

25th **ECCMID** Copenhagen, Denmark
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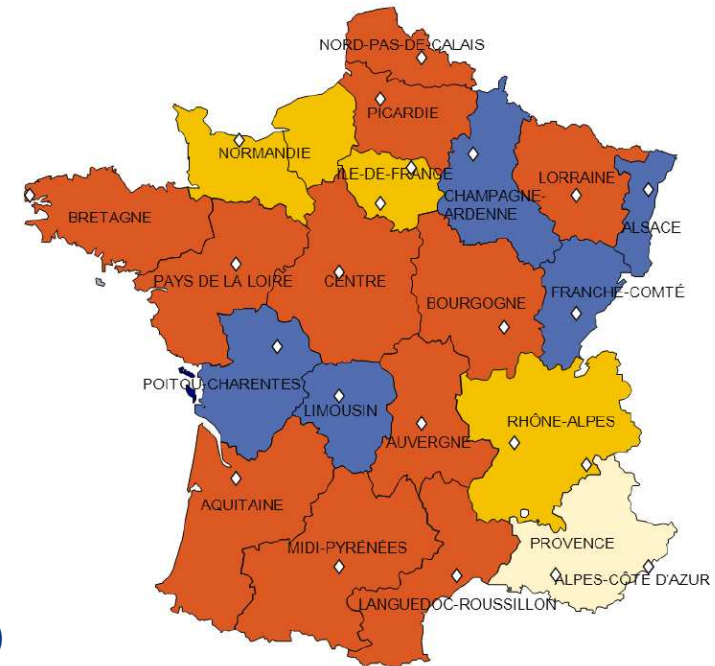
Trends in antibiotic resistance and serotype distribution in Invasive Pneumococcal Disease (IPD) in France from 2003 to 2013; On-going Survey of the French Pneumococcus Network

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and the French Pneumococcal Surveillance Network*

French Pneumococcal surveillance network



- ✓ Founded in 1995
- ✓ Includes 361 laboratories (300 public hospital laboratories and 61 private laboratories)
- ✓ Biannual national surveys (collection of > 4,000 pneumococcus isolates each year of study: **CSF, blood, middle ear fluid, pleural fluid**)
- ✓ Data collected in 23 regional observatories (Observatoires Régionaux du Pneumocoque, ORP)
- ✓ Coordination with the National Reference Centre for Pneumococci (CNRP) and the Institut de Veille Sanitaire (InVS)



Percentage of admission in medical wards (2011)

≥ 80%

70 to 79%

60 to 69%

40 to 59%

Methods



✓ Study period 2003-2013 : **22,555 *S. pneumoniae*** isolated from **CSF (2,221)** and **blood cultures (20,334)** in **children (<16 year old – 2,679)** and **adults (19,876)**



✓ MIC of penicillin G (PEN), amoxicillin (AMX) and cefotaxime (CTX) by agar dilution method

