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Welcome to the second issue of Infection Prevention and Control Research Review, which brings you the most important research in the field of infection prevention and control from around the world. Dominating this issue is the broad range of factors present in healthcare environments that are potential sources of bacterial dissemination, from asymptomatic patients to animals to towels to sphygmomanometers to mobile phones. We hope this issue provides you with valuable information that can be put into action in your practice or institution. Please keep your comments and feedback coming.

Kind regards,
Dr Chris Tofield
Medical Advisor, Research Review
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Risk of Guillain-Barré syndrome after seasonal influenza vaccination and influenza health-care encounters: a self-controlled study

Authors: Kwong JC et al.

Summary: This Canadian study used the self-controlled risk interval design and obtained data from universal healthcare system databases between 1993 and 2011, which included physician billing claims for influenza vaccination and influenza-coded healthcare encounters (to ascertain exposures) and hospitalisation rates for primary-coded Guillain-Barré syndrome (GBS). Of 2831 incident admissions for GBS identified, 330 received an influenza vaccine and 109 had an influenza-coded healthcare encounter within 42 weeks before hospitalisation. The risk of GBS within 6 weeks of vaccination was 52% higher than in the control interval of 9-42 weeks (relative incidence 1.52; 95% CI 1.17-1.99), with the greatest risk observed during weeks 2-4 after vaccination. The risk of GBS within 6 weeks of an influenza-coded healthcare encounter was greater than for vaccination (15.81; 10.28-24.32), The attributable risks were 1.03 GBS admissions per million vaccinations versus 17.2 GBS admissions per million influenza-coded healthcare encounters.

Comment (RE): GBS is a rare auto-immune disorder involving acute paralysis; 14% of victims are permanently disabled and 3% die as a result of respiratory failure. Recent studies have shown a very small causative link between modern seasonal influenza vaccines and this disorder. The authors of this current study confirmed a small but significant increase in risk (1.5-fold) of GBS in the 6 weeks after vaccination but also confirmed the findings of other studies of a much larger increase in risk (15.8-fold) of GBS in the 6 weeks after an influenza infection. Based on these data and estimates that 10-20% of New Zealanders get influenza each year and that the vaccine is 60% protective in most seasons, you are approximately equally likely to get GBS if you have the vaccine compared with if you do not.

Reference: Lancet Infectious Diseases 2013:13(9):769-76

Abstract

Independent commentary by Dr Richard Everts

Richard is an Infectious Diseases Physician and Microbiologist. He trained in Christchurch and at Duke University in North Carolina. Richard has been the Infectious Diseases specialist for Nelson and Marlborough for the last 10 years.

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Disclaimer: This publication is not intended as a replacement for regular medical education but to assist in the process. The reviews are a summarised interpretation of the published study and reflect the opinion of the writer rather than those of the research group or scientific journal. It is suggested readers review the full trial data before forming a final conclusion on its merits.
Factors associated with hand hygiene compliance at a tertiary care teaching hospital

Authors: Kowitt B et al

Summary: This observational study identified factors associated with hand hygiene compliance and rates of compliance among nursing, physician, technical, and support staff during a multiyear period of intervention at a 719-bed US tertiary care teaching hospital. The hospital-wide hand-hygiene intervention initiatives included: education modules; posters and table tents; feedback to units, medical directors and the executive board; and an increased number of automated alcohol hand-hygiene product dispensers. A total of 161,562 unique hand-hygiene observations were made during the 4.5-year study period. Overall compliance was 83%. Significant differences in compliance were observed between physician staff (78%) and support staff (69%) versus nursing staff (84%). Paediatric units (84%) and intensive care units (84%) had higher compliance than medical (82%) and surgical units (81%). The overall rate of compliance increased from 60% in the first year of observation to a peak of 96% in the fourth year. It decreased to 89% in the final year, with significant improvements occurring in each of the four professional categories.

Comment (RE): I am impressed by the improvements in hand hygiene compliance rates for doctors (from 47% to 89%) and nurses (from 62% to 93%) between 2008 and 2012 at this large hospital in Rhode Island. How did the Infection Prevention and Control team achieve this? Perhaps because they monitored and reported data weekly, wrote down the names of the non-compliers, and sent the data to the Medical Director and Department Chiefs at the hospital. And they held “pizza parties” for the staff with high compliance.


Modification of antimicrobial prophylaxis based on rectal culture results to prevent fluoroquinolone-resistant Escherichia coli infections after prostate biopsy

Authors: Suwantarat N et al

Summary: This US study showed that rectal-culture screening of patients undergoing transrectal ultrasound-guided biopsy of the prostate (TRUBP) for rectal carriage of fluoroquinolone-resistant Escherichia coli with modification of peri-procedure prophylaxis was effective as a strategy to reduce infections after TRUBP.

