

Invasive Pneumococcal Disease Quarterly Report

July–September 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. 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 14 October 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

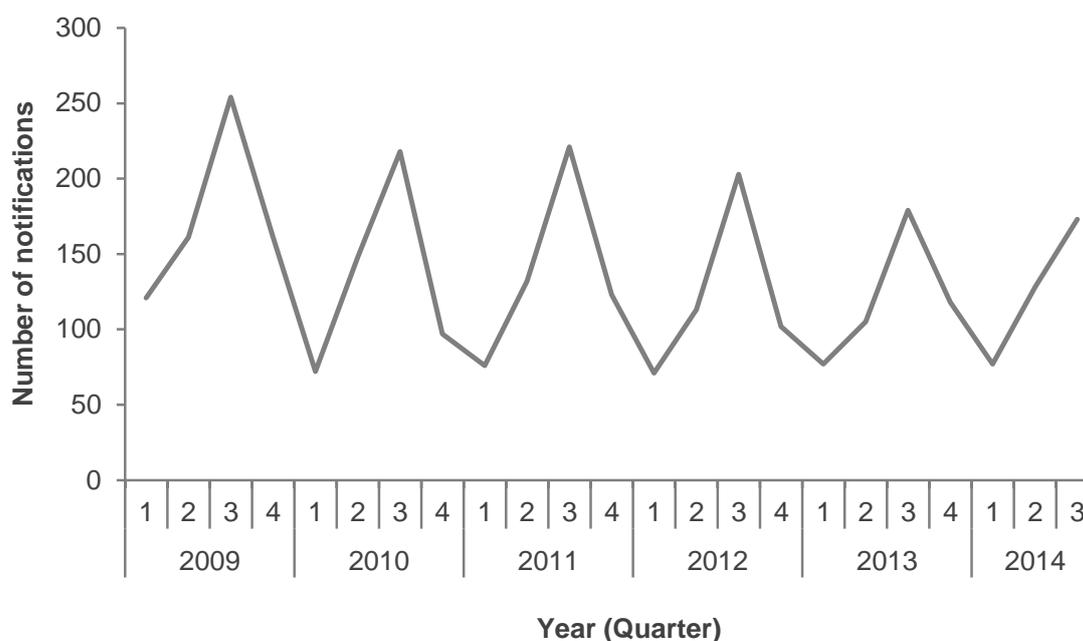
A case of invasive pneumococcal disease is defined as:

- 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 173 IPD cases notified in the July–September 2014 quarter, compared with 179 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 September 2014 (11.1 per 100 000 population, 496 cases) was greater than the rate for the previous 12-month period ending September 2013 (10.4 per 100 000, 463 cases).

Figure 1. Number of cases of invasive pneumococcal disease by quarter reported, January 2009–September 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 (33.5 per 100 000 population, 213 cases) and < 2 years (23.3 per 100 000, 28 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	Jul–Sep 2014	12 months ending Sep 2014		12 months ending Sep 2013	
	Cases	Cases	Rate ^a	Cases	Rate ^a
<2 years	8	28	23.3	28	22.8
2–4 years	8	21	11.2	15	7.9
5–64 years	91	234	6.6	239	6.8
≥ 65 years	66	213	33.5	181	29.6
Total	173	496	11.1	463	10.4

^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 (14.2 per 100 000 population, 120 cases). Comparing the latest 12-month period to the previous 12-month period, there was a significant increase in the Auckland DHB (28 to 60 cases).

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

Region	Jul–Sep 2014	12 months ending Sep 2014		12 months ending Sep 2013	
	Cases	Cases	Rate ^a	Cases	Rate ^a
Northern ^b	67	193	11.3	158	9.4
Midland ^c	44	120	14.2	111	13.2
Central ^d	38	108	10.7	108	10.7
Southern ^e	24	75	8.3	86	9.6
Total	173	496	11.1	463	10.4

^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, Tairāwhiti 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 157 (91%) of the 173 cases notified in the July–September 2014 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 PCV7 serotypes decreased 37% between the last two 12-month periods (101 to 64 cases), with a decrease in the number of cases due to each of the PCV7 types except serotype 14. 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 3 (Table 3). Cases due to serotypes 19A and 3 (both PCV13 types) increased during the last 12-month period, with the increases in both serotypes occurring predominantly in the >5 years age group. The increases observed in serotype 7F disease since 2012, also mainly confined to the >5 years age group, appear to have arrested with a similar number of cases (58 vs 59) in the latest and previous 12-month periods. This stabilisation of cases of serotype 7F IPD may indicate some 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		
	Q3 2014 ^a	2014 ^b	2013 ^c	Q3 2014 ^a	2014 ^b	2013 ^c	Q3 2014 ^a	2014 ^b	2013 ^c	Q3 2014 ^a	2014 ^b	2013 ^c
4	0	0	0	0	1	0	9	18	41	9	19	41
6B	0	0	0	0	0	0	0	3	6	0	3	6
9V	0	0	0	0	0	0	4	8	12	4	8	12
14	0	0	0	0	1	1	1	7	4	1	8	5
18C	0	1	0	0	0	0	3	10	13	3	11	13
19F	0	0	2	0	0	0	2	13	14	2	13	16
23F	0	0	0	0	0	0	0	2	8	0	2	8
Total PCV7	0	1	2	0	2	1	19	61	98	19	64	101
1	0	0	0	0	1	2	0	0	3	0	1	5
5	0	0	0	0	0	0	0	0	0	0	0	0
7F	0	1	1	0	0	0	20	57	58	20	58	59
Total PCV10	0	2	3	0	3	3	39	118	159	39	123	165
3	1	3	4	1	1	0	9	33	22	11	37	26
6A	0	0	1	0	0	0	0	0	5	0	0	6
19A	2	7	8	4	6	4	31	79	57	37	92	69
Total PCV13	3	12	16	5	10	7	79	230	243	87	252	266
6C	2	2	0	0	1	0	4	24	15	6	27	15
8	0	1	3	0	0	0	6	14	15	6	15	18
9N	0	2	0	0	0	0	6	18	10	6	20	10
10A	0	0	2	0	1	1	2	6	7	2	7	10
11A	0	1	1	0	0	1	1	7	10	1	8	12
22F	0	0	1	1	1	0	13	33	37	14	34	38
33F	0	2	1	0	0	0	2	10	6	2	12	7
15B	0	0	0	0	0	2	2	7	5	2	7	7
17F	0	0	0	0	0	1	3	5	5	3	5	6
23A	0	0	0	0	0	0	2	6	6	2	6	6
23B	0	0	1	0	0	1	4	10	4	4	10	6
31	0	0	0	0	0	0	1	5	0	1	5	0
35 non-typable	0	0	0	0	0	1	7	12	5	7	12	6
16 non-typable	0	1	0	0	1	0	5	11	4	5	13	4
Other types ^d	0	1	1	0	2	1	9	20	23	9	23	25
Total non-PCV13	2	10	10	1	6	8	67	188	152	70	204	170

^a Cases reported in the third quarter of 2014 (July–September 2014).

^b Cases reported in the 12 months ending 30 September 2014.

^c Cases reported in the 12 months ending 30 September 2013.

^d Other serogroups/serotypes reported in the July–September 2014 quarter include 7C, 11 non-typable, 13, 15A, 20, 34, 37 and 38. Each of these serogroups/serotypes accounted for <5 IPD cases during the 12 months ending 30 September 2014.