Changes in Invasive Pneumococcal Disease (IPD)
Following 5 Years of 13-valent Pneumococcal Conjugate Vaccine Use in the U.S.

Tamara Pilishvili
Advisory Committee on Immunization Practices
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Background and Aims

• In 2010, PCV13 replaced PCV7 in the U.S. infant immunization schedule.
• In 2014, PCV13 was recommended for use in series with 23-valent polysaccharide vaccine (PPSV23) for all adults >65 years.

• We evaluated the impact of PCV13 on IPD among adults and children.
• Using data from Active Bacterial Core Surveillance system, we compared incidence (cases/100,000 population) pre-PCV13 (2007-2008) to post-PCV13 (2014-2015).
Rate differences by serotype among children <5 years old, 2007 - 2008 vs. 2014 - 2015

Rate difference (cases/100,000)

-0.10 0.10 0.11 0.21 0.25 0.39

-7.0 -6.0 -5.0 -4.0 -3.0 -2.0 -1.0 0.0 1.0

PCV13
Non-PCV13

07F 19A

PCV7 introduction

PCV13 introduction for children

Cases per 100,000

PCV13 serotype: 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, and 23F
Annual Trends in IPD Incidence by Serotype Groups, Adults ≥65 Years Old, 2007–2015

[Graph showing annual trends in IPD incidence by serotype groups for adults 65 years and older from 2007 to 2015. The graph includes data for all IPD, PCV13, PPSV11, and NVT. Vertical lines indicate the year PCV13 was introduced for children and adults.]
Rate differences by serotype among adults ≥65 Years Old, 2007 - 2008 vs. 2014 - 2015

Rate difference (cases/100,000)

PCV13
PPSV11
NVT

All IPD  | PPSV23 type*  | PCV13 type
---|---|---
1998 | 59 | 51 | 44
1999 | 60 | 50 | 46
2000 | 58 | 49 | 43
2001 | 51 | 42 | 43
2002 | 43 | 36 | 34
2003 | 42 | 32 | 29
2004 | 38 | 27 | 20
2005 | 36 | 26 | 18
2006 | 40 | 27 | 17
2007 | 39 | 26 | 17
2008 | 41 | 27 | 18
2009 | 39 | 26 | 17
2010 | 36 | 23 | 22
2011 | 35 | 30 | 31
2012 | 30 | 22 | 18
2013 | 25 | 18 | 13
2014 | 23 | 13 | 13
2015 | 23 | 13 | 5

*PPSV23 serotypes: 1, 2, 3, 4, 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B, 17F, 18C, 19A, 19F, 20, 22F, 23F, and 33F

+PCV13 serotype: 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, and 23F
Serotype distribution among adults ≥65 Years Old, 2007 - 2008 vs. 2014 - 2015

2007-2008

- PCV13: 43%
- PPSV23/non-PCV13: 25%
- Non Vaccine: 32%

2014-2015

- PCV13: 42%
- PPSV23/non-PCV13: 36%
- Non Vaccine: 22%

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Serotype group</th>
<th>% change (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5</td>
<td>PCV13</td>
<td>-86.82 (-90.59, -81.53)*</td>
</tr>
<tr>
<td></td>
<td>Non-PCV13</td>
<td>-10.88 (-28.09, 10.44)</td>
</tr>
<tr>
<td></td>
<td>ALL IPD</td>
<td>-58.24 (-64.67, -50.65)*</td>
</tr>
<tr>
<td>5-18</td>
<td>PCV13</td>
<td>-84.78 (-91.04, -74.13)*</td>
</tr>
<tr>
<td></td>
<td>Non-PCV13</td>
<td>-5.77 (-34.63, 35.83)</td>
</tr>
<tr>
<td></td>
<td>ALL IPD</td>
<td>-55.28 (-66.11, -41.00)*</td>
</tr>
<tr>
<td>19-64</td>
<td>PCV13</td>
<td>-68.66 (-72.17, -64.72)*</td>
</tr>
<tr>
<td></td>
<td>PPSV11</td>
<td>6.19 (-4.85, 18.52)</td>
</tr>
<tr>
<td></td>
<td>NVT</td>
<td>-10.9 (-21.47, 1.08)</td>
</tr>
<tr>
<td></td>
<td>ALL IPD</td>
<td>-35.11 (-39.23, -30.72)*</td>
</tr>
<tr>
<td>&gt;65</td>
<td>PCV13</td>
<td>-69.29 (-73.73, -64.10)*</td>
</tr>
<tr>
<td></td>
<td>PPSV11</td>
<td>-10.11 (-22.59, 4.39)</td>
</tr>
<tr>
<td></td>
<td>NVT</td>
<td>-12.77 (-23.52, -0.50)*</td>
</tr>
<tr>
<td></td>
<td>ALL IPD</td>
<td>-36.47 (-41.42, -31.1)*</td>
</tr>
</tbody>
</table>

* statistically significant decrease
Summary

• Significant reductions in PCV13-type IPD following the 5 years of PCV13 use; reductions driven by types 19A and 7F

• Significant decreases in overall IPD among children and adults

• No significant changes in non-PCV13 types among children and adults
  • Increases of small magnitude (<0.5 case/100,000) in select non-PCV13 serotypes

• In 2010-2015, PCV13 use in children has prevented an estimated 280,000 IPD cases and 20,000 deaths among all ages
Conclusions

• In 5 years post-PCV13 introduction, significant reductions were seen in IPD caused by the PCV13 serotypes in children and adults, indicating continued direct and indirect effects.

• No evidence of serotype replacement in children or general population of adults.
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