Comment (RE): It is perhaps surprising that only about 1% of men who undergo up to a dozen biopsies of the prostate collected through the rectum get bacteremia after the procedure. In New Zealand and Australia, most patients are given pre-biopsy ciprofloxacin prophylaxis but an increasing number of bacteremia and other post-procedure infections are caused by ciprofloxacin-resistant E. coli. Some centres have started screening patients pre-biopsy for stool carriage of ciprofloxacin-resistant Enterobacteriaceae and using additional prophylactic antibiotics in those with positive results; this paper (and two other similar recent papers) validates that approach by showing a dramatic reduction in infective complications.


Asymptomatic carriage of toxigenic Clostridium difficile by hospitalized patients

Authors: Guerrero DM et al

Summary: This point-prevalence culture survey of asymptomatic hospitalized patients in the US revealed that 18 of 149 (12%) were carriers of toxigenic C. difficile. The prevalence of skin and/or environmental contamination was significantly lower in asymptomatic carriers than in C. difficile infection patients (3/18, 17% versus 5/6, 83%; p=0.007). However, carriers outnumbered C. difficile infection patients by a factor of three to one.

Comment (RE): A colleague once challenged me as to why an asymptomatic MRSA and ESBL-producing E. coli carrier needs to be in contact isolation during an inpatient stay. It is a good question – asymptomatic carriers of all kinds of organisms shed or transmit less than symptomatic infected patients. This paper illustrates that for Clostridium difficile – hand or environmental contamination was 17% for carriers versus 83% for those with symptomatic infection. But other studies suggest that most C. difficile transmission in hospital may be from asymptomatic carriers. How do we deal with the vast number of asymptomatic hospital inpatients unknowingly carrying multidrug-resistant bacteria, meningococcus, C. difficile and other potential pathogens? First, cleanse our hands correctly and perform environmental cleaning properly for every patient. Second, where isolation resources are limited, prioritise them to those most likely to be shedding and spreading, which is generally those with an active infection.

Reference: J Hosp Infect 2013;85(2):155-8

Impact of environmental olfactory cues on hand hygiene behaviour in a simulated hospital environment: a randomized study

Authors: Birnbach DJ et al

Summary: In this US study the impact of a fresh scent on the rate of hand-hygiene compliance among novice healthcare providers was assessed. A total of 165 participants were randomised to examine a standardized patient while exposed to fresh scent (n=79) or while exposed to the standard environment (n=86). Video surveillance was used to observe hand-hygiene behaviours before patient contact. The fresh scent group had a hand - hygiene rate of 80% compared with a rate of 51% the standard environment group (p<0.001).

Comment (RE): A fresh citrus scent in the room was associated with better hand hygiene (80% versus 51%) in a randomised simulated patient examination scenario involving 165 medical students and interns. Perhaps the scent reminded the staff to perform hand hygiene or made the product seem more attractive? I wonder if certain pleasant or unpleasant odours could also be used to prompt doctors to wear masks?


Multidrug-resistant organisms in a routine ward environment: differential propensity for environmental dissemination and implications for infection control

Authors: Tan TY et al

Summary: This was an observational study in an 800-bed hospital that was performed to determine the prevalence, bacterial density and genetic relatedness of multidrug-resistant organisms (MDROs) isolated from ward surfaces, medical devices and the hands of healthcare professionals. The targeted MDROs were meticillin-resistant Staphylococcus aureus (MRSA), vancomycin-resistant enterococci (VRE), Escherichia coli and Klebsiella pneumoniae resistant to extended-spectrum cephalosporins, and carbapenem-resistant Acinetobacter baumannii (CRAB). During a 2-month period, the target MDROs were recovered from 79% of sampled surfaces, predominantly MRSA (74% of all tested surfaces) and CRAB (23%) but also VRE (2%) and K. pneumoniae (1%). MRSA was recovered from most tested surfaces throughout the ward whereas CRAB was more likely to be recovered from near-patient surfaces. Hand sampling demonstrated infrequent recovery of MRSA (5%), CRAB (1%) and VRE (1%). Molecular typing of the study isolates identified seven MRSA and five Acinetobacter clonal clusters, respectively, and typing identified similar strains from the environment, patients, and hands.

Comment (RE): In this Singapore ward, where MRSA and CRAB are endemic, MRSA was detected on 82% of bedside surfaces, 67% of staff stethoscopes, 65% of sphygmomanometers and 50% of telephones; CRAB was detected on 40% of bedside surfaces, 40% of sphygmomanometers and 14% of door handles. MRSA was also detected on the hands of 5% of the staff. Change MRSA to MSSA (methicillin-sensitive Staphylococcus aureus) and CRAB to a more susceptible strain and this could be your ward or hospital in New Zealand! This study highlights the ability of these particular bacteria to persist on environmental surfaces and the importance of good cleaning in clinical workplaces. How often are stethoscopes and sphygmomanometer cuffs cleaned in your institution?


