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PNEUMOCOCCAL SEROTYPE DISTRIBUTION IN ADULTS HOSPITALIZED WITH RADIOLOGICALLY CONFIRMED COMMUNITY-ACQUIRED PNEUMONIA IN MALMÖ, SWEDEN



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Background

Skåne is the third largest region in Sweden and introduced PCV7 in its pediatric vaccination schedule in Jan 2009, followed by PCV10 in May 2010, PCV13 in May 2014, and PCV10 again from May 2018. Both PCV13 and PCV10 are administered in a 2+1 schedule and Sweden's pediatric PCV program has led to substantial declines in invasive pneumococcal disease...

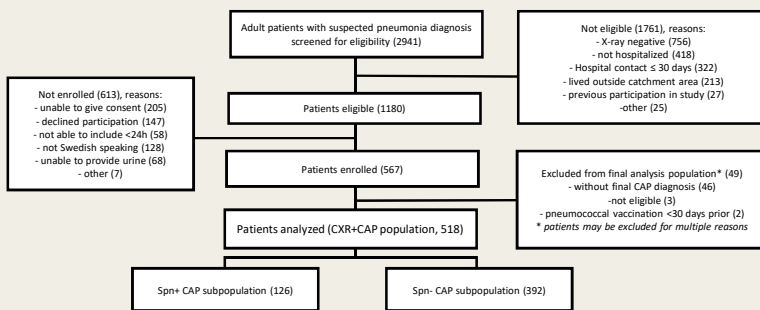
Methods

This was a prospective, observational study of adults >=18 years of age, hospitalized with CAP. Study participants were recruited between September 2016 to September 2018 at the Skåne University Hospital (SUS) in Malmö...

Results

Of 567 enrollees, 518 had chest x-ray positive (CXR+) CAP. Spn serotypes were identified by UAD or culture isolates (Figure 1 and 2).

Figure 1. Patient screening, eligibility, enrollment and analysis population (n):



The mean age of enrolled subjects was 69.0 years. 42.7% of subjects with CAP had at least one at-risk condition and 34.7% were considered high risk (Table 1). Most common comorbidities reported in 18-64 years were chronic pulmonary disease (COPD) 34/168 (20.2%)...

Table 1. Baseline Characteristics, Risk factors and Medical History

Table with 5 columns: Variable, <18-64 years, n=169 (32.6%), <=65 years, n=349 (67.4%), >=18 years, n=518 (100%). Rows include Age, Sex, Prior Vaccination, Lifestyle risk factors, Risk level.

Mean pneumonia severity index (PSI) score was 92.6 and 106.6 in <=18 and >=65 years old groups respectively. Mean CRB-65 score was 0.9 and 1.3 in <=18 and >=65 years of age respectively. (Table 2).

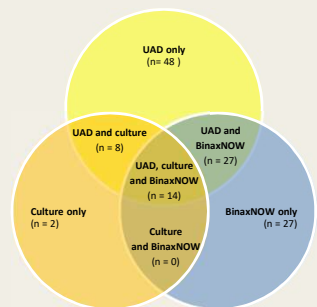
For subjects <=18 years, mean hospital stay was 8.6 days (<=6.0) and mortality within 30 days from hospital admission was 4.1% (Table 2).

In study participants with CXR+CAP aged <=18 years, Spn+ was detected by any test (BinaxNOW, UAD or culture) in 126/518 (24.3%) subjects (Figure 1 and 2).

Table 3. Vaccine serotypes and categories detected by UAD or blood culture, and Spn+ detected from any diagnostic method (UAD, BinaxNOW* or culture).

Table with 5 columns: Pneumococcal Conjugate Vaccines (PCVs), PCV13 serotypes, PCV20 serotypes not in PCV13, PCV20 serotypes, PCV20 serotypes not in PCV15, Spn+ from any diagnostic method*. Rows list serotypes 4, 14, 18C, 19F, 23F, 3, 5, 6A, 7F, 19A, 23, 22F, 33F, 15B, 9N, 17F, 12*, 35B*, 37*, and 46/169.

Figure 2. Distribution of Spn detection by diagnostic method among all study participants with Spn+ CXR+CAP (n = 126). The UAD1/2 test and BinaxNOW* was performed for all enrolled patients (567). In 522 patients, any cultured for Spn was performed (culture from a normally-sterile site in 519 patients with and culture from respiratory secretions in 52 patients).



The most common serotypes identified were serotypes 3, 19A, 8, 11A, 5 and 22F. PCV13 serotypes were found in 56/518 (10.8%) of CXR+CAP cases. PCV20 serotypes were found in 88/518 (17.0%) of CXR+CAP cases (Table 3).

The UAD1/2 test also detects the non-PCV20 serotypes 9N, 17F, 2 and 20 and some of these serotypes were found in small proportions in the study population. All remaining serotypes were only detected by bacterial culture (Table 3).

In subjects <=18 years of age among those with high-risk, at-risk, and not at-risk conditions, PCV20-type CAP was found in 10/39 (25.6%), 13/52 (25.0%), and 12/78 (15.4%) of CAP cases, respectively. A similar trend was also observed in >=65 years old subjects (Table 4).

Table 4. Vaccine coverage per age group and risk level

Table with 4 columns: Risk level, PCV13 serotypes, n (%), PCV15 serotypes, n (%), PCV20 serotypes, n (%). Rows include 18-65 years of age and >=65 years of age, further divided by High risk, At-risk, and Low risk.

Conclusions

Despite Sweden's robust pediatric PCV immunization program, a persistent burden of adult CAP was caused by PCV13 pneumococcal serotypes. These findings emphasize the limits of indirect effects from pediatric immunization for protection of the elderly and younger adults with high-risk and at-risk conditions...

Serotype 3 contributed to 20-21% of all Spn+ CXR+CAP, depending on age group. In this regard it should be noted that in the CAPITA-trial PCV13 the efficacy against serotype 3 CAP was consistent with the vaccine's overall efficacy.

Compared to PCV13 and PCV15, the additional serotypes included only in PCV20 lead to a substantial increase in the coverage of pneumococcal CAP in Swedish adults. To accurately account for the potential impact of adult pneumococcal vaccination, however, not only serotype coverage, but also expected vaccine effectiveness against non-bacteremic CAP, duration of protection, and expected cross-protection against vaccine-related serotypes needs to be considered.

References: 1. Naucler P et al Clin Infect Dis 2017;65:1780-92. Berglund A et al PLoS One 2014;9:e112213. Johansson N et al Clin Infect Dis 2010;50(2):202-9A. Stralin K et al Scand J Infect Dis 2010;42(6-7):426-34...

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