Journal Watch

Neil Wigglesworth

Welsh Healthcare Associated Infection Programme, Public Health Wales, Temple of Peace and Health, Cathays Park, Cardiff CF10 3NW, UK. Email: neil.wigglesworth@wales.nhs.uk

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 editorial management group would welcome feedback and recommendations for articles to feature in this column; for comments and recommendations please contact the editor: editor@ips.uk.net

I try, as often as possible to have a method or a theme to the choice of the articles for the Journal Watch feature. In this issue of the *Journal of Infection Prevention* all of the articles selected for Journal Watch are 'open access', i.e. they are freely available without subscription or payment. In some cases this is just for the specific article, although the papers by Zilberberg and colleagues and by Berrazeg et al are from wholly open access publications. To begin with, a study into recurrence of *Clostridium difficile* infection (CDI):

Zilberberg MD, Reske K, Olsen M, Yan Y, Dubberke ER (2014) Risk factors for recurrent *Clostridium difficile* infection (CDI) hospitalization among hospitalised patients with an initial CDI episode: a retrospective cohort study. *BMC Infectious Diseases* 14: 306.

I am made aware through my conversations with infection prevention teams (IPT) of continuing interest in CDI recurrence, as anecdotally it contributes noticeably to the burden of CDI in their facilities. The authors of this long time-period retrospective cohort study identified recurrence as a positive toxin test for *C. difficile* in hospital patients who'd previously tested positive within 42 days. The crude recurrence rate in this large sample ($n=4,200$) was just over 10% or 425 cases. In these recurrent cases the authors modelled univariable and multivariable risk factors for recurrence using Cox proportional hazards methods. The authors included a lot of variables and I would recommend reading the results in full, but I'll summarise the 'headlines'. Some of these are unsurprising and relatively unmodifiable, such as age as well as comorbidities and chronic disease (diabetes in particular). There are however some lessons for practice, even if these are equally unsurprising; exposure to health care, for example, with two or more inpatient hospitalisations and community onset but healthcare associated cases both identified as risks for recurrence. One of the key findings of note is a strong relationship between giving 'high risk' antimicrobials or using gastric acid suppression after finishing the treatment for the initial case of CDI. There are some limitations, given the retrospective design, but

on the whole this study is helpful to those looking to reduce CDI recurrence.

The second 'open access' paper, from BMJ Quality and Safety, looks at the Hawthorne effect in relation to hand hygiene auditing.

Srigley JA, Furness CD, Baker GR, Gardam M. (2014) Quantification of the Hawthorne effect in hand hygiene compliance monitoring using and electronic monitoring system: a retrospective cohort study. *BMJ Quality & Safety* 0: 1-7. doi: 10.1136/bmjqs-2014-003080. [Published online first.]

Anyone who has concerns about 'Big Brother' may wish to look away now. This study gives us a fascinating insight into the magnitude of the Hawthorne effect in the context of hand hygiene audits. The combination of detail and innovative technology and approaches in this paper makes it a very interesting and thought provoking read. As part of a larger study, the researchers installed what they call a 'Real Time Location System' (RTLS) on an organ transplant unit in a hospital in Canada (this is relevant and I'll come back to it). The RTLS uses battery operated 'tags' worn by staff and attached to equipment. The upshot of this is that the researchers could calculate whenever the hand hygiene product dispensers were activated (alcohol based hand rub and soap) and also where the hand hygiene auditors stood and what parts of the department they were visible to, when auditing. The authors used these data to calculate how often the dispensers were used when the auditor was visible to the users (healthcare workers), compared with how often they were used when not visible. For the 'not visible' aspects the study included three different scenarios that covered differences in both place and time. The results are strongly supportive of a Hawthorne effect in hand hygiene compliance auditing. For each comparison there was a significant increase in hand product use when hand hygiene auditors were visible to the staff; there was a 2 to 3 fold increase in use of the dispensers when the auditors were deemed to be visible and this was statistically significant. There are some caveats; the authors note they were not measuring 'appropriate' hand hygiene (i.e. opportunities). Also, the fact that the hospital, typical of North America, doesn't have 'bays' but patient rooms (it doesn't specify private or semi-private), means the observations were restricted to 'hallways' (presumably corridors). It is possible that the effect would be less pronounced within patient rooms but these are never audited in this system because of privacy.

Evidence based guidelines are invaluable to infection prevention practitioners and clinical staff, even if implementation remains a challenge. The journal *Infection Control and Hospital Epidemiology* has published two recent updated guidelines, both open access, authored by a

combination of the Society of Healthcare Epidemiologists of America (SHEA), the Infectious Disease Society of America (IDSA), APIC and 'the Joint Commission' (a US regulator). Both of these updated guidelines update and replace guidance published in 2008. Each is structured in the same way; rationale and statements of concern, strategies to detect, strategies to prevent, performance measure, examples of implementation strategies. The evidence for each suggested intervention is graded using a recognised system (GRADE: <http://www.gradeworking-group.org/>) which gives the evidence as 'high, medium or low' quality. Finally, each gives the strategies to prevent in two parts; basic practices and special approaches. The basic practices are those which have the greater evidence base, are less likely to carry the risk of unintended consequences and should, in themselves, lead to reductions in the infections in question. The special approaches are recommended when a healthcare organisation continues to have higher rates of infection despite implementing the basic practices. It's not possible for me to summarise the complete recommendations for each but I will highlight a small number of points from both. Readers will want to access, read and refer to the complete guidelines.

