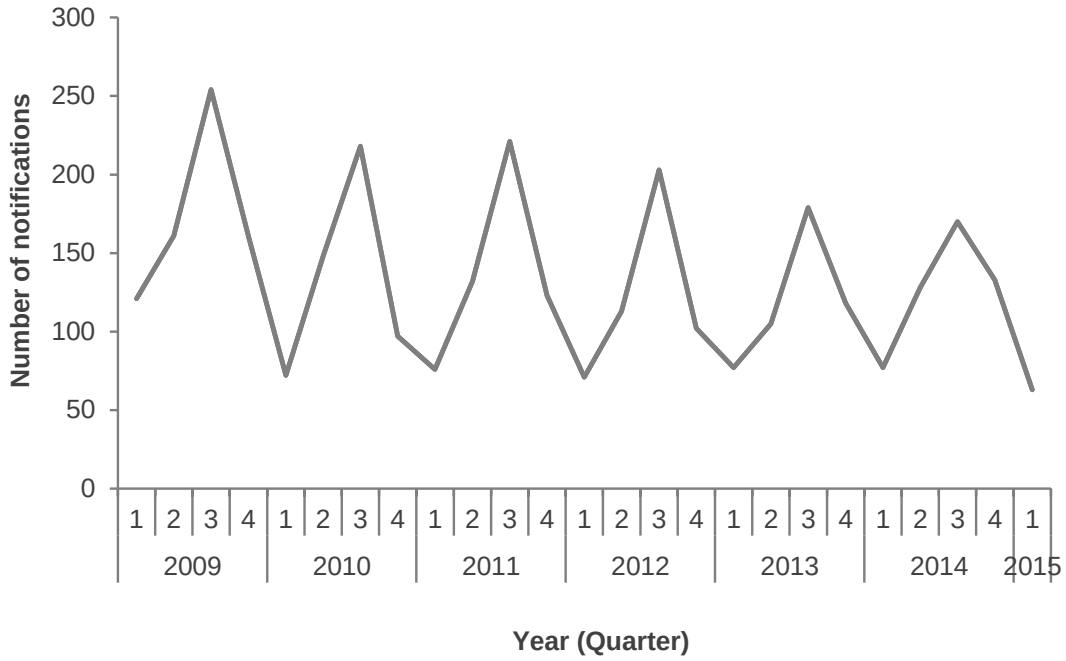
A case of invasive pneumococcal disease is defined as:

- the isolation of *S. pneumoniae* from CSF, blood or other normally sterile site; or
- the detection by nucleic acid amplification test of pneumococcal DNA in CSF, blood or other normally sterile site; or
- a positive newer-generation *S. pneumoniae* antigen test on CSF in individuals from whom samples were obtained after antibiotic treatment.

Results

There were 63 IPD cases notified in the January−March 2015 quarter, compared with 77 cases in same quarter in 2014. 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 March 2015 (11.0 per 100 000 population, 494 cases) was greater than the rate for the previous 12-month period ending March 2014 (10.8 per 100 000, 479 cases).

Figure 1. Number of cases of invasive pneumococcal disease by quarter reported, January 2009–March 2015



The distribution of IPD cases and rates by age group is presented in Table 1. During the latest 12-month period the highest rates were in the ≥65 years (33.1 per 100 000 population, 215 cases) and <2 years (29.3 per 100 000, 35 cases) age groups. 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	Jan-Mar 2015	12 months ending Mar 2015		12 months ending Mar 2014	
	Cases	Cases	Rate[a]	Cases	Rate[a]
<2 years	3	35	29.3	24	19.7
2–4 years	4	24	12.7	18	9.5
5–64 years	30	220	6.2	250	7.1
≥65 years	26	215	33.1	187	29.9
Total	**63**	**494**	**11.0**	**479**	**10.8**

[a] Rate is expressed as cases per 100 000 population.

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 (13.3 per 100 000 population, 115 cases). Comparing the latest 12-month period to the previous 12-month period, there was a significant decrease in Nelson Marlborough DHB (15 to 5 cases).

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

Region	Jan−Mar 2015	12 months ending Mar 2015		12 months ending Mar 2014	
	Cases	Cases	Rate[a]	Cases	Rate[a]
Northern[b]	29	206	12.0	175	10.5
Midland[c]	11	115	13.3	120	14.0
Central[d]	14	100	9.8	108	10.7
Southern[e]	9	73	8.0	76	8.4
Total	**63**	**494**	**11.0**	**479**	**10.8**

[a] Rate is expressed as cases per 100 000 population.