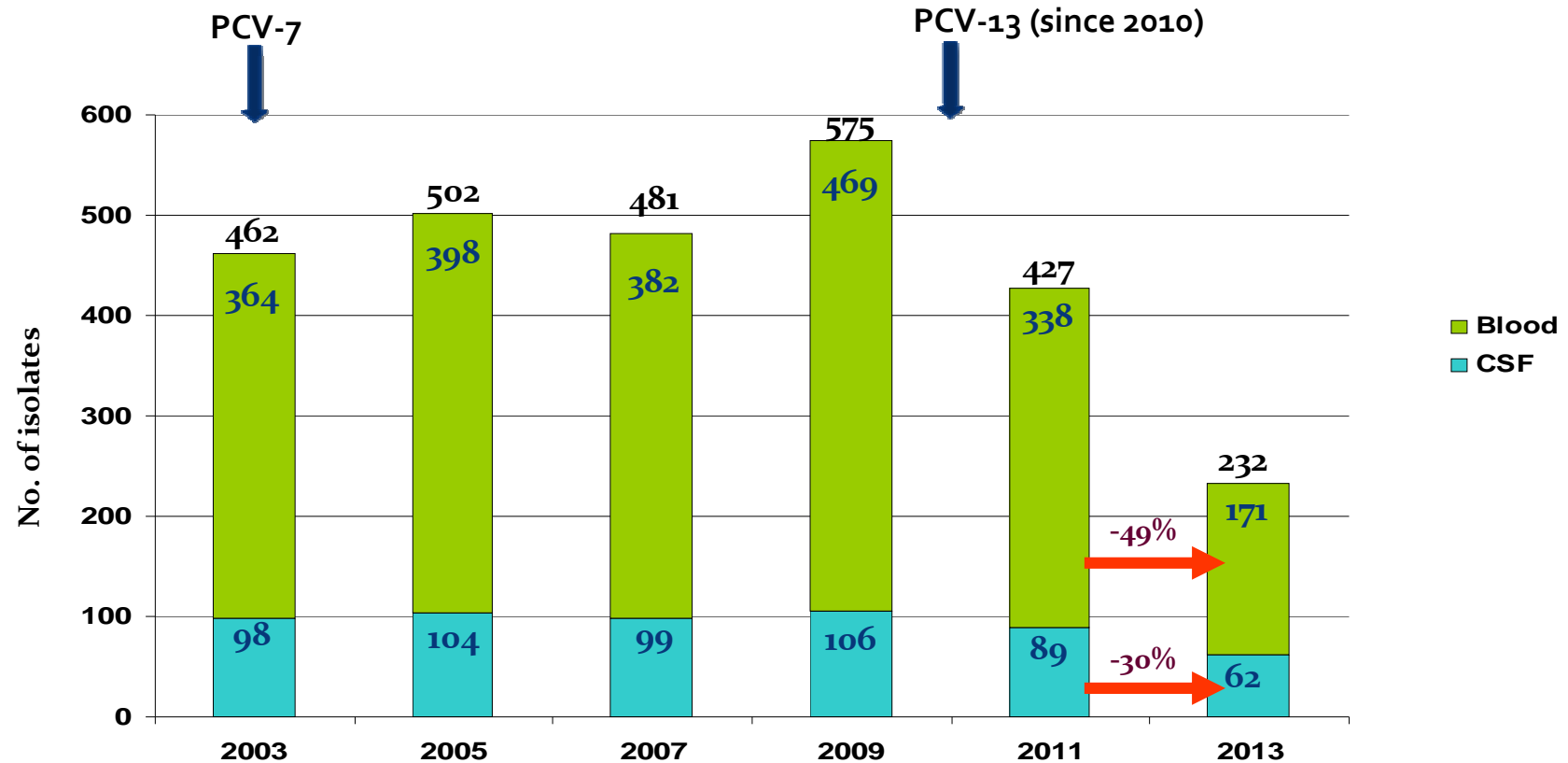
✓ Serotyping of a systematic sample of **8,094 strains** (latex particles sensitized with antisera from Statens Serum Institute Copenhagen, Denmark)

✓ Statistical analysis, Capture System software (SAS Institute, Cary, NC) Chi-square test for trends ($p < 0.01$)

Results



✓ Evolution of IPD in children (<16 yo)

