



Introduction/Aims: Streptococcus pneumoniae is a nasopharynx colonizing bacteria responsible for around one million of deaths in children under five years of age in developing countries. The main group of risk is composed by children up to two years of age, who are considered the most susceptible to the pneumococcal diseases. Campos dos Goytazes is the first and unique Brazilian city to introduce free of charge in 2010 the 13-valent conjugated pneumococcal vaccine (PCV-13). This study aimed to determine the prevalence of colonization by pneumococci in the nasopharynx of healthy infants in the city of Campos dos Goytacazes and risk variables associated with such colonization

Methods: The county of Campos dos Goytacazes (Figure 1) is the main city in the state of Rio de Janeiro, the main national producer of petroleum, comprising about 4,032 square kilometres distributed over urban and rural areas, with an estimated population of 511,168 inhabitants. Study population comprised infants aged up to 6 months. Sample calculation was performed by the software OPENEPI and considered population of 7.000 babies; prevalence of 50% and confidence interval of 95%, resulting in a minimum of 365 infants. A Stuart Swab was collected from the nasopharynx of the infants (figure 2). Isolated colonies were colored by using Gram's method. The Microscan Walkaway 96 MICroSTREP plus panel was used for antimicrobial susceptibility test and specimen confirmation.

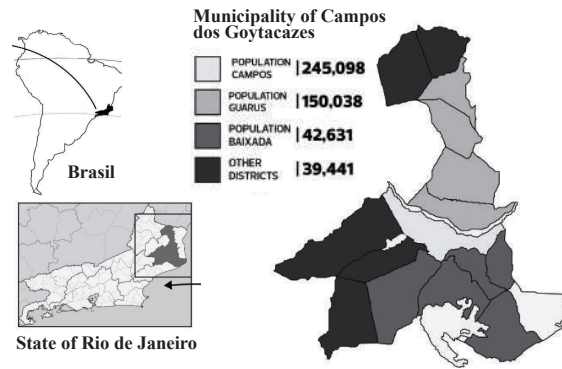


Figure 1: Campos dos Goytacazes map



Figure 2: Infants selected for the study

Results: Final sample comprised 398 individuals. Prevalence of pneumococcus colonization was 14,6% (58 positive infants). The age of higher prevalence was three months, totalizing 38% of the sample. Despite the young age of analysis up to 40% of the sample have already used antimicrobial agents. It was found an elevated number of infants (131 infants) with past history of upper airway infection, so the risk of colonization of

pneumococcus was 100% higher in the group with past history of upper airway infection. We also founded strains that manifested higher resistance to penicillin and sulfamethoxazole/trimethoprim. The most prevalent serotypes were 23F(22,7%), 6B(13,6%), 14(13,6%) and 15B(13,6%).

| Colonization Prevalence by age group | | |
|--------------------------------------|-------------------------|------|
| Age (months) | Colonization Prevalence | |
| | (n) | (%) |
| 2 | 4 | 6.9 |
| 3 | 22 | 38 |
| 4 | 14 | 24.1 |
| 5 | 12 | 20.7 |
| 6 | 6 | 10.3 |

Table 1 – Colonization Prevalence by age group

| Antimicrobial | Prevalence of resistance to antimicrobial agents | | | |
|-------------------------------|--|------|----------------------|------|
| | Intermediate resistance* | | Full resistance* (%) | |
| | (n) | (%) | (n) | (%) |
| Amoxicilin / clavulanate | 1 | 2.0 | 0 | 0 |
| Azithromycin | 1 | 2.0 | 5 | 9.8 |
| Cefaclor | 5 | 9.8 | 7 | 13.7 |
| Cefepime | 2 | 3.9 | 1 | 2.0 |
| Cefotaxime | 2 | 3.9 | 1 | 2.0 |
| Ceftriaxone | 4 | 7.8 | 0 | 0 |
| Cefuroxime | 0 | 0 | 8 | 15.7 |
| Chloramphenicol | 0 | 0 | 0 | 0 |
| Clindamycin | 1 | 2.0 | 2 | 3.9 |
| Erythromycin | 2 | 3.9 | 4 | 7.8 |
| Levofloxacin | 0 | 0 | 1 | 2.0 |
| Meropenem | 5 | 9.8 | 1 | 2.0 |
| Penicilin | 15 | 29.4 | 5 | 9.8 |
| Tetracycline | 1 | 2.0 | 4 | 7.8 |
| Sulfamethoxazole/Trimethoprim | 3 | 5.9 | 29 | 56.8 |
| Vancomycin | 0 | 0 | 0 | 0 |

Table 2 – Prevalence of antimicrobial resistance

| Serotypes | Prevalence | |
|-----------|------------|-------|
| | (n) | (%) |
| 6B | 3 | 13.64 |
| 14 | 3 | 13.64 |
| 15B | 3 | 13.64 |
| 15C | 1 | 4.55 |
| 16F | 1 | 4.55 |
| 18A | 1 | 4.55 |
| 19F | 1 | 4.55 |
| 21 | 1 | 4.55 |
| 23F | 5 | 22.7 |
| NT | 3 | 13.64 |
| Total | 22 | 100 |

Table 3 – Serotype profile in the population

Conclusions: The lower prevalence of colonization found in the study can be inferred because Campos dos Goytacazes made available the pneumococcal conjugate vaccine 7-valent (PCV-7) in 2009, changing for VPC-13 in 2010, which was used until 2013, and after that was changed for federal government official vaccine (PCV-10). There was a moderate antimicrobial resistance, however, the latest report from the Latin American surveillance system (SIREVA-2018) showed 88,9% of resistance to pneumococcus serotype 19A. These results demonstrate the right decision of the municipality in the introduction of VPC-13 in 2010-2013, and should be revised by the Brazilian public vaccination program