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### Abstract

**Development and assessment of national performance indicators for infection prevention and control and antimicrobial stewardship in European long-term care facilities**

Authors: Cookson B et al

Summary: This literature report the efforts to develop consensus national performance indicators (NPIs) for infection control (ICP) and antimicrobial stewardship (ASP) in long-term care facilities (LTCF), and to assess the performance of 32 European countries against these NPIs. The 42 agreed component indicators were grouped into six NPI categories: ‘national programme’, ‘guidelines’, ‘expert advice’, ‘IC structure’ (not present in the ASP), ‘surveillance’ and ‘composite’. Although several scores were low, some countries were able to implement all NPIs, indicating that this was feasible. Most NPIs were very significantly related, indicating that they were part of the same framework.

**Reference:** J Hosp Infect 2013;85(1):8-16

### Abstract

**Keypad mobile phones are associated with a significant increased risk of microbial contamination compared to touch screen phones**

Authors: Pal P et al

Summary: This UK study tested the hypothesis that microbial contamination of phones used in hospitals will be lower on touchscreen devices compared to keypad devices. Sixty-seven mobile phones belonging to healthcare workers were sampled. The median colony count for touchscreen phones and keypad devices was 0.09 colony forming units (cfu)/cm² (interquartile range 0.05–0.14) and 0.77 cfu/cm² (IQR range 0.45–3.52), respectively. Colony counts were significantly higher on the keypad phones (p<0.001). Multivariate analysis showed the type of phone (keypad vs touch screen) was significantly associated with increased colony counts (p<0.001). Overall, nine (13%) phones grew either methicillin-resistant *Staphylococcus aureus* or vancomycin-resistant enterococci. Eight (24%) keypad phones were contaminated with these organisms compared with one touch screen phone (3%).

**Reference:** J Infect Prev 2013;14(2):65-68

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Extended-spectrum β-lactamase-producing Enterobacteriaceae in healthy companion animals living in nursing homes and in the community

Authors: Gandolfi-Decristophoris P et al

Summary: The prevalence of extended-spectrum β-lactamase (ESBL)-producing Enterobacteriaceae in pets living in nursing homes and in households was determined to investigate the potential role of companion animals as carriers of ESBL. Rectal swabs (n=376) were taken from cats and dogs visiting or living in 68 randomly selected nursing homes or brought to 26 veterinary practices for routine mandatory vaccination. The overall prevalence of ESBL-producing isolates was 2.5% (95% CI: 1.3-4.6). Pets that received an antibiotic treatment in the three months prior to the study had a higher risk of being carriers of these microorganisms (adjusted OR, 7.8; 95% CI: 2.2-26.9).

Comment (RE): We recently learned that our innocent household pets can become carriers of MRSA; now these Swiss researchers have found 2.5% of healthy cats and dogs visiting Rest Homes to be carriers of multi-drug-resistant Enterobacteriaceae. This has implications for pet therapy programmes. It is probably more difficult to maintain good faecal-oral hygiene with a visiting dog or cat than it is with visiting humans.


Microbial contamination of hospital reusable cleaning towels

Authors: Sifuentes LY et al

Summary: This US study determined the effects of laundry and cleaning practices commonly used in hospitals for washing, storage, and disinfection of cloth cleaning towels on their microbial loads. The results revealed that cloth towels used for cleaning hospital rooms contained high numbers of microbial contaminants. The investigators concluded that hospital laundering practices appear insufficient to remove microbial contaminants and may even add contaminants to the towels.

Comment (AS): This article looks at the cloth towels being used in the cleaning of clinical environments. Hospital-acquired infections are a significant risk in an environment that provides services to people who are immune-compromised. This study demonstrates that the efforts of the facility staff to create a safe environment may need reviewing. There are three aspects of cleaning the environment to be addressed: which type of towels to use; how to achieve an effective laundering process so that the disinfectants used to clean are actually putting their biocidal activity into destroying bacteria on surfaces and not the cleaning cloths; and how the disinfectant is applied (spray or soaking). This study demonstrates that 93% of the clean towels (cotton and microfiber) from 10 hospitals carried viable microorganisms after laundering. Of the 93%, the microfiber held the highest number of cfu. It also showed that disinfectant sprayed onto the cloths was associated with a higher microbial load than soaking. Policy makers need to heed the information in this study and investigate products and processes in place to evaluate whether the environment is being cleaned.


Independent commentary Alison Stewart

Alison is the Programme Leader for Sterilising Technology at the Open Polytechnic and was previously the Training & Quality Supervisor and Service Team Leader of the sterile services for Capital & Coast District Health Board (CCDHB), where she worked alongside Infection Control.

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