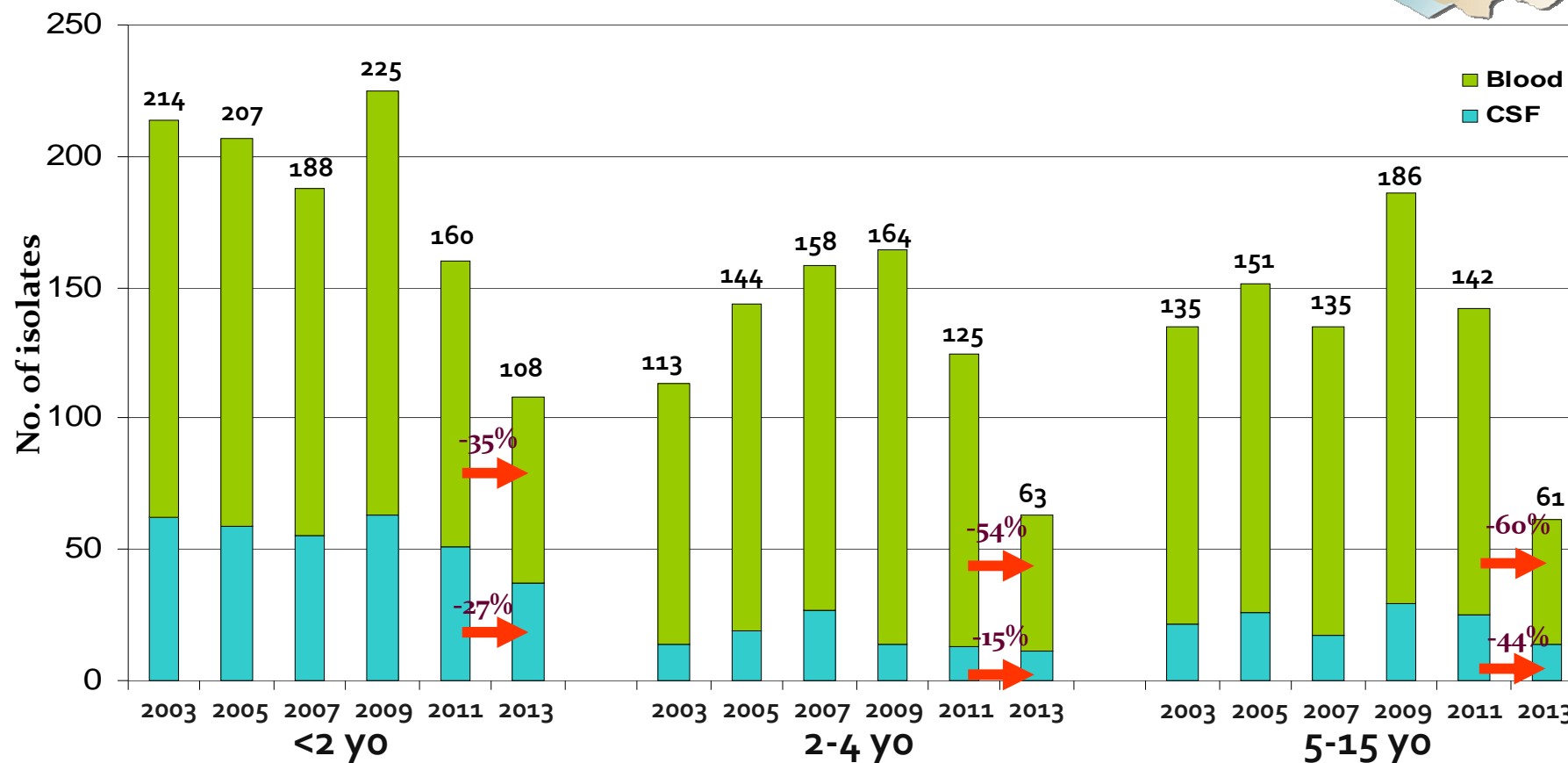


- globally, no decline in the IPD after PCV-7 vaccination
- dramatic decrease of meningitis and bloodstream infections in children after PCV-13 introduction in France

