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.

There are some cross-cutting themes in this issue of Journal Watch; antimicrobial resistance is discussed in two articles, surgery and surgical site infection (SSI) in two articles and chlorhexidine antiseptics also in two articles. Methodologically we include systematic reviews with meta-analysis and secondary analysis of ‘big data’, as well as some opinion and a spot of video observation! Quite a mixed bag of studies, but all with something to tell us about some of the big themes of infection prevention and control.

To start with, two different systematic reviews that are linked by a focus on the use of chlorhexidine washing to prevent infections, the first of which is concerned with preventing bloodstream infections (BSI) in critical care settings.

Alfonso E, Blot K and Blot S. (2016) Prevention of hospital-acquired bloodstream infections through chlorhexidine gluconate-impregnated washcloth bathing in intensive care units: a systematic review and meta-analysis of randomised controlled trials. *Eurosurveillance* 21(46): 30400. DOI: 10.2807/1560-7917.

Anecdotally, using antimicrobial washing, with or without specific washcloths, is common practice in critical care units. These authors have reviewed the efficacy of washcloths impregnated with chlorhexidine gluconate (CHG) in reducing the risk of hospital-acquired bloodstream infections (HABSI), and specifically central line associated BSI (CLABSI), in critical care settings. The review considered randomised trials in both adults and children, where the comparison was between CHG impregnated washcloths and either non-antiseptic washcloths or other daily bathing routines. Once again, using relatively strict inclusion criteria

highlights the paucity of high-quality studies in the infection prevention literature, the authors identified only four studies to include in the review and meta-analysis. The details of the inclusion and exclusion criteria as well as the statistical analysis are well described and the researchers assessed risk of bias and methodological quality using recognised methods (the Cochrane risk of bias assessment tool). The four studies identified were non-blinded cluster randomised crossover trials involving over 22,000 patients, both adults and children. The headline results support the use of CHG washcloths in this patient population; CHG washcloths were associated with significant reductions in overall HABSI and stronger reductions in CLABSI specifically (odds ratio [OR], 0.5; 95% confidence interval [CI], 0.6–0.9). The authors attribute this tentatively to the reduction in Gram-positive organisms colonising the skin. This is supported by a sub-group analysis of Gram-positive BSI showing a significant reduction, although this result did not remain significant when one of the studies with a high risk of bias was removed from the analysis. It is worth noting that the authors found no reports of significant adverse effects from CHG washcloths, although generally, patients with skin problems were excluded from the studies. This paper does not address the question of CHG resistance, but notes the limited evidence for any such impact in clinical practice; also, there were no economic data available to take into consideration. The authors note that, given the effect on Gram-positive organisms, the observed effect may be influenced by blood culture contamination; nevertheless, their work supports this practice in critical care units.

The focus of the second systematic review of CHG, from the *American Journal of Infection Control*, is on preventing SSI in clean surgery.

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Maciel de Castro Franco L, Fernandes Cota G, Saraiva Pinto T and Falci Ercole F. (2016) Preoperative bathing of the surgical site with chlorhexidine for infection prevention: Systematic review with meta-analysis. *American Journal of Infection Control*; DOI: 10.1016/j.ajic.2016.12.003.

The first, albeit minor, thing to note about this study, is that it is not about washcloths; more of that later. This is another well described systematic review and meta-analysis. This one is particularly well reported and can be read as an example of how to report these kinds of studies. The researchers did a systematic review looking for randomised trials in the population of patients undergoing clean surgery, where the intervention was whole-body bathing with 4% CHG; the comparison was bathing with other antiseptics or not and the outcome was SSI. This is an elegant illustration of using the PICO framework for a systematic review. Once again, the authors found only a small number of methodologically adequate trials that met their criteria; a total of eight trials were included. A ninth trial was excluded at the stage of methodological quality analysis using a tool called the Jadad scale, with which I'm not familiar. Coming back to the question of washcloths, it is worth noting that the studies included in this review ranged in date from 1983 to 2009; all quite old, and I wonder if the popularity of washcloths has changed the clinical landscape more recently and also perhaps the relevance of these findings. This is another large meta-analysis; involving almost 11,000 patients and the findings do not support the use of CHG as described. There was no significant difference in SSI between the CHG group (7.1%) and the placebo group (9.1%) or the non-antiseptic soap group (5.1%). The authors looked for publication bias and found no evidence of any and there was only moderate heterogeneity at worst between the studies in the different comparisons. The authors discuss a number of explanations for this lack of effect, including sample size, though this seems relatively unlikely. Of interest is the question of exposure time and application of the antiseptic. This brings us back to washcloths again; perhaps this method of applying CHG to the preoperative patient may prove more effective than liquid solutions. Further high quality studies are needed in this area.

