

# Journal Watch

*Journal Watch presents a brief description of articles recently published in other journals and thought to be of relevance or interest to the AIC readership. Readers are encouraged to refer to the full article for complete information.*

## Association of *Clostridium difficile* diarrhoea with gatifloxacin use

In this study undertaken in a long-term care facility in the United States, the authors investigated the cause of an increase in *Clostridium difficile*-associated diarrhoea (CDAD) amongst residents. The increase was noted 2 months after a change in the fluoroquinolone in the formulary from levofloxacin to gatifloxacin. The authors performed a retrospective case-control study to determine the association with the change, and prospectively monitored the effect of a subsequent change back to levofloxacin.

A total of 37 patients with CDAD were studied, and three controls per case were randomly selected from the cohort of 612 residents over a 9 month period from October 2001 – June 2002. Several risk factors were examined, but logistic regression analysis identified only the use of clindamycin and gatifloxacin to be significantly associated with CDAD. The authors observed an increased risk of CDAD with increasing duration of gatifloxacin therapy.

The rate of CDAD fell back to the previous level over the 9 months after a change back to levofloxacin. The authors postulate that the explanation may be because gatifloxacin has anti-anaerobic activity that levofloxacin lacks.

Gaynes R, Rimland D, Killum E et al. *Outbreak of Clostridium difficile infection in a long-term care facility: association with gatifloxacin use. Clin Infect Dis* 2004; 38:640-5.

## Hospital architecture and nosocomial infection

The objective of this study was to review the evidence regarding the effects of improvement in hospital design and construction on the occurrence of nosocomial infections. The authors conducted a systematic review of articles published since 1975 covering experimental and non-experimental architectural intervention studies in intensive care units (ICUs), surgical departments, isolation units and hospitals in general.

None of the 178 articles found that met the inclusion criteria described a meta-analysis, systematic review, or randomised, controlled trial. Most of the articles were categorised at the lowest level of evidence (expert judgment or consensus statements). Only 17 described completed concurrent or historical cohort studies matching the inclusion criteria. There were nine studies conducted in ICUs, four in surgical departments, two in isolation units and two hospital-wide studies. The interventions generally included a move to other premises or renovation, including provision of more space per bed, single rooms, or improved handwashing facilities.

Some studies showed lower infection rates after intervention, but this finding cannot be generalised because of confounding and the small size of study populations. Most studies identified other factors that also improved, such as the staff-to-patient ratio. The authors conclude that there is lack of good evidence linking hospital design and construction with the prevention of nosocomial infection, and this is partly attributable to the multifactorial nature of these infections.

Dettenkofer M, Seegers S, Antes G, Motschall E et al. *Does the architecture of hospital facilities influence nosocomial infection rates? A systematic review. Infect Cont Hosp Epid* 2004; 25(1):21-25.

## Surgical site infections in cardiac surgery

This article summarises continuous surgical site infection (SSI) surveillance of coronary artery bypass operations in a 600-bed hospital over an 11 year period between 1991 and 2001. The method used by the authors included the use of Centers for Disease Control and Prevention (CDC) criteria and a post-discharge surgeon questionnaire at 30 days. Infections were stratified by the CDC NNIS risk index.

The strategies used to lower SSI rates included active surveillance and feedback of surgeon-specific standardised morbidity ratios. Additional interventions included investigation of infection clusters, decolonisation of staff nasal carriers of *S. aureus*, and the introduction of a routine nasal mupirocin plus chlorhexidine shower protocol.

The authors report a substantial decline in the rate of coronary artery bypass-related SSIs from >8% to <2%. Most infections were at the harvest site and were superficial. More than half of the sternal infections were deep. They obtained >95% return rate for the post-discharge questionnaires, and found that the percentage of infections documented post-discharge was highly variable over the study period. Implementation of a routine nasal mupirocin plus chlorhexidine shower protocol led to statistically decreased rates of post-operative infections with *S. aureus*.

Martorell C, Engelman R, Corl A & Brown R. *Surgical site infections in cardiac surgery: an 11-year perspective. Am J Infect Cont* 2004; 32(2):63-67.

### Effectiveness of antimicrobial catheters

This review by Crnich & Maki re-examines the evidence for the efficacy of antimicrobial catheters in prevention of intravenous catheter-related bloodstream infection (BSI). The article was written in response to a previous article by McConnell *et al.* published in the same journal that was critical about the quality of the evidence for the effectiveness and particularly the cost-effectiveness of this intervention.

Crnich & Maki re-examine the dozen or so randomised trials that have addressed this issue, and conclude that, when collectively viewed, there is a significant body of evidence for both the effectiveness and cost-effectiveness of this intervention. The authors state that aggregate analysis of the 15 studies that compared antimicrobial-impregnated central venous catheters to non-impregnated catheters demonstrated a statistically significant 40% reduction in catheter-related BSI.

On the other hand, McConnell *et al.* believe that all of the published studies contained serious methodological flaws that throw into question the validity of their results. They also assert that the studies have failed to show any significant clinical benefit associated with the use of antimicrobial-impregnated catheters.

These two articles present different views of the published literature, and present fascinating reading on the various aspects of study design.

