

# EVOLUTION FROM 2003 TO 2015 OF ANTIBIOTIC RESISTANCE AND SEROTYPE DISTRIBUTION OF PNEUMOCOCCUS ISOLATED IN INVASIVE PNEUMOCOCCAL DISEASE (IPD) IN FRANCE

J. Cremniter<sup>1</sup>, M. Kempf<sup>1</sup>, E. Varon<sup>2</sup>, C. Grelaud<sup>1</sup>, S. Luce<sup>1</sup>, A. Labrunie<sup>1</sup>, A. Lepoutre<sup>3</sup>, M. C. Ploy<sup>1</sup>, J. Raymond<sup>1</sup> and the French Pneumococcus Network.

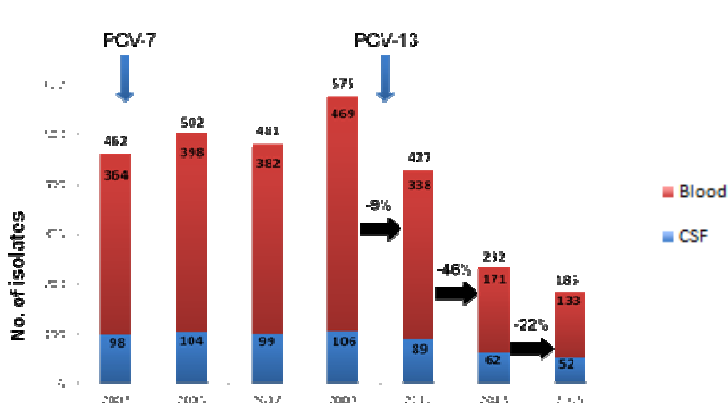
<sup>1</sup>Observatoires Régionaux du Pneumocoque, CHU, Limoges, France <sup>2</sup>Centre National de Référence du Pneumocoque (CNRP), AP-HP HEGP, Paris, France <sup>3</sup>Institut de Veille Sanitaire, Saint Maurice, France

**Objective.** To evaluate trends in antibiotic resistance and serotype distribution in IPD, data from the French national survey program between 2003 and 2015 were analysed.

**Methods.** 24,907 *Streptococcus pneumoniae* were isolated from meningitis (2,500) and blood samples (22,407), in children (<16 year old-2,864) and adults (22,043) from 2003 to 2015  
 • MICs of penicillin G (PEN), amoxicillin (AMX) and cefotaxime (CTX) were performed by agar dilution method, the decreased susceptibility was defined when MIC was > 0,06mg/L for penicillin G, > 0,5mg/L for amoxicillin and > 0,5mg/L for cefotaxime  
 • Serotyping of 9,231 strains (latex particles sensitized with antisera from Statens Serum Institute Copenhagen, Denmark)

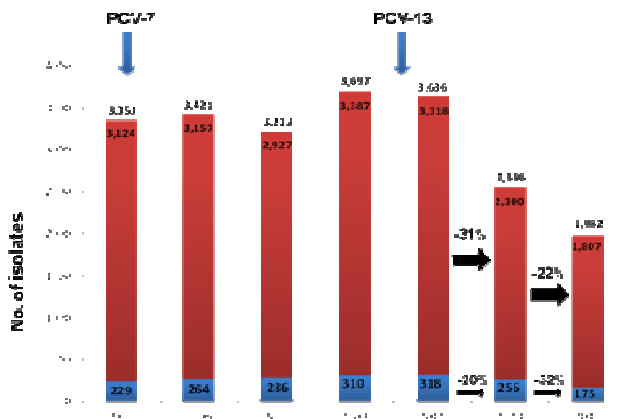
## Results.

