Changes in Pneumococcal Meningitis Incidence Following Introduction of PCV10 and PCV13: Results from the Global PSERENADE Project

Yangyupei Yang on behalf of the PSERENADE team*

November 2021

*The PSERENADE Team includes the Hopkins Core Team & investigators in over 50 surveillance sites and at the WHO.
Pneumococcal conjugate vaccines (PCV10 and PCV13) have been introduced into infant immunization programs of 147 countries. We assessed the impact of PCV10/PCV13 introduction on pneumococcal meningitis incidence globally in children <5 years and adults ≥18 years.

**Methods**

- Countries shared IPD surveillance data
- Meningitis cases = pneumococcus detected in cerebral spinal fluid (CSF)
- Modeled each site’s change in meningitis incidence after PCV introduction and averaged across sites (Bayesian multi-level Poisson regression)
  
  Stratified by: age group, PCV10 vs PCV13, and the amount of PCV7 impact prior to PCV10/13 introduction

Number included in analysis:

<table>
<thead>
<tr>
<th>Sites:</th>
<th>PCV13 = 32</th>
<th>PCV10 = 14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Countries:</td>
<td>PCV13 = 22</td>
<td>PCV10 = 12</td>
</tr>
<tr>
<td>N Cases:</td>
<td>&lt;5 years: 13,391</td>
<td>≥18 years: 36,322</td>
</tr>
</tbody>
</table>
Key messages: Meningitis caused by serotypes in PCV10 by year 5:

- <5 years -- Almost eliminated in most sites
- ≥18 years -- large herd effect but took longer and heterogeneous across sites

November, 2021
Change in pneumococcal meningitis: PCV13 (non-10) Types

Children < 5 years
- PCV10: 4-9 fold increase
- PCV13: 78-93% decline
- Serotype 6A: 80-99% decline

Adults ≥ 18 years
- PCV10: 5-8 fold increase
- PCV13: 10-53% decline
- Serotype 19A: 48-96% decline

Key messages
- Evidence of cross protection against 6A for PCV10
- Serotype 19A was reduced at PCV13 sites, but increased at PCV10 sites
- No clear trends in Serotype 3 for either product

November, 2021
Change in pneumococcal meningitis: Non-PCV13 Types

Key messages

Non-PCV13 serotypes:
- Increased in both age groups; both PCV10 and PCV13
- Increase peaked by year 5

A single high HIV-prevalence site with concurrent non-vaccine interventions, including ART
Change in all pneumococcal meningitis

Key messages

For both PCV10 and PCV13 sites, the net impact on all pneumococcal meningitis by year 5 was a reduction in all ages:

- **Children <5 years** – reduced about 50-70%
- **Adults ≥18y years** – reduced by about 25-36% (most sites)