

Invasive Pneumococcal Disease Quarterly Report

July–September 2016

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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 13 October 2016. 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 2015 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, the 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:

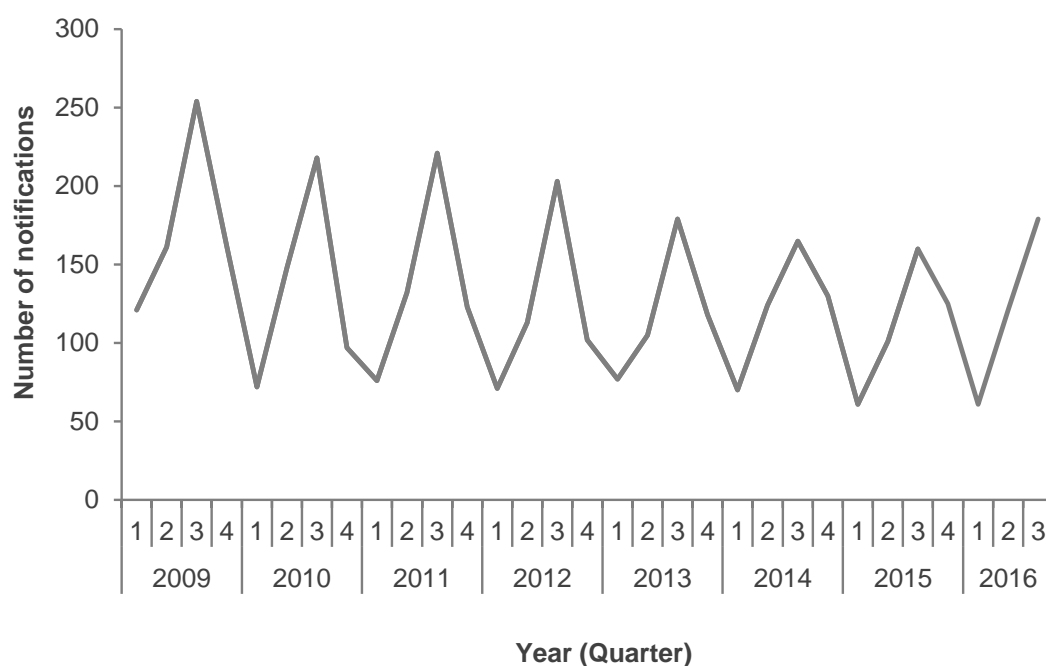
- the isolation of *S. pneumoniae* from CSF, blood or other normally sterile site; or
- the detection by nucleic acid amplification test of pneumococcal DNA in CSF, blood or other normally sterile site; or
- a positive newer-generation *S. pneumoniae* antigen test on CSF or pleural fluid.¹

¹ A positive *S. pneumoniae* antigen test on pleural fluid was added to the case definition in mid-September 2016.

Results

There were 179 IPD cases notified in the July–September 2016 quarter, compared with 160 cases in the same quarter in 2015. 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 2016 (10.6 per 100,000 population, 486 cases) was similar to the rate for the previous 12-month period ending September 2015 (10.0 per 100,000, 452 cases).

Figure 1. Number of cases of invasive pneumococcal disease by quarter reported, January 2009–September 2016



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 (29.4 per 100,000 population, 198 cases). Comparing the latest 12-month period with the previous 12-month period, there was a significant increase in IPD cases in the 5–64 years age group (199 to 246 cases).

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

Age group	Jul-Sep 2016	12 months ending Sep 2016		12 months ending Sep 2015	
	Cases	Cases	Rate ^a	Cases	Rate ^a
<2 years	6	20	16.9	22	18.4
2–4 years	8	22	11.8	14	7.4
5–64 years	90	246	6.8	199	5.6
≥ 65 years	75	198	29.4	217	33.4
Total	179	486	10.6	452	10.0

^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 Northern region (12.5 per 100,000 population, 219 cases).

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

Region	Jul-Sep 2016	12 months ending Sep 2016		12 months ending Sep 2015	
	Cases	Cases	Rate ^a	Cases	Rate ^a
Northern ^b	91	219	12.5	181	10.6
Midland ^c	35	106	12.2	103	11.9
Central ^d	26	84	8.3	93	9.1
Southern ^e	27	77	8.4	75	8.2
Total	179	486	10.6	452	10.0

^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, Tairāwhiti and Taranaki DHBs.

^d Includes Hawke's Bay, Whanganui, MidCentral, Hutt Valley, Capital & 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 170 (95.0%) of the 179 cases notified in the July–September 2016 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 10.1% between the last two 12-month periods (217 to 195 cases). In the <2 years age group during the last 12 months there were no cases of IPD due to a PCV10 type and six cases due to PCV13 types.

