Invasive Pneumococcal Disease
Quarterly Report

April–June 2014

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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. In June 2008, a 7-valent pneumococcal conjugate vaccine (PCV7), Prevenar®, was added to the New Zealand childhood immunisation schedule. From approximately October 2011, the 10-valent pneumococcal conjugate vaccine (PCV10), Synflorix®, replaced PCV7 as supplies of the latter were depleted. The latest immunisation schedule changes introduced on 1 July 2014 include replacement of PCV10 with the 13-valent pneumococcal conjugate vaccine (PCV13), Prevenar 13®.

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 14 July 2014. 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 2013 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

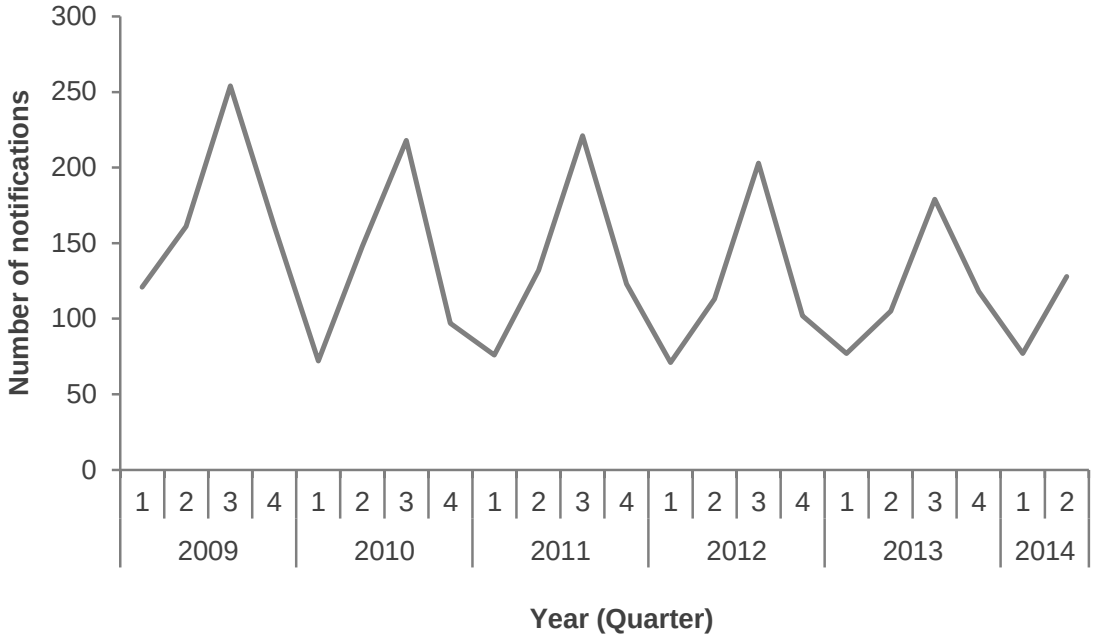
A case of invasive pneumococcal disease is defined as:

- 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 128 IPD cases notified in the April−June 2014 quarter, compared with 105 cases in same quarter in 2013. 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 June 2014 (11.2 per 100 000 population, 502 cases) was similar to the rate for the previous 12-month period ending June 2013 (11.0 per 100 000, 487 cases).

Figure 1. Number of cases of invasive pneumococcal disease by quarter reported, January 2009–June 2014



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 (33.4 per 100 000 population, 212 cases) and <2 years (22.4 per 100 000, 27 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	Apr−Jun 2014	12 months ending Jun 2014		12 months ending Jun 2013	
	Cases	Cases	Rate[a]	Cases	Rate[a]
<2 years	10	27	22.4	41	33.4
2–4 years	4	17	9.1	15	7.9
5–64 years	50	246	7.0	224	6.4
≥65 years	64	212	33.4	207	33.9
Total	**128**	**502**	**11.2**	**487**	**11.0**

[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 (13.8 per 100 000 population, 117 cases). Comparing the latest 12-month period to the previous 12-month period, there was a significant decrease in the Southern DHB (39 to 21 cases).

