Journal Watch

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The journal watch feature is provided as a service to our readers. The intention is to highlight new research and other developments in infection prevention and control and related fields, published elsewhere. A brief description of each article and its main findings is given here; readers are encouraged to refer to the full published article for the details of the work. The authors and the editorial management group would welcome feedback and recommendations for articles to feature in this column; for comments and recommendations please contact neil.wigglesworth@gmail.com or editor@ips.uk.net.

This issue of Journal Watch coincides with Infection Prevention 2017 in Manchester, the premier infection prevention conference of the year in the UK! So, for each of the quite eclectic articles in this issue, we have suggested a link to a presentation at this year's conference (#IP2017 for the Twitter users!). If you're in Manchester, you can choose these highlighted sessions from the array of brilliant speakers and topics. If you can't make it this year, then perhaps it will spur you on to attend in 2018. We start this time with a perennial subject, because it's a perennial challenge; hand hygiene.

Dawson C, Wells F, Mackrill J and Prevc K. (2017) Using inherent and elective behaviour to improve hand hygiene monitoring in health care. *American Journal of Infection Control*; in press. DOI: 10.1016/j.ajic.2017.03.032

Some familiar names in the author list for this study, including three IPS members, one of whom is a previous IPS Board member; it's always good to highlight the work of colleagues. This paper is described as the first study in a larger programme of work exploring the concepts of 'inherent' and 'elective' hand hygiene. The former is in response to hands being or feeling physically contaminated or 'dirty' and the latter is every other hand hygiene episode. The authors designed a mixed methods study in two clinical areas, chosen for their likelihood of staff exposure to blood; greater in a renal dialysis unit and lesser in a cardiothoracic ward. The study involved direct observation of hand hygiene, with a focus on the inherent/elective characteristic and semi-structured interviews of a sample of the staff

observed, to elicit views and understanding of hand hygiene performance monitoring and the feedback method used. Interestingly the first 15 min of each period of observation were discarded in an attempt, based on author experience, to limit the Hawthorne Effect. The results are a mix of unsurprising and intriguing; that hand hygiene performance was better for 'inherent' tasks is not surprising, nor is the observation that the effect was less marked in an area with more exposure to blood (desensitisation). What is more surprising is that there was confusion about what was hand hygiene performance, with staff equating it with training compliance, rather than measurement in practice. Two things struck me about this paper; one a minor point that three of the four prompts for the semi-structured interviews appeared, at face value, to be 'closed' questions. Second, I wondered: if desensitisation is a strong phenomenon, how can it be overcome? I hope further work from this group helps us to answer that question. Further insight into behaviour change approaches can be found at #IP2017, including 'Fundamentals of behaviour change' by Dr Carmen Lefevre (Tuesday 09:45, room 2).

Our second paper is a return to another favourite subject: single rooms, how important are they? This paper from *JHI* looks at moving to a new hospital with very good single room provision and the impact on healthcare-associated infection and Norovirus.

Darley E. (2017) Impact of moving to a new hospital build with a high proportion of single rooms on healthcare associated infection and Norovirus outbreaks. *Journal of Hospital Infection*; in press. DOI: 10.1016/j.jhin.2017.06.027

This article is a simple but elegant description of the impact of much increased isolation capacity on the incidence of a range of reportable (in England) healthcare-associated

