Optimizing antibiotic prescribing in primary care settings in the UK: findings of a BSAC multi-disciplinary workshop 2009

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Several UK resources, including the National Institute for Health and Clinical Excellence (NICE), Clinical Knowledge Summaries, the Infection Specialist Library, the HPA Management of Infection Guide, the Map of Medicine and the Royal College of General Practitioners (RCGP) web site, produce primary care antibiotic prescribing guidance. A BSAC 2009 workshop aimed to discuss how guidance could be best translated into practice using public and professional educational programmes. Workshop participants were asked to consider approaches within the context of a behaviour change model, in which readiness to change is recognized as a product of the individual’s perception of the importance of change (the ‘why’ of change; ‘Why should I change my antibiotic prescribing’) and their confidence that they can achieve a change (the ‘how’ of change). Participants concluded that antibiotic education campaigns should be repeated during peak prescribing periods, should be located in pharmacies, clinical waiting areas and schools, and should be reinforced verbally during patient consultations for infections. Patients should receive clear information, ideally reinforced with leaflets, about the likely duration of symptoms, self-care and the likely benefits and harms of antibiotics. Education for clinicians needs to focus on increasing awareness of the importance of antibiotic resistance and providing tools to increase confidence in changing their prescribing. Videos are a useful tool for demonstrating good and poor communication skills and approaches to eliciting and addressing patient concerns and expectations. Well-designed patient information can facilitate consultations. Feedback and audit on antibiotic use to clinicians is essential; this can be facilitated by incentive schemes, especially if clinical records link diagnosis with prescriptions.

Keywords: antibiotic resistance, community, education, cognitive theories

Why optimize antibiotic prescribing?

In 1953 the immunologist Frank Macfarlane Burnet predicted the ‘virtual elimination of infectious disease as a significant factor in social life’. More recently, antibiotics were voted by clinicians to be the second most important medical milestone of the last 150 years.1 However, bacteria are very adaptable and since the mid-1990s multiresistant staphylococci, pneumococci and, more recently, Gram-negative species have been increasingly recognized as an emerging threat to public health. Antibiotic resistance is related to antibiotic use,2–4 and if widespread and often poorly targeted antibiotic use continues increasing resistance may lead to increasing numbers of untreatable infections and increasing community infections requiring intravenous treatment.

The majority of antibiotics are prescribed in the community setting. The rate of antibiotic prescribing by primary care clinicians varies widely across Europe and within the UK,5 suggesting that there may be an opportunity for reduction in use by many clinicians. Patients who are prescribed antibiotics immediately for a sore throat are more likely to consult a health professional to request antibiotics the next time they develop symptoms.6 Clinicians report that they often prescribe antibiotics because they perceive that patients want them,7 although patient expectations for antibiotics may be overestimated.8

How successful are antibiotic campaigns?

There have been several national and European public education campaigns aimed at reducing patient expectations for antibiotics.9–11 These have been aimed at the area of maximal antibiotic use—respiratory tract infection (RTI)—and aimed to encourage the public not to consult with a cough or cold and to reduce the expectation for antibiotics for these conditions.12

In 2008 an English Department of Health antibiotic campaign was launched, featuring three different posters delivering messages on how antibiotics do not work for common coughs and colds. The posters were sent to all general practice surgeries...
and pharmacies in England and placed as adverts in newspapers and magazines. An information leaflet was also sent to general practices for clinicians to give to patients instead of an antibiotic prescription. A before-and-after survey showed that, among English respondents, there was a small increase in recollection of any of three antibiotic campaign posters (23.7% in 2009 versus 19.2% in 2008, P = 0.03), but the actual absolute change from baseline as a result of the campaign was only 2.3% when compared with recollection of posters in Scotland where there was no campaign. This survey showed no improvement in the public understanding about the lack of benefit from antibiotics for most coughs and colds, and no improvement in the use of antibiotics. In fact there was a significant increase in retention of left-over antibiotics. Using public antibiotic poster campaigns alone in this way is probably less effective than a multifaceted campaign also targeting health professionals. Other antibiotic campaigns in Belgium, England and France that have used posters with radio or television advertisements linked in with simultaneous education targeted at primary care doctors have led to improved antibiotic use and changes in professional and public attitudes.

