Invasive Pneumococcal Disease
Quarterly Report

October–December 2012

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by
Esther Lim
Helen Heffernan

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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.

PCV10 includes the seven serotypes in PCV7 (4, 6B, 9V, 14, 18C, 19F, and 23F) as well as serotypes 1, 5, and 7F. 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 change from PCV7 to PCV10, 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 11 January 2013. 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 2012 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. P-values less than 0.05 are considered to be significant at the 95% level of confidence.

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

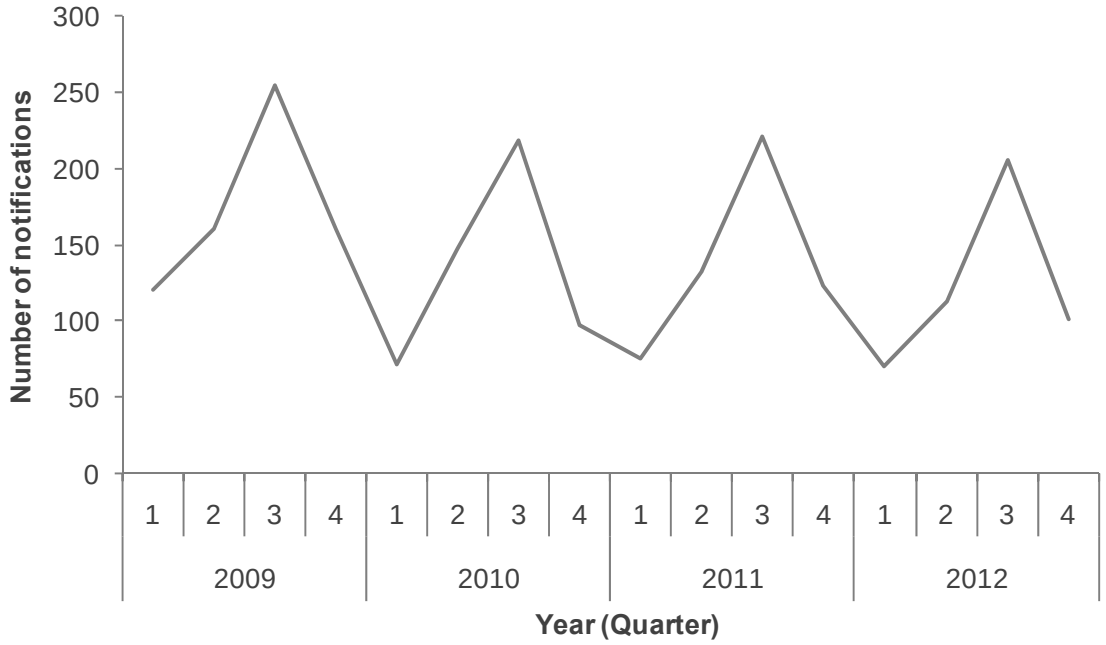
A case of invasive pneumococcal disease is defined as:

- 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 (i.e. Binax NOW) on CSF.

Results

There were 101 IPD cases notified in the October–December 2012 quarter (123 cases in October–December 2011). There is a distinct seasonal pattern with a peak in the July-September quarter and a trough in the January-March quarter each year (Figure 1). The notification rate for the latest 12-month period ending December 2012 (11.1 per 100 000 population, 491 cases) was a significant decrease from the rate for the previous 12-month period ending December 2011 (12.5 per 100 000, 552 cases).

Figure 1. Number of cases of invasive pneumococcal disease by quarter reported, January 2009–December 2012



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 <2 years (35.9 per 100 000 population, 44 cases) and ≥65 years (34.3 per 100 000, 210 cases) age groups. Comparing the latest 12-month period with the previous 12-month period, there was a significant decrease in IPD in the 5–64 years age group (7.8 to 6.4 per 100 000) and a non-significant increase in the <2 years age group (23.8 to 35.9 per 100 000).

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

Age group	Oct-Dec 2012	12 months ending Dec 2012		12 months ending Dec 2011	
	Cases	Cases	Rate[a]	Cases	Rate[a]
<2 years	7	44	35.9	30	23.8
2-4 years	3	14	7.4	18	9.6
5-64 years	46	223	6.4	274	7.8
≥65 years	45	210	34.3	230	39.2
Total	**101**	**491**	**11.1**	**552**	**12.5**

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

The distribution of IPD cases and rates by region is presented in Table 2. During the last 12-month period, IPD rates were similar across all regions, ranging between 9.4 and 12.9 per 100 000 population. There were significant decreases in the rates in Waitemata (11.0 to 6.9 per 100 000), Lakes (28.2 to 13.6 per 100 000), and Canterbury (13.3 to 8.2 per 100 000) DHBs between the previous 12-month period and the latest 12-month period.

