1.8 *Streptococcus pneumoniae* (invasive)

Summary

Number of cases in 2009: 433
Number of cases in 2008: 465
Number of deaths in 2009: 18
Number of deaths in 2008: 17
Crude incidence rate, 2009: 10.2/100,000

Notifications

Notification by clinicians and laboratories of invasive *Streptococcus pneumoniae* infection is mandatory since January 2004. Data on these notifications are collated in the Computerised Infectious Disease Reporting (CIDR) system. For the purposes of this report the term invasive pneumococcal disease (IPD) will be used to describe these infections.

In 2009, 433 cases of IPD (10.2/100,000) were notified in Ireland. Eighty two percent (n=356) of notifications were classified as confirmed, 16% (n=69) as probable and 2% as possible (n=8). Compared with 2008 there was a 12% decrease in confirmed cases in 2009 (405 and 356 cases, respectively).

Of the 433 cases notified in 2009, clinical diagnosis was reported for 158 cases (36%), which included invasive pneumonia (n=82), septicaemia (n=45), meningitis (n=23) and meningitis & septicaemia (n=5). Peritonitis, soft tissue infection and abscess accounted for one case each.

More cases occurred in males (55%; n=240) than in females (45%; n=193). Cases ranged in age from 4 weeks to 101 years, with a median age of 61 years. The elderly i.e. those aged 65 years and older accounted for the greatest proportion of cases (45%, n=196), followed by children <5 years of age (12%, n=52) (figure1).

As in previous years, the incidence of IPD in 2009 was high in the very young and very old and was relatively low in the age groups in between (figure 1). In children, the incidence was highest in infants <1 year of age (29.5/100,000), followed by the 1 year old children (23.5/100,000). In the age groups thereafter the incidence declined and did not exceed 14 cases per 100,000 in those aged 2-64 years. In the elderly (≥ 65 years) the incidence increased considerably and