Our third paper in this issue is somewhat unusual, a commentary rather than a study. We include it because we think it has something important to say about the influence of infection prevention and control on the growing crisis of antimicrobial resistance.

Harris A, Pineles L and Perencevich E. (2016) Recognising the value of infection prevention and its role in addressing the antimicrobial resistance crisis. *BMJ Quality & Safety*; DOI: 10.1136/bmjqs-2016-005982.

This publication is different from the ones we typically look at in our column, as it is neither a review nor a study;

this viewpoint drew my attention exactly for that reason. The authors seek to draw the attention of quality improvement enthusiasts, subtly lobbying for their support to help outline the critical importance of infection prevention (IP) programmes as a cost-effective way of providing safe healthcare that is free of healthcare-associated infections (HAI). It also aims to put infection prevention into the whole 'antimicrobial resistance' picture. The most important phrase in the title is 'recognising value', a phrase not often linked to infection prevention. It starts by setting the scene, with the importance of infection prevention programmes, spelling out the costs and impact of HAIs due to multidrug-resistant pathogens. It also lists and summarizes key findings from some of the (limited number of) randomised controlled trials directly relating to infection prevention strategies, but clearly outlines the struggles we face in our clinical work: '*despite these advances, the proportion of hospital-acquired infections (HAI) caused by antibiotic resistance remains high and bacteria containing new resistant mechanisms continue to emerge*'. This background to IP is necessary in this editorial, given that it is published in a non-IP publication.

As an infection preventionist, I found most interesting the suggestions put forward for future IP research; mainly human factors approaches (new technologies that do not require behaviour change), improvement science approaches, better use of technology to help assist in surveillance and looking at novel barrier approaches to prevent cross-transmission. It seems IP is still lagging behind other specialties on good quality research; we need to be focusing on generating a larger volume of better quality, IP-related evidence. The authors, however, acknowledge the reducing investment in IP programmes, coupled with a concurrent increase in reporting and surveillance demands. Both these create the '*unintended consequence of taking the focus away from patient-focused infection prevention duties*'. It concludes by giving some ideas on how to push IP programmes forward and asks how resources can be mandated towards them. It highlights the role professional bodies (like IPS) have, suggesting working with government agencies to create comprehensive recommendations for IP programmes. One limitation of this viewpoint is that at some points it feels quite 'US focused'. However, all in all, it makes a good, quick read.

Back to surgical practice for the penultimate paper in this edition and also back to a more recognisable study, albeit with a twist. There has been a recent fashion for music and hand hygiene, but surgical scrub?

Gautschi N, Marschall J, Candinas D and Banz V. (2017) The effect of music on surgical hand disinfection – A video-based intervention study. *Journal of Hospital Infection*; DOI: 10.1016/j.jhin.2017.01.005.

This is not the first study to look at the possible effects of background music on the performance of surgical teams in

the operating theatres with some showing an improvement in the quality of surgery (e.g. more efficient process of wound closing, improved technique). This study tested the hypothesis that staff exposed to music would scrub their hands longer than the control group. Surgical scrubbing is a monotonous task and as a result time spent performing it can be reduced to a minimum. This prospective intervention study compared the time surgeons, medical students and scrub nurses took to perform a hand scrub using alcohol-based products while music from local (Swiss) radio stations was played in the scrub room versus time taken when no music was played (control group). Alcohol-based hand scrubbing using a product licensed for this purpose is becoming increasingly popular in operating theatres, since it significantly reduces time spent scrubbing and also possible damage to the skin. The researchers videotaped 101 hand-scrubbing procedure observations in the no-music group versus 135 observations in the music group, amounting to 150 h of footage, using an inconspicuously placed camera. The study was carried out in two surgical theatres at Bern University Hospital, Switzerland. All the team knew they were being videotaped.

