Journal Watch

Neil Wigglesworth¹ and Deborah Xuereb²

Journal of Infection Prevention
2018, Vol. 19(5) 254–257
© The Author(s) 2018
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/1757177418795031
jip.sagepub.com

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.

Another episode in what is latterly becoming an occasional series of *Journal Watch*; we promise to try harder! Another eclectic collection of papers including original research and expert commentary on a range of subjects including hand hygiene, sharps safety and even drug allergies.

We start this issue with an expert review by someone who has previously spoken very eloquently on this subject at an Infection Prevention Society (IPS) conference.

Graves N. (2018) Make economics your friend. *Journal of Hospital Infection*; DOI: 10.1016/j.jhin.2018.07.008.

Professor Nicholas Graves is a highly respected health economist and has written this piece for *JHI*, in which he discusses the use of economics by infection prevention and control (IPC) professionals. In my view, this is a must-read for anyone working in the resource-limited systems that most of us experience. The article starts with a ‘primer’ on the meaning and the essentials of economics. In particular he describes, using everyday examples, how economics is about people, organisations and governments, among others, making choices about how they use their limited resources to satisfy their ‘wants and needs’. In healthcare terms, he describes allocating resources to high-value activities and not low-value ones and uses the example of the United States healthcare system as one where, arguably, resources are not well used, indeed are wasted on unnecessary interventions or those with limited health value. The article moves on to a more specific discussion of economics in infection prevention and describes the economic outcomes that need to be measured in every case: ‘total costs’ and the change to ‘value of health benefits’. In terms of costs, he makes the important point that a

lot of the costs of hospital care is money ‘that is already spent’ – overheads, salaries and other fixed costs. Personally, I’ve seen too many commercial colleagues approaching hospitals with claims of vast cost savings that simply aren’t ‘bottom line’ savings and are of limited interest to finance executives. There is a very easy to understand explanation of quality-adjusted life years (QALYs) using surgical site infection to illustrate it, though Professor Graves doesn’t explain how he arrives at his ‘cost per QALY’ figure of £10k that he uses in his examples (which would have been interesting to know). Also, there are some excellent figures showing how different interventions may be more or less economically valuable, again using IPC examples such as an Antimicrobial Stewardship Programme versus a Hand Hygiene initiative. Towards the end of the article, there is a discussion about the need to include the level of uncertainty in any health economic estimates and the article concludes with some summary statements from his Lowbury Lecture, one of which I cite here: ‘If you use economics, use good methods. Otherwise we might choose the wrong programmes. This harms people because opportunities for larger benefits are lost.’

Economics is relevant to our second article, as the unnecessary use of broader spectrum and newer antibiotics is likely to be more costly; but this paper mainly tells us something about unintended consequences.

Blumenthal KG, Lu N, Zhang Y. et al. (2018) Risk of meticillin resistant *Staphylococcus aureus* and *Clostridium difficile* in patients with a documented penicillin allergy: population based matched cohort study. *BMJ* 361: k2400.

As the title suggests, the focus of this article is not IPC but the identification of people as having a penicillin allergy and the consequences to them and the healthcare system. The

¹Infection Prevention and Control, Guy’s and St Thomas’ NHS Foundation Trust, Westminster Bridge Road, London, UK

²Infection Control Unit, Mater Dei Hospital, Malta

Corresponding author:

Neil Wigglesworth, Infection Prevention and Control, Guy’s and St Thomas’ NHS Foundation Trust, Westminster Bridge Road, London SE1 7EH, UK.

