Long-term impact of ten-valent pneumococcal conjugate vaccine (PCV10) on pneumonia among vaccine-eligible children in Finland

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Background

- PCV10 was introduced into the Finnish National Vaccination Programme (NVP) in Sep-2010 using a 2+1 schedule with estimated uptake at 93%.
- We evaluated the long-term impact of PCV10 on pneumonia among vaccine-eligible children during the first six years after the NVP introduction.

Methods: cohort comparison

- The target cohort eligible for PCV10-NVP born 06/2010-09/2016 was compared with a calendar-time and age-matched (3-78 months) reference cohort before NVP introduction (Figure 1).

Figure 2. Pneumonia episodes in children <2 years and 2-5 years by epidemiologic year, Finland 2000-2017

Methods: Case definitions

- Hospital in- and outpatient discharge notifications with diagnoses compatible with any hospital-diagnosed pneumonia (HDP, ICD-10 codes J10.0/J11.0/J12-J18/J85.1/J86) or any empyema/lung abscess (ICD-10 codes J85/J86) were collected from the national Care Register.
- We calculated rates of HDP and hospital-treated primary pneumonia (HTPP, pneumonia as the primary diagnosis after inpatient hospitalization) and empyema before and after NVP introduction
- No radiological evaluation data were available.
- Episode duration was 90 days.

Figure 1. PCV10 target and reference cohorts

Figure 3. Annual incidences of empyema/abscess

Table. Pneumonia incidences with relative and absolute rate reductions after vaccine introduction.

Event type	Incidence per 1000 person-years (N)		Rate reduction (RR) in target vs. reference cohort	
	Reference cohort	Target cohort	Relative RR, % (95% CI)	Absolute RR, per 1000 person-years (95% CI)
Hospital-diagnosed pneumonia, HDP	8.3 (10085)	7.8 (9640)	7 (4, 9)	0.6 (0.4, 0.8)
Hospital-treated primary pneumonia, HTPP	4.3 (5215)	3.3 (4067)	24 (21, 27)	1.0 (0.9, 1.2)
HDP, pneumococcal (ICD-10 J13)	0.22 (266)	0.06 (69)	75 (67, 81)	0.2 (0.1, 0.2)
Any empyema/abscess, (ICD-10 J85/J86)	0.05 (58)	0.05 (64)	-7.5 (-54, 25)	0.0 (-0.02, 0.01)
Hospitalization for empyema/abscess	0.03 (33)	0.04 (48)	-42 (-123, 9)	-0.01 (-0.03, 0.01)

Results

- Relative rate reduction in HDP was 7% and in HTPP 24%; absolute reduction for HTPP was 1/1000 person-years (Table).
- Number of lung abscess/empyema diagnoses fluctuated by years, but remained low with non-significant increase (Table, Figure 3).

Conclusions

- This nation-wide study provides evidence of the long-term effects of the 10-valent PCV against pneumonia in a routine vaccination program setting.
- Potential increase in empyema diagnoses is inconclusive and requires further follow-up.
- The PCV10 introduction has prevented over 1000 pneumonia hospitalizations during 2010-2016 in the vaccine-eligible target cohort.