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Using NNIS Data to Reduce UTIs

Gina Pugliese, RN, MS
Martin S. Favero, PhD

Dumigan and coworkers from the Hospital of Saint Raphael, New Haven, Connecticut, reported on a study whose aim was to reduce catheter-related urinary tract infection (UTI) rates in three ICUs to at or below the National Nosocomial Infection Surveillance System pooled mean for similar units. A nursing team, physician team, and laboratory team reviewed and revised protocols and procedures for better catheter management in a 500-bed community teaching hospital. The

teams developed medical indications for urinary catheter placement and criteria that allowed the registered nurse to remove a catheter without a physician's order when no longer medically necessary. They created a computer prompt to assure a urinalysis accompanied all urine cultures.

After introducing the new protocols, the incidence density of catheter-related UTIs fell 17% in the surgical ICU, 29% in the medical intensive-care acute unit, and 45% in the coronary intensive-care acute unit. The registered nurses' compliance in removing the catheter per protocol was 88%. Physician ordering

of a concomitant urinalysis with each urine culture achieved 93%. The authors concluded that a multidisciplinary approach assisted in reducing catheter-associated UTIs in three ICUs, although not to the extent desired. The teams are investigating preconnected and antimicrobial-coated catheters further.

FROM: Dumigan DG, Kohan CA, Reed CR, Jekel JF, Fikrig MK. Utilizing National Nosocomial Infection Surveillance System data to improve urinary tract infection rates in three intensive-care units. *Clinical Performance and Quality Health Care* 1998;6:172-178.

VRE in ICUs

Austin and coinvestigators from the University of Oxford, United Kingdom, and Cook County Hospital in Chicago, Illinois, have described the transmission of nosocomial pathogens by using a micro-epidemiological framework based on the transmission dynamics of vector-borne diseases. By using the concept of a basic reproductive number, R_0 , defined as the average number of secondary cases generated by one primary case, they show quantitatively how infection control measures such as hand washing, cohorting, and antibiotic restriction affect nosocomial cross-transmission. By using detailed molecular epidemiological surveillance and compliance monitoring, they found that the estimated

basic reproductive number for vancomycin-resistant enterococci (VRE) during a study at Cook County Hospital was approximately 3 to 4 without infection control and 0.7 when infection control measures were included. The impact of infection control was to reduce the prevalence from a predicted 79% to an observed 36%. Hand washing and staff cohorting were the most powerful control measures, although their efficacy depended on the magnitude of R_0 . Under the circumstances tested, endemicity of VRE was stabilized, despite infection control measures, by the constant introduction of colonized patients. Multiple stochastic simulations of the model revealed excellent agreement with observed patterns. In

conjunction with detailed microbiological surveillance, a mathematical framework provides a precise template to describe the colonization dynamics of VRE in ICUs and impact of infection control measures. The analyses suggest that compliance for hand washing significantly in excess of reported levels or the cohorting of nursing staff are needed to prevent nosocomial transmission of VRE in endemic settings.

FROM: Austin DJ, Bonten MJ, Weinstein RA, Slaughter S, Anderson RM. Vancomycin-resistant enterococci in intensive-care hospital settings: transmission dynamics, persistence, and the impact of infection control programs. *Proc Natl Acad Sci USA* 1999;96:6908-6913.