Marschall JM, Mermel LA, Fakih M, Hadaway L, Kallen A, O'Grady N, Pettis AM, Rupp ME, Sandora T, Maragakis L, Yokoe D. (2014) Strategies to prevent central line-associated bloodstream infections in acute care hospitals: 2014 update. *Infection Control & Hospital Epidemiology* 35(7): 753–71.

For central line-associated bloodstream infections (CLABSI), an intervention that I wasn't aware had a high level of evidence is to 'bathe ICU patients over 2 months of age with a chlorhexidine solution daily', although there are unresolved issues for other patient groups and children under two months. The guidance promotes the use of a checklist, albeit with limited evidence, but importantly and specifically mentions the empowerment of personnel to stop the procedure if breaches in technique are observed. I was surprised to read that we shouldn't use peripherally inserted central catheters (PICCs) as a strategy to reduce CLABSI and that, in the intensive care unit, these have similar infection rates to 'traditional' CVCs. The guidance cites high quality evidence for nurse-patient ratios (albeit only in ICUs) and notes the continuing, for as long as I've been in infection prevention and control, lack of evidence for intermittent giving set duration of use. Among the 'special approaches' are antiseptic/antimicrobial CVCs and antimicrobial locks and finally the routine use of needleless connectors for CLABSI prevention and the efficacy of intravenous teams remain unresolved.

Anderson DJ, Podgorny K, Berrios-Torres SI, Bratzer DW, Patchen Dellinger E, Green L, Nyquist AC, Saiman L, Yokoe D, Maragakis L, Kaye KS. (2014) Strategies to prevent surgical site infections in acute care hospitals: 2014 update. *Infection Control & Hospital Epidemiology* 35(6): 605–27.

The first and most noticeable thing about these guidelines, in comparison with the CLABSI ones above, is the number of recommendations for which there is high quality evidence. These recommendations will be familiar to you and form the basis of 'bundles', improvement programmes and policies. Such things as appropriate and

timely antimicrobial prophylaxis, maintaining normothermia, optimal oxygenation and alcohol based skin prep have a sound evidence base, and others such as not removing hair at the site and glucose control have a reasonable one. All of this leads to a question – why is surgical site infection (SSI) still a significant burden and frequently the commonest healthcare associated infection (HCAI) in acute settings? Is it because there are a number of intrinsic patient factors that have a large impact on SSI risk, or is it because of the gap between evidence and implementation? It's probably a little of both. Some of the 'special approaches' for SSI prevention merit a mention; screening and decolonising for *Staphylococcus aureus* for some categories of surgery (cardiac and orthopaedic) and antiseptic wound lavage, for example. Also interesting are some of the interventions that are not recommended; delaying surgery to administer parenteral nutrition and neither antiseptic sutures nor drapes are supported. Finally, despite, to my knowledge, a great deal of debate and some vigorous promotion, pre-op bathing with chlorhexidine remains an 'unresolved issue'.

The final article in this issue of Journal Watch is the equivalent of the '...and finally' item on the 10 o'clock news...

Berrazeg M, Diene SM, Medjahed L, Parola P, Drissi M, Raoult D, Rolain JM. (2014) New Delhi metallo-beta-lactamase around the world: an eReview using Google Maps. *Eurosurveillance* 19(20): pii=20809

This review is useful, in itself, as a reminder of the history, importance and worldwide spread of this carbapenemase and as a essential primer about its epidemiology. However, I have included it for another reason entirely; the use of Google Maps. Briefly the authors used a literature review to identify all reports of New Delhi metallo-beta-lactamase from the first in 2009 until the end of 2012. After classifying the reports as human infection or colonisation or environmental isolate and, for the human reports, association with travel, the authors used Google Maps to create an interactive, dynamic and real time updated resource. The map is available online at <http://www.mediterranean-infection.com/article.php?leref=318&titre=new-delhi-metallo-lactamase-around-the-world> and I highly recommend having a look and, frankly, a play with it. If you are familiar with Google Maps the interface will be instantly recognisable, with the ability to zoom in and out to any level and a table of references as a sidebar. The key messages for me are that technology such as Google Maps offers new ways of representing information and, importantly, it is readily available for researchers and epidemiologists to use. The authors mention that Google provides full documentation, tutorials and other resources to get you started. I'm certain there are applications to this technology that many people in public health and epidemiology could use.

A somewhat eclectic collection for this issue of Journal Watch, original research, evidence based guidelines and an excuse to play on Google Maps at lunchtime. I hope something to interest, inform, even entertain a bit, and all free to access. So, go access....

Declaration of conflicting interest

The author declares that there is no conflict of interest.

Funding

This work received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.