Impact of the Pneumococcal Conjugate Vaccines (PCV) on the burden of invasive pneumococcal disease (IPD) in Ireland

Data source: National Pneumococcal Typing Project
(Data based on invasive Streptococcus pneumoniae isolates submitted for serotyping)

Date updated: 11th August 2016
Background

- IPD is a notifiable disease since January 2004
  - Clinicians and laboratories are legally obliged to notify all cases to the relevant Department of Public Health

- IPD Typing Project commenced in April 2007 and has been instrumental in:
  - Determining the serotype distribution of IPD isolates prior to the introduction of PCV7 to the infant immunisation schedule
  - Monitoring the impact of the vaccine on the burden of IPD and on the serotype distribution of isolates

- PCV7 vaccine was introduced in September 2008
  - To the routine infant immunisation schedule at 2, 6 and 12 months
  - Catch-up for children < 2 years of age (born 02/09/2006-30/06/2008)

- PCV13 was introduced in December 2010
  - To the routine infant immunisation schedule at 2, 6 and 12 months for children born in or after October 2010
Serotypes covered by the Pneumococcal Conjugate Vaccines (PCV) used in Ireland since 2008

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<th>1</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6A</th>
<th>6B</th>
<th>7F</th>
<th>9V</th>
<th>14</th>
<th>18C</th>
<th>19A</th>
<th>19F</th>
<th>23F</th>
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<tbody>
<tr>
<td>PCV7</td>
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<tr>
<td>PCV13</td>
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</tbody>
</table>

PCV7 and PCV13 serotypes are highlighted in red and blue, respectively.
Where the term “PCV13-7” is presented in later slides, this relates to the six additional 6 serotypes covered by PCV13 i.e. serotypes 1, 3, 5, 6A, 7F and 19A.
Summary of Results

Comparing data from Jan-Jun 2016 with same period in 2008, the main findings based on laboratory data from the National Pneumococcal Typing Project are:

- IPD in Ireland declined by 4% overall

- The most dramatic decline was in children <5 years of age
  - 100% decline due to PCV7 serotypes
  - 45% decline due to PCV13-7 serotypes
  - 57% decline due to all serotypes

- There was a 90% decrease in IPD due to PCV7 serotypes in ≥5 year olds

- Overall increase in IPD in ≥5 year olds:
  - 10% increase due to PCV13-7 serotypes
  - 109% increase due to non-PCV13 serotypes

- Predominant serotypes in Jan – Jun 2016 were:
  - 12F, 19A, 3 and 8
Impact of PCV on the burden of IPD caused by PCV7 vaccine serotypes in <5 year olds

100% reduction in IPD cases, comparing Jan-Jun 2016 with the same period in 2008

Data source: IPD Typing Project
Impact of PCV on the burden of IPD caused by PCV7 vaccine serotypes in ≥5 year olds

90% reduction in IPD cases, comparing Jan-Jun 2016 with the same period in 2008

Data source: IPD Typing Project
Impact of PCV on the burden of IPD caused by PCV7 vaccine serotypes in all age groups

93% reduction in IPD cases, comparing Jan-Jun 2016 with the same period in 2008

Data source: IPD Typing Project
Impact of PCV on the burden of IPD caused by PCV13-7 vaccine serotypes in <5 year olds

45% reduction in IPD cases, comparing Jan-Jun 2016 with the same period in 2008

Data source: IPD Typing Project
Impact of PCV on the burden of IPD caused by PCV13-7 vaccine serotypes in ≥5 year olds

10% increase in IPD cases, comparing Jan-Jun 2016 with the same period in 2008

**Data source:** IPD Typing Project
The impact of PCV on the burden of IPD caused by PCV13-7 vaccine serotypes in all age groups resulted in a 2% decrease in IPD cases, comparing Jan-Jun 2016 with the same period in 2008. The data source is the IPD Typing Project.
Impact of PCV on the burden of IPD caused by non-PCV13 vaccine serotypes in <5 year olds

333% increase in IPD cases, comparing Jan-Jun 2016 with the same period in 2008

Data source: IPD Typing Project
Impact of PCV on the burden of IPD caused by non-PCV13 vaccine serotypes in ≥5 year olds

109% increase in IPD cases, comparing Jan-Jun 2016 with the same period in 2008

Data source: IPD Typing Project
Impact of PCV on the burden of IPD caused by non-PCV13 vaccine serotypes in all age groups

119% increase in IPD cases, comparing Jan-Jun 2016 with the same period in 2008

Data source: IPD Typing Project
Impact of PCV on the burden of IPD caused by all serotypes in <5 year olds

57% reduction in IPD cases, comparing Jan-Jun 2016 with the same period in 2008

Data source: IPD Typing Project
Impact of PCV on the burden of IPD caused by all serotypes in ≥5 year olds

