Risk factors for invasive infection with fluoroquinolone resistant *S. pneumoniae* and failure of oral outpatient fluoroquinolone therapy

K. GREEN, A. MCGEER, and D. E. LOW for the Toronto Invasive Bacterial Diseases Network (TIBDN)
Mount Sinai Hospital, Toronto, Canada.

**Abstract (revised)**

**Background:** There is increasing concern about the emergence of fluoroquinolones (FQ) resistant *S. pneumoniae*. We examined fluoroquinolone resistance rates and risk factors in patients with invasive pneumococcal disease in Toronto, Canada.

**Methods:** From Jan 2000 until Dec 2004, TIBDN performed population-based surveillance for invasive pneumococcal disease in persons living in the Toronto-Peel region, Can. (pop 4m). Invasive disease was defined as illness associated with isolation of *S. pneumoniae* from a sterile site. Patients exposed to fluoroquinolones were classified as: treated for current infection before presenting with disease (outpatient Rx) or received a FQ for another infection in the previous 3 months (prior 3 mths). Failure of treatment was defined as having a positive blood culture for *S. pneumoniae* while on or within 2 days of finding their fluoroquinolone outpatient Rx.

**Results:**

1. **Methods Results (con't)**

   **Tables 3.** Factors predicting FQ resistance in infecting isolates in multivariable logistic regression analysis

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Odds ratio (95% Confidence Limits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nosocomial SPN infection</td>
<td>5.2 (4.7-5.7)</td>
</tr>
<tr>
<td>Isolated in a hospital (yes or no)</td>
<td>4.2 (3.1-5.4)</td>
</tr>
</tbody>
</table>

   Isolates from patients with community-acquired disease who have not recently been exposed to fluoroquinolones are almost uniformly susceptible to respiratory fluoroquinolones (Figure 4). However patients with institutionally acquired infection (either nosocomial or nursing home), and those with recent exposure to fluoroquinolones (either for the current infection or within the previous 3 months) are more likely to be infected with a FQ resistant organism.

   **Figure 4.** Rates of resistance to respiratory fluoroquinolones in sterile site isolates from population-based surveillance in Toronto.

**Conclusions**

- FQ resistance among pneumococci may be a cause of clinical failures of outpatient pneumococcal therapy.
- Patients failing FQ therapy are more likely to be adults, to have an underlying disease, to have acquired their infection in a hospital or nursing home or to have been treated with a FQ in the 3 mths prior to their current infection (Table 1).

  **Table 1:** Clinical characteristics of patients with pneumococcal bacteremia that have failed FQ therapy compared with patients with pneumococcal bacteremia in the absence of FQ therapy

**Acknowledgements**

We are grateful to the infection control practitioners, microbiology technologists, public health staff and our tireless TIBDN staff for their ongoing contributions to this surveillance. This work has been supported in part by Bayer Healthcare.