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Using antibiotics responsibly: right drug, right time, right dose, right duration

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Everyone prescribing antibiotics should consider both their clinical and public health responsibilities. The objective should be to provide optimal patient care while at the same time seeking to minimize selective pressure that may result in the emergence and spread of antibiotic resistance. To this end, in 2008 the European Centre for Disease Control initiated the annual European Antibiotic Awareness Day (EAAD) to take place on 18 November, when Europe-wide activities are undertaken to highlight the critical importance of prudent antibiotic prescribing. This year activities in England will focus on the optimal management of infections in secondary care, and will have two inter-related aims. The first is to improve the quality of the initial decision to prescribe an antibiotic (including making an informed choice of empirical drug and dose) in particular ensuring rapid prescribing and administration in presumed sepsis. This is deliberately combined with a second focus on the critical importance of formally reviewing antibiotic therapy at 48 h, based on the patient's clinical response and the availability of microbiology test results. This should lead to a clear decision to stop, switch to oral, switch to outpatient antibiotic therapy (OPAT) or change antibiotic, if possible to a narrower spectrum. The EAAD campaign in England will highlight the need to 'Start Smart—Then Focus'. The aim is that patients receiving antibiotics should receive the right drug at the right time at the right dose for the right duration.

Keywords: antimicrobial stewardship, European Antibiotic Awareness Day

Introduction

Antibiotics are life-saving drugs, but unlike drugs used in other therapeutic areas, the future utility of many antibiotics is threatened by the emergence and spread of resistant bacteria. Infection with antibiotic-resistant bacteria often results in a delay in appropriate antibiotic therapy, resulting in increased patient morbidity and mortality, as well as increased hospital length of stay.[1] The current pipeline for new antibiotics is limited, and if antibiotic resistance continues to grow, there may be no effective antibiotics in the future.[2] History could well regard the past 70 years as an era of immense profligacy, with a squandering of the world's finite resources, included among which must be antibiotics. It may become a reality that antibiotics were discovered and squandered within the living memory of a single lifetime; a startling achievement for mankind.

Improving the quality of antibiotic prescribing

Among the strategies currently being advocated for control of antibiotic resistance is antibiotic stewardship, which aims, via a multidisciplinary approach, to promote optimal patient care while at the same time seeking to minimize selective pressure that may result in the emergence and spread of antibiotic resistance as well as other undesirable side effects such as *Clostridium difficile* infection or toxicity.[3,4] Such problems associated with the use of antibiotics have been referred to as collateral damage.[5] Common examples of the misuse of antibiotics are shown in Figure 1, while actions to optimize antibiotic prescribing are given in Figure 2.

It is a major cause of frustration to those seeking to implement optimal antibiotic prescribing that while the actions listed in Figure 2 seem intuitively obvious, the prescribing patterns of many clinicians continue to fall into the categories shown in Figure 1. While it is self-evident that education has a central role to play in helping to improve the quality of antibiotic prescribing, the difficulty in practice is in identifying and targeting those groups of individuals who would derive maximum benefit, and in developing and implementing effective educational strategies. In the UK the need for educational programmes aimed at improving the quality and safety of antibiotic prescribing has been recognized by the government's Specialist Advisory Committee on Antimicrobial Resistance (SACAR) and its successor, the Advisory Committee on Antimicrobial Resistance and Healthcare-associated Infection (ARHAI), both of which have stressed the importance of continuing professional education to improve antibiotic prescribing.[6,7]

At a Europe-wide level, the European Centre for Disease Control has implemented a large-scale and coordinated approach to promoting antibiotic stewardship, with the introduction of the annual European Antibiotic Awareness Day (EAAD), scheduled to take place on 18 November each year.[8,9] The EAAD seeks to emphasize the critical importance of prescribing antibiotics responsibly and minimizing their unnecessary use. In England, the Department of Health (DH) and its advisory committee (ARHAI), together with the BSAC, strongly support the EAAD. Each year materials are provided to support the development of local campaigns and initiatives to educate both healthcare professionals and the public and promote prudent antibiotic prescribing. This year, antimicrobial stewardship guidance for hospitals in England will be highlighted, with clinicians being recommended to 'Start Smart—Then Focus' when prescribing antibiotics.

- Prescribing antibiotics unnecessarily
- Delaying administration of antibiotics in critically ill patients
- Spectrum of antibiotic therapy too narrow or too broad
- Dose of antibiotic too low or too high relative to that indicated for the patient
- Duration of antibiotic treatment is too short or too long
- Failure to review antibiotic treatment when microbiological culture data become available

Figure 1. Examples of misuse of antibiotics.

Prudent antibiotic prescribing: the basic message

As mentioned previously, simple steps to optimize the use of antibiotics are provided in Figure 2. The approach outlined should not be considered as something 'special', but should be regarded as the routine standard of care that patients should expect to receive. The take-home message is straightforward: when prescribing antibiotics, 'Start Smart—Then Focus'; use the right drug at the right time at the right dose for the right duration. In this way we might be able to preserve the utility of antibiotics, whose use is central to most areas of modern medicine.

Start Smart
- Initiate effective antibiotic treatment as soon as possible in patients with life-threatening infection
- Send appropriate specimens to the microbiology laboratory for culture, identification and susceptibility testing wherever possible prior to starting treatment
- Prescribe in accordance with local and national policies and guidelines, avoiding broad-spectrum agents
- Document indication(s) for antibiotic prescription in clinical notes, along with the route of administration, the dose and the planned duration
- Prescribe the shortest antibiotic course likely to be effective
- Select agents with a view to minimizing collateral damage (e.g. selection of multi-resistant bacteria or *Clostridium difficile*)
- Monitor antibiotic drug levels when relevant to avoid toxicity
- Use single dose antibiotic surgical prophylaxis wherever possible
- Consult infection experts when managing patients with difficult infections

Then Focus
- At 48 h review the need for on-going antibiotic therapy based on the patient's clinical condition and available microbiology results
- Stop antibiotics if no evidence of infection
- If antibiotics need to be continued, use individual, local and national antimicrobial susceptibility data to substitute or change agents, moving to a narrow-spectrum antibiotic if possible
- Wherever possible switch from intravenous to oral therapy
- If intravenous antibiotics are still required, consider outpatient parenteral antibiotic therapy (OPAT)

Figure 2. Actions to optimize antibiotic prescribing.

Transparency declarations

None to declare.

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