### Evolution of IPD in children (n=2,864)



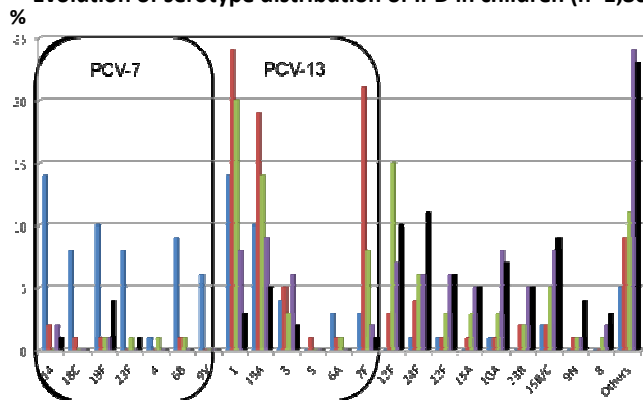
- No decrease of IPD after PCV-7 vaccination
- Significant decrease of meningitis and bloodstream infections in children after PCV-13 vaccination (-68% of IPD, p<0.05, 2009-2015)

### Evolution of IPD in adults (22,043)



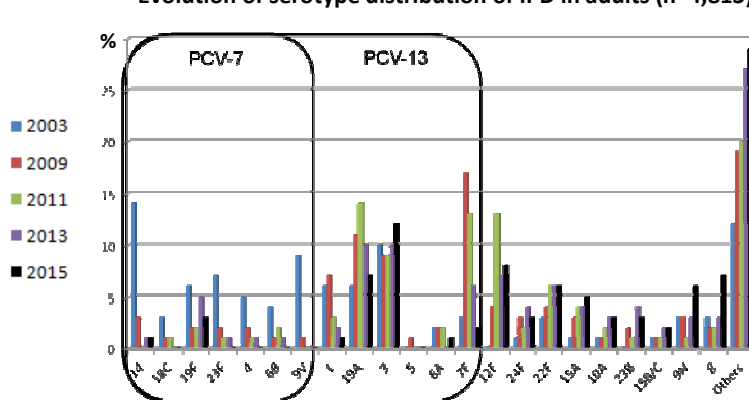
- No decrease of IPD in adults after PCV-7 vaccination of children
- Significant decrease of IPD in adults after PCV-13 vaccination in children (-47% of IPD, 2009-2015, p<0.05)

### Evolution of serotype distribution of IPD in children (n=1,861)



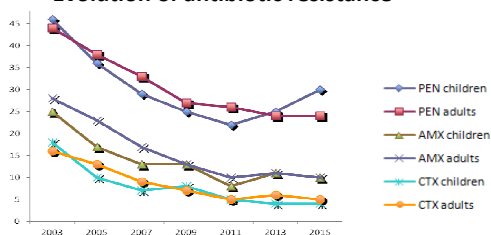
- Almost complete disappearance of PCV-7 serotypes (6.5% in 2015 vs 55.6% in 2003) except for serotype 19F
- Dramatic decrease of the 6 additional PCV-13 serotypes after vaccination (17.1% in 2015 vs 70.4% in 2009)
- Increase of non-vaccine serotypes particularly 12F, 24F (not PPSV23 serotype), 15B/C, 9N and 8

### Evolution of serotype distribution of IPD in adults (n=4,813)



- Almost complete disappearance of PCV-7 serotypes in 2015 (5.8% in 2015 vs 48.4% in 2003)
- Decrease of most of the 6 additional PCV-13 serotypes after vaccination in children except for serotype 3
- Increase of non-vaccine serotypes

### Evolution of antibiotic resistance



- Decrease in beta-lactams resistance between 2003 and 2015
- Not significant increase of resistance to penicillin G in children between 2011 and 2015. Need to be monitored

### Conclusion.

- Introduction of PCV-7 not followed by a decrease of IPD in France due to replacement by serotypes 19A and 7F
- Vaccination with PCV-13 rapidly followed by a decrease of IPD
- Decrease in beta-lactams antibiotic resistance during the last decade
- Dramatic shift in serotype distribution: 12F, 24F, 15A/B/C, 9N and 8, particularly 12F and 24F serotypes in children, and of 12F, 22F, 15A, 9N and 8 in adults

Acknowledgments: Authors thanks to laboratories for their support laboratories Pfizer, Sanofi and bioMérieux