Email: neil.wigglesworth@gstt.nhs.uk

article opens with some very important points about penicillin allergy: it's the commonest documented drug allergy (5–16% of patients). People who are labelled 'penicillin-allergic' get prescribed antibiotics that are broader spectrum, because penicillins and other beta lactam antibiotics, such as cephalosporins, are avoided. Most importantly, the article asserts that much of this is unnecessary, as many, if not most people labelled penicillin-allergic are not, citing a study where 95% were not allergic and could tolerate penicillin. Also of note, it says that 80% of patients with immediate hypersensitivity to penicillin are no longer allergic after 10 years; so the situation changes over time. Why does this matter? This study gives us some answers to that question in relation to risk of MRSA and *C. difficile*. This is a 'big data' study and although written by US academics, the data are from the UK, the Health Improvement Network (THIN) database of 1.1 million UK GP patients. The authors describe this as a matched cohort study and it's written as if it was conducted prospectively, but it appears to be a retrospective analysis, so a case control study (unless they truly started it in 1995, which was very forward-thinking of them). They compared adults with a documented penicillin allergy with matched controls with no documented allergy, up to five controls per case, with the outcomes of new MRSA and *C. difficile* incidence. The study also collected and controlled for a range of covariates including demographic, behavioural (e.g. smoking) and co-morbidities. The analysis used Cox proportional hazard models to identify the risk of MRSA and *C. difficile* and also identified subsequent antibiotic use in both groups. The results are very interesting, a documented penicillin allergy increased the risk of both MRSA (adjusted hazard ratio [HR] = 1.69, 95% confidence interval [CI] = 1.51–1.9) and *C. difficile* (adjusted HR = 1.26, 95% CI = 1.12–1.4). Patients with documented penicillin allergy received more macrolides, clindamycin, tetracyclines and sulphonamides. They also received more vancomycin, aminoglycosides and linezolid, but these were rare in both groups – these are GP-derived data. As these are GP data, some may argue that the identification of cases of MRSA and *C. difficile* may be limited; the authors agree but assert that this limitation would tend to bias their results towards the null hypothesis. We all recognise the risk for *C. difficile* from certain classes of antibiotics but it's important to remember that MRSA risk is also influenced by prior administration of some antibiotics too. There is a need to address the over readiness to label someone as 'penicillin-allergic'.

From big data to point of care interventions, our next paper considers a novel support approach for staff managing central venous catheters.

Buchanan MO, Summerlin-Long SK, DiBiase LM, et al. (2018) The compliance coach: A bedside observer, auditor, and educator as part of an infection prevention department's team approach for improving central line

care and reducing central line-associated bloodstream infection risk. *American Journal of Infection Control*; DOI: 10.1016/j.ajic.2018.06.005.

The title of this short paper from the United States intrigued me to read (and eventually select) this publication for review. Compliance with good, safe practices is what we often look at when auditing for infection prevention but then find difficulty in identifying ways to actually affect practices. The authors rightly point out that infection preventionists have reducing (often none) contact with patients and identification of risky practices is often done through third parties. This paper describes a novel way of preventing central line related infections within a large hospital by enrolling a 'clinical compliance coach' to directly audit CVC-related practices and providing real-time feedback to those delivering direct patient care. This method of improving compliance through direct and timely feedback has been reported elsewhere (Sinuff et al., 2015). The 'compliance coach' collected data by observation and provided feedback to the nurse assigned to the patient and one-to-one central line care education if required. Ten months into the introduction of the 'compliance coach' role, a survey was carried out among nursing staff to assess their acceptance of the role and scope. Overall, there was a reported improvement in CVC-related practices as observed by the compliance coach, data which the IP team would not have had access to without a bedside presence. The compliance coach also identified gaps in knowledge and practice which allowed for targeted education at ward level. Regrettably, the study did not measure any outcome improvements; however, the authors attributed an observed reduction in central line-associated bloodstream infection rates in units that received most audits, feedback and education to the compliance coach. One could question the sustainability of this 'compliance coach' as it's a demanding role but arguably cost-effective in the long run. Empowering staff by providing timely feedback in a non-punitive way could help embed infection prevention practices. This publication describes how to take infection prevention to the bedside and the simplicity of the intervention is surprisingly refreshing and logical. It is also a reminder that often the most effective IP interventions are not complex and tend to be based on effective communication. Could this be the next step for IPC?

If the previous study was 'back to basics', then perhaps this study is forward to a technology enhanced future.

McCalla S, Reilly M, Thomas R, et al. (2018) An automated hand hygiene compliance system is associated with decreased rates of health care-associated infections. *American Journal of Infection Control*; DOI: 10.1016/j.ajic.2018.05.017.

This study looks at the impact of using wireless hand hygiene monitoring systems on healthcare associated infections

