

Appropriate antibiotic use – whose responsibility?

Antimicrobial resistance, coupled with a decline in antibiotic research and development is a serious patient safety and public health problem that may pose a threat to many medical advances that we take for granted, such as cancer treatment, transplantation, and neonatal care.^{1,2} Infections with resistant organisms, including some commonly seen in primary care, may be more difficult to treat and take longer to resolve.³

The use (particularly the overuse or misuse) of antimicrobial agents is considered a major driver of resistance,^{4,5,6} and a major contributor to the development of gastrointestinal disease with *Clostridium difficile*.⁴ In Wales, over the last six years, resistance increased for some major pathogens, including *Escherichia coli* (the commonest cause of blood stream infections in Wales), urinary coliforms, and *Pseudomonas aeruginosa*.¹

As well as increasing resistance at a population level, antibiotic exposure has been shown to increase antibiotic resistance in an individual, greatest in the month immediately after treatment, but perhaps persisting for up to 12 months.⁷

Effective antibiotics should be thought of in the same way as oil – a non-renewable resource that needs to be guarded. What we use now, we will not be able to use sometime in the future.⁸

Reductions in antibiotic prescribing are associated with reductions in resistance.^{9,10} Significant variations in usage between hospitals and between health boards in Wales suggests an opportunity to reduce antibiotic use.¹ However, prudent or appropriate antibiotic use does not mean using as few antimicrobials as possible, but rather to identify the small patient cohort that really needs treatment and to reassure and educate the much larger cohort that doesn't.¹¹

This bulletin discusses the roles and responsibilities of some of those involved in the process of antibiotic use; various strategies to influence behaviour in relation to antibiotics are considered.

General Practitioners (GPs)

The majority of antibiotics are prescribed in the community,¹² often to treat infections such as acute sinusitis,¹³ acute bronchitis,¹⁴ acute otitis media,¹⁵ and sore throat,¹⁶ for which antibiotics are of limited value (see Supplement).

GPs report that prescribing antibiotics is one of the more uncomfortable prescribing decisions they make.¹⁷

The decision to prescribe antibiotics is a complex one that is influenced by many factors such as real or perceived patient expectation, fear of damaging the doctor-patient relationship, communication problems, diagnostic uncertainty, medicolegal concerns, and time pressures.¹⁸ Prescribers need to balance the interests of their individual patients against societal concerns such as resistance, often without adequate evidence to support accurate diagnosis or prognosis.¹⁹

Because the prescribing process is multifactorial, no universal intervention is thought to work in changing behaviour. However, understanding the antibiotic prescribing process is useful in identifying and addressing potential barriers to change in practice.¹⁹

Fear, on the part of the clinician or the patient, that the infection may turn into something more serious can play a role in the decision to prescribe an antibiotic. Such an approach may not be in the best interests of the patient as it may expose them to unnecessary risk of side effects and carriage of resistant bacteria. However, it remains difficult to determine the minority of patients that will benefit from antibiotic treatment as clinical judgement alone may lack specificity in differentiating mild from serious infection.²⁰ The use of clinical decision tools such as the Modified Centor sore throat score can be helpful in this respect (see Supplement).

A clinician's perception of patient expectation can be a major factor influencing the decision to prescribe.²¹ However, patient demand is often assumed, rather than ascertained directly, and can be overestimated.

Receiving antibiotics medicalises illness, both reinforcing patient perceptions that they should reconsult for similar problems in the future, and their expectation of a prescription.²²

When a GP thinks their patient wants antibiotics, they are ten times more likely to prescribe.²¹

The use of a **delayed prescription strategy**, where antibiotics can be collected if symptoms worsen, or do not improve after a specified duration, has been shown to be useful in reducing antibiotic consumption, while preserving the doctor-patient relationship. The strategy is recommended by NICE (in certain circumstances – see Supplement) for self-limiting respiratory infections.²³ When the strategy is used for upper respiratory tract infections, it is not associated with a significant increase in patient morbidity compared to immediate antibiotics.^{24,25} Patients should be reassured that antibiotics are not needed immediately because they are likely to make little difference to symptoms and may have side effects. Clear and specific information should be given about when to use the antibiotics and when to return for reassessment.^{23,26}

