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 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

The first Journal Watch of 2014 is a mixture of major reviews and guidance, innovation, revelation and a brief revisit to the concept of 'positive deviance'. A number of the articles in this Journal Watch are lengthy and complicated and I can only give you a 'taster' – so as always, do refer to the full articles for the detail.

Starting with revelation, although many will have already seen this article from the *New England Journal of Medicine* about whole-genome sequencing of *Clostridium difficile*, it would be remiss of me to ignore it.

Eyre DW, Cule ML, Wilson DJ, et al (2013) Diverse sources of *C. difficile* infection identified on whole-genome sequencing. *New England Journal of Medicine* 369(13): 1195–205.

The authors of this major whole-genome sequencing study of *C. difficile* sequenced isolates from September 2007 through to March 2011 in Oxfordshire ($n=1,223$). The technical characteristics of the sequencing and the decisions about the relatedness of isolates according to their genetic variants are beyond my expertise and I take the authors' descriptions and conclusions as read. The headline result from this study is that only 147 of the patients whose samples were sequenced had genetically related strains and evidence of same ward contact with another patient that could explain transmission. A small number of patients had links with the same ward that could indicate transmission via the contaminated environment and some had hospital but not ward links. Of those who had genetic evidence of a link but no hospital connection, a small number had community links. This raises the question of where the majority of cases acquired the organism. The authors point out that the possibility of diverse sources isn't entirely surprising as *C. difficile* is 'an ancient organism with diverse strains present in humans, animals and food', but they aren't able to do more than speculate as to the answers to this question. A key message from this study is the reinforcement of the importance of controlling disease-triggers in *C. difficile*, antibiotic exposure in particular; however I would make two further observations. First, that these

results represent a situation with vigorous control measures in place – how much worse would transmission be without them? And second, even if only 20% of cases can be prevented by eliminating transmission, that's a 20% worth achieving; keep washing your hands!

The second article is, again, hardly obscure, but in terms of usefulness to infection prevention and control practitioners this ranks very highly. This guidance from a working group of the Healthcare Infection Society deals with the thorny issue of masks.

Coia JE, Ritchie L, Adisesh A, et al (2013) Guidance on the use of respiratory and facial protection equipment. *Journal of Hospital Infection* 85(3): 170–82.

This paper and the accompanying article (Bunyan et al, 2013) give us the 'state of the art' on the use of masks and other respiratory and facial protection in the UK. I say the UK in particular as the guidance takes into account the UK health and safety regulatory framework in making its recommendations, although the majority of the information is also relevant to an international readership. This is a comprehensive expert review of the literature and consensus where required and is likely to become the authoritative reference on the subject for the foreseeable future, influencing local and national policy. Briefly, the content runs through the risks from infectious particles transmitted in some way through the air (both splashes and droplets of all sizes), the available types of respiratory and facial protection and the selection and correct wearing of each type. In addition to the essential information above, the paper also provides some 'dos and don'ts' and identifies the gaps in the current evidence where more research is required. Useful features of the paper include a very helpful flow diagram for the selection of the appropriate protection; a table of infections with the appropriate protection; and appendices that cover fit testing and give some worked examples of choosing appropriate protection and notes on the UK health and safety requirements. The guidance is freely available, at the time of writing via the *JHI* website, but I expect it will also be made available via the *HIS* website in due course. It will be indispensable to infection prevention and control practitioners and teams when revising and updating policies and procedures.

The first of two papers in this issue from *BMJ Quality & Safety* summarises the current knowledge about the efficacy of strategies to reduce the use of urinary catheters and catheter associated urinary tract infection (CAUTI).

Meddings J, Rogers MAM, Krein SL, et al (2013) Reducing unnecessary urinary catheter use and other strategies to prevent catheter-associated urinary tract infection: an integrative review. *BMJ Quality & Safety Online First*; doi: 10.1136/bmjqs-2012-001774.

This article combines an updated systematic review of interventions to prompt the removal of urinary catheters, with a wider review of other interventions to reduce CAUTI including aseptic insertion by properly trained persons, the use of closed systems of drainage, antimicrobial catheters, and the use of 'bundled' interventions ('bladder bundles'). The article also discusses issues of implementation and this is further supported by an editorial published simultaneously that considers the context in which interventions are attempted (Meddings, 2013). The systematic review is an update to one that considered the literature to mid-2008; this update goes to October 2012 (even with online publishing there is a considerable time between conducting research and getting it published). The review specifically considers two intervention types – reminders to remove catheters and 'stop orders', usually nurses empowered to remove catheters based on criteria. The main results are quite compelling and may well influence you to consider such a strategy – I've said before that well conducted systematic reviews are the engine of evidence-based changes in practice. Meta-analysis showed a 53% reduction in CAUTI using a reminder or stop order, the results for reduction in catheter days were mixed but generally showed a reduction. The authors also note that few of these studies monitored for adverse events, e.g. rates of re-catheterisation; in those that did, rates were low. The article goes on to discuss in brief the other interventions mentioned above, repeating the importance of aseptic insertion and the maintenance of a closed system but reminding us that any benefits of 'antimicrobial catheters' remain speculative at best. Finally I would urge you to read the section on implementation considerations, and the editorial by Meddings (2013), both of which emphasise the importance of organisational context and in particular, culture, to the success of any attempts to reduce CAUTI (and by extension all healthcare associated infections (HCAIs)).

