

Directive forms were completed in each patient chart. Because the surveyors already review every chart, this provided a low-cost way to determine the level of hospital-wide compliance with this policy.

The use of rigorous definitions and methodologies makes repeated prevalence studies particularly useful within a hospital in the areas of infection control and quality improvement. However, attempts to use such prevalence survey data for interhospital comparison (by managed-care organizations, for example) remain hazardous due to the inherent difficulty of case-mix and severity differences between institutions. Large institutions may benefit by combining incidence surveillance in the highest risk areas with ongoing surveillance of microbiology reports and repeated prevalence surveys. This approach moderates the costs that would be incurred through hospitalwide incidence surveillance without sacrificing the quality of the infection control program.

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## Nosocomial Infections in Medical ICUs in the United States

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Richards and colleagues from the CDC's Hospital Infections Program have reported on the epidemiology of nosocomial infections in medical ICUs in the United States. Surveillance data collected from medical ICUs through the National Nosocomial Infections Surveillance (NNIS) System between 1992 and 1997 were analyzed. The study included data from 181,993 patients.

Urinary tract infections (UTIs) were most frequent (31%), followed by pneumonia (27%) and primary bloodstream infections (BSIs) (19%). Eighty-seven percent of primary BSIs were associated with central lines, 86% of nosocomial pneumonias were associated with mechanical ventilation, and 95% of UTIs were associated with urinary catheters. Coagulase-negative staphy-

lococci (36%) were the most common bloodstream isolates, followed by enterococci (16%) and *Staphylococcus aureus* (13%). Twelve percent of bloodstream isolates were fungi. The most frequent isolates from pneumonia were gram-negative aerobic organisms (64%), with *Pseudomonas aeruginosa* (21%) and *S aureus* (20%) being the most frequently isolated. *Candida albicans* was the most common single pathogen isolated from urine and made up just over half of the fungal isolates. Fungal urinary infections were associated with asymptomatic funguria rather than symptomatic UTIs ( $P < .0001$ ). Certain pathogens were associated with device use: coagulase-negative staphylococci with central lines, *P aeruginosa* and *Acinetobacter* species with ventilators, and fungal infections with urinary catheters. Patient nosocomial infection rates for the major sites correlated strongly with device use. Device exposure was

controlled for by calculating device-associated infection rates for BSIs, pneumonia, and urinary tract infections by dividing the number of device-associated infections by the number of days of device use. There was no association between these device-associated infection rates and number of hospital beds, number of ICU beds, or length of stay, and there was considerable variation within the distribution of each of these infection rates. The authors concluded that the distribution of sites of infection in medical ICUs differed from that previously reported in NNIS ICU surveillance studies, largely as a result of anticipated low rates of surgical-site infections.

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