Some clinicians have concerns about the use of delayed prescriptions. They argue that the strategy may give mixed messages about the need for antibiotics, and also that it puts the onus on the patient to make the clinical decision about whether or not the antibiotics are needed.²⁷ A Cochrane review found that, for patients with respiratory infections, a **no antibiotic strategy**, with advice to return if symptoms do not resolve is likely to result in the least antibiotic use, with similar patient satisfaction and clinical outcomes to delayed antibiotics.²⁸

Patient satisfaction may depend more on information and reassurance than on receiving an antibiotic prescription.²¹

A Cochrane review of interventions to improve antibiotic prescribing in ambulatory care found that higher complexity, multifaceted interventions, incorporating many aspects of patient and professional education, appear to be most effective in changing antibiotic prescribing behaviours.²⁵ An example of such a multifaceted intervention is the Stemming the Tide of Antibiotic Resistance (STAR) educational programme.²⁹ The intervention shows GPs the most recent evidence on antibiotic prescribing and encourages them to make sense of their own prescribing and resistance data. A practice-based randomised controlled trial in Wales found that the use of the STAR programme resulted in a

statistically significant 4.2% reduction in antibiotic dispensing compared with control practices who did not receive the programme.²⁹

Fig. 1. Good Antibiotic Prescribing Practice in Primary Care ^{21,30} (adapted).

- Prescribe an antibiotic only when there is likely to be a clear clinical benefit.
- Patient satisfaction is not necessarily related to receiving an antibiotic: information and reassurance are sometimes more important.
- Consulting techniques that make expectations explicit, preserve relationships, and facilitate acceptable management are important.
- Empowering patients who are not acutely ill and emphasising positive aspects of non-antibiotic treatment, especially in children could be helpful.
- Risks to individuals from unnecessary antibiotics should be emphasised.
- Consider a no- or delayed-antibiotic strategy for acute self-limiting upper respiratory tract infections.
- Avoid broad spectrum antibiotics (e.g. co-amoxiclav, quinolones, and cephalosporins) when narrow spectrum antibiotics remain effective.
- Prescribe in accordance with recognised guidelines.

Patients

National campaigns aimed at improving the public's knowledge and awareness of antibiotic use and resistance, although leading to a transient decrease in expectation, have failed to make a lasting impact on prescribing rates.³¹ No simple relationship appears to exist between increasing public knowledge and prudent antibiotic use.³² In fact, it has been shown that greater patient knowledge of antibiotics is associated with more self-medication and potentially more inappropriate use.³² Therefore campaigns or interventions based on influencing behaviour, particularly when aligned with those aimed at prescribers, may be more effective than those aimed solely at improving public knowledge about antibiotics.³²

A patient's expectation of an antibiotic prescription may be based on the widespread misunderstanding about what constitutes an 'infection', belief that antibiotics are effective against viruses, and the lack of appreciation of the benefits of normal flora.

A simple model of health behaviour change has been proposed whereby an individual's readiness to

change can be described as a product of motivation ('why should I?') and confidence ('how could I?').^{22,31} Educating patients about the benefits and risks of using antibiotics for self-limiting illness (e.g. potential unwanted effects and the risk of bacterial resistance) may give them a greater sense of 'why' they may not want to take an antibiotic. Advising them about how to recognise signs and symptoms of more serious disease, how to manage self-limiting illnesses themselves, and providing realistic expectations of the likely duration may reduce a patient's anxieties and help them to realise 'how' they can avoid antibiotics for this illness¹² (see Supplement).

Problems with adherence to antibiotic treatment are well recognised and documented. One study found that over half of patients who were prescribed antibiotics for acute cough or lower respiratory tract infection did not adhere to the full course, with over 40% not taking any of the prescribed course. Although not found to be associated with slower recovery, this low adherence may result in wasted resources and antibiotics being kept for future, potentially inappropriate use.³³

Clearly, communication with patients is of great importance, and there are several resources available to support clinicians in developing their communication skills within the patient consultation and to help clinicians empower patients or parents to self-manage the illness (see Resources section in Supplement).