So why haven’t the public poster campaigns and research evidence showing that antibiotics could be used more prudently led primary care clinicians to reduce their antibiotic prescribing? Repeating campaigns and clinician education over several years also improves outcomes of campaigns.

Cognitive theories behind antibiotic prescribing in primary care

General practitioners (GPs) are well placed to educate the public about antibiotic use. In a recent household survey in England and Scotland, 20% of respondents reported that they had discussed antibiotics with their GP or nurse in the last year, and nearly as many were offered a delayed antibiotic prescription or alternative medication to antibiotics for their cough or cold. However, despite this, 90% of respondents who asked their GP for an antibiotic were prescribed one. This is similar to recent American and Belgian general practice studies. So why haven’t the public poster campaigns and research evidence showing that antibiotics could be used more prudently led primary care clinicians to reduce their antibiotic prescribing?

Theories of behaviour change can be used to understand why differing educational approaches have had varying success. A simple model describes readiness to change as a product of the individual’s perception of how important it is to change (the ‘why’ of change) and their confidence that they can achieve a change (the ‘how’ of change) (Figure 1). The ‘why’ can be described as the importance of change to an individual; in this scenario, ‘Why should I change my antibiotic prescribing?’ GPs will not change their antibiotic prescribing behaviour if they do not perceive it to be an important change to make. The ‘how’ of change is about providing clinicians with effective tools and approaches in order to increase their confidence in achieving change (modifying their prescribing behaviour) without adversely affecting their relationships with their patients. This simple model can also be used to help determine the factors to consider when attempting to influence patient behaviour. For example, educating patients about the likely balance of risk and harm from using antibiotics for self-limiting illnesses may give them a greater sense of ‘why’ they may wish to avoid taking antibiotics for these illnesses. Educating them about recognizing signs and symptoms of more serious illness, and how to self-manage their illness, may give them more confidence in ‘how’ they can avoid using antibiotics for these illnesses.

Another important factor when considering behaviour change is the communication styles employed. Communication styles include following, directing and guiding (Figure 2). All three of these styles are legitimate ways of communicating and are used in everyday life and in healthcare consultations. ‘Following’ is about listening, empathizing or understanding, ‘directing’ is about giving advice, pointing in the right direction or taking charge, and ‘guiding’ is about supporting, motivating or taking along. Efforts to change the behaviour of others, whether by educators trying to change clinicians’ prescribing behaviours or by clinicians trying to change patients’ consulting behaviour or requests for antibiotics, often involve use of the directing style. Examples of directing styles that may be recognized in educational programmes for clinicians aimed at changing antibiotic prescribing behaviour are: ‘I must give GPs insight as they obviously don’t appreciate the magnitude of antibiotic resistance; ‘I must give them knowledge as they don’t understand the problem; ‘I must give them skills as they don’t know how to change’, and ‘They don’t seem to care enough to change so I must score or criticize their behaviour’. Educators and clinicians are likely to be more successful in achieving behaviour change if they make greater use of a guiding style. As Pascal said, ‘People...
are generally better persuaded by the reasons which they themselves have discovered, than by those which have come into the mind of others.\textsuperscript{21}

**Examples of putting cognitive theories into practice in primary care**

Several interventions aimed at rationalizing antibiotic prescribing in primary care, which are based upon an understanding of behaviour change theory and enhanced communication skills, have been developed and evaluated in clinical trials (Table 1).\textsuperscript{22–24} A recent Dutch study showed that GPs trained in enhanced communication skills for the management of acute lower RTI prescribed antibiotics half as often as clinicians with no such training.\textsuperscript{23} Improving communication within the patient consultation and helping clinicians empower the parents of children with infections through addressing information needs has been the focus of another GP-based study in which clinicians were trained to use an interactive booklet on RTIs with parents or carers of children.\textsuperscript{22} The booklet aimed to set realistic expectations for parents about their child’s recovery and the need for antibiotics. Clinicians received online training that aimed to encourage use of the booklet to facilitate discussions between the clinician and parent using a guiding style. Use of this approach helped to target antibiotics and reduced antibiotic prescriptions by about two-thirds.\textsuperscript{22} The importance of eliciting and responding to patients’ feelings, ideas, fears and expectations to increase understanding of antibiotic prescribing decisions has also been used in the recent 2009 European Antibiotic Awareness Day materials.\textsuperscript{25}