Crnich CJ & Maki DG. *Are antimicrobial-impregnated catheters effective? Don't throw out the baby with the bathwater. Clin Infect Dis* 2004; 38:1287-92.

McConnell SA, Gubbins PO & Anaissie EJ. *Do antimicrobial-impregnated catheters prevent catheter-related bloodstream infection? Clin Infect Dis* 2003; 37:65-72.

### Examining the efficacy of event related sterility principles

Compliance with time related sterilisation principles regarding management of sterile stock in hospitals has resulted in considerable expenditure of resources. Barrett *et al.* used a quasi-experimental, time series, repeated measures design to test over a 2 year period the efficacy and material costs associated with shelf-life sterility and different combinations of packaging using the principles of event related sterility.

A 50mm steel paper clip (similar in mass and shape to screws and other small items regularly sterilised by CSSDs) was chosen as the test item. The paper clip was wrapped in one of three types of packaging: double linen and double paper; single linen and single paper; and laminate. Forty items were selected randomly from a pool of 400 and tested for contamination by a microbiology laboratory every 3 months for 2 years. Eighty items from the overall sample were randomly selected for testing immediately after sterilising and packing.

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<sup>1</sup>Guidelines for the Prevention of Intravascular Catheter - Related Infections, CDC MMWR August 9, 2002/Vol. 51/No. RR-10

Results found there was no contamination directly related to the sterilisation process or failure of sterile barriers and no evidence of contamination related to either time or packaging. Further, the cost of the packaging for these items varied considerably (57.8%) between the most expensive and least expensive wraps.

This research did not find that more packaging provides more protection from contamination, although the authors acknowledge that there was no evaluation of the packaging of complicated or heavy items such as instrument trays. The authors conclude that these findings have implications for hospital budgets and provide evidence to support the use of event related sterility principles.

Barrett R, Stevens J & Taranter J. *A shelf-life trial: examining the efficacy of event related sterility principles and its implications for nursing practice. Aust J Adv Nurs 2003/2004; 21(2):8-12.*

### ***Burkholderia cepacia* infections associated with intrinsically contaminated ultrasound gel**

*Burkholderia cepacia* is a microorganism naturally abundant in soil, water and plant surfaces. It is recognised as a pulmonary pathogen in patients with cystic fibrosis and has been identified as the cause of nosocomial infection outbreaks linked to contamination of liquid and instruments.

Hutchinson *et al.* describe an outbreak of nosocomial *B. cepacia* in six patients in two Canadian institutions following transrectal prostate biopsy. The outbreak was associated with ultrasound gel intrinsically contaminated with paraben-degrading microorganisms. The gel contained parabens as the sole stabilising agent; parabens are broadly antimicrobial and are used as preservatives in cosmetics. Strains of *B. cepacia* and *Enterobacter cloacae* have been shown to render parabens inactive.

*B. cepacia* isolates recovered from the blood of the six patients and the ultrasound gel were identical. Strains of *E. cloacae* isolated from the ultrasound gel at the two centres were also identical. *E. cloacae* strains were also found in unopened bottles of gel. Both the *B. cepacia* and *E. cloacae* strains found in the gel were proved to have the ability to degrade parabens. The authors suggest that the gel was most likely contaminated at the source.

The authors point out that ultrasound gels are not sterile and that intrinsic contamination can be expected. They recommend the use of sterile, single use packets whenever a sterile body site is entered.

Hutchinson J, Runge W, Mulvey M, Norris G, Yetman M, Valkova N, Villemur R & Lepine F. *Burkholderia cepacia* infections associated with intrinsically contaminated ultrasound gel: the role of microbial degradation of parabens. *Infect Cont & Hosp Epid 2004; 25(4):291-296.*

### **Uptake of guidelines to avoid and report exposure to blood and body fluids**

Cutter & Jordan used a cross sectional survey design to determine the extent of self reported compliance with 'universal precautions' by surgeons, scrub nurses and midwives (n=276) performing exposure prone procedures in the general operating theatres and delivery suite in two hospitals in a National Health Service Trust in the United Kingdom.

Only 1.5% of respondents indicated that they adopt universal precautions for all patients, irrespective of their known bloodborne viral status. Surgeons were more likely than other professions to be influenced by known patient infection (92%) compared to nurses (80%) and midwives (74%). On average, only half the recommended theatre specific recommendations were always adopted. Only 45.8% of respondents wore eye protection for all patients and less than 10% double gloved during surgery.

The most frequent cited influence on choice of protective clothing was education (95.5%) followed by known patient infection (83%), suspected patient infection (81%), patient's lifestyle, sexual orientation and nationality (63%), availability of protective clothing (50%) and lack of time (14%). Guideline adherence was influenced by profession but not by time since qualification.

Most professionals reported sustaining an inoculation injury in the 10 years prior to the study; incidence was highest among surgeons and most injuries occurred during surgery. Although most (90%) were aware of the mechanism for reporting, only two thirds (67.6%) actually reported. Surgeons were least likely to report, and the most common reason given was that the patient was not considered high risk.

The authors assert that the extent of non-compliance suggests that unless practice is modified the risk of occupational transmission of bloodborne viral infections will continue.

Cutter J & Jordan S. *Uptake of guidelines to avoid and report exposure to blood and body fluids. J Adv Nurs 2004; 46(4):441-452.*