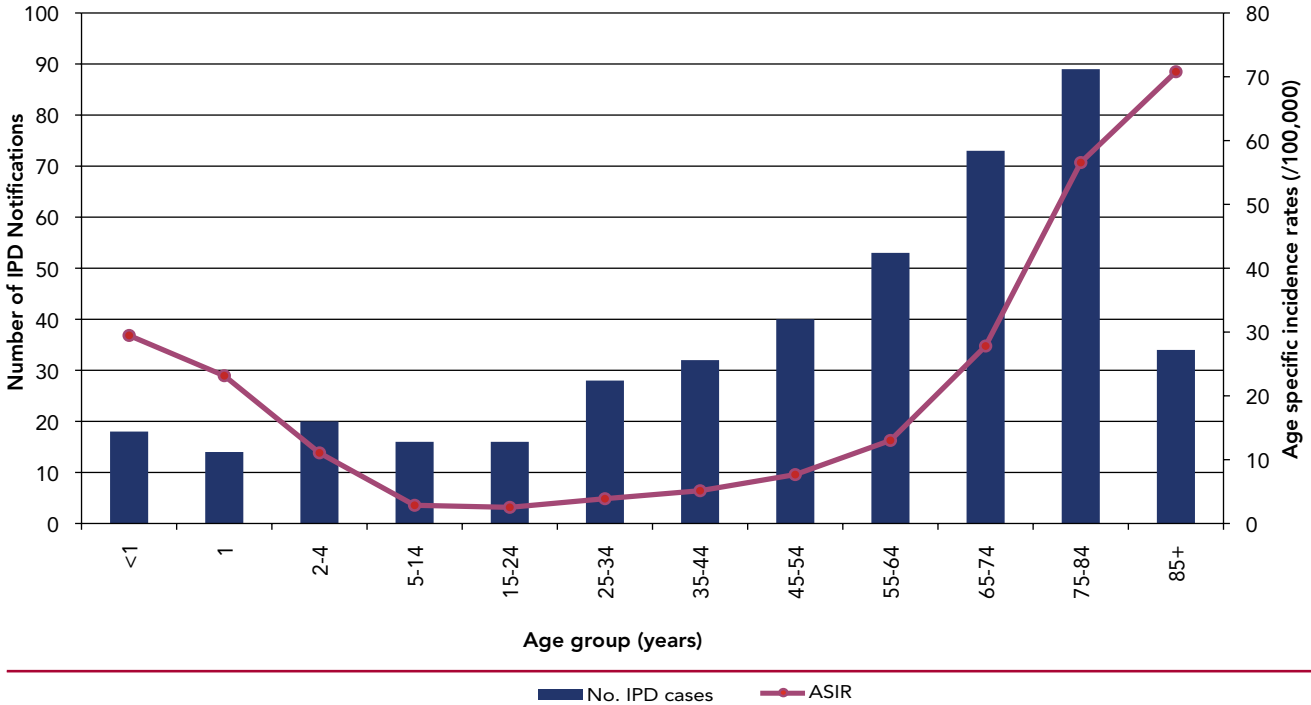

Figure 1. Number and age specific incidence rates (ASIR) of invasive pneumococcal disease notifications by age group, 2009

was highest in elderly adults 85 years of age and older (70.8/100,000), (figure 1).

Comparing the 2008 and 2009 age specific incidence rates, there was a notable decline in IPD in infants < 1 year of age (42%), in 1 year olds (33%) and in elderly adults 85 years of age and greater (21%) (figure 2). The introduction of the 7-valent pneumococcal vaccine (PCV7) to the childhood immunisation programme in September 2008 would explain the reduction in burden of IPD seen in young children in 2009.

Outcome was reported on just 24% (n=106) of the IPD notifications in 2009. Therefore, figures presented may underestimate IPD mortality in Ireland. Based on the data available, 18 deaths potentially due to IPD infection were reported in 2009. Four deaths occurred in children (< 5 years of age) and the remainder (n=14) were in adults, age range 18-89 years. Clinical presentation was reported for 13 of the 18 deaths; 10 had meningitis and/or septicaemia and three had pneumonia.

IPD notification data was extracted from CIDR on 16th August 2010. These figures may differ slightly from those previously published due to ongoing updating of notification data on CIDR.

Typing data

Of the 356 confirmed IPD cases notified in 2009, 279 (78%) had an isolate submitted for typing; 37 different serotypes were identified. The predominant serotypes associated with IPD infection in the overall population were 14, 7F, 19A and 3 (figure 3). In children < 2 years of age 7F, 14 and 6B were the most common serotypes (figure 3).

Since April 2007, the National Pneumococcal Typing Project has been offering a typing service to Irish laboratories for all invasive *S. pneumoniae* isolates submitted. Data from this project are used here to access the impact of introducing PCV7. Comparing the cumulative number of IPD cases between April 2007 – June 2008 and April 2009 – June 2010, there has been an 84% reduction in the burden of IPD associated with PCV7 serotypes, in children <2 years of age (figure 4, table 1) and a 44% reduction when all age groups are included (table 1). Overall there has been a 19% reduction in the burden of IPD when all age groups and all serotypes are included (table 1).

PCV7 vaccine failures

Based on data received through the IPD enhanced surveillance undertaken by the Departments of Public Health, two PCV7 vaccine failures were reported in

