Molecular Epidemiology of Pneumococcal Infections In Adults and Children from the Kansas City Area between 2010 and 2013

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ABSTRACT

Background: Pneumococcal infections cause morbidity and mortality in young children and older adults. Implementation of pneumococcal conjugate vaccines (PCV) has decreased invasive disease (IPD) among children, whereas nonvaccine serotypes/serogroups (NVSS) have increased among adults. The most frequent NVSS shared among children and adults were selected for pulsed field gel electrophoresis (PFGE) analysis.

Methods: Isolates were serotyped and PFGE analyzed. PFGE and serotyping were performed at the University of Kansas Medical Center, Kansas City, MO, USA and the Children’s Mercy Hospital & University of Missouri at Kansas City, Kansas City, MO, USA.

Results: A total of 307 (79 adult and 228 pediatric) 6 pneumococcal isolates were serotyped. PFGE analysis was performed on 100 isolates of the most common NVSS shared among children and adults (Table 1). PFGE typing clustered related isolates and revealed 86% relatedness (86% relatedness, Figure). However, the serotype/serogroup was a major determinant of relatedness within that relatedness (86% relatedness, Figure).

Conclusions: This study revealed a genetic diversity among high-frequency NVSS that may account for geographic variation in NVSS distribution. In conclusion, PFGE typing clustered related isolates and revealed a high percentage of relatedness, while serotype/serogroup was a major determinant of relatedness within that relatedness. This suggests that PFGE and serotyping are important tools for understanding the evolutionary relationships among NVSS.

RESULTS

Table 1: Serotype/Serogroup and Associated PFGE Clusters

<table>
<thead>
<tr>
<th>Serotype/Serogroup</th>
<th>Propensity for Relatedness</th>
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<tbody>
<tr>
<td>3, 7, 22, 33, 35</td>
<td>86% relatedness</td>
</tr>
<tr>
<td>1, 2, 4</td>
<td>86% relatedness</td>
</tr>
<tr>
<td>7, A, F</td>
<td>86% relatedness</td>
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</tbody>
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REFERENCES


DEFINITIONS

Serotype: Pneumococcal strains with identical capsular antigens in the polyvalent/capsule capsule antigen: 1 to 19A, 22F, 23F.

Serogroup: Pneumococcal strains with common capsule antigens that include more than one serotype (e.g., serogroup 15, with serotypes 15A, 15B, 15C, and 15V).

PFGE: Pulsed field gel electrophoresis.

Cluster: A collection of bacterial isolates that are genetically closely related, here defined as 86% or higher genetic similarity.