Streptococcus pneumoniae is a leading causative pathogen of common pediatric head and neck infections (HNIs), such as: acute otitis media (AOM), meningitis, acute mastoiditis (AM) and acute bacterial sinusitis (ABS). The latter could be accompanied by related complications, e.g., orbital cellulitis and subperiosteal abscess.

We analyzed the incidence and epidemiology of pneumococcal HNIs (pHNIs) in hospitalized children with HNIs in the years prior, during and after the introduction of PCVs in Israel.

A substantial reduction in the all-cause HNIs incidence, and more specifically in pHNIs, in PCV immunized children was evident. This was mainly due to significant reduction in AOM rate and to a much lesser extent, in AM and meningitis rates.

**Introduction**

**Streptococcus pneumoniae** is a leading causative pathogen of common pediatric head and neck infections (HNIs), such as: acute otitis media (AOM), meningitis, acute mastoiditis (AM) and acute bacterial sinusitis (ABS).

Pneumococcal conjugate vaccines (PCVs) were introduced into the Israeli National Immunization Program in 2009 (PCV7) and 2010 (PCV13).

**Study Aims**

We sought to characterize the epidemiology of pneumococcal HNIs (pHNIs) before, during and after the introduction of PCVs. We expected a reduction in pHNIs incidence after the PCVs’ implementation.

**Methods**

- Children 0–16 years of age, who were hospitalized with HNIs between 01/07/12-14 were retrospectively identified.
- Study years were categorized according to the PCV introduction timeline: 2007–2008: “pre-PCV years”; 2009–2011: “transition years” and 2012–2014: “post-PCV years”.
- pHNIs episodes were defined if pneumococcal cultures or if urine antigen was positive.
- Children who received ≥2 doses of PCV7/PCV13 were considered as immunized. All other children were considered as unimmunized.

**Results**

- HNIs accounted for 2.5%–4.7% of the total admissions; 3%–17% of them were pHNIs.
- Eighty-seven pHNIs episodes were identified: AOM (n = 42), acute mastoiditis (n = 28) and meningitis (n = 17).
- There was a significant downward trend in the overall incidence of HNIs, and particularly of pHNIs in the post-PCV years.
- In 2009–2010, pHNIs incidence sharply decreased, from 7 to 1.74/1000 hospitalized children/year, due to ~55% reduction of pneumococcal AOM episodes.
- Immunized children were less likely to present with pHNIs (P = 0.001) but were more likely to undergo surgery (P = 0.042).

**DISCUSSION**

- PCVs are effective against HNIs requiring hospitalization in PCV immunized children.
- A substantial reduction in all-cause HNIs incidence, and more specifically in pHNIs, in PCV immunized children who required hospitalization, was evident. This was also followed by a significant reduction in AOM rate and to a much lesser extent, in AM and meningitis rates.

The routine PCV immunization program has confirmed its effectiveness in reducing pHNIs incidence. Maintaining high routine immunization coverage will help to enhance this protection.