I return to the subject of 'Positive Deviance' for the next study, having reviewed a single-centre study in an earlier Journal Watch (Wigglesworth, 2013).

Marra AR, Teixeira Noritomi D, Westheimer Cavalcante AJ, et al (2013) A multicenter study using positive deviance for improving hand hygiene compliance. *American Journal of Infection Control* 41: 984–8.

For those who were fortunate enough to hear Dr Michael Gardham from Toronto speak at 'Infection Prevention 2013' in London this article will have some resonance. Dr Gardham was eloquent in advocating local innovation as the driver of change and improvement and mentioned 'Positive Deviance' (PD) during his talk. I quoted the following explanation/definition in my previous reference to PD:

'in every community there are certain individuals or groups (the positive deviants), whose uncommon but successful behaviours or strategies enable them to find better solutions to a problem than their peers. These individuals or groups have access to exactly the same resources and face the same challenges and obstacles as their peers.'
(Cited in Wigglesworth, 2013)

In reviewing the previous paper I commented that it wasn't the most robust methodology, a single-centre study, lacking controls and with limited evidence of a causal relationship, but it appeared to be

a promising approach. This study uses the same approach of giving the 'positive deviants' opportunity and permission to innovate to improve hand hygiene compliance, but was conducted in eight locations in seven hospitals in two countries (Brazil and Thailand). The locations were mostly intensive care units but included one general ward and again the study uses a 'before and after approach' without any contemporary controls. As in the previously reported study, description of the methods is a little vague and seemed to consist primarily of creating opportunities for teams to discuss hand hygiene compliance and for the positive deviants to come up with their ideas for innovation. The outcome measures for this study were covert, observed hand hygiene compliance, usage of hand hygiene products and HCAIs, which were measured using standard surveillance methods. The results were generally positive; hand hygiene compliance and use of alcohol hand rub, though not hand wash solution, increased significantly and there was a reduction in device-related HCAI, though not HCAI overall. This latter finding could reflect the importance of hand hygiene in device-related infections. Overall this study, although still not very robust, adds more weight to the arguments for local, context and culturally specific solutions for HCAI reduction.

The final paper for this issue, the second from *BMJ Quality and Safety*, is a slight cheat as it's not the most recent, but is included as an introduction and overview to the science of human factors.

Russ AL, Fairbanks RJ, Karsh B-JI, et al (2013) The science of human factors: separating fact from fiction. *BMJ Quality & Safety* 22: 802–8.

Many infection prevention practitioners and colleagues working in patient safety and quality are developing an interest in 'human factors', while many other colleagues may have heard the term and want to learn more. This paper and a 'thought paper' published by the Health Foundation (Storr et al, 2013) are a useful starting point in understanding human factors in general and their potential application in infection prevention. The authors of this paper are human factors' experts and set out to 'describe the scientific discipline of human factors and provide common ground for partnerships between healthcare and human factors communities'. They do this by describing a set of facts and associated myths about human factors, what it is and what it isn't. Essentially, human factors, also known as ergonomics, is a science that draws on both psychology and engineering to '[design] all aspects of a work system to support human performance and safety'. This is very much a recommendation to read this paper in full – the paper is freely available – but I will illustrate the content with a brief selection of the facts and myths as examples;

'Fact #2: Human factors addresses problems by modifying the design of the system to better aid people'

'Fiction: Human factors addresses problems by teaching people to modify their behaviour'

The authors go on to point out that while training is important for healthcare professionals, it is generally a weak safety intervention.

'Fact #3 Human factors work ranges from the individual to the organisational level'

'Fiction: Human factors is focussed only on the individuals'

Many people hear 'ergonomics' and think of how one sits at a computer or lifts a load, but human factors is a much more wide-ranging

topic, covering organisational systems in the broadest sense. If this has whetted your appetite – read on!

The literature of interest to infection prevention and control practitioners and our colleagues in related specialties is varied and wide ranging. I hope these articles and those in this issue of *JIP* provide interest, information and stimulation.

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