Results (cont’d)

Population-based surveillance
The Toronto Invasive Bacterial Disease Network (TIBDN) has conducted prospective, population-based surveillance of invasive pneumococcal disease in metropolitan Toronto, Canada (population 2,300,000), since 1 January 1995, and population-based surveillance for culture confirmed non-bacteremic pneumococcal disease since 1 January 2002. The surveillance network includes all hospital-based laboratories and diagnostic laboratories in the city, and ensures that all patients admitted to Toronto hospitals, or those living on the street, are included. Case data are acquired by chart review, patient interview, and from patients’ attending physicians. All isolates are submitted to the central laboratory. Annual audits are conducted in each laboratory. Surveillance and associated studies are approved by the research ethics board of participating institutions.

For this study, population estimates were obtained from Statistics Canada. Population estimates of the adult homeless populations in Toronto were obtained from the Shelter, Support and Housing Administration of the City of Toronto.

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Results

Characteristics of invasive pneumococcal disease in homeless and housed adults
Table 2 shows the characteristics of patients with invasive pneumococcal disease during a time in which they had homeless vs housed status. The rate of disease was 5 fold higher in homeless (7/58, 12%) than housed (24 of 943, 2.5%) patients (P<.001). One recurrence of disease in a patient who had previously been homeless occurred at 5 months apart, and, in all cases where both isolates were available for typing, the isolates were of different serotypes. Three patients with episodes of invasive disease while they were homeless had another episode of disease during a time in which they were housed. No other recurrences were observed.

No outbreaks of pneumonia or pneumococcal meningitis were observed in this study.

In 23-valent polysaccharide vaccine (VPS) meningitis was not present in cases in homeless persons (Figure 1).

Over 5 years, 69 of 1039 (6.6%) adult cases of IPD occurred in the homeless, with an incidence of 4.4 per 1,000,000 person-years. Over the 5 year period, there were 69 episodes of invasive pneumococcal disease, but only 8.2% of the population of Toronto. The typical seasonal patterns of invasive pneumococcal disease in Toronto, with highest rates in the winter months, and a nadir in July and August, was seen in cases in homeless persons (Figure 1).

Recurrences
Out of 69 homeless patients 7 (10%) were not admitted, and 7 (10%) left hospital against medical advice. 22 (32%) of those in housed persons (P=.06) had recurrences of disease during a time in which they had homeless status. The very high rate of disease suggests that specific vaccination programs should be developed for homeless populations.

Table 2. Serotype distribution in patients with severe pneumococcal pneumonia
Serotypes are shown in Table 2. Overall, 32% (28/87) isolates associated with disease in homeless persons were of serotypes included in the conjugate vaccine, and 31% by isolates of serotypes included in the 7-valent conjugate vaccine.

Streptococcus pneumoniae (S. pneumoniae) was defined as: (i) a clinical presentation including fever, cough, pleurisy, or pleural effusion, but not bronchogenic). Non-bacteremic pneumococcal pneumonia was defined as: (i) a clinical presentation including fever, cough, pleurisy, or pleural effusion consistent with pneumonia, and (ii) if admitted to hospital and on chest radiograph (iii) no identification of a causal pathogen from blood or respiratory specimen. Persons were classified as homeless if they had no fixed address, or gave their address as an emergency or transitional shelter. Invasive pneumococcal disease during a time in which they had homeless vs housed status. The rate of disease was 5 fold higher in homeless (7/58, 12%) than housed (24 of 943, 2.5%) patients (P<.001). One recurrence of disease in a patient who had previously been homeless occurred at 5 months apart, and, in all cases where both isolates were available for typing, the isolates were of different serotypes.

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Conclusions

• Homeless persons in Toronto have an exceptionally high rate of invasive pneumococcal disease, and are vaccinated.

• Relative to disease in housed persons, disease in homeless persons is more likely to occur in the summer months, and more likely to be associated with a clinical diagnosis of pneumonia.

• 84 % episodes of invasive disease in homeless persons were caused by S. pneumoniae isolates of serotypes included in 23-valent polysaccharide vaccine, but only 31% by isolates of serotypes included in the 7-valent conjugate vaccine.

• The very high rate of disease suggests that specific vaccination programs should be developed for homeless populations.