(HAI). Automated hand hygiene auditing systems seem to be increasingly popular in measuring hand hygiene compliance (HHC). Healthcare workers wear a device that reminds them to carry out hand hygiene. A yellow and then red light on the device shines until hand hygiene is performed, at which point the light shines green, assuring patients and anyone at the bedside that hand hygiene was performed. Although the World Health Organization (WHO) considers direct observation to be the gold standard for measuring HHC, the authors argue that it is labour-intensive, expensive and comes with a high Hawthorne effect risk. The authors had previously shown that automated HHC systems are a reliable means of measuring compliance (McCalla et al., 2017); when compared to human observers, automated HHC systems captured significantly more hand hygiene opportunities. The current paper reports results of a pre-post intervention study in a 292-bed community hospital in New York and sought to determine whether whole hospital roll out of the automated HHC system led to a reduction in catheter-associated urinary tract infections (CAUTIs) and central line-associated bloodstream infections (CLABSI). All patients admitted to units before (14,297) and after (36,890) implementation of the automated HHC system were included in the infection surveillance exercise. The pre-intervention period was 14 months long and post intervention was a total of 22 months. The study reported an impressive HHC rate of 95% following implementation of the device although it fails to report in this paper the compliance rate pre intervention. The high compliance rate possibly was related to the use of a reminder tone on the HHC system device. The study reported a significant drop in both CAUTIs (from 2.2/1000 catheter days to 1.21/1000 catheter days) and CLABSIs (1.43/1000 catheter days to 0.64/1000 catheter days). Several CLABSI and CAUTI specific interventions were also implemented during the study period and may have influenced the magnitude of the observed reduction in infection rates. It is often challenging to completely isolate the influence of automated HHC system on HAI rates simply because HAI reduction interventions are often multi-modal. However, this study shows that automated HHC system in combination with hospital infection control measures may be an effective means to reduce HAIs. This is one of few published studies to measure the effect of automated HHC systems on HAIs and highlights the potential of technology as an infection prevention tool.

Back to another reference to value and economics for our last paper, this time engineered safer sharp devices: do they actually add value and make the job of healthcare workers safer? Maybe not.

Schuermans J, Lutgens SP, Groen L, et al. (2018) Do safety engineered devices reduce needlestick injuries? *Journal of Hospital Infection*; DOI: 10.1016/j.jhin.2018.04.026.

All infection prevention practitioners and colleagues in related fields will be familiar with the consequences of the European Safer Sharps Directive which was incorporated into UK law as the Health and Safety (Sharps Instruments in Healthcare) Regulations 2013. Anecdotal evidence suggests implementation of these regulations has been slow and problematic and the Health and Safety Executive have used enforcement action in a number of healthcare organisations. This paper is from The Netherlands, which is subject to the same regulations and has similarly incorporated their requirements into national law. The authors have reviewed occupational reports of blood and body fluid exposures, including needlestick injuries before and after the introduction of safer sharps devices in their facility, and the results are mixed at best. As in most settings, not all sharp devices are engineered safer alternatives; such alternatives are not always available or may be clinically unacceptable, although this latter point is arguably too often used as a proxy for 'we don't like it'. The setting is a single hospital of circa 700 beds and around 4000 healthcare workers and the study identified the exposure, the type of device, and whether and what kind of safer device was involved. Overall, there was no statistically significant difference in the number of 'needlestick injuries' or any other type of sharps injury, but there is some interesting detail. Some specific devices demonstrated a significant reduction in injuries: injection needles and blood sugar needles; but one type of device showed a significant increase in injuries associated with its use: Nadroparine needles. I had to Google Nadroparine (other search engines are available); it's a low molecular weight heparin. The authors also conducted what they described as qualitative interviews with individuals who had reported a sharps incident. Notably, these were rather short interviews of average 5 min and the qualitative methodology is not properly explained. The study identifies some interesting issues: the difference between active and passive safety mechanisms and the opportunity for misuse or failure to properly activate the device when passive and also the possible false sense of security that devices may provide (especially if not the greatest design). This latter point is starkly illustrated by this direct quote: '...I administered Nadroparine to a patient, I slipped the shield over the needle and put the needle in the pocket of my white coat'. The quote goes on to describe an abdominal needlestick injury when the shield came off! There is one other point worth making about this study, part way through the study period, they introduced 'an improved surveillance system for NSIs' – this may have led to some ascertainment bias in the latter part of the data collection period. Do safer devices prevent sharps injuries? It probably depends on the design and quality of the device.

Do you have a subject or a paper you'd like to see covered in *Journal Watch*? If you do, let us know, contact the editor or the authors, or tweet us a link @Neilwigg and @

XuerebD – we can all learn something from that gem of a paper you’ve spotted or that issue that’s been bothering you!

ORCID iD

Neil Wigglesworth <https://orcid.org/0000-0002-0289-8200>

References

- McCalla S, Reilly M, Thomas R and McSpedon-Rai D. (2017) An automated hand hygiene compliance system is associated with improved monitoring of hand hygiene. *American Journal of Infection Control* 45: 492–497.
- Sinuff T, Muscedere J, Rozmovits L, Dale CM and Scales DC. (2015) A qualitative study of the variable effects of audit and feedback in the ICU. *BMJ Quality & Safety* 24: 393–399.