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

Region	Apr−Jun 2014	12 months ending Jun 2014		12 months ending Jun 2013	
	Cases	Cases	Rate[a]	Cases	Rate[a]
Northern[b]	50	192	11.3	170	10.1
Midland[c]	30	117	13.8	115	13.6
Central[d]	24	114	11.3	110	10.9
Southern[e]	24	79	8.7	92	10.2
Total	**128**	**502**	**11.2**	**487**	**11.0**

[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.

Table 3 shows the culture-positive IPD cases due to each of the serotypes included in PCV7 and PCV10, and due to non-PCV10 serotypes. Of the 128 cases notified in the April−June 2014 quarter, 119 (93%) were culture positive.

The number of IPD cases due to PCV7 serotypes decreased 23% between the last two 12-month periods (111 to 86 cases), with a decrease in the number of cases due to each of the PCV7 types except 18C. Notably during the last 12 months, there were only three IPD cases due to a PVC7 type in the <5 years age group. Among the <2 years age group there was only one case due to one of the three additional serotypes in PCV10.

The three most prevalent serotypes during the last 12 months were 19A, 7F and 22F (Table 3). Of these three serotypes, only 7F cases increased substantially during the last 12 month period. Despite type 7F being one of the additional serotypes covered by PCV10, cases of IPD due to this type have increased since the introduction of PCV10 in late 2011: from an average of 11 cases per annum in the years prior to the change to PCV10 to 51 cases in the 12 months to June 2013 and 68 cases in the 12 months to June 2014. The increase in type 7F cases has occurred wholly in the ≥5 years age group which suggests that, as yet, there is no evidence of herd immunity for 7F disease.

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

Serotypes	Age group											
	<2 years			2–4 years			≥5 years			Total		
	Q2 2014[a]	2014[b]	2013[c]	Q2 2014[a]	2014[b]	2013[c]	Q2 2014[a]	2014[b]	2013[c]	Q2 2014[a]	2014[b]	2013[c]
4	0	0	0	0	1	0	4	27	40	4	28	40
6B	0	0	0	0	0	0	1	6	7	1	6	7
9V	0	0	0	0	0	0	1	8	12	1	8	12
14	0	0	0	0	1	1	1	7	13	1	8	14
18C	1	1	0	0	0	0	2	14	12	3	15	12
19F	0	0	2	0	0	0	4	17	17	4	17	19
23F	0	0	0	0	0	0	1	4	7	1	4	7
Total PCV7	**1**	**1**	**2**	**0**	**2**	**1**	**14**	**83**	**108**	**15**	**86**	**111**
1	0	0	0	1	2	1	0	1	3	1	3	4
5	0	0	0	0	0	0	0	0	0	0	0	0
7F	0	1	1	0	0	1	15	67	49	15	68	51
Total PCV10	**1**	**2**	**3**	**1**	**4**	**3**	**29**	**151**	**160**	**31**	**157**	**166**
3	0	5	1	0	0	0	12	29	27	12	34	28
6A	0	0	3	0	0	0	0	1	5	0	1	8
6C	0	0	2	0	1	0	9	26	16	9	27	18
8	0	2	3	0	0	0	3	14	15	3	16	18
9N	2	2	0	0	0	0	4	15	10	6	17	10
10A	0	0	3	1	1	1	1	6	7	2	7	11
11A	0	1	3	0	0	1	4	8	11	4	9	15
19A	3	6	13	1	5	3	21	72	59	25	83	75
22F	0	1	0	0	0	0	6	37	38	6	38	38
33F	1	2	1	0	0	0	3	10	6	4	12	7
Other types[d]	1	3	5	1	3	6	15	59	58	17	65	69
Total non-PCV10	**7**	**22**	**34**	**3**	**10**	**11**	**78**	**277**	**252**	**88**	**309**	**297**

[a] Cases reported in the second quarter of 2014 (April−June 2014).

[b] Cases reported in the 12 months ending 30 June 2014.

[c] Cases reported in the 12 months ending 30 June 2013.

[d] Other serogroups/serotypes reported in the April−June 2014 quarter include 15B, 16, 15, 17, 21, 23A, 23B, 31 and 35.