Editorial

The science of prescribing

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Much has been written about the knowledge and skills required for safe and effective prescribing, yet evidence of unsatisfactory prescribing practice continues to emerge [1]. While there are concerns about the training and competence in prescribing of newly qualified doctors, irrational and unsafe prescribing also occurs with more experienced doctors. Fortunately, in most cases this does not lead to recognizable harm. However, the absence of any obvious untoward consequences can reinforce the view that there is no need for concern. There are also increasing numbers of non-medical prescribers, who bring different skills sets to underpin their prescribing practice. Less is known about the impact this will have on medication-related incidents.

Rational prescribing is the culmination of a chain of decisions, some conscious but many subconscious. It begins with making a diagnosis, or arriving at a working diagnosis, and determining whether the benefits of initiating treatment are likely to outweigh the risks. The choice of treatment could include both medicines and non-pharmacological approaches [2]. A medicine is often the most immediate and accessible intervention, even if it may not be the optimal solution.

Having decided that a medicine is the preferred option, the prescriber must then choose from a range of available drugs with which they may be more or less familiar. The prescriber should be aware of the evidence base for using a particular drug, which is often presented in lengthy guidance such as that issued in the UK by the National Institute for Health and Clinical Excellence (NICE), or via specialist society or local guidelines for best practice. They should then consider whether there are any contraindications to use of the drug in the person they are treating. These processes are less certain in children, where the evidence remains sparse and we rely on expert opinion and experience outside formal clinical trials [3]. The use of drugs in pregnancy also requires special care and the principles are comprehensively reviewed by Thomas & Yates in this issue [4].

Next, the prescriber must decide on a dose, which may vary according to the severity of the condition or require

careful dose titration over time. They must also consider whether the dose should be reduced to take account of renal impairment or liver disease. Potential drug–drug interactions may be encountered and are a frequent source of harm [5]. The unpredictable and variable nature of these interactions means that judgement on whether to prescribe, and vigilance if the combination is used, will be paramount to minimize the risk of detrimental consequences. Decision support that is built in to many ePrescribing systems can alert the prescriber to potential interactions, but will not always give clear advice on the most appropriate action to take. In addition, ‘alert fatigue’ with the ability to over-ride a warning can reduce the impact of these messages.

Pharmacogenetics opens up the opportunity to ‘personalize’ medicines, which has long been a holy grail for clinical pharmacologists. While progress has been made in identifying predictors of drug response, few of the findings have yet had an impact on prescribing behaviour. However, this could become an added complexity to be considered and the state of the art is reviewed by Shah & Shah [6] in this issue.

National formularies, such as the British National Formulary (BNF) and the British National Formulary for Children (BNFC) in the UK are a rich source of information when choosing a drug [7]. While most UK doctors say that they regularly use the BNF as a resource when prescribing, it is unclear how many use the more complex prescribing guidance rather than look up a drug dose. National formularies give advice on most drugs available for prescribing in the local healthcare system, but there are strong arguments for restricting the range of drugs for common conditions. Using a restricted formulary alongside a more comprehensive national reference source, the prescriber is more likely to become familiar with the efficacy, dose range, side effects, interactions, cautions, contraindications and monitoring of drugs used for conditions that they most frequently treat. These arguments are strengthened by the trend for patients to be treated by several doctors, both in primary and secondary care, who need to manage drug therapy initiated by another clinician. The value of

local formularies is explored in this issue of the Journal by Reynolds *et al.* [8].

The behaviour of prescribers is not uniform. Several studies have suggested that a minority of doctors are responsible for most prescribing of new drugs in primary care. By contrast, these doctors are less likely to report adverse reactions to drugs. Is this because they have a lack of awareness of the harm that can arise from prescribed medicines [9]?

Why do prescribers choose not to access information when selecting a drug? One reason may be accessibility of information. Books are not the preferred reference for many young prescribers who are used to digital searches, but the provenance of the information on the internet is not always clear. NICE have recently released a BNF app to begin to address this need in the UK (<http://www.nice.org.uk/newsroom/news/FreeBNFPrescribingAppLaunches.jsp>) and similar digital sources are available in other healthcare environments. An analysis of the processes that lie behind decision making can help us to understand why individuals do not have insight into their 'unconscious incompetence' and why they do not refer to prescribing information more often. In this issue, Bate *et al.* [10] explore the theory behind our decision making and use it to promote strategies that could improve prescribing practice.

There is increasing recognition that prescribing should involve a partnership between prescriber and patient. The ability of a prescriber to convey balanced information on the risks and benefits of drugs is hampered by the limited information on which to make a judgement [11]. Nevertheless, patient education is one of the interventions that can improve adherence to therapy [12], which in turn can improve outcomes [13]. There are many factors that influence the creation of effective partnership between a patient and the prescriber and these are outlined in the article by Bond *et al.* [14].

Mistakes also arise from poor communication about medicines. The lack of a shared health care record, or the use of undocumented over the counter medicines and herbal remedies, can lead to errors of omission on transfer of care between clinicians or unrecognized drug interactions. The importance of medicines reconciliation in reducing these sources of error is increasingly recognized [15].

Long term medication should always be regularly reviewed. Disease activity and control may vary and requirements for medicines will change. Blenkinsopp *et al.* [16] in this issue examine the evidence that such reviews can improve outcomes.

Several articles in this themed issue of the Journal cover the recognition of adverse events arising from drugs, and the education and training of doctors and non-medical prescribers in the science that informs effective prescribing. Together, they are a valuable resource for all who are concerned to increase the benefit derived from medicines and to minimize their risk.

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