Results



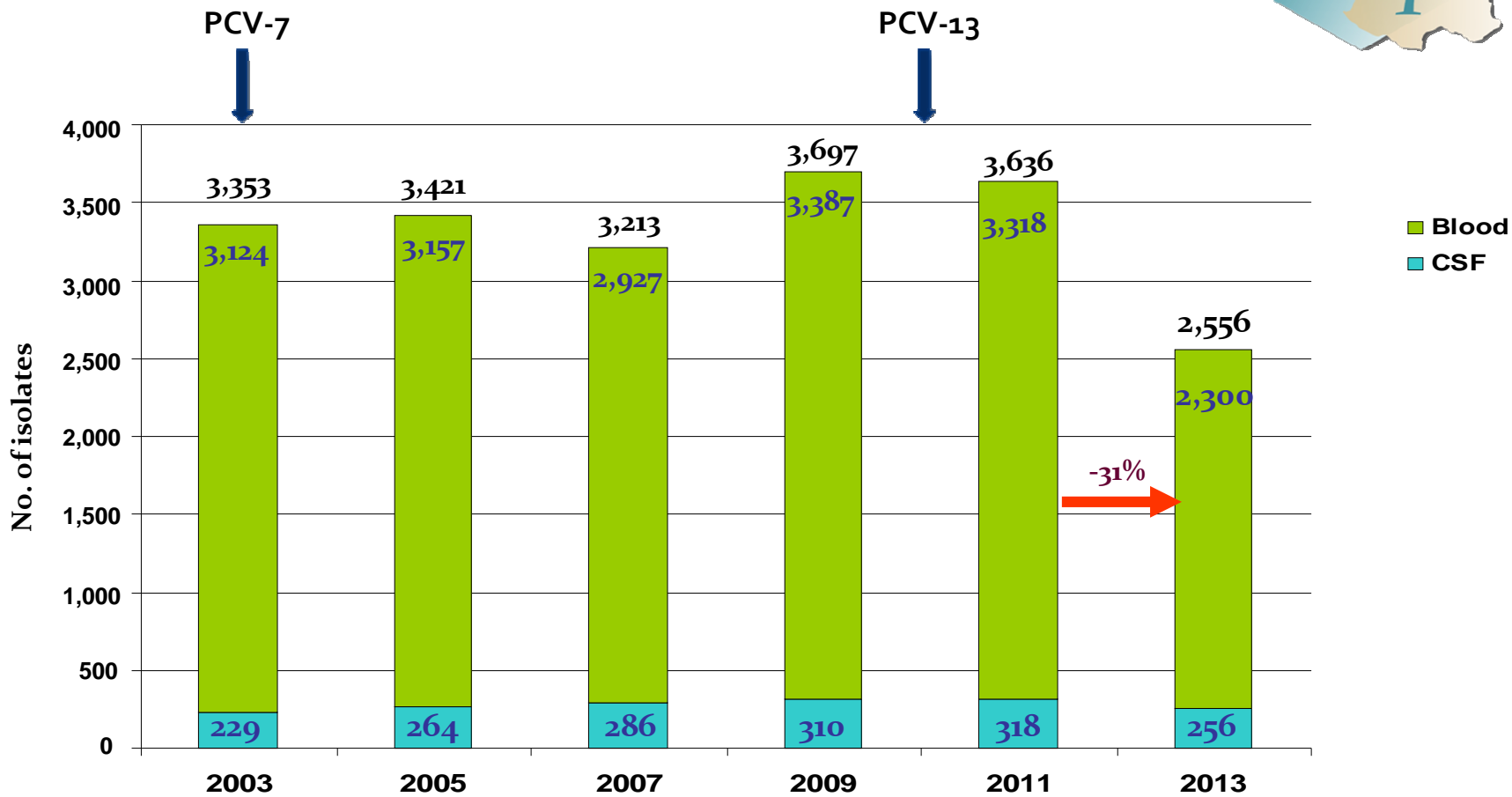
✓ Evolution of IPD in children according to age



- slight decrease of BSI in <2 yo after PCV-7 introduction and ↑ in older children
- after PCV-13 introduction: decrease of IPD whatever the age of the children
bloodstream infections +++
- significant decrease of meningitis in children <2 yo between 2001 and 2013