It is good to see a published study reporting a negative outcome (helping to offset publication bias) as it found that listening to music did not result in longer scrub times. However, in a small sub-group with very short scrubbing times (less than 90 s) there was a noted increase in response to background music. This study, however, had a limitation since hand scrubbing was being performed using a product requiring minimum scrub duration of 90 s (although during the study period, in-house infection prevention standards were based on the EN 12791 norm recommending preoperative hand disinfection with an alcohol-based product for 180 s). It is possible that staff were aware of this fact, which would explain why no further improvement was noted. It would be interesting to see the effect of music on duration of scrubbing with soap and water, which requires a much longer scrubbing time.

This study reported several other curious findings, which are worth mentioning. The use of a stopwatch within the scrub room significantly increased the overall mean scrub time; female staff scrubbed longer than male staff irrespective of staff rank, while surgeons scrubbed for significantly shorter times than scrub nurses. Also, as might be expected, senior surgeons scrubbed their hands for shorter durations than any other type of staff, possibly explained by the fact that years of repeating a monotonous routine procedure may lead to shortcuts. Still one would ask, what harm could possibly be done by having some background radio music playing in the scrub room? Indeed, listening to music in this setting may have a positive overall effect, as reported by some of the study participants who enjoyed listening to 'a good song or two'!

Finally, from the *Journal of Antimicrobial Chemotherapy*, part of the answer as to whether care homes are a reservoir of antibiotic-resistant bacteria, as well as an interesting

exercise in the use and limitations of 'big data' and database linking.

Rosello A, Haywood AC, Hopkins S, et al. (2017) Impact of long-term care facility residence on the antibiotic resistance of urinary tract *Escherichia coli* and *Klebsiella*. *Journal of Antimicrobial Chemotherapy*; DOI: 10.1093/jac/dkw555.

It has long been thought that care homes are a potential reservoir for multi-resistant bacteria, both Gram-positive, such as MRSA, and, more recently, Gram-negative species. The authors of this study have used routine laboratory reported data to explore this phenomenon in the species responsible for many urinary tract infections (UTIs) in the elderly population. This study used laboratory bug-drug resistance data for urine specimens provided by laboratories in the West Midlands region of England and compared the results with postcode data to identify older (≤ 70 years) people, resident in what they term long-term care facilities (LTCF), more commonly referred to as nursing and residential homes. The researchers compared laboratory defined UTI and resistance to specific antibiotic classes between residents of LTCF and people resident in their own homes. Specimens from both general practitioners (GPs) and hospitals were included in the analysis as the key comparison was the residence of the patient, not their location when the specimen was taken. The results are quite dramatic; residents of LTCF had close to three times the rate of *E. coli* and *Klebsiella spp.* UTI (as defined). Resistance to trimethoprim, nitrofurantoin and third-generation cephalosporins was more than fourfold higher in LTCF residents, with resistance to ciprofloxacin over fivefold greater. In all cases, this was the rate per 100 person years of *E. coli* and *Klebsiella* with resistance to the specified antibiotics, compared with non-LTCF residents. These results support the theory that there is a lot of resistance in Gram-negative bacteria in these settings. There are some caveats; postcode data may mean some people are misclassified as to their place of residence and also laboratory results may not indicate true UTI, but rather asymptomatic bacteriuria. It is also likely that, in care settings, samples are more likely to be sent; however, not all the samples were taken at the place of residence. Even with these limitations, the results require some consideration. If this picture is reflected in your local area, does that have an impact on your screening criteria for resistant Gram-negative bacteria and if it does not currently, should it? The NHS has large amounts of data and we need more exercises of this nature to make good use of it.

There are a number of messages in the articles we have presented here. We need high quality studies, both on their own and to include in systematic reviews with meta-analyses; we need to make better and more frequent use of 'big data' and we need to report all the studies that are conducted, including the ones with 'negative' results. There are still a lot of IPC questions to answer!