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infections (HCAI) as well as outbreaks and ward closures due to Norovirus. The paper describes a move from two hospital sites with 10% of the beds as single rooms, to a newly built, single site with 75% single rooms and 100% single rooms in critical care. The data were analysed retrospectively and covered a five-year period, roughly three years before and two years after, and included *Clostridium difficile*, Meticillin-sensitive *Staphylococcus aureus* (MSSA) bacteraemia and *Escherichia coli* bacteraemia reports as well as records of Norovirus ward closures and bed-days lost. The results are simple enough to describe; none of the reportable HCAI were significantly affected by the move to the new facility. All were reducing or stable in line with national trends over the period, none showed a step change in reduction following the move. The author notes that their experience, which is shared by many, has been that evidence for cross infection of *C. difficile* was already rare before the move; thus, isolation capacity may have added little. Hospital acquisition of any organisms such as Meticillin-resistant *S. aureus* (MRSA) isn't mentioned, which may have been interesting; however, they may not have the screening data to identify this for the whole period/whole hospital. It's helpful to note that, with a large proportion of single rooms, Norovirus can be managed on an individual patient basis, largely without recourse to ward closure. The author notes that year-on-year differences in Norovirus strains and incidence may have impacted on their experience so far. As far as the bigger single rooms question goes, this paper fuels the discussion, but perhaps doesn't end the debate. Don't forget to check out these two sessions at #IP2017; on Monday at 16:25, ex IPS President Judy Potter is talking about Norovirus, and on Tuesday at 09:05, Professor Satoshi Hori is talking about healthcare buildings.

The next paper is a large piece of work published in the *Lancet* on the relevance of laminar airflow in surgical site infection (SSI) prevention and links to the WHO SSI prevention guidelines published last year.

Bischoff P, Kubilay NZ, Allegranzi B, Egger M and Gastmeier P. (2017) Effect of laminar airflow ventilation on surgical site infections: a systematic review and meta-analysis. *Lancet Infectious Diseases* 17: 553–561.

This extensive systematic review with meta-analysis tackles a much-debated question among those interested in SSIs: 'is the use of laminar airflow (LAF) in the operating room associated with the reduction of overall or deep SSI as outcomes in patients of any age undergoing surgical operations?' LAF infrastructure is used largely (but not exclusively) in orthopaedic operating rooms to reduce air contamination based on the landmark study carried out in the late 1970s (Lidwell et al., 1982). The study had reported a significant reduction of deep SSIs in joint replacement surgeries performed in LAF theatres by comparison with

procedures done in conventionally ventilated operating rooms and led to the introduction of ultraclean air systems in operating theatres. In their meta-analysis, however, Bischoff et al. conclude that LAF ventilation does not reduce overall SSI when compared with conventional ventilation in total hip arthroplasties, total knee arthroplasties, abdominal and open vascular surgery studies. This conclusion is in line with the conclusions from a previous systematic review by one of the authors (Gastmeier et al., 2012). This systematic review yielded information about an impressively large dataset from 12 observational cohort studies using data from national surveillance systems and registries. None of the studies had a randomised study design and only studies performed after 1990 were included since ventilation systems used before this date might not be technically comparable with those used in hospitals today. This is a very comprehensive and detailed write-up of the systematic review and meta-analysis process yet its conclusions stir debate on several levels (Jutte et al., 2017). First, the studies included in this review had high heterogeneity based on study designs, definitions of infections, air handling policies in the control populations and infection control behaviours in the operating theatres. Second, the authors conclude that the available evidence is very low quality or inadequate. On the other hand, the authors put forward plausible reasons why LAF may not be as effective in SSI prevention as once was thought. They point out that during surgical procedures (unlike in industrial manufacturing where the concept of clean air flow originated) it is very difficult to maintain effectiveness of LAF over the sterile field due to the several disruptions from overhead lights, personnel and instruments. In addition, the high flow from LAF cools the patient and surgical wound potentially leading to intraoperative hypothermia, a risk factor for SSI (NICE, 2008). In conclusion, there seems to be not enough evidence to justify the extra costs associated with procuring and maintaining LAF ventilation as a measure of SSI prevention.

You can learn more on SSI prevention at #IP2017 on Wednesday 20th September at 11:25 (Pauline Harrington) and 12:15 (Claire Kilpatrick).

We are seeing more publications on glove use and their role in infection prevention (or lack of it!). This next review from Germany looks at feasibility and validity of disinfection of gloved hands.