Results

✓ Evolution of IPD in adults



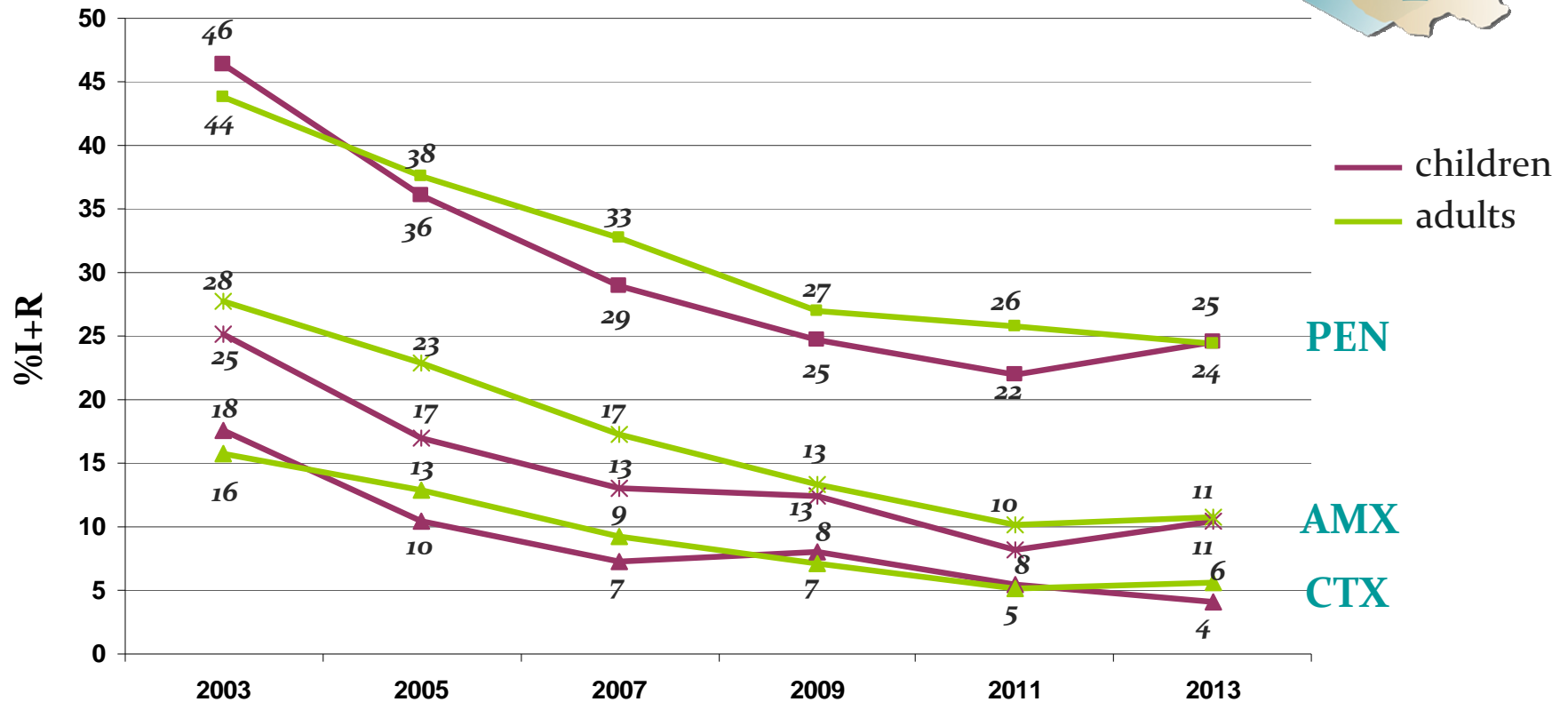
→ no decrease of IPD after PCV-7 introduction

→ decrease of IPD after PCV-13 introduction

↓ BSI +++

Results

✓ Evolution of antibiotic resistance



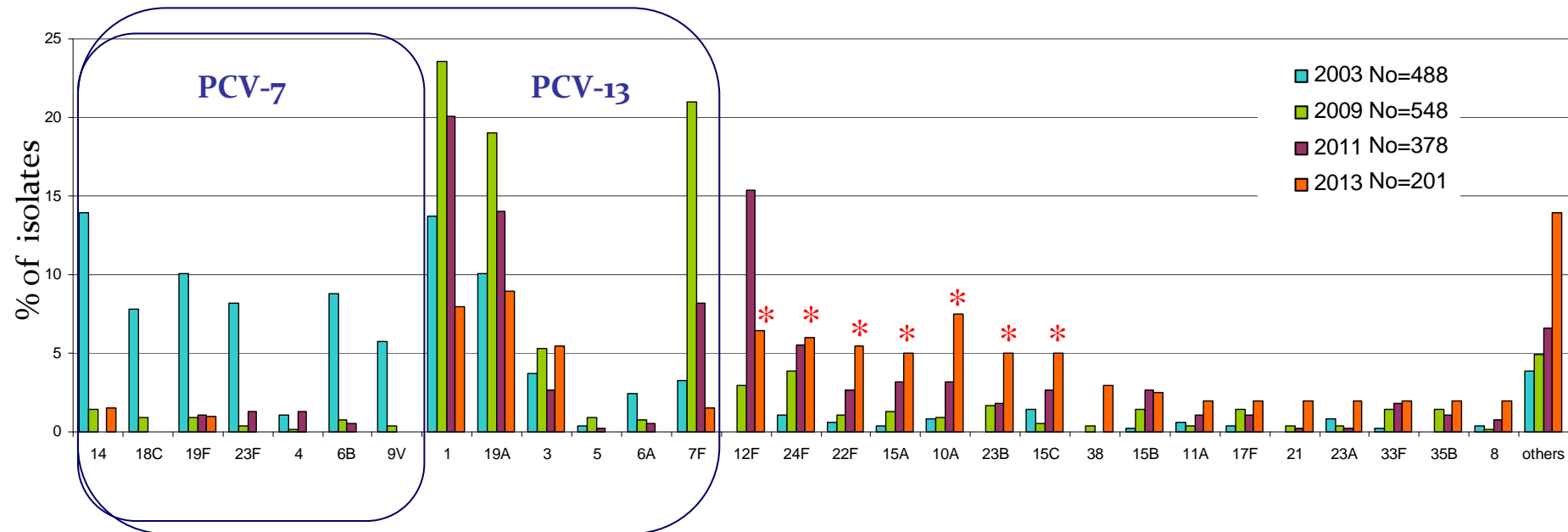
No. of strains	C	2003	2005	2007	2009	2011	2013
A	3,354	461	501	465	575	428	220
		3,354	3,423	3,230	3,697	3,649	2,528

