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## Editorial

### Antimicrobial stewardship: a COVID casualty?



How the world has changed in under a year. This time last year the threat posed by antimicrobial resistance (AMR), and particularly multi-drug resistant Gram-negative bacteria (MDRGNB), was widely seen as the foremost infectious threat to mankind on a global level. More parochially, in December 2019 this journal published a report of a research prioritization exercise undertaken by a partnership of patients, carers and healthcare professionals in the UK [1]. Five of the top ten research priorities identified were directly or indirectly related to AMR and antimicrobial stewardship (AMS) [1].

Now, amidst a pandemic that has seen over one million deaths, the continuing threat posed by AMR may no longer be at the forefront of many peoples' minds. However, in this issue an article by Karakonstantis *et al.* serves a timely reminder of the threat that multi-drug-resistant organisms (MDROs) pose. The authors estimated that one in three patients infected with pan-drug resistant *Acinetobacter baumannii* died in hospital as a result of the infection [2]. Donà *et al.* recently highlighted the potential impact of COVID-19 on hospital transmission of MDROs [3]. Indeed, we are beginning to see reports fulfilling some of these authors' prophecies: Meda *et al.* reported an increase in infections and environmental contamination with Gram-negative bacteria as a consequence of sessional use of long-sleeved gowns [4].

AMS has become a casualty of the COVID-19 pandemic for various reasons. AMS programmes will have been disrupted by the far-reaching changes in clinical service delivery during the pandemic, whilst other contributory factors include disruption to global antibiotic supply chains and a tendency to over-treat hospitalised COVID-19 patients with antibiotics (sometimes repurposing antibiotics such as azithromycin as anti-viral drugs).

This year's WHO World Antimicrobial Awareness Week (WAAW) presents an opportunity to re-focus on AMS programmes. It is notable that the scope of WAAW this year has been broadened, with the term 'antimicrobial' replacing the former term 'antibiotic'. This is timely in the context of rising concern about antifungal resistance. Indeed recent articles in the JHI have reported on the use of antifungal stewardship to control *Candida auris* outbreaks and that in hospitals where *C. auris* becomes prevalent the proportion of patients treated with appropriate antifungals is decreased [5,6].

To coincide with WAAW we are pleased to publish the second special section on AMR and AMS in the JHI this year. In the rest of this article we review some of the themes arising from research on AMR and AMS in the JHI.

Interventions to affect behaviour change to facilitate antimicrobial stewardship are extensive and varied. The widespread use of restrictive antibiotic policies is common, though further research is needed to ensure that these are not 'squeezing the balloon' – creating new problems elsewhere [7]. The cost of implementing antimicrobial stewardship programmes (ASPs) can be a barrier to their implementation, though savings are available not only through reduced drug costs but also reduced length of stay and readmission rates [8]. This effect has been demonstrated for antifungal stewardship with one group reporting a 73% reduction in spending on antifungals following the employment of an infectious diseases specialist [9]. The specific challenges of ASPs in paediatric settings have been reported [10], along with recognition that training and education alone is unlikely to be successful and a more directive approach may be more efficacious [11].

When making a decision to prescribe an antibiotic a prescriber must balance the immediate risk to patients from suboptimal antibiotic therapy against the harms to future patients and humanity from increased rates of AMR. Interventions which acknowledge and address this tension are expected to be more successful [12]. It has been proposed that this diagnostic uncertainty can be managed by utilising decision support tools to support prescribers undertaking antimicrobial prescribing [13]. One such tool was incorporated into the Antibiotic Review Kit (ARK) intervention which, having been successful in increasing rates of stopping unnecessary antibiotics in a feasibility study at a single centre, was expanded to hospitals across the UK in 2018 [14]. One of the aims of this is to prevent decision inertia, whereby an antibiotic, appropriately started in the context of an unwell patient and incomplete information, is continued despite further evidence becoming available of alternate, often non-infectious, diagnoses. It might also have a role in tackling the reported 'weekend effect,' whereby broad-spectrum antibiotics are likely to be continued over weekends and holidays [15].

The diagnostic microbiology laboratory has a vital role to play in facilitating AMS, termed diagnostic stewardship. Timely reporting of results increases the confidence of prescribers that they are treating infection appropriately with empirical antibiotics, and allows treatment to be focussed, as reported in this issue by Mahrous *et al.* who report an AMS benefit in their hospital from rapid-diagnostic testing in combination with pharmacist intervention [16]. Whilst new technology is

attractive, and can facilitate a considerable reduction in reporting time for antimicrobial resistance genes in some settings [17], Weinbren *et al.* have demonstrated that existing blood culture pathways can often be optimised, reducing turnaround times without necessarily requiring investment in new equipment [18]. The role biomarkers such as procalcitonin have to play in AMS is yet to be fully defined [19], though its wider use during the COVID-19 pandemic is expected to bring further evidence for its utility in discontinuing or withholding antibiotics in respiratory infections.

A potentially controversial approach to AMS, as it involves using a carbapenem for prophylaxis, is reported in this issue by Bloomfield *et al.* Using a single intramuscular dose of ertapenem as prophylaxis for transrectal prostate biopsy, the average total antibiotic use per biopsy was decreased, in part due to the reduced incidence of infections [20]. Recent concerns regarding adverse drug reactions with fluoroquinolones [21], as well as the known association between ciprofloxacin prophylaxis and development of resistance [22], increases the attractiveness of this approach, although the authors acknowledge that it may not be suitable for all settings – particularly those in which carbapenemase producing *Enterobacteriales* (CPE) are already endemic. Prospective surveillance of post-biopsy infection rates and rates of resistance would be important if this was to be adopted more widely.

Decolonising patients known to carry MDRGNB to prevent infections is an attractive proposition, particularly with measures other than antimicrobial administration. A systematic review of faecal microbiota transplantation by Tavoukjian found low quality evidence that decolonization occurred in around 50% of patients and recommended further randomised controlled trials to establish the safety and efficacy of this approach [23]. Novel approaches such as this are interesting to consider, though focussing on the basics of infection prevention and control to prevent acquisition will probably have the greater benefit.

Whilst infection prevention and control teams may currently be focussed on the COVID-19 pandemic we must not forget that, along with the climate crisis, AMR presents an immediate and escalating threat to humanity which requires a One Health approach. Although the impact of infection preventionists may appear to be limited to the healthcare setting, we can also contribute by raising awareness to ensure that limiting the spread of AMR remains in the international spotlight. Courtenay *et al.* recently noted that COVID-19 has focused attention on nurse leaders' power and potential to promote AMS. The legacy of innovative approaches to AMS like those necessitated by the COVID-19 pandemic could actually strengthen AMS in the post-pandemic era [24].

#### Conflicts of interest

Chris Lynch, Nik Mahida and Jim Gray are all current members of the Editorial Team for the *Journal of Hospital Infection*, the official journal of the Healthcare Infection Society. The authors have no conflicts of interest to declare.

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N/A.

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