ery of *P aeruginosa* was 0 days for SPA, 11 days for MDRPA, and 24 days for HRPA.

The authors concluded that the duration of empirical antipseudomonal antibiotic treatment influences selection of resistant strains of *P aeruginosa;* the longer the duration, the broader the pattern of resistance.

FROM: Philippe E, Weiss M, Shultz JM, Yeomans F, Ehrenkranz NJ. Emergence of highly antibiotic-resistant *Pseudomonas aeruginosa* in relation to duration of empirical antipseudomonal antibiotic treatment. *Clinical Performance and Quality Health Care* 1999;7:83-87.

Evaluation of an Antiseptic Triple-Lumen Catheter in an ICU

Hanley and coinvestigators, from the Department of Epidemiology, Albany Medical Center Hospital, Albany, New York, conducted a study to evaluate a decrease in catheter-related (CR) bloodstream infection (BSI) rate in patients with antiseptic triple-lumen catheters in an ICU.

They conducted a retrospective review of surveillance records, patient medical records, laboratory and microbiological reports, and antibiotic administration records. The study included patients admitted to the ICU with triple-lumen catheters. A subset of one entry per patient was extracted from 2 years of primary BSI surveillance data. Data collection included risk factors, laboratory and microbiological data, insertion sites, and dates of all intravascular catheters present during triple-lumen catheterization.

The CR BSI rate was 5.4 and 11.3 per 1,000 catheter-days in antiseptic and nonantiseptic triple-lumen catheter groups, respectively (P=.06).

By multivariate analysis using a Cox Proportional Hazards Model, the antiseptic triple-lumen catheters (chlorhexidine gluconate and silver sulfadiazine) were associated with a significant reduction in CR BSI (P=.03).

The authors concluded that the use of antiseptic triple-lumen catheters may substantially reduce CR BSIs in an intensive care population and may be subsequently associated with a decrease in length of stay.

FROM: Hanley EM, Veeder A, Smith T, Drusano G, Currie E, Venezia RA. Evaluation of an antiseptic triple-lumen catheter in an intensive care unit. *Crit Care Med* 2000;28:366-370.

TB Practices in Maryland Hospitals

In 1992 and 1993, the Maryland Hospital Association and the Maryland Department of Health and Mental Hygiene conducted two surveys of TB prevention practices in Maryland hospitals that showed poor compliance with the 1990 CDC guidelines for preventing transmission of TB in healthcare facilities. In 1997, Fuss and colleagues conducted a study to assess compliance with the CDC's guidelines in Maryland acute-care hospitals.

A written questionnaire with three components (Infection Control, Employee Health, and Microbiology Laboratory) was mailed to 56 Maryland acute-care hospitals. Seventy-three percent of the surveys were returned. One hundred percent of responding hospitals with TB isolation rooms reported negative-pressure ventilation, six air exchanges per hour, and air exhausted to the outside or through high-efficiency particulate air filters. One hundred percent of the responding hospitals reported providing NIOSH-approved respiratory protection for healthcare workers, compared with 24% in 1992 (P<.01). One hundred percent of the responding hospitals reported performing at least annual tuberculin skin testing, compared with 50% in 1992 (P<.01).

The survey results demonstrate excellent compliance with the 1994 CDC recommendations for TB control in Maryland acute-care hospitals, even in those facilities determined to be at minimal to low risk for TB exposure. The proposed OSHA regulations are unlikely to reduce the risk of TB exposure to healthcare workers in Maryland acute-care hospitals further.

FROM: Fuss EP, Israel E, Baruch N, Roghmann MC. Improved tuberculosis infection control practices in Maryland acute-care hospitals. *Am J Infect Control* 2000;28:133-137.

Prolonged Hospital Stay and Surgical-Site Infections

The accepted standard in estimating the stay prolongation attributable to surgical-site infections (SSIs) is the matched-cohort study (MCS) method, which is associated with selection bias. The Appropriateness Evaluation Protocol (AEP) has been used to estimate stay prolongation attributable to nosocomial infections but has not been validated specifically for SSIs.

Merle and coinvestigators, from the Rouen University Hospital–Charles Nicolle, conducted a study to compare estimates of stay prolongation attributable to SSIs after digestive surgery, obtained by AEP and by MCS. Sixty-five SSIs after digestive tract surgery were analyzed by AEP and MCS. AEP stay prolongation was the number of days judged specifically appropriate for the care of SSIs. MCS stay prolongation was the difference of stay duration in SSI cases and two controls matched by age, gender, and diagnosis-related groups. Sensitivity and specificity of AEP, and agreement between both methods, were calculated.

The mean AEP stay prolongation was 3.5 days versus 7.2 days for MCS. The sensitivity of AEP was 58%, and the specificity was 75%. The agreement between the two methods was poor.

