

been extremely difficult, if not impossible. In this outbreak, receipt of intermittent IV therapy was a possible determinant for increased BSI risk; because this form of therapy is common among outpatients receiving home IV therapy, an urgent need exists to develop BSI surveillance systems for such patients. Paradoxically, it may be outpatients receiving "low-intensity" intermittent IV therapy via CVCs who are at the greatest risk for BSIs associated with needleless devices. Our results suggest that intermittent intravenous therapy or flushing practices may be important determinants of BSI risk associated with some needleless devices and again emphasize the need to monitor infection rates closely after the introduction of any new medical device.

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## Multidrug-Resistant Pneumococcal Pneumonia in a Nursing Home

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An outbreak of multidrug-resistant pneumococcal pneumonia was reported recently among the residents of a nursing home in rural Oklahoma. Nasopharyngeal swabs for culture were obtained from residents and employees, and *Streptococcus pneumoniae* isolates were serotyped and compared by pulsed-field gel electrophoresis (PFGE). A retrospective cohort study was conducted to identify factors associated with colonization and disease.

Pneumonia developed in 11 (13%) of 84 residents, 3 of whom died. Multidrug-resistant *S pneumoniae*, serotype 23F, was isolated from blood and sputum from 7

(64%) of the 11 residents with pneumonia and from nasopharyngeal specimens from 17 (23%) of the 74 residents tested and 2 (3%) of the 69 employees tested. All the serotype-23F isolates were identical according to PFGE. Recent use of antibiotics was associated with both colonization and disease. Only three residents (4%) had received pneumococcal vaccine. After residents received pneumococcal vaccine and prophylactic antibiotics, there were no additional cases of pneumonia, and carriage rates decreased substantially.

Outbreaks of pneumococcal disease are uncommon and have occurred mainly in institutional settings. Epidemic, invasive, drug-resistant pneumococcal disease has not been seen among adults in the

United States. In this outbreak, a single pneumococcal strain was disseminated among the residents and employees of a nursing home. The high prevalence of colonization with a virulent organism in an unvaccinated population contributed to the high attack rate. Clusters of pneumococcal disease may be underrecognized in nursing homes, and wider use of pneumococcal vaccine is important to prevent institutional outbreaks of drug-resistant *S pneumoniae* infection.

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