The four most prevalent serotypes during the last 12 months were 19A, 22F, 7F and 3 (Table 3), although between the last two 12-month periods there were decreases in IPD due to each of these serotypes. However, between the same two time periods, there was a 21.8% increase in IPD due to non-PCV13 serotypes, with notable increases in types 15A (2 to 18 cases), 16F (3 to 11 cases), 17F (2 to 9 cases), 23B (8 to 21 cases) and 33F (14 to 20 cases). With the exception of serotype 33F, the increases in IPD due to non-PCV13 types occurred in the ≥5 years age group.

Table 4 shows the immunisation status for the 16 cases notified in the July–September 2016 quarter who were age-eligible for PCV (ie, cases born after 1 January 2008 and aged ≥6 weeks). Immunisation status was based on information recorded in EpiSurv (ie, data was not matched to the National Immunisation Register). Eight of the 16 cases were due to a PCV13 type: two cases of type 3 IPD and six cases of type 19A disease. The remaining age-eligible cases were due to non-PCV13 types (6 cases) or the serotype causing disease was not known (2 cases).

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 2016 ^a	2016 ^b	2015 ^c	Q3 2016 ^a	2016 ^b	2015 ^c	Q3 2016 ^a	2016 ^b	2015 ^c	Q3 2016 ^a	2016 ^b	2015 ^c
4	0	0	0	0	1	1	6	19	20	6	20	21
6B	0	0	1	0	0	0	0	1	1	0	1	2
9V	0	0	0	0	0	0	2	2	6	2	2	6
14	0	0	0	0	0	0	4	9	1	4	9	1
18C	0	0	0	0	0	0	2	2	4	2	2	4
19F	0	0	0	0	0	0	2	13	13	2	13	13
23F	0	0	0	0	0	0	1	2	7	1	2	7
Total PCV7	0	0	1	0	1	1	17	48	52	17	49	54
1	0	0	0	0	0	0	0	1	1	0	1	1
5	0	0	0	0	0	0	1	2	0	1	2	0
7F	0	0	0	0	0	1	9	33	37	9	33	38
Total PCV10	0	0	1	0	1	2	27	84	90	27	85	93
3	0	1	3	1	1	3	11	28	28	12	30	34
6A	0	0	0	0	0	0	1	2	1	1	2	1
19A	4	5	8	3	9	0	25	64	81	32	78	89
Total PCV13	4	6	12	4	11	5	64	178	200	72	195	217
6C	0	0	2	0	1	2	7	23	20	7	24	24
8	0	0	2	0	0	0	8	23	24	8	23	26
9N	1	1	0	0	0	0	4	9	9	5	10	9
10A	0	0	0	0	0	0	3	6	4	3	6	4
11A	0	0	0	0	0	0	3	9	10	3	9	10
12F	0	0	0	0	0	0	3	7	4	3	7	4
15A	1	1	0	0	1	0	7	16	2	8	18	2
15B	0	1	1	1	2	2	1	8	6	2	11	9
16F	0	0	0	0	0	0	6	11	3	6	11	3
17F	0	0	0	0	0	0	4	9	2	4	9	2
22F	0	1	0	0	1	1	14	35	40	14	37	41
23A	0	1	2	0	0	0	1	12	13	1	13	15
23B	0	0	0	0	0	1	9	21	7	9	21	8
31	0	0	0	0	0	0	2	5	7	2	5	7
33F	0	3	1	0	0	0	9	17	13	9	20	14
35B	0	0	0	0	2	1	2	5	5	2	7	3
38	0	0	0	0	1	0	3	6	3	3	7	3
Other types ^d	0	4	1	1	1	2	8	25	30	9	30	36
Total non-PCV13	2	12	9	2	9	9	94	247	202	98	268	220

^a Cases reported in the third quarter of 2016 (July-September 2016).

^b Cases reported in the 12 months ending 30 September 2016.

^c Cases reported in the 12 months ending 30 September 2015.

^d Any of these other serogroups/serotypes accounted for ≤5 IPD cases during the 12 months ending 30 September 2016.

Table 4. Immunisation status of the invasive pneumococcal disease cases notified in the July-September 2016 quarter and who were 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 or 7F ^b		Cases due to additional PCV13 serotypes: 3, 6A or 19A ^b		Cases due to non-PCV13 serotypes ^b		Total ^{b,c}	
	No	%	No	%	No	%	No	%	No	%
0	0	-	0	-	0	-	0	-	0	-
1	0	-	0	-	0	-	1	16.7	1	6.3
2	0	-	0	-	0	-	0	-	0	-
3	0	-	0	-	2 ^d	25.0	1	16.7	3	18.8
4	0	-	0	-	5 ^e	62.5	3	50.0	10	62.5
Unknown	0	-	0	-	1 ^f	12.5	1	16.7	2	12.5
Total	0		0		8		6		16	

^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 reported 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 where serotype information was not available.

^d Cases due to serotype 19A (2 cases).

^e Cases due to serotype 3 (2 cases) and 19A (3 cases).

^f Case due to serotype 19A.