INTRODUCTION

- Pneumococcal capsular serotype is a determinant of disease potential. The presence of a pneumococcal serotype in the nasopharynx of a pneumonia case may suggest evidence of pneumonia etiology if the serotype is rarely carried in a healthy population.¹

- We aimed to assess the association between the serotype in pneumococcal carriage and radiographic pneumonia and to evaluate differences across sites.

METHODS

PERCH Study: case-control study in seven African and Asian countries (August 2011 to January 2014; 24 months at each site).²

- Cases: hospitalized children aged 28 days – 59 months with WHO-defined severe or very severe pneumonia.

- Controls: age-frequency matched selected randomly from the community.

Prior antibiotic use: positive serum bioassay (for cases and controls), or receipt of antibiotics at a referral facility or at the study facility prior to nasopharyngeal (NP) swab collection (cases only).

PCV use: Kenya, PCV10; The Gambia, South Africa and Mali, PCV13; Zambia, Bangladesh and Thailand, None [Zambia introduced in final months of PERCH].

Specimens and Laboratory testing: Pneumococci cultured from NP specimens from cases and community controls were serotyped using Quellung or PCR-based methods.

Analysis

- Serotype-specific carriage frequencies and odds ratios (OR) were calculated comparing cases with consolidation on chest radiograph (CXR-AC) to controls, restricting to children with serotyped pneumococcal isolates (NP).

- Significance (p<0.05) was not adjusted for multiple comparisons.

- Attributable fraction among the exposed (AFE), expressed as a percentage, was calculated for each serotype as 1-(1/OR).

RESULTS

- Pneumococcus was isolated from the NP in 487 (51.0%) CXR-AC pneumonia cases and 3654 (69.4%) controls; the proportion positive varied by site (Fig 1).

- Prior antibiotic use among cases varied by site, ranging from 20% to 90%.

- NP culture positivity was lower among cases with antibiotic use (41% versus 63% without antibiotic use).

- The most commonly carried serotype in cases was 19F and 6A in controls.

- Serotypes 1 and 14 were significantly associated with case status (Fig2).

- Serotypes 19F in the Gambia, 23F in Kenya, 15C in Thailand, ST3 in Zambia, and ST18C in Bangladesh; all p<0.05.

- AFE for CXR-AC pneumonia for Serotype 1 was 85.1%; no other ST had high AFE (the next highest AFE was 35.5% for ST 14).

CONCLUSIONS

- Pneumococcal carriage in both CXR-AC pneumonia cases and controls varied by site and whether antibiotics were received prior to NP sample collection.

- Analyses of all sites identified only two serotypes (1 and 14) significantly associated with case status but site-specific analyses identified 5 additional STs (19F, 23F, 15C, 3, 18C).

- Small numbers limited ability to detect associations for less common serotypes and ability to adjust analyses for site or other potential confounders.

- AFE was low for all serotypes except ST1, suggesting that isolation of a serotype from the NP may not provide information about the cause of a pneumonia.

References


Funding: PERCH was supported by grant 48968 from The Bill & Melinda Gates Foundation to the International Vaccine Access Center, Department of International Health, Johns Hopkins Bloomberg School of Public Health.