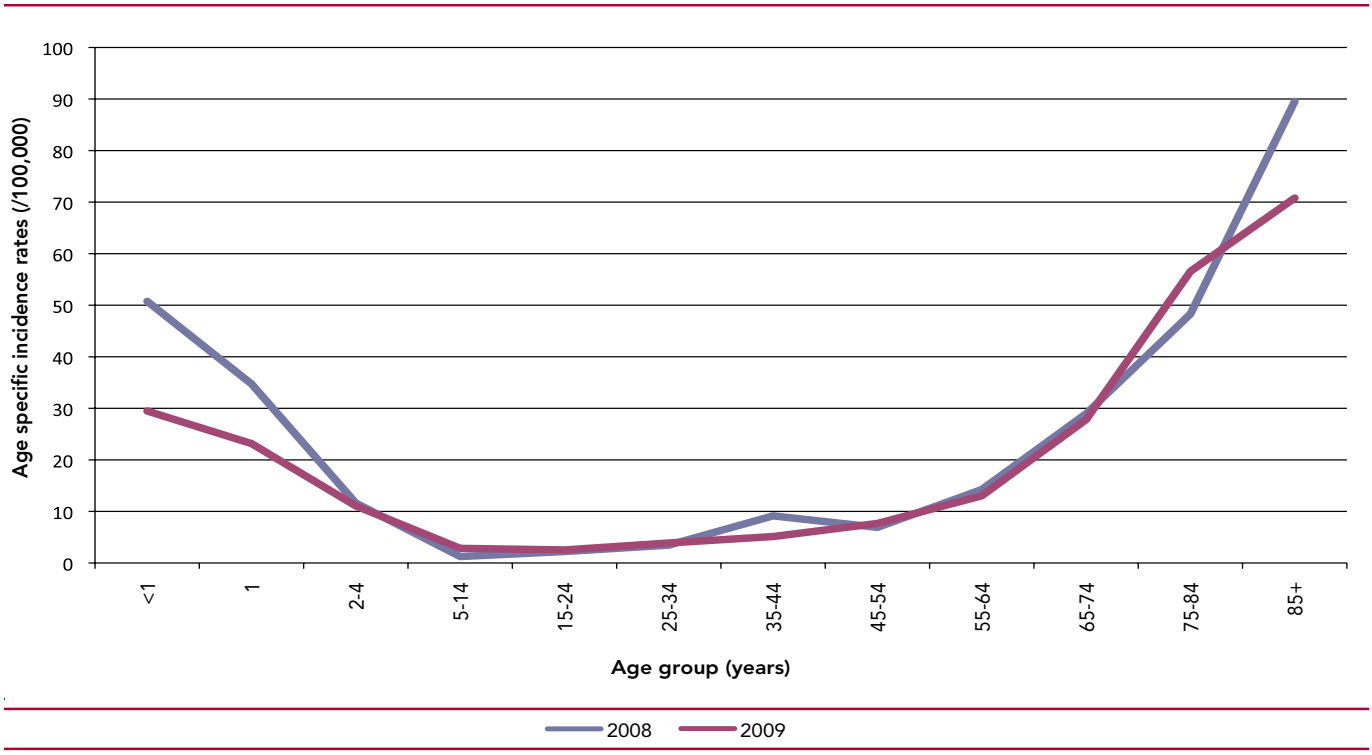

Figure 2. Age specific incidence rates of invasive pneumococcal disease by age group in 2008 and 2009

Table 1. Number of IPD cases pre-PCV7 (April 2007-June 2008) and post-PCV7 (April 2009–June 2010) introduction

	PCV7 serotypes			Non-PCV7 serotypes			All IPD serotypes		
	<2 yrs	≥2 yrs	All ages	<2 yrs	≥2 yrs	All ages	<2 yrs	≥2 yrs	All ages
Apr 07 – Jun 08	45	163	208	14	216	230	59	379	438
Apr 09 – Jun 10	7	110	117	19	217	236	26	327	353
% change	**-84.4**	**-32.5**	**-43.8**	**+35.7**	**+0.5**	**+2.6**	**-55.9**	**-13.7**	**-19.4**

Date source: National IPD Typing Project

2009. One was in an 18 month old child and the other in a 3 year old child, due to serotype 19F and 14, respectively. Both children survived.

Penicillin non-susceptible *S. pneumoniae* (PNSP)
In 2009, 20.2% of *S. pneumoniae* isolates were PNSP, compared to 23.1% in 2008 (Data source: EARS-Net). For details on the antimicrobial resistance patterns of *S. pneumoniae*, please see the chapter on Antimicrobial Resistance within this report.

Reinforcing IPD Surveillance
To build on and improve the current IPD surveillance systems/initiatives in Ireland it is important that:

- All laboratories and clinicians notify all cases of IPD diagnosed to the relevant Department of Public Health
- All laboratories send invasive *S. pneumoniae* isolates for typing to the National IPD Typing Project based at Beaumont Hospital
- All laboratories report details of *S. pneumoniae* isolates from blood and CSF to EARS-Net
- All Departments of Public Health undertake enhanced surveillance of IPD cases

The ongoing collection of good quality surveillance data is vital to accurately monitor: the burden of illness due to IPD, the antimicrobial resistance profiles, the impact of introducing PCV7 and also to estimate the impact of introducing new vaccines.