- decrease in resistance, whatever the antibiotic tested
- also the case for erythromycin and cotrimoxazole (not shown)
- for PEN and AMX: slight increase between 2011 and 2013, but not significant

Results



✓ Evolution of serotype distribution of IPD in children

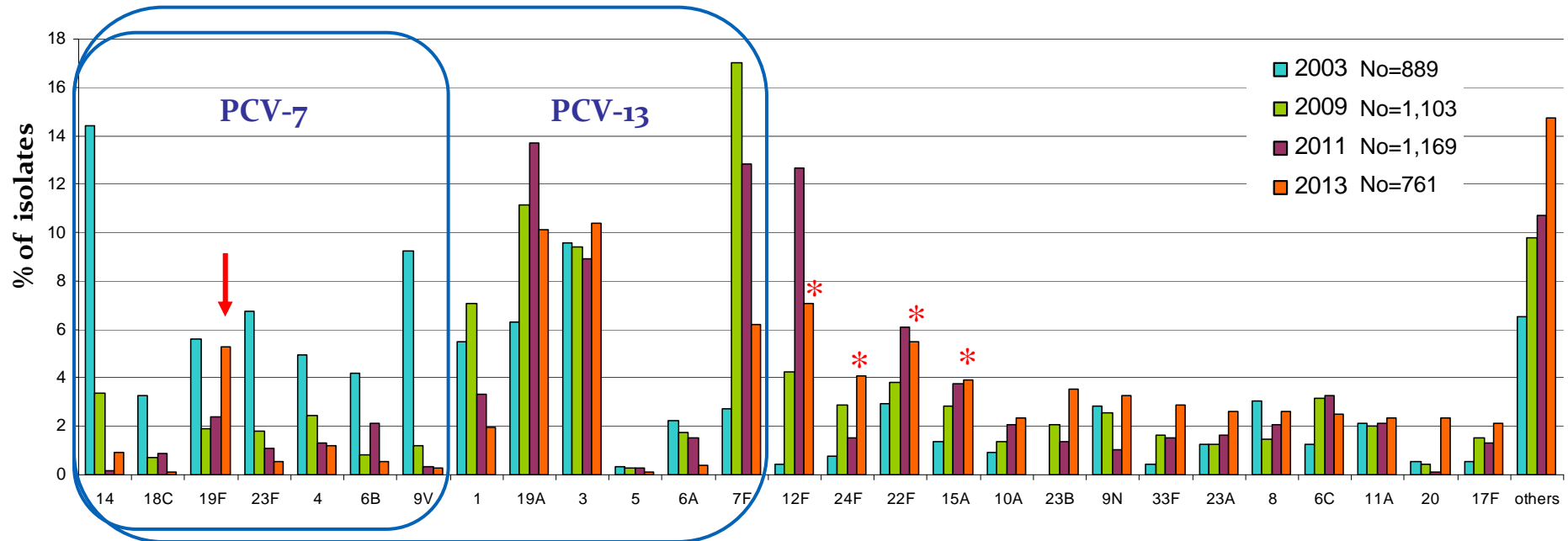


- near disappearance of PCV-7 serotypes in 2013 (2.5% in 2013 vs 55.6% in 2003)
- dramatic decrease of the 6 additional PCV-13 serotypes after vaccine introduction (23.9% in 2013 vs 70.4% 2009)
- increase of non-vaccine serotypes (73.6% in 2013 vs 10,9% in 2003) particularly 12F, 24F, 22F, 15A, 10A, 23B, 15C, 38,...
- “other serotypes”: ↑ number and diversity in 2013 (27 different serotypes in 2013 vs 20 in 2011)

