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P0606 Changes in serotype distribution and antimicrobial non-susceptibility in Streptococcus pneumoniae causing pneumonia in adults from four European countries following paediatric immunization with the 13-valent pneumococcal conjugate vaccine (PCV13)

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Background: Pneumonia accounts for over 80% of adult disease caused by *Streptococcus pneumoniae*. In four European countries with routine paediatric PCV13 use (England, France, Germany, Ireland), we assessed changes in serotype distributions and antimicrobial non-susceptibility among pneumococcal isolates obtained from adults age ≥50 years with pneumonia.

Materials/methods: *S. pneumoniae* isolates *(n=670)* were recovered from invasive (22.5%) and lower respiratory tract specimens (77.5%). We used 2009–2010 and 2015-2016 as pre- and post-PCV13 periods. The *cpsB* sequence was obtained by PCR and Sanger sequencing or genome sequencing for serotype assignment. Multiplex PCR and/or Quellung reactions were performed, as needed. MLST was determined by genome sequencing. Antimicrobial susceptibility was performed by CLSI methods.

Results: The percent of pneumococcal isolates during the pre- vs. post-PCV13 periods were for PCV7 serotypes 21.9%/4.2% (p<0.01), PCV13 serotypes 54.3%/21.2% (p<0.01), PPV23-unique serotypes 18.6%/29.5% (p=<0.01), serotype 19A 9.3%/9.5% (p=0.95), and for serotype 3 12.5%/6.7% (p=0.01).

The percent of all pneumococcal isolates non-susceptible to one or more antibiotics during 2015-2016 were lower than during the pre-PCV13 period. When limited to PCV13-type isolates, the percentage non-susceptible during 2015-2016 was higher than during 2009-2010, due to a greater frequency during 2015-2016 of parenteral penicillin non-susceptibility among 19A isolates belonging to clonal complex 320 from two sites in Ireland. When excluding Ireland from the analysis, non-susceptibility among PCV13-type isolates was lower for parenteral penicillin and ceftriaxone, and stable for clindamycin and erythromycin (Table 1).

Conclusions: Paediatric PCV13 immunization programs in these European countries were associated with substantial declines in the proportion of vaccine-type pneumonia in adults, likely through indirect protection following reduced transmission from vaccinated children to unvaccinated adults. Nevertheless, there remains a substantial proportion of pneumonia due to PCV13 serotypes, suggesting that direct adult PCV13 immunization may have public health benefit. PCV13 may also have contributed to reduced antimicrobial susceptibility; the emergence of a resistant 19A clone in

Ireland deserves additional analysis in the context of Ireland's paediatric immunization program.

Table 1. Antimicrobial Non-Susceptibility Rates in Pneumococcal Pneumonia in Adults

	Pneumococcal Pneumonia (PP)		PCV13-type PP	
Country/Antimicrobial Type	2009-2010	2015-2016	2009-2010	2015-2016
England, France, Germany, and Ireland combined	n=311	n=359	n=169	n=76
Penicillin	4.2%	3.6%	7.1%	14.5%
Ceftriaxone	6.8%	2.2%	11.8%	7.9%
Clindamycin	23.8%	18.4%	33.1%	44.7%
Erythromycin	29.6%	23.1%	39.6%	51.3%
England, France, and Germany combined*	n=259	n=296	n=135	n=57
Penicillin	3.9%	0.3%	6.7%	0.0%
Ceftriaxone	6.6%	0.7%	11.9%	1.8%
Clindamycin	25.5%	16.2%	35.6%	35.1%
Erythromycin	31.7%	19.3%	43.0%	42.1%

* Secondary analysis excluding Ireland due to serotype 19A belonging to clonal complex 320 identified in two sites in Ireland explaining all the all the non-susceptibility for parenteral penicillin.