The Stemming the Tide of Antimicrobial Resistance (STAR) project in Wales is currently evaluating the effectiveness of a blended learning programme (incorporating online learning, a practice-based seminar and context-bound learning) that aims to address the ‘why’ and ‘how’ of changing antibiotic prescribing in primary care.\textsuperscript{24} The intervention exposes GPs to the latest evidence about antibiotic prescribing in primary care and encourages them to make sense of their own prescribing and resistance data. In addition, the programme provides guidance (including videos) on communication styles and asks clinicians to reflect on their own style. The results of this study are expected in late 2010.

Future interventions aimed at changing antibiotic prescribing in the community should employ similar multifaceted approaches. The planning of educational campaigns needs to involve all relevant stakeholders, including primary care doctors and nurses, community medicine managers, community pharmacists, the pharmaceutical industry, primary care practice managers and care home staff.

**What resources are there to guide antibiotic prescribing in primary care?**

One of the important parts of improving antibiotic prescribing in primary care is providing evidence-based guidance to clinicians to enable them to prescribe antibiotics appropriately. The importance of accessible evidence-based antibiotic guidance, to help control antibiotic use and therefore resistance, has been highlighted by the European Union Commission\textsuperscript{26} and endorsed by many National Antibiotic Resistance Advisory Committees.\textsuperscript{27,28} These committees advise that guidance should cover when and which antibiotic agents are appropriate and the dose and length of the course, and should advise on alternatives to antibiotics. Currently, much antibiotic guidance across the European Union is hospital-based, but increasingly primary care guidance is becoming available.

Within the UK there are a range of resources, aimed at professional and public audiences, which advise on antibiotic prescribing within the primary care setting. Within the workshop setting each resource was presented briefly and a small group of microbiologists, primary care clinicians, medicine managers and educationalists discussed their strengths, weaknesses, opportunities for use and barriers to their use in primary care.

**National Institute for Clinical Excellence (NICE) guidelines**

NICE provides evidence-based guidance on promoting good health and preventing and treating ill health (www.nice.org.uk). It is funded by the Department of Health. Each very comprehensive set of guidance takes 1–3 years to research and write, and these sets form the basis of treatment recommendations and other, shorter guidance for NHS trusts to follow and fund in England. Workshop participants felt that the guidance is researched extremely thoroughly and as such contains the best evidence base. The summaries are simple and there are patient summaries too, but these are not used as primary

**Table 1. Recent educational interventions based on cognitive theory**

<table>
<thead>
<tr>
<th>Study</th>
<th>Setting in primary care</th>
<th>Intervention(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EQUIP\textsuperscript{22}</td>
<td>children with any RTI</td>
<td>booklet designed for use in the consultation and as a take-home resource for parents, and training for clinicians in its use</td>
</tr>
<tr>
<td>IMPACT\textsuperscript{23}</td>
<td>adults presenting with acute cough</td>
<td>communication skills training; C-reactive protein near-patient testing</td>
</tr>
<tr>
<td>European Antibiotic Awareness Day\textsuperscript{25}</td>
<td>patients presenting with acute cough, cold or flu</td>
<td>multifaceted approach with posters for waiting rooms, patient information leaflet, information sheet explaining importance of antibiotic resistance and use for clinicians and communication skills leaflet for clinicians</td>
</tr>
<tr>
<td>STAR\textsuperscript{24} educational programme</td>
<td>antibiotic prescribing</td>
<td>training programme involving online training, seminars and self-directed learning, and the use of practice-specific prescribing and resistance data</td>
</tr>
</tbody>
</table>
Leading article

The HPA prescribing systems.

The weaknesses were related to its simplicity and length in that it contains just the facts, does not cover all infections or alternatives to antibiotics and has no extensive information on the rationale used for antibiotic choice and no direct links to the references. The group considered that there was a greater opportunity for its wider use with increased marketing and links to other sites, including patient leaflets and incorporation into local intranets. Since the workshop in 2009 the references have been reviewed and the rationale for choice included.