Results



✓ Evolution of serotype distribution of IPD in adults

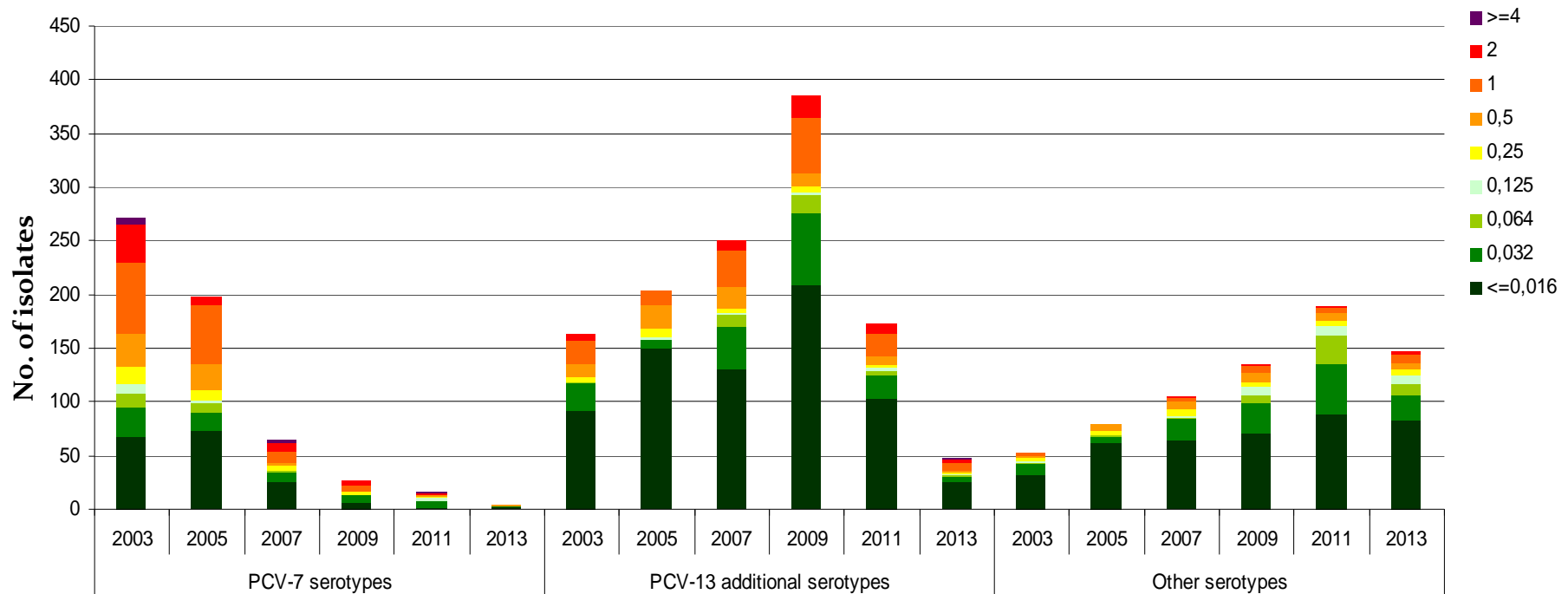


- near disappearance of PCV-7 serotypes in 2013 (8.8% in 2013 vs 48.4% in 2003) except for 19F
- decrease of most of the 6 additional PCV-13 serotypes after PCV-13 vaccination
- increase of some non-vaccine serotypes: 12F, 24F, 22F, 15A, 23B, 9N, 33F, 23A...
- “other serotypes”: increase of number but not diversity

