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**Carriage Rate, Serotype Distribution and Antimicrobial  
Susceptibility of *Streptococcus pneumoniae* among Children of Five  
Years and Below Admitted in Thika Level Five Hospital, Kenya**

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## ABSTRACT

*Streptococcus pneumoniae* is a facultative anaerobic Gram positive bacterium which normally resides within the human nasopharynx. It causes diseases that range in severity from meningitis, septicaemia, and pneumonia to sinusitis and acute otitis media. Rates of carriage are highest in infants and the elderly. The main objectives of this study were to determine the rate of nasopharyngeal colonization by *S. pneumoniae*, to describe the antibiotic resistant patterns and serotypes of the carried isolates, to determine carriage rate by ailments resulting to admission and to describe the variation in carriage by age and sex. The study population included children, five years and below admitted in Thika Level Five Hospital. The study was conducted in the month of October and November 2010. Nasopharyngeal swabs were collected from 315 children, 185 of whom were males and 130 were females. They were processed using standard bacteriological methods to isolate *S. pneumoniae*. The isolates were serotyped by the Quellung reaction and their antibiotic susceptibilities assessed by disk diffusion method. The overall nasopharyngeal carriage rate for *S. pneumoniae* was 17% in the 315 children studied. The highest rate of carriage was found in children between one and two years (23 %). There was no significant difference in carriage rates between males and females. The most common causes of admission among the selected 315 children were pneumonia, diarrhoea, and meningitis. Those children who had been admitted with a diagnosis of pneumonia had the highest rate of carriage (71%) as compared to other causes of admission. Seventeen serotypes were detected among 55 strains analyzed. The isolates belonged to serotype 6A, 23F, 19F, 13, 6B, 14A, 20, 7C, 1, 15B, 35B, 19A, 11A, 34, 5, 3 and 23A. The three most frequent serotypes were serotype 6A, 23F and 19F.

Susceptibility testing revealed that 9% of the isolates were resistant to penicillin and 7% to cefotaxime. Resistance to chlorophenical and erythromycin was found to be 2% and 4%, respectively. High levels of resistance were noted for cotrimoxazole (98%). All isolates were fully sensitive to tetracycline. There was high level of cotrimoxazole resistance (98%) and some resistance to other antimicrobial agents commonly used in Thika Level Five Hospital. This information shows that antimicrobials susceptibility testing should be conducted before treatment of diseases caused by *S. pneumoniae*. The frequent serotypes found in this study are associated with pneumococcal infections in children. These serotypes are included in the Ten-valent vaccine currently being used in Kenya and therefore may be prevented by vaccination.