Kampf G and Lemmen S. (2017) Disinfection of gloved hands for multiple activities with indicated glove use on the same patient. *Journal of Hospital Infection; in press*. DOI: 10.1016/j.jhin.2017.06.021

We chose this publication for its controversial yet pragmatic nature. The changing of gloves between patients and between activities on the same patient is one of the basic concepts of infection prevention, and this paper challenges

exactly that. It puts forward the concept of glove disinfection as a solution to the clinical reality of continuous glove use and poor hand hygiene associated with glove use. The authors argue that glove use has increased and will most likely continue to grow with the increasing prevalence of multidrug resistant organisms. The reality is that doffing of gloves, followed by hand disinfection and then donning a new pair of gloves, is complex and time-consuming and in reality, more often than not, healthcare workers do not decontaminate their hands in such scenarios. The authors argue that the disinfection of gloved hands is simpler and probably facilitates (gloved) hand disinfection at the right moments. In their review, they look at the safety of disinfection of gloved hands in relation to the integrity of gloves and efficacy of hand disinfection and conclude that there is not enough evidence to show that this is actually unsafe. Interestingly, they state that studies have showed that using alcohol hand rub on gloves did not lead to significant glove damage and that it can be '*concluded with reasonable certainty that decontamination for gloved hands is at least as effective as treating bare hands*'. After reading the whole review it seems that the authors are slightly too eager to 'strongly recommend' the use of targeted disinfection of gloved hands, simply because the evidence is still scarce. As they themselves admit, there is lack of good quality evidence on the topic and further research is required. Still, the authors must be applauded for putting this idea forward for debate and their paper makes an interesting, thought-provoking read. Besides researching what is happening in actual shop floor practices, we also need innovative but practical solutions to constant challenges.

Learn more on the challenges of changing practices at #IP2017 in Session 23a on Wednesday 20th September; Professor Carl May will speak about 'Infection prevention and implementation science: how can we understand the parameters of practice change?'

Our final suggestion is one of those occasional papers that might be described as 'and now for something completely different!' Want to make sure your environment is free of *C. difficile*? Get a sniffer dog!

Bryce E, Zurberg T, Zurberg M, Shajari S and Roscoe D. (2017) Identifying environmental reservoirs of *Clostridium difficile* with a scent detection dog; preliminary evaluation. *Journal of Hospital Infection*; in press. DOI: 10.1016/j.jhin.2017.05.023

To be honest, if you like dogs, you'll love this article! This work follows an earlier published study detecting *C. difficile* in patients using a sniffer dog (that one was a Beagle, this time a Springer Spaniel). The study was in two stages; after training the dog to detect the smell of *C. difficile* from both cultures and faeces (which is described in detail in both words and pictures), the dog was tested in a kind of training environment before moving on to the clinical environment. In stage one, the dog had to both identify and search for sources of artificially contaminated materials and performed extremely well with levels of sensitivity and specificity that test designers would die for! The details of the tests read like a combination of a standard operating procedure in a lab and the commentary from Crufts! More seriously, this is a rigorously conducted trial and the clinical evaluation has been followed by implementation in which any positive 'alert', i.e. detection by the dog of *C. difficile* is communicated to housekeeping staff to prompt supplementary cleaning and use of additional technologies such as UV-C light. The performance of the dog in the clinical environment is as impressive as in testing with 100% sensitivity for detection of quality control specimens placed (hidden) in the clinical environment and very few false-positives. The authors note that a second dog is in training with a view to testing inter-rater reliability between teams. There is a line in the discussion which merits quoting verbatim: '*Similarly, the training of detection dogs is linked with a reward for correct alerts and the potential exists for the dogs to be biased*' – this made me smile! Sadly, there are no dogs at #IP2017 but *C. difficile* will be discussed by Professor Thomas V Reilly on Monday at 09:35 and at the 'meet the expert' session on Tuesday at 08:30 with Dr Michael Weinbren. Hope to see you there!

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