

# Nosocomial bloodstream infections in Finnish acute care hospitals, 1999–2006

## Abstract

### General

Eleven hospitals participated in the Finnish hospital infection programme (SIRO) between 1999 and 2006.

The surveillance covered all patients admitted to departments offering acute care (2,731,544 admissions).

A total of 6,769 nosocomial bloodstream infections (BSI) were identified in 5,723 patients, with an overall rate of 0.7 BSIs per 1,000 patient-days.

The rate of BSIs varied by medical speciality; the highest rates were detected in pediatrics, internal medicine, and oncology. The proportion of infections related to intensive care was highest among surgical, neurological and pediatric patients.

### Patient groups

Nearly one third of the BSIs occurred in patients with a hematological malignancy. An equal number of patients had undergone surgery preceding infection, and more than one quarter occurred in intensive care patients.

### Source of infection

Central venous catheter was the most common predisposing factor. Other sources of infection included urinary tract infection (7%) and surgical wound infection (5%).

### Causative organisms

The most common pathogens were coagulase-negative staphylococci (29%), *Staphylococcus aureus* (13%), *Escherichia coli* (11%) and enterococci (9%).

Nine per cent of the BSIs were polymicrobial, i.e. caused by more than one microbe.

The causative organisms varied depending on the patient group.

### Antimicrobial susceptibility

Resistance to methicillin was detected in 80% of coagulase-negative staphylococci (MRSE) and 3% of *Staphylococcus aureus* isolates (MRSA).

Of the *Escherichia coli* isolates, 7% were cefuroxime-resistant and 10% ciprofloxacin-resistant, and 2–4% were possibly extended-spectrum  $\beta$ -lactamase-producing strains (ESBL).

Among enterococci, the proportion of vancomycin-resistant isolates was 1% (VRE).

### Outcome

Eight per cent of the patients died within seven days after the onset of BSI and 16% within 28 days.

The case fatality was highest for infections caused by *Candida* sp., *Pseudomonas aeruginosa* and enterococci.

The patients who died were elderly and had severe underlying conditions.

### Conclusions

The rate of nosocomial BSIs in Finland is similar to the rates in other European countries and the United States. BSIs caused by MRSA, VRE and ESBL-positive enterobacteria are still rare, but their proportion has nearly doubled compared with the past. Coagulase-negative staphylococci and *Pseudomonas aeruginosa* show the lowest susceptibility to antimicrobials. More efficient surveillance and control measures are needed in intensive care, oncology and hematology relating to BSIs associated with central venous catheters. National recommendations on the prevention of infections associated with central venous catheters would facilitate the development and implementation of the hospitals' own guidelines.