Infection Specialist Library

The Infection Specialist Library at www.library.nhs.uk is a single access point for high-quality evidence-based infection resources aimed primarily at clinicians with content relevant for use in a clinical setting. Content is loaded and updated by the HPA and contains comprehensive reliable references. The group felt that the site was not well known by those working in primary care and was not used directly by them. It could be used to research the evidence base for antibiotic guidance if this was not available elsewhere. It is not widely used for advice on the management of infection by primary care clinicians, who are more likely to go to the other resources available.

Clinical Knowledge Summaries (CKS; www.cks.nhs.uk)

CKS is an online resource that aims to provide a reliable source of evidence-based information and guidance about the common conditions managed in primary and first contact care. It aims to help healthcare professionals make evidence-based decisions about the healthcare of their patients and provide them with the know-how to put these decisions into practice. CKS is commissioned by NHS Evidence and is hosted on the NHS Library for Health. The guidance has single-page summaries and a full rationale and references for each recommendation, many of which are based on NICE guidance if available. It is regularly updated and undergoes formal review by end-users and experts. All common infections in primary care are covered, including antibiotic choice, course length and dose. The main weakness identified was that clinicians thought that it was too lengthy and not accessible enough to use in consultations. However there was an opportunity to improve the site if the searches could be speeded up and it could be used as a decision tool for when to prescribe antibiotics with possible links into GP prescribing systems.

The HPA

The HPA Management of Infection Guide,29 updated in 2010, is designed to be used by primary care clinicians during the patient consultation. The four-page guide includes concise, evidence-based advice on the antibiotic choices, course length and dose for all the common infections in primary care. The guidance is referenced and also has short cuts to other web-based resources. It is published online in both PDF and Word format to allow GPs, Primary Care Trusts (PCTs) and Health Boards to modify it to suit local antibiotic resistance problems or needs. Many PCTs have produced local pocket or desktop versions. The group considered its major strengths to be simplicity, brevity, hyperlinks to the evidence, open access and the ability to make locally appropriate changes to the recommendations.

Royal College of General Practitioners (RCGP) web site

The RCGP e-learning tools at www.elearning.rcgp.org.uk are online educational resources and courses for health professionals who are RCGP members. Use of the resources requires registration and login. Resources on antibiotic prescribing are extremely limited at present, but new content is under development. The acknowledged strength of this site is that it is created by primary care professionals and will be a recognized site for the compulsory reaccreditation of primary care staff in the UK. However, the major weakness is that the resources are only available to RCGP members and the current content is very limited. However, as the e-portfolio will be obligatory, there will be a demand for more resources to be created on this site—which could be an area in which infection societies could become involved.

The Map of Medicine

The Map of Medicine is an online resource (www.mapofmedicine.com) of evidence-based guidelines which are regularly reviewed. It includes guidance on all common infections seen in primary care. The Map of Medicine presents the user with a flow chart taking them through the management of conditions; clicking on boxes within the flow chart reveals detailed recommendations with references. Antibiotic course length and dose are not covered. The workshop participants felt that the layout of the pathways made the site simple to use, but there was lack of awareness about the site in primary care and it was not accessed frequently. The group felt that there was an opportunity for greater use in the primary care setting with possible links into GP prescribing systems and other primary care websites.

A lack of central leadership to encourage collaboration was identified as a potential limiting factor affecting all of these resources. Many groups work independently and intellectual property may be a barrier to attaining optimal resources for GPs. The authors of these resources should note the identified strengths of their resources and maintain or build on these. The resource authors and other stakeholders involved in antibiotic prescribing in primary care should consider the opportunities of each of the resources, how partnerships between the groups may be encouraged and developed and how these may be used to target antibiotic prescribing.

Moving forward to improve antibiotic prescribing in the community

Participants attending the workshop in 2009 were asked to consider the importance of change (‘why’) and confidence in change...
(‘how’) while exploring the barriers, needs and requirements of clinicians, patients, the PCT and NHS for improving appropriate antimicrobial prescribing. Key suggestions for interventions and opportunities to improve antibiotic prescribing within the primary care setting are outlined below.

**Barriers related to patient beliefs/attitudes and overcoming them**

In our fast-moving, technology-driven society many patients expect to feel well quickly and return to work as soon as possible. There is often an expectