Nasopharyngeal Carriage of *Streptococcus pneumoniae* Serotype 6A/6B in Gambian Infants is Highly Dynamic Within the First year of Life: A longitudinal Study

S.M.S. Suso¹, A. Worwui¹, M. Senghore¹, Tientcheu PT¹, C. Ebruke¹, C. Okoi¹, E. Foster-Nyarko¹, S.W. Lo², R.A. Gladstone², K.P. Klugman³, L. McGee⁴, R.F. Breiman³, S.D. Bentley², R.A. Adegbola⁵, M. Antonio¹, B. Kwambana-Adams¹

¹. Medical Research Council Unit The Gambia at the London School of Hygiene and Tropical Medicine, Atlantic Road, Fajara, The Gambia; 2. The Wellcome Trust Sanger Institute, Wellcome Trust Genome Campus, Hinxton, Cambridge CB10 1SA, UK; 3. Global Health Institute, Emory University, Atlanta GA, USA; 4. Respiratory Diseases Branch, Centers for Disease Control and Prevention, Atlanta, GA, USA; 5. GSK.

**Introduction**

- *Streptococcus pneumoniae* serotypes 6A and 6B are associated with invasive disease and commonly carried in young children in The Gambia
- Prevnar (PCV7) protects against serotype 6B; however, the extent at which it cross-protects against serotype 6A is not fully understood
- We studied the impact of PCV7 on carriage and genotypic diversity of serotypes 6A and 6B among infants in The Gambia (Fig 1 & 2)

**Study design**

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children unvaccinated</td>
<td>Community unvaccinated</td>
<td>n=33</td>
</tr>
<tr>
<td>Community vaccinated</td>
<td>Community unvaccinated</td>
<td>n=30</td>
</tr>
<tr>
<td>Children vaccinated</td>
<td>Community vaccinated</td>
<td>n=39</td>
</tr>
</tbody>
</table>

**Materials and Methods**

- Latex agglutination
- 6A/6B differential qPCR
- Antimicrobial susceptibility testing
- Multilocus sequence typing
- Whole genome sequencing

**Results**

- 1595 nasopharyngeal swabs were collected from 102 infants
- Pneumococcus 1258 (78.9%): 6A/6B 220 (17.5%)
- 6A carriage was significantly higher than 6B carriage in vaccinated infants (Fig 3).
- Carriage appeared to be clonal within individuals and at community level (Fig 4)
- Infants colonised by the same strain; occasional switching
- Tetracycline and trimethoprim resistance: Disc diffusion - 45.7% and 94.9% and E-test - 33.9% and 40.7% respectively

**Whole genome phylogeny**

- Whole genome phylogeny shows a close relationship between serotype 6A and serotype 6B (Fig 5)
- Strains within an individual were conserved

**Conclusions**

- PCV7 does not appear to have reduced carriage of serotype 6A as reported in previous studies; however, longer periods of study will be required to ascertain this finding
- Carriage of 6A and 6B is highly dynamic in infants and includes cloud diversity within host
- Continued monitoring of vaccine effect on carriage is crucial for feature vaccine advocacy

**Acknowledgements**

We thank the participants and their families who participated in the study.