Resurgence of Serotype 19F Carriage in Preschool Children in Portugal in the Context of Continuing Moderate Conjugate Pneumococcal Vaccine Uptake

To the Editor—Reduction to near extinction of pneumococcal (Streptococcus pneumoniae [Sp]) vaccine serotype nasal colonization has been reported over a period of around 5–7 years of pneumococcal conjugate vaccine (PCV) use [1, 2].

PCVs have been used in private practice in Portugal since 2001. They are not included in the universal national immunization program. After licensure of the 7-valent vaccine (PCV7, Wyeth), estimated coverage, based on sales information, increased from 32% in 2002 to 65% in 2005 and 79% in 2007, then fell slightly to 75% in 2008 (oral communication, Pfizer). In April 2009, the 10-valent vaccine (PCV10, GSK) became available and some infants received it. In January 2010, the 13-valent vaccine (PCV13, Pfizer) replaced PCV7 and is the vaccine that has been used almost exclusively since then (estimated coverage in 2010 and 2011 was approximately 65%; oral communication, Pfizer). Both schedules (2 + 1 and 3 + 1) have been used.

Previously, we reported carriage rates by serotype in cross-sectional studies performed annually in preschool children attending day care centers (DCCs) in Coimbra, a city in the central region of Portugal, between 2007 and 2009 [3, 4]. Among the children studied, the proportion who had received at least 1 dose of PCV7 vaccine showed a significant upward trend over the 3 years (76.5%, 82.4%, and 84%) [4]. The proportion of PCV7 serotypes (by Quellung reaction) showed a significant downward trend over time, apart from 19F, which persisted, detected in 4.1% of all children studied in 2009 [4]. Studies from other countries suggest that 19F is slower to disappear than other PCV types [5, 6].

In February–March 2010 we swabbed the nasopharynges of 586 children attending the same urban DCCs in Coimbra. The study was approved by the Ethics Committee of Centro Hospitalar de Coimbra. Parents or guardians provided written informed consent for their child to participate.

The mean age was 41.5 months (standard deviation, 18.1; range, 6.3–74.5); 326 (56%) children were male, and 507 (86.5%) had received at least 1 dose of PCV7 or PCV10. Among those aged ≥18 months, 78 (15.2%) and 338 (65.6%) had completed either a full 2 + 1 or 3 + 1 schedule, respectively. Nasopharyngeal swabs were inoculated into skim-milk tryptone glucose glycerol broth and stored at −80°C prior to culture. Standard microbiological techniques for the isolation and identification of Sp were used as described previously [7]. The Sp carriage rate was 58.5% (343/586). Molecular serotyping was undertaken, using a microarray-based method to determine cps gene content from genomic DNA hybridization, capable of detecting multiple serotypes in a single sample [8]. Excluding nontypeable (NT) signals (n = 7 NT only, n = 76 NT with other serotypes), which, using this methodology can include non-Sp streptococci, 73 children (12.5%) carried >1 Sp serotype. A total of 11.3% had PCV7/10 vaccine serotypes: 19F, 8.9% (52); 7F, 2.2% (13, including 2 with 19F); 1, 5, and 18C (1 each). Serotype 19F was more commonly detected than any other serotype. There was sole colonization by 19F in 34 children (5.8%) and by 19F with other serotype(s) in 18 (3.1%), among whom in 11 (1.9%) 19F was both the predominant serotype and represented >50% of the bacterial DNA detected in the sample (Figure 1). Accordingly, 45 children (7.7%) carried 19F as the only or the predominant serotype, a clear rise.

Twenty cases of invasive disease due to 19F were reported to the national surveil-

![Figure 1. Percentage of serotype 19F DNA in 18 children cocolonized with 19F and at least 1 other serotype.](image-url)
Serotype 19F, covered by all 3 PCVs, has emerged as the most commonly carried encapsulated pneumococcus in this DCC population. Higher coverage than at present being achieved in Portugal may be necessary to control it at the population level.

**Note**

**Potential conflicts of interest.** All authors: No reported conflicts.

All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

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