

Invasive Pneumococcal Disease Quarterly Report

July–September 2013

Prepared as part of a Ministry of Health
contract for scientific services

by
Ali Borman
Helen Heffernan

October 2013

Acknowledgements

This report could not have been produced without the continued support of staff in the public health units and diagnostic microbiology laboratories throughout New Zealand who provide us with data from their regions and refer isolates to ESR.

The authors would also like to thank Julie Morgan (ESR Invasive Pathogens Laboratory) for providing serotyping data, Esther Lim (ESR Health Intelligence Team) for data checking, and Vanita Dhanda for reviewing the draft report.

Disclaimer

This report or document (“the Report”) is given by the Institute of Environmental Science and Research Limited (“ESR”) solely for the benefit of the Ministry of Health, Public Health Service Providers and other Third party Beneficiaries as defined in the Contract between ESR and the Ministry of Health, and is strictly subject to the conditions laid out in the contract.

Neither ESR nor any of its employees makes any warranty, express or implied, or assumes any legal liability or responsibility for use of the Report or its contents by any other person or organisation

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 9 October 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. Results are considered statistically significant when the *P* value is less than or equal to 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

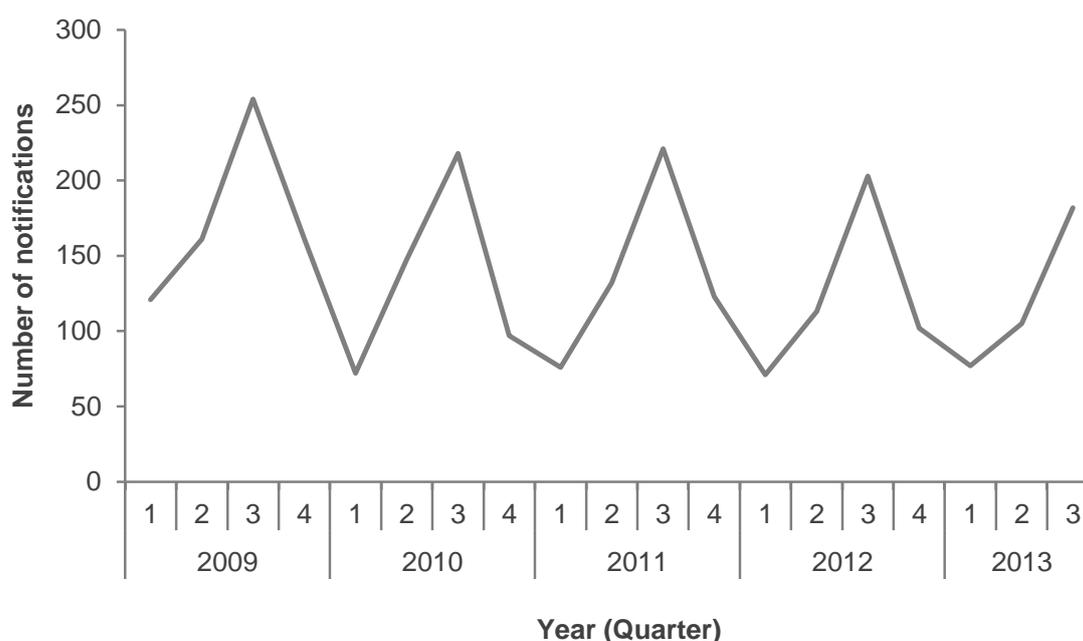
A case of invasive pneumococcal disease is defined as:

- 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 182 IPD cases notified in the July–September 2013 quarter (203 cases in July–September 2012). There is a distinct seasonal pattern with a winter peak and summer trough (Figure 1). The notification rate for the latest 12-month period ending September 2013 (10.5 per 100 000 population, 466 cases) was a non-significant decrease from the rate for the previous 12-month period ending September 2012 (11.6 per 100 000, 510 cases).

Figure 1. Number of cases of invasive pneumococcal disease by quarter reported, January 2009–September 2013



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 (29.8 per 100 000 population, 182 cases) and < 2 years (22.8 per 100 000, 28 cases) age groups. Comparing the latest 12-month period with the previous 12-month period, there was a significant decrease in the ≥ 65 years age group (37.3 to 29.8 per 100 000).