9% increase in IPD cases, comparing Jan-Jun 2016 with the same period in 2008

Data source: IPD Typing Project
Impact of PCV on the burden of IPD caused by all serotypes in all age groups

4% reduction in IPD cases, comparing Jan-Jun 2016 with the same period in 2008

Data source: IPD Typing Project
Cumulative number of IPD isolates between January – June 2008 and 2016 and percentage changed in burden of IPD since introducing PCV in Ireland

<table>
<thead>
<tr>
<th></th>
<th>PCV 7 serotypes</th>
<th>PCV 13-7 serotypes</th>
<th>Non PCV 13 serotypes</th>
<th>All serotypes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;5yrs</td>
<td>&gt;5yrs</td>
<td>All ages</td>
<td>&lt;5yrs</td>
</tr>
<tr>
<td>2008 Jan-Jun</td>
<td>30</td>
<td>68</td>
<td>98</td>
<td>11</td>
</tr>
<tr>
<td>2015 Jan-Jun</td>
<td>0</td>
<td>7</td>
<td>7</td>
<td>6</td>
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<tr>
<td>% change</td>
<td>-100</td>
<td>-90</td>
<td>-93</td>
<td>-45</td>
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Data Source: National Typing Project
PCV7 serotypes: 4, 6B, 9V, 14, 18C, 19F and 23F;
PCV13-7 serotypes: 1, 3, 5, 6A, 7F, 19A
Non-PCV13 serotypes: All serotypes excluding the 13 serotypes (listed above) in PCV13
Distribution of the *S. pneumoniae* serotypes in Ireland by age group in Jan - Jun 2016

* Denotes serotypes included in PCV7
**^ Denotes additional serotypes included in PCV13

Data source: IPD Typing Project
Activities key to the surveillance of IPD in Ireland

- **Notifications:** Clinicians and laboratories should notify all cases of IPD to the relevant Department of Public Health and data are inputted to the national Computerised Infectious Diseases reporting (CIDR) system for notifiable infectious diseases.

- **Typing:** Laboratories should submit all invasive *S. pneumoniae* isolates to CUH for typing.

- **Enhanced surveillance:** Departments of Public Health perform enhanced surveillance on cases of IPD notifications and enter these data on CIDR.

- **Antimicrobial resistance:** Laboratories should report data on antimicrobial resistance profiles of invasive *S. pneumoniae* isolates (from blood and CSF) to the European Antimicrobial Resistance Surveillance System Network (EARS-Net) at HPSC.
Laboratories: Submission of isolates for typing

For details regarding the submission of invasive *Streptococcus pneumoniae* isolates for typing, please contact:

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Tel.: 01 878 4854  
Email: mary.corcoran@cuh.ie
Departments of Public Health: IPD surveillance

- **IPD enhanced surveillance form** is available at: http://www.hpsc.ie/hpsc/A-Z/VaccinePreventable/PneumococcalDisease/SurveillanceForms/

- **Protocol** for the enhanced surveillance of IPD is available at: http://www.hpsc.ie/hpsc/A-Z/VaccinePreventable/PneumococcalDisease/InformationforHealthProfessionals/
Further Reading

For further details on the surveillance and epidemiology of IPD in Ireland, please see:

- Biannual Reports on invasive *Streptococcus pneumoniae* infection; available at [http://www.hpsc.ie/A-Z/VaccinePreventable/PneumococcalDisease/Publications/QuarterlyReportsonInvasivePneumococcalDisease/](http://www.hpsc.ie/A-Z/VaccinePreventable/PneumococcalDisease/Publications/QuarterlyReportsonInvasivePneumococcalDisease/)
- Annual Reports on invasive *Streptococcus pneumoniae* infection; available at [http://www.hpsc.ie/A-Z/VaccinePreventable/PneumococcalDisease/Publications/AnnualReportsonInvasivePneumococcalDisease/File,14720,en.pdf](http://www.hpsc.ie/A-Z/VaccinePreventable/PneumococcalDisease/Publications/AnnualReportsonInvasivePneumococcalDisease/File,14720,en.pdf)
- Articles published in Epi-Insight; available at [http://www.hpsc.ie/hpsc/A-Z/VaccinePreventable/PneumococcalDisease/Publications/Articles/](http://www.hpsc.ie/hpsc/A-Z/VaccinePreventable/PneumococcalDisease/Publications/Articles/)
- Posters and Presentations, available at [http://www.hpsc.ie/hpsc/A-Z/VaccinePreventable/PneumococcalDisease/PostersPresentations/](http://www.hpsc.ie/hpsc/A-Z/VaccinePreventable/PneumococcalDisease/PostersPresentations/)

IPD National Typing Project Team

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Thanks to all the health care professionals involved in the surveillance of invasive pneumococcal disease in Ireland.