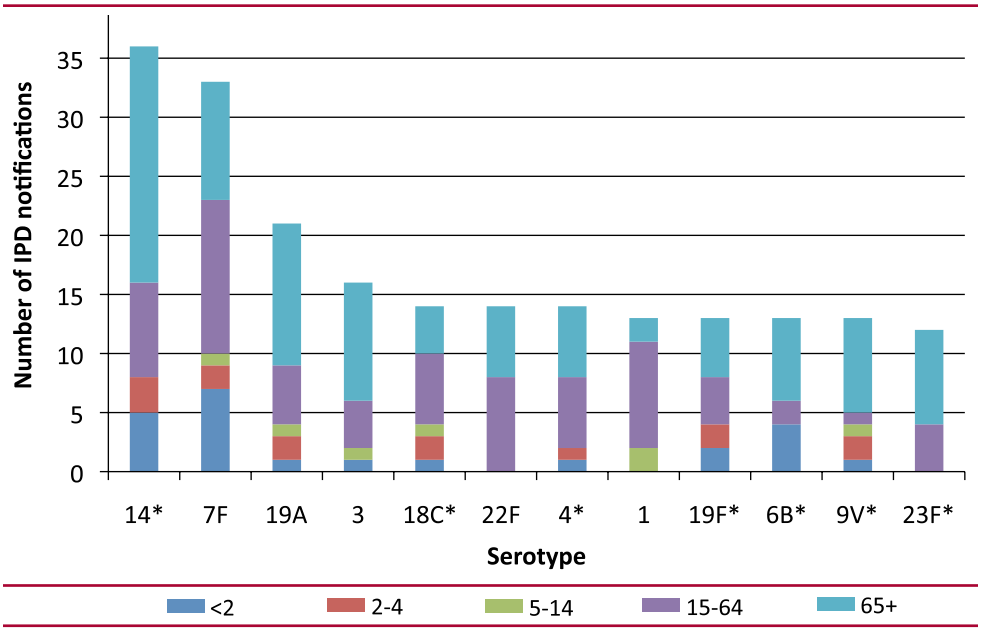

Figure 3. Most common S. pneumoniae serotypes associated with IPD infection by age group, 2009
*Denotes serotypes covered by PCV7

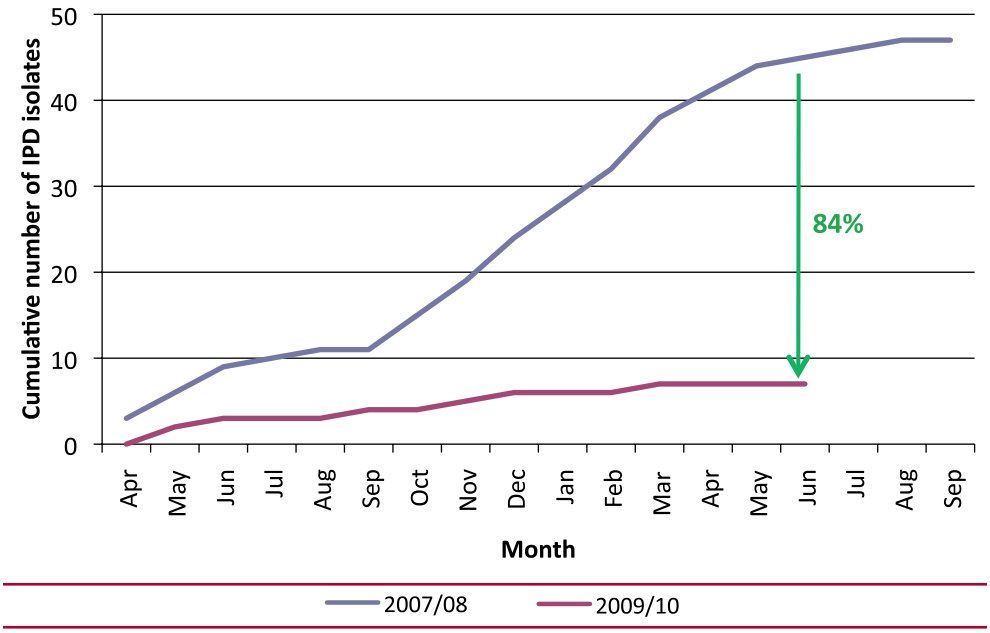

Figure 4. Cumulative number of IPD cases due to PCV7 serotypes in children <2 years of age, April 2007 - June 2008 and April 2009 – June 2010