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

Age group	Jul–Sep 2013	12 months ending Sep 2013		12 months ending Sep 2012	
	Cases	Cases	Rate ^a	Cases	Rate ^a
<2 years	7	28	22.8	45	35.8
2–4 years	4	15	7.9	15	8.0
5–64 years	105	241	6.9	231	6.6
≥ 65 years	66	182	29.8	219	37.3
Total	182	466	10.5	510	11.6

^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, 112 cases). Comparing the latest 12-month period to the previous 12-month period, there was a significant decrease in the rate for Northern DHB (12.1 to 9.4 per 100 000).

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

Region	Jul–Sep 2013	12 months ending Sep 2013		12 months ending Sep 2012	
	Cases	Cases	Rate ^a	Cases	Rate ^a
Northern ^b	66	158	9.4	201	12.1
Midland ^c	42	112	13.3	110	13.1
Central ^d	44	108	10.7	113	11.2
Southern ^e	30	88	9.8	86	9.6
Total	182	466	10.5	510	11.6

^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.

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 182 cases notified in the July–September 2013 quarter, 158 (86.8%) were culture-positive.

The predominant PCV7 serotype reported in the quarter was type 4 (17 cases), followed by type 18C (7 cases). Notably, there were no cases due to a PCV7 type in the <5 years age group in the quarter. Comparing the latest 12-month period with the previous 12-month period, the number of cases due to each of the PCV7 serotypes decreased, except for type 18C.

The number of cases of type 7F IPD (additional serotype covered by PCV10) increased by 53% between the last two 12-month periods (36 to 55 cases). Serotype 7F is now the second most common serotype among IPD cases in New Zealand. However, the increase in type 7F cases appears to be occurring wholly in the ≥5 years age group.

In the latest 12-month period, the most common serotype among IPD cases in all age groups was the non-PCV10 type 19A. However, the number of cases due to this type actually decreased by 14% between the last two 12-month periods (80 to 69 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 2013 ^a	2013 ^b	2012 ^c	Q3 2013 ^a	2013 ^b	2012 ^c	Q3 2013 ^a	2013 ^b	2012 ^c	Q3 2013 ^a	2013 ^b	2012 ^c
4	0	0	0	0	0	0	17	39	48	17	39	48
6B	0	0	1	0	0	0	3	6	10	3	6	11
9V	0	0	0	0	0	1	4	12	12	4	12	13
14	0	0	1	0	1	0	1	4	18	1	5	19
18C	0	0	0	0	0	0	7	13	12	7	13	12
19F	0	2	0	0	0	0	5	13	24	5	15	24
23F	0	0	0	0	0	1	2	8	9	2	8	10
Total (PCV7)	0	2	2	0	1	2	39	95	133	39	98	137
1	0	0	1	1	2	0	1	3	11	2	5	12
5	0	0	0	0	0	0	0	0	0	0	0	0
7F	0	1	2	0	0	3	26	54	31	26	55	36
Total (PCV10)	0	3	5	1	3	5	66	152	175	67	158	185
3	2	3	1	0	0	0	5	22	26	7	25	27
6A	0	1	2	0	0	0	0	4	2	0	5	4
6C	0	0	2	0	0	0	6	15	15	6	15	17
8	1	3	1	0	0	0	6	15	17	7	18	18
9N	0	0	1	0	0	0	3	10	9	3	10	10
10A	0	2	2	0	1	0	2	6	7	2	9	9
11A	0	1	2	0	1	0	2	10	12	2	12	14
19A	1	8	15	3	4	7	24	57	58	28	69	80
22F	1	1	0	0	0	0	16	36	48	17	37	48
33F	0	1	0	0	0	0	2	6	11	2	7	11
Other types ^d	1	2	11	0	6	1	16	52	53	17	60	65
Total (non-PCV10)	6	22	37	3	12	8	82	233	258	91	267	303

^a Cases reported in the third quarter of 2013 (July–September 2013).

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

^c Cases reported in the 12 months ending 30 September 2012.

^d Other serogroups/serotypes reported in the July–September 2013 quarter include 7A, 9 (not 9N or 9V), 11 (not 11A), 15B, 15 (not 15B), 17F, 20, 23A, 35, and 38.