The authors concluded that SSIs after digestive tract surgery increased the hospital stay. Accurate estimations of a prolongation of stay will vary according to the method selected.

FROM: Merle V, Germain JM, Chamouni P, Daubert H, Froment L, Michot F, et al. Assessment of prolonged hospital stay attributable to surgical site infections using

Appropriateness Evaluation Protocol. *Am J Infect Control* 2000;28:109-115.

Team Approach to Reducing Ventilator-Associated Pneumonia

Ventilator-associated pneumonia (VAP) rates in a medical-surgical intensive care unit first exceeded the 90th percentile in September 1997 and were significantly ($P<.05$) higher than National Nosocomial Infections Surveillance (NINS) System pooled mean data. In January 1998, a multidisciplinary "Critical Care Bug Team" was developed by the Infection Control Committee to review 1997 NNIS System data for four adult ICUs in a 583-bed tertiary-care hospital. Membership included clinical nurse specialists, a dietitian, a pharmacist, a respiratory therapist, an infection control professional, a research specialist, and a physician adviser. Having the team report directly to the hospital's Infection Control and Adult Critical Care committees maximized support for recommendations and provided a direct link from patient care to hospital administration. By identifying issues, evaluating patient-care processes, performing literature searches, and monitoring compliance, the team implemented numerous interventions, including policy and procedure changes, purchasing of equipment, and implementation of various education tools.

Each member of the Critical Care Bug Team contributed to a synergized effort that may have produced the desired outcome of decreasing VAP rates. Except for August 1998, VAP rates have been below the 75th percentile since May 1998.

This study illustrates the effectiveness of a multidisciplinary team approach devised to reduce and stabilize VAP rates in a medical-surgical intensive care unit

FROM: Kaye J, Ashline V, Erickson D, Zeiler K, Gavigan D, Gannon L, et al. Critical care bug team: a multidisciplinary team approach to reducing ventilator-associated pneumonia. *Am J Infect Control* 2000;28:197-201.

PCR Typing of E cloacae in an NICU

Enterobacter cloacae has become a common cause of nosocomial infections. Bryan and Cole, from the Department of Microbiology and Immunology and the Department of Laboratory Medicine, Georgetown University Medical Center, conducted a study to investigate the pattern of spread of *E cloacae* during an outbreak in a neonatal intensive care unit (NICU). Enterobacterial repetitive intergenic consensus polymerase chain reaction was used to examine 111 *E cloacae* isolates from 17 patients, including 81 from surveillance cultures, 23 from endotracheal tubes, 3 from eyes, and 1 each from blood, urine, skin, and throat. Antibiotic susceptibility profiles were also obtained.

Infection with *E cloacae* resulted from endogenous bacteria and from horizontal transmission. One group of 61 isolates, a third of which were obtained from clinical specimens, was uniformly susceptible to imipenem and ciprofloxacin only. A second group of 50 isolates, only 18% of which were obtained from clinical specimens, was susceptible to all antibiotics tested except for aminopenicillins and first-generation cephalosporins.

These data indicate that patient-to-patient spread is an important cause of *E cloacae* infection in the NICU and that highly antibiotic-resistant *E cloacae* may emerge during an outbreak.

FROM: Peters SM, Bryan J, Cole MF. Enterobacterial repetitive intergenic consensus polymerase chain reaction typing of isolates of *Enterobacter cloacae* from an outbreak of infection in a neonatal intensive care unit. *Am J Infect Control* 2000;28:123-129.

Educational Approach to Improving Patient Isolation Practice

Kidd and colleagues from the University of Cincinnati (Ohio) College of Medicine recently described a workable plan for the successful education of a large, diverse group of healthcare workers in a university hospital setting. They did a prospective, nonrandomized study of compliance with infection control isolation practice following various educational interventions in a 300-bed tertiary-care academic medical center with outpatient clinics. Study participants were hospital employees and contract workers.

The infection control department introduced a plan to implement the CDC's new isolation guidelines. A comprehensive proposal was presented to administration. It included a time line for institution and a comprehensive educational and performance-improvement plan, including standard lectures and a video that explained Standard and Transmission-Based Precautions. Follow-up consisted of customized in-services and one-on-one continued education tailored to the individual units.

Compliance with isolation procedure after standardized lectures and video alone was poor. Compliance improved after institution of smaller, more intensive in-services tailored to individual departments and given during all shifts. The authors concluded that intensive, individualized education is the key to compliance. This requires sufficient infection control staffing and administrative support.

FROM: Kidd F, Heitkemper P, Kressel AB. A comprehensive educational approach to improving patient isolation practice. *Clinical Performance and Quality Health Care* 1999;7:74-76.