Results



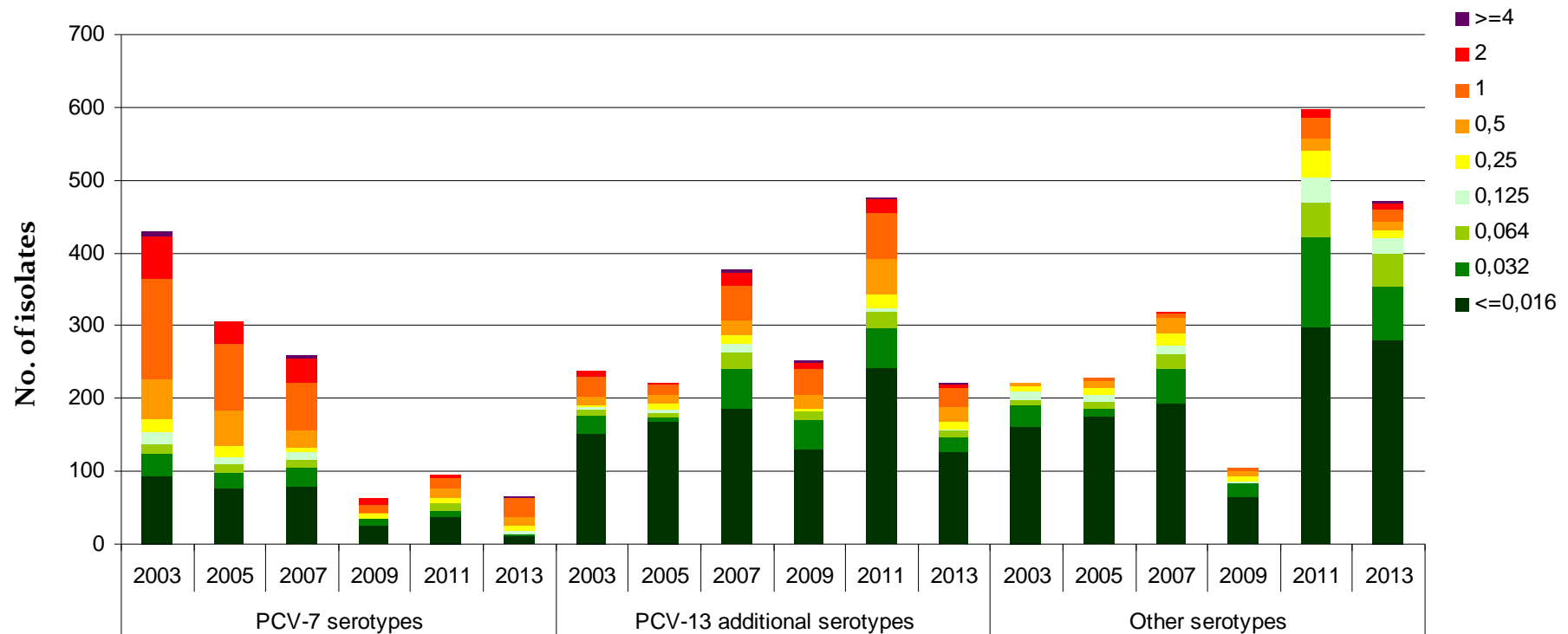
✓ Evolution of serotype distribution in children, according to susceptibility to PEN



- most of the PNSP belonged to vaccine serotypes: ↓ of vaccine serotypes = ↓ of PNSP
- most of the non-vaccine serotypes were susceptible to PEN
- the non-vaccine serotypes the most resistant were: 15A/B/C, 23B, 24F and 35B

Results

✓ Evolution of serotype distribution in adults, according to susceptibility to PEN



- most of the PNSP belonged to vaccine serotypes
- most of the non-vaccine serotypes were susceptible to PEN
- the non-vaccine serotypes the most resistant were: 15A/B/C, 6C, 23B, 24F and 35B

Conclusion



- **Introduction of PCV-7 not followed by a decrease of IPD in France (also observed in Spain) – cause: initial low uptake of PCV-7 (Lepoutre *et al.*, 2008; Munoz-Almagro *et al.*, 2008)**
- **Vaccination with PCV-13 rapidly followed by a decrease of IPD in children (<16 year old)**
 - in relation with a sharp decrease of serotype 1, 19A and 7F
- **Decrease of IPD in older non-vaccinated age-groups**
- **Decrease in antibiotic resistance**
- **Dramatic shift in serotype distribution**

The French Pneumococcal Surveillance Network



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