27th ECCMID Vienna, Austria 22 – 25 April 2017
The congress of ESCMID

Session: OS095 Late-breaker: News in vaccine research

Category: Other

23 April 2017, 16:00 - 16:11
OS0486A

Which pneumococcal vaccine for the elderly? Indirect effect of childhood PCV10/13 vaccination on invasive pneumococcal disease in the elderly of 10 European countries

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[3].

[4]*Epiconcept*

Background: Two pneumococcal vaccines are indicated for the elderly, the 13-valent pneumococcal conjugate (PCV13) and the 23-valent polysaccharide (PPV23) vaccines. The disease burden caused by vaccine serotypes has changed due to herd (indirect) effects generated by childhood PCV13 and PCV10 (10-valent conjugate vaccine). This multi-centre European study estimated the indirect effect of five years of childhood PCV10/13 (2011-15) on invasive pneumococcal disease (IPD) in the elderly at 13 sites in 10 countries, to help decision-making on pneumococcal vaccination policies. Universal childhood vaccination with PCV13 or PCV10 is implemented in six and two sites (uptake >93%), respectively. Both PCV10 and PCV13 are used in five sites (two universal and three non-universal vaccination). Nine sites recommend PPV23 to all elderly (uptake >50% in five sites).

Material/methods: In each site, we calculated incidence rate ratios (IRR) for IPD in adults ≥65 year-olds comparing each PCV10/13 year to 2009 (pre-PCV10/13 year). We calculated pooled IRR and 95% confidence intervals (CI) using random-effects meta-analysis, PCV10/13 impact as (1-IRR)*100 and proportion of IPD caused by PCV13 and PPV23 serotypes.

Results: During 2009-2015, the 13 sites reported 55,969 IPD cases. After five PCV10/13 years, IPD incidence caused by all-types, PCV7, PCV10 serotypes not included in PCV7 (PCV10non7) and PCV13 serotypes not included in PCV10 (PCV13non10) declined by 9% (95%CI: -4 to 20), 77% (67-84), 73% (60-82) and 20% (-5 to 39), respectively. Non-PCV13 serotype incidence increased by 63% (38-92). The incidence of PPV23 serotypes not included in PCV13 (PPV23nonPCV13) increased in all

sites (pooled increase of 50% [36-66]). Non-vaccine serotype incidence increased by 76% (39-124). In sites with universal PCV13 vaccination, PCV13non10 serotype incidence declined by 38% (22-50); PCV13 and PPV23nonPCV13 serotypes represented 20-29% and 37-54% of IPD in 2015, respectively. In sites using PCV10 (universal, alone or with PCV13), PCV13non10 serotype incidence increased by 50% (-8 to 146), mostly due to a 175% (52-398) rise in 19A serotype incidence; PCV13 and PPV23nonPCV13 serotypes represented 32-58% and 22-44% of IPD cases in 2015, respectively.

Conclusions: In the elderly at 13 European sites, declines in PCV10/13 serotype incidence, suggesting an indirect effect of childhood PCV10/13 vaccination, were partly countered by increases in non-PCV13 serotypes. As a result, the serotype coverage of PCV13 progressively decreased over 2011-2015, while the incidence of PPV23nonPCV13 serotypes progressively increased.

These trends varied according to the childhood PCV used. The remaining proportion of PCV13 serotypes was lower in sites with universal PCV13 (<30% IPD) compared to sites using PCV10, due to differences in PCV13non10 serotype trends, and 19A in particular. In conclusion, the childhood vaccination strategies must be a factor to consider when deciding on elderly vaccination policies. Trends in IPD serotypes, in particular 19A, must be kept under close monitoring in future years.