[b] Includes Northland, Waitemata, Auckland and Counties Manukau DHBs.

[c] Includes Waikato, Lakes, Bay of Plenty, Tairawhiti and Taranaki DHBs.

[d] Includes Hawke's Bay, Whanganui, MidCentral, Hutt Valley, Capital and Coast, Wairarapa and Nelson Marlborough DHBs.

[e] Includes West Coast, Canterbury, South Canterbury and Southern DHBs.

A culture was received at ESR for serotyping from 56 (89%) of the 63 cases notified in the January−March 2015 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 PCV10 serotypes decreased 33% between the last two 12-month periods (160 to 108 cases). During the last 12 months, there were only three cases of IPD due to a PVC10 type in the <2 years age group.

The three most prevalent serotypes during the last 12 months were 19A, 7F and 3 (Table 3). Cases due to serotypes 19A and 3 (both PCV13 types) increased during the last 12-month period. Notably the increase in cases of 19A disease occurred in the <2 years age group (8 to 13 cases) as well as the >5 years age group.

The increases observed in cases of serotype 7F (a PCV10 type) since 2012, which have been mainly confined to the >5 years age group, appear to have arrested with a decrease in the number of cases in the latest 12-month period compared to the previous 12-month period (70 to 52 cases). This decrease in cases of serotype 7F IPD may indicate an indirect effect of infant PCV10 immunisation on type 7F disease in the older age groups is beginning to occur.

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

Serotypes	Age group											
	<2 years			2–4 years			≥5 years			Total		
	Q1 2015[a]	2015[b]	2014[c]	Q1 2015[a]	2015[b]	2014[c]	Q1 2015[a]	2015[b]	2014[c]	Q1 2015[a]	2015[b]	2014[c]
4	0	0	0	0	0	1	0	20	31	0	20	32
6B	1	1	0	0	0	0	0	2	6	1	3	6
9V	0	0	0	0	0	0	0	7	10	0	7	10
14	0	0	0	0	0	1	0	3	6	0	3	7
18C	0	1	0	0	0	0	0	7	16	0	8	16
19F	0	1	0	0	0	0	4	9	13	4	10	13
23F	0	0	0	0	0	0	1	3	4	1	3	4
Total PCV7	**1**	**3**	**0**	**0**	**0**	**2**	**5**	**51**	**86**	**6**	**54**	**88**
1	0	0	0	0	1	1	1	1	1	1	2	2
5	0	0	0	0	0	0	0	0	0	0	0	0
7F	0	0	1	0	1	0	6	51	69	6	52	70
Total PCV10	**1**	**3**	**1**	**0**	**2**	**3**	**12**	**103**	**156**	**13**	**108**	**160**
3	0	5	5	1	3	0	4	32	23	5	40	28
6A	0	0	0	0	0	0	0	1	1	0	1	1
19A	2	13	8	0	5	4	11	74	62	13	92	74
Total PCV13	**3**	**21**	**14**	**1**	**10**	**7**	**27**	**210**	**242**	**31**	**241**	**263**
6C	0	3	0	1	2	1	6	25	21	7	30	22
8	0	1	2	0	0	0	1	19	15	1	20	17
9N	0	2	0	0	0	0	0	12	13	0	14	13
10A	0	0	0	0	1	0	0	4	7	0	5	7
11A	0	0	2	0	0	1	0	12	8	0	12	11
15B	0	0	0	1	2	1	2	7	7	3	9	8
16 non-typable	0	1	0	0	0	1	0	11	8	0	12	9
22F	0	0	1	0	1	0	4	35	42	4	36	43
23A	0	2	0	0	0	0	2	11	5	2	13	5
23B	0	0	0	0	0	1	0	8	4	0	8	5
31	0	0	0	0	0	0	1	6	2	1	6	2
33F	0	1	2	0	0	0	1	8	8	1	9	10
35 non-typable	0	0	0	0	1	1	2	16	6	2	17	7
38	0	0	1	0	0	0	1	4	1	1	4	2
Other types[d]	0	0	1	0	3	2	3	26	24	3	29	27
Total non-PCV13	**0**	**10**	**9**	**2**	**10**	**8**	**23**	**204**	**171**	**25**	**224**	**188**

[a] Cases reported in the first quarter of 2015 (January−March 2015).

[b] Cases reported in the 12 months ending 31 March 2015.

[c] Cases reported in the 12 months ending 31 March 2014.

[d] Any of these other serogroups/serotypes accounted for ≤5 IPD cases during the 12 months ending 31 March 2015.