Impact of Infant Pneumococcal Vaccination on the Epidemiology of Invasive Pneumococcal Disease in Belgium, 2002 – 2010

L. Liesenborghs, J. Verhaegen, W.E. Peetermans, J. Flamaing*

* Johan Flamaing, MD, PhD
Dept. Geriatric Medicine
University Hospitals Leuven
Herestraat 49, 3000 Leuven,Belgium
Tel: +32 16 34 26 40 Fax: +32 16 34 26 41
E-mail: johan.flamaing@uzleuven.be

Introduction and Aims

- The 7-valent pneumococcal conjugate vaccine (PCV7) became available in Belgium in 2004 and was introduced in the national immunization program in 2007.
- The surveillance of changes in pneumococcal serotype epidemiology introduced by PCV7 in infants and older age groups by herd immunity is important to guide future vaccination strategies.
- We evaluated the effect of infant vaccination on the epidemiology of invasive pneumococcal disease (IPD) in the overall population.

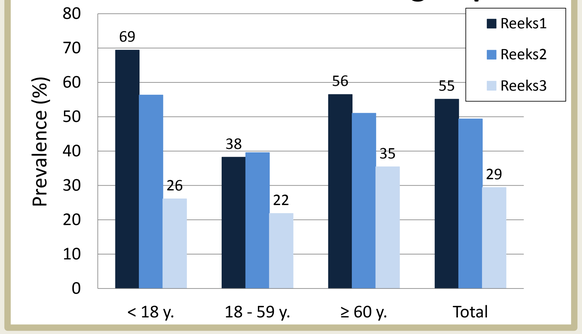
Definitions and Methods

- ***Pre- and post PCV7 eras***
  Pre-PCV7: 2002 – 2004
  Transition period: 2005 – 2006 (low infant PCV7 coverage)
  Post-PCV7: 2007-2010
- ***Analyzed age groups***
  < 18 y.
  18 – 59 y.
  ≥ 60 y.
- ***Serogroups***
  PCV7 serogroups: 4, 6, 9, 14, 18, 19, 23
  Serotyping within serogroups only performed in subjects < 18 y. since 2005.
- ***Vaccine formulations***
  PCV7: serotypes 4, 6B, 9V, 14, 18C, 19F, 23F
  PCV13: serotypes **1, 3,** 4, **5, 6A,** 6B, **7F,** 9V, 14, 18C, **19A,** 19F, 23F
  PPV23: serotypes 1, **2,** 3, 4, 5, 6B, 7F, **8, 9N,** 9V,**10A, 11A, 12F,** 14, **15B, 17F,** 18C, 19A, 19F, **20, 22F,** 23F, **33F**
- Subtyping of a random sample of serogroup 19 isolates of the pre-PCV7 era (2005) to compare the subtype distribution pre- and post PCV7 (2010).
- ***Microbiological testing***
  13,998 pneumococcal blood and pleural fluid isolates were mailed to the National Reference Laboratory for IPD (Dept. of Microbiology, University Hospitals Leuven, Belgium) for capsular typing by phase-contrast microscopy with serotype/serogroup specific sera obtained from the Statens Serum Institute (Copenhagen) between 2002 and 2010.

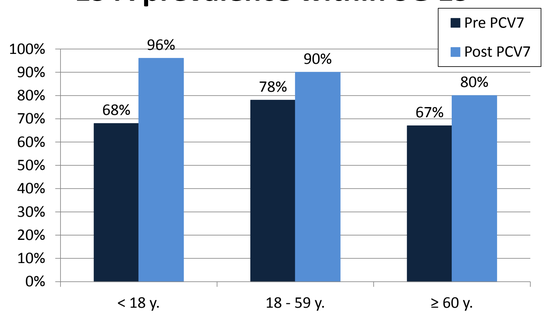
Blood and Pleural Fluid Isolates

Mean number of isolates / y.				
	< 18 y.	18 – 59 y.	≥ 60 y.	All ages
Pre – PCV7	366	369	678	1421
Transition	357	369	743	1471
Post – PCV7	360	508	838	1717

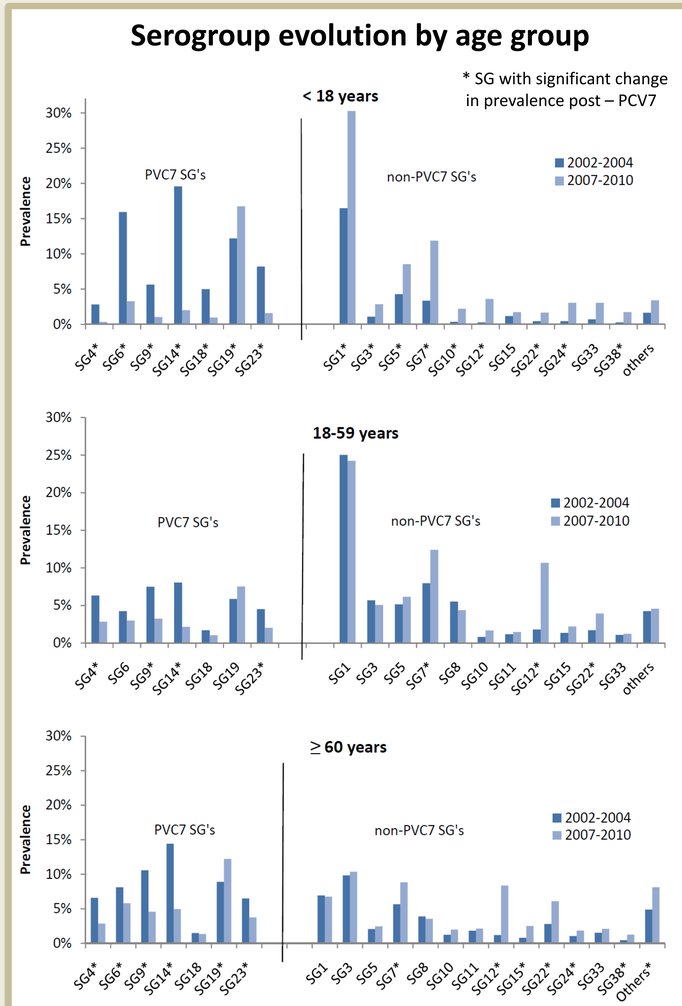
Evolution of PCV7 - serogroups



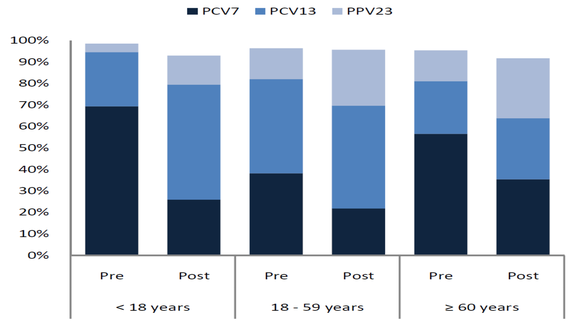
19 A prevalence within SG 19



Serogroup evolution by age group



Pneumococcal vaccine coverage



Conclusions

- **PCV7 in infants resulted in a marked decline of all PCV7 serogroups except SG 19 in all age groups.**
- **Several non-PCV7 serogroups increased significantly after PCV7 introduction.**
- **The rise in SG 19 is attributable to serotype 19A.**
- **After the introduction of the PCV7 the overall serogroup coverage of the PCV7 declined to 29 %. The overall coverage of PCV13 and PPV23 were 69 % and 93 %, respectively.**
- **A future vaccine strategy combining the immunological advantages of the PCV13 and the broad coverage of the PPV23 in persons at risk for IPD needs to be considered.**