Secondary care

The strategies for antibiotic use in secondary care may be different from those appropriate in the primary care setting due to differences in the severity and nature of the infections. However, it has been estimated that half of all antibiotic use in hospitals may be inappropriate.³⁴ Health boards should have an antimicrobial prescribing policy and procedures in place to ensure prudent prescribing and antimicrobial stewardship. In England, the Department of Health Advisory Committee on Antimicrobial Resistance and Healthcare Associated Infection (ARHAI) recommends a "start smart – then focus" approach to antibiotic prescribing (see Fig. 2.).³⁵

Although it is often the junior doctor who prescribes antibiotics, the whole clinical team should be familiar with the antimicrobial prescribing policy for their hospital and speciality, and prescribe accordingly, documenting the indication and intended duration of therapy on the prescription chart and in the patient's

notes. Antimicrobial prescriptions should be reviewed within 48 to 72 hours of initiation (ideally by the responsible consultant), as the patient's condition changes, or in light of significant positive cultures, with decisions to continue clearly documented.

Fig. 2. "Start Smart – Then Focus"³⁵

Start Smart:

- Start prompt, effective treatment in patients with life-threatening infection.
- Collect appropriate cultures before starting antibiotic therapy.
- Prescribe in accordance with local antibiotic policies.
- Document indication, route, dose, and duration for antibiotic prescription on chart and in notes.
- Consult infection expert and/or pharmacists if appropriate.

Then Focus:

At 48 hours; review patient, make a clinical judgment on the need for on-going antibiotic therapy, and document the decision.

The inclusion of an antimicrobial prescribing section on the hospital prescribing chart has been shown to improve the documentation of antimicrobial indication and review.³⁶ An all-Wales antimicrobial prescription chart is being developed, and several health boards in Wales now use antimicrobial stickers that attach to the patient's prescription chart to aid documentation and prompt early review of appropriateness of therapy.

Dentists

Dentists are responsible for approximately 10% of antimicrobial prescribing in Wales, and have a role to play in ensuring that antimicrobials are prescribed appropriately. Dental infections are usually localised and should first be managed by surgical means, with antibiotics best being used as occasional supportive therapy.³⁷ Patients often expect, as a matter of routine, antibiotics for the treatment of 'toothache'. It can be difficult to explain to the patient, or their relatives, that dental pain is an inflammatory condition that is appropriately managed by the use of analgesics and local measures.³⁸

The Cardiff University Department of Postgraduate Medical and Dental Education and the School of Dentistry have developed an antimicrobial prescribing audit to support the most effective clinical use of antimicrobials by dentists.

Pharmacists

Hospital pharmacists may be involved in a number of key areas aimed at improving antimicrobial prescribing, such as the development of prescribing policies and audit of prescribing. They are well qualified to advise prescribers and educate junior doctors on appropriate changes of antimicrobial agent, route, dose, or duration of therapy. Some antimicrobial pharmacists' roles have become highly specialised such that they are actively involved in infection management, working alongside consultant microbiologists.

Community pharmacists are often the point of contact for patients seeking advice on managing self-limiting illnesses, or collecting a prescription for antibiotics, and are ideally placed to offer reassurance and education on the appropriate use of antibiotics.⁶

Other health professionals

Non-medical prescribers should adhere to the antimicrobial prescribing policy and formulary for

their health board. Nurses, health visitors, and midwives have good opportunities to empower patients to engage in self-care, e.g. for women attending antenatal clinics, or with their children for baby checks.²¹ All healthcare professionals should be mindful not to refer patients to their GPs specifically 'for antibiotics' as this raises a patient's expectation of a prescription and undermines the opening position of the GP.

Local microbiology services

Laboratory antibiotic susceptibility reporting appears to have a direct effect on antibiotic prescribing by GPs. In one study, cefalexin and cephalosporin use increased when cefalexin was reported, and co-amoxiclav prescribing decreased when co-amoxiclav was not reported by the laboratory.³⁹ In order to influence antibiotic use, laboratories need to consider carefully which antibiotic susceptibilities they report to GPs. Clinicians should be aware that when an antibiotic susceptibility is reported it doesn't necessarily mean that an antibiotic is warranted.

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