

Retrospective database analysis on the impact of pneumococcal conjugate vaccines on otitis media and pneumonia among children in Germany

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Introduction

Routine immunization of children up to two years of age with the pneumococcal conjugate vaccine PCV7 started in Germany in 2007. Two higher-valent PCVs have been licensed in Europe for children in 2009, PCV10 (April 2009) and PCV13 (December 2009), and were consecutively introduced in Germany. Although substantial decline of invasive pneumococcal diseases has been observed, particularly the effect of the higher-valent PCVs on non-invasive disease is unknown so far. Therefore, we assessed the impact of PCVs on otitis media (OM) and pneumonia in children in Germany.

Materials and Methods

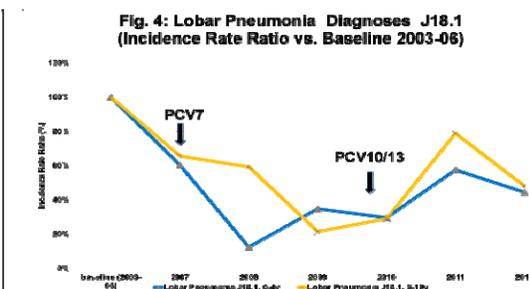
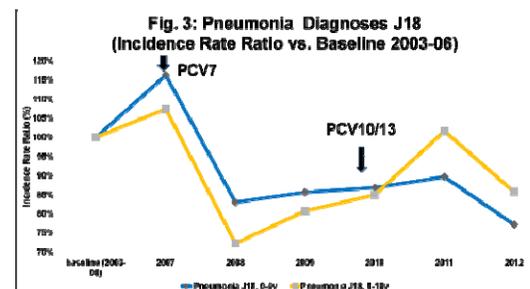
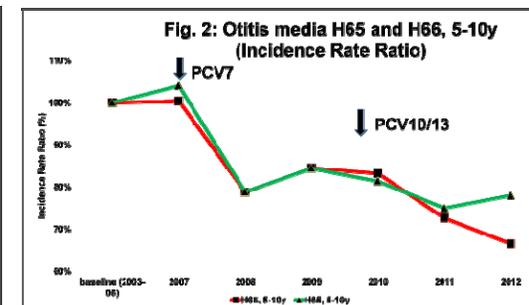
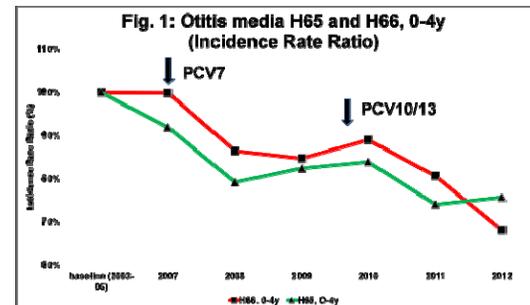
Data from IMS-Health-VIP[®] were used for uninterrupted time series analyses that used ICD-10 diagnoses of suppurative (H66) and non-suppurative (H65) OM, as well as pneumonia (J18; which includes sub-diagnosis lobar pneumonia J18.1) documented in children 0-10 years of age. The pre-vaccine period 2003-2006 provided baseline values and was compared to single years following 2007 (up to 2012) characterized by a rapidly growing vaccination rate with 7-valent and higher-valent PCVs in children <2 years of age. Reduction rates (%) were adjusted to the size of the corresponding age cohorts; the Poisson model was used for statistical analysis.

Results

- During baseline period an average of about 1.7 million episodes of suppurative and non-suppurative OM occurred annually in children aged 0-4 years. With regard to suppurative OM only, 31.9% ($p < 0.0001$) less episodes were documented representing a reduction of nearly 500,000 cases in 2012 compared to baseline (Fig. 1).
- Episodes of pneumonia decreased in 2008 in children aged 0-4 years and showed a re-increase in the following years until 2011. In 2012, a significant reduction of 22.8% ($p < 0.0001$) compared to baseline was observed (Fig. 3). More extremely, episodes of lobar pneumonia (sub-diagnosis, frequently caused by pneumococci) decreased by 87.6% in 2008. Until 2011, a temporarily increase was observed, followed by a re-decrease in 2012 with a significant reduction from baseline in 2012 of 55.5% ($p < 0.0001$) (Fig. 4).
- Analyses among children aged 5-10 years showed similar trends for OM and pneumonia (Fig. 2-4).
- During the 6 years from 2007 to 2012, the cumulated number of reduced episodes of suppurative and non-suppurative OM was more than 3.6 million and more than 447,000 for pneumonia for all children 0-10 years.

Conclusions

- Demonstration of a significant reduction in otitis media and pneumonia diagnoses among children in Germany after introduction of pneumococcal conjugate vaccines.
- The reduction was not only observed in the cohort of the potentially vaccinated children (0-4 years), but also in the age group 5-10 years, which may indicate a herd effect in this population.
- Cumulated number of more than 3.6 million less episodes of otitis media and more than 447,000 less episodes of pneumonia in children 0-10 years of age since introduction of universal vaccination with PCVs in Germany (2007 to 2012)
- The results contribute to the growing body of evidence supporting the benefits of pneumococcal conjugate vaccines in children also in non-invasive diseases.



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