Increase of serotype 19A invasive pneumococcal disease in young children after the switch from PCV13 to PCV10 in Belgium

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## Speaker Disclosure

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Honoraria/ Expenses</th>
<th>Consulting/ Advisory Board</th>
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<th>Stock Options</th>
<th>Ownership/ Equity Position</th>
<th>Employee</th>
<th>Other (please specify)</th>
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<tbody>
<tr>
<td>Pfizer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Investigator initiated research grant</td>
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</table>
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Belgium


PCV7 PCV13 PCV10

2+1 dose vaccine coverage >90%*

Belgium Language Communities

Flemish Community

German-speaking Community

French Community


Passive laboratory-based surveillance for invasive pneumococcal disease (IPD)

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period 2007-2018: 81 laboratories sending strains every year

<table>
<thead>
<tr>
<th>Description</th>
<th>Number</th>
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<tbody>
<tr>
<td>Number of unique IPD isolates sent to the NRC</td>
<td>1632</td>
</tr>
<tr>
<td>Number of laboratories involved in surveillance</td>
<td>95</td>
</tr>
<tr>
<td>Sending more than 5 isolates per year</td>
<td>80</td>
</tr>
<tr>
<td>Located in Flanders</td>
<td>54</td>
</tr>
<tr>
<td>Located in Wallonia</td>
<td>31</td>
</tr>
<tr>
<td>Located in Brussels</td>
<td>10</td>
</tr>
</tbody>
</table>

Regional distribution of all isolates based on residence of patient (percentage)

<table>
<thead>
<tr>
<th>Region</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flanders</td>
<td>58.92%</td>
</tr>
<tr>
<td>Wallonia</td>
<td>27.62%</td>
</tr>
<tr>
<td>Brussels</td>
<td>12.71%</td>
</tr>
<tr>
<td>Other/Unknown</td>
<td>0.76%</td>
</tr>
</tbody>
</table>

*Taking into account fusion of laboratories over time

Belgian inhabitants
- 57.6% in Flanders
- 31.9% in Wallonia
- 10.5% in Brussels

Data 1/1/2018: [https://statbel.fgov.be/nl/themas/bevolking/loop-van-de-bevolking](https://statbel.fgov.be/nl/themas/bevolking/loop-van-de-bevolking)
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IPD epidemiology in children < 2 years old

Graph showing the number of IPD cases based on isolates sent to the Belgian National Reference Centre from 2007 to 2018. The graph compares the number of cases for PCV7, PCV13, PCV10, and non-vaccine serotypes, with a total line.
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IPD epidemiology in children < 2 years old

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IPD epidemiology children < 2 years old (2015-2018)

Number of IPD (in children < 2 years old) received at the National Reference Centre

- PCV7 serotypes
- PCV10 non-PCV7 serotypes (1,5,7F)
- serotype 3
- serotype 19A
- non-PCV serotypes

- 2015
- 2016
- 2017
- 2018
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IPD children < 2 years old

<table>
<thead>
<tr>
<th>Year</th>
<th>PCV7</th>
<th>PCV13</th>
<th>PCV10</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>154</td>
<td>47</td>
<td>29</td>
</tr>
<tr>
<td>2008</td>
<td>165</td>
<td>47</td>
<td>47</td>
</tr>
<tr>
<td>2009</td>
<td>197</td>
<td>67</td>
<td>67</td>
</tr>
<tr>
<td>2010</td>
<td>185</td>
<td>62</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>163</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>91</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>2013</td>
<td>95</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>2014</td>
<td>79</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>2015</td>
<td>101</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>96</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>119</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>137</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **total IPD**
  - PCV7:
    - 2007: 154
    - 2008: 165
    - 2009: 197
    - 2010: 185
    - 2011: 163
    - 2012: 91
    - 2013: 95
    - 2014: 79
    - 2015: 101
    - 2016: 96
    - 2017: 119
    - 2018: 137

- **serotype 19A IPD**
  - PCV7:
    - 2007: 29
    - 2008: 47
    - 2009: 47
    - 2010: 67
    - 2011: 62
    - 2012: 13
    - 2013: 6
    - 2014: 4
    - 2015: 2
    - 2016: 2
    - 2017: 17
    - 2018: 37
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Serotype 19A in children < 2 years old

- Total serotype 19A cases

- Number of serotype 19A cases in children < 2 years old based on the isolates sent to the National Reference Centre


- Cases: 67, 62, 13, 6, 4, 2, 2, 17, 37
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Serotype 19A in children < 2 years old
Increase of serotype 19A invasive pneumococcal disease in young children after the switch from PCV13 to PCV10 in Belgium

Serotype 19A in children < 2 years old
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Serotype 19A in children < 2 years old

The diagram shows the number of serotype 19A cases in children under 2 years old based on the isolates sent to the National Reference Centre. The x-axis represents the years from 2010 to 2018, and the y-axis represents the number of cases. The data is color-coded to indicate different types of isolates.
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Serotype 19A in children < 2 years old

- **Pre-PCV13 period** (2010-2012): ST276 and ST193 predominant
- **PCV13 period** (2012-2015): Different STs
- **PCV10 period** (2017-2018): ST416 and ST994 predominant

MLST sequence type (ST) derived from whole-genome sequence by use of CDC Streplab pipeline: Clin Microbiol Infect. 2016 Dec;22(12):1002
Serotype 19A in children < 2 years old

Pre-PCV13 period
(2010-2012)
ST276 and ST193 predominant

PCV13 period
(2012-2015)
Different STs

PCV10 period
(2017-2018)
10 different STs
ST416 and ST994 predominant

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MLST sequence type (ST) derived from whole-genome sequence by use of CDC Streplab pipeline: Clin Microbiol Infect. 2016 Dec;22(12):1002
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Serotype 19A IPD children < 2 years old (2017-2018)

**ST416 - CC119**
related to Netherlands 15B-37 clone pilus-1 positive penicillin S erythromycine R/S

Italy: Del Grosso M et al. Journal of medical Microbiology (2013);62:1220-1225

Czech Republic: Zemlickova H et al. Journal of Medical Microbiology (2018);67:1003-1011

Germany: van der Linden M et al. BMC Infect Dis (2013);13:70

**ST994 – CC994**
no pilus genes fully susceptible

Germany: 3th most important ST in serotype19A post PCV – van der Linden M et al. BMC Infect Dis (2013);13:70

Some cases post PCV


Portugal: Aguiar SI et al. JCM 2010;48:101-108
Conclusions

Two years after the switch from PCV13 to PCV10 (2017-2018) in childhood vaccination programme in Belgium, we describe in children <2 years old:

- Re-emergence of serotype 19A causing increase in total number of IPD
- Serotype 19A in 2017-2018 most important serotype causing IPD
- Different MLST sequence types with two predominant clones ST416 and ST994
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National Reference Centre
Streptococcus pneumoniae

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Nasopharyngeal pneumococcal carriage study during and after PCV13-to-PCV10 switch

Wouters Ine et al.
ESPID19-0415

Impact of IPD epidemiology changes on decision making for vaccine choice

Top Geert et al.
ESPID19-0946