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

Region	Oct–Dec 2012	12 months ending Dec 2012		12 months ending Dec 2011	
	Cases	Cases	Rate[a]	Cases	Rate[a]
Northern[b]	33	188	11.2	208	12.5
Midland[c]	22	109	12.9	120	14.3
Central[d]	27	110	10.9	112	11.1
Southern[e]	19	84	9.4	112	12.5
Total	**101**	**491**	**11.1**	**552**	**12.5**

[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 cases due to each of the serotypes included in PCV7 and PCV10, and due to non-PCV10 serotypes. Of the 101 cases notified in the October–December 2012 quarter, 83 (82%) were culture-positive. The predominant PCV7 serotype reported in the quarter was type 4 (11 cases), all from cases in the ≥5 years age group. During the quarter there were two cases of IPD due to a PCV7 serotype (14 and 19F) in the <5 years age group.

Comparing the latest 12-month period with the previous 12-month period, the number of cases due to each of the PCV7 serotypes, except type 4, decreased. The small increase in the number of cases due to type 4 was all in the ≥5 years age group.

In recent years New Zealand has experienced an 'outbreak' of serotype 1 (a PCV10, but not PCV7, type) disease which started in 2006, peaked in 2009 with 153 cases, then since 2010 cases have declined each year with just 8 cases in the latest 12-month period. In contrast, the number of cases of another PCV10 serotype, 7F, more than doubled between the last two 12-month periods (16 to 36). This increase in type 7F cases occurred in the ≥5 years age group.

The number of cases due to non-PCV10 serotypes decreased by 8% (303 to 278) in the latest 12-month period compared with the previous 12-month period, with the largest decreases in type 9N (53%) and type 3 (39%) cases. However, the number of cases due to non-PCV10 serotypes increased in the <2 years age group (21 to 34). In the latest 12-month period, serotype 19A was the most common non-PCV10 type in all age groups, and the number of cases due to this type increased 27% between the last two 12-month periods (63 to 80). The second most common non-PCV10 type in the latest 12-month period was serotype 22F. During the last two 12-month periods, type 22F has been isolated only from IPD cases ≥5 years of age.

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 2012[a]	2012[b]	2011[c]	Q4 2012[a]	2012[b]	2011[c]	Q4 2012[a]	2012[b]	2011[c]	Q4 2012[a]	2012[b]	2011[c]
4						1	11	48	45	11	48	46
6B			1					7	17		7	18
9V			1		1		3	12	14	3	13	15
14		1		1	1	1	2	15	27	3	17	28
18C			1			1	1	9	14	1	9	16
19F	1	1				3	4	23	36	5	24	39
23F						1	2	8	16	2	8	17
Total (PCV7)	**1**	**2**	**3**	**1**	**2**	**7**	**23**	**122**	**169**	**25**	**126**	**179**
1		1	2			1	2	7	32	2	8	35
5												
7F	1	2	2		2	2	4	32	12	5	36	16
Total (PCV10)	**2**	**5**	**7**	**1**	**4**	**10**	**29**	**161**	**213**	**32**	**170**	**230**
3		1					7	22	38	7	23	38
6A		2					3	5	8	3	7	8
6C		2	1				2	13	15	2	15	16
8	1	2	2				4	16	11	5	18	13
9N			1				2	7	14	2	7	15
10A	1	3	1	1	1		2	5	10	4	9	11
11A		2	1				4	12	13	4	14	14
19A	1	13	8		5	5	12	62	50	13	80	63
22F							4	40	38	4	40	38
33F			1				1	9	10	1	9	11
Other types[d]		9	6	1	2	2	5	45	68	6	56	76
Total (non-PCV10)	**3**	**34**	**21**	**2**	**8**	**7**	**46**	**236**	**275**	**51**	**278**	**303**

[a] Cases reported in the fourth quarter of 2012 (October–December 2012).

[b] Cases reported in the 12 months ending 31 December 2012.

[c] Cases reported in the 12 months ending 31 December 2011.

[d] Other serogroups/serotypes reported in the October–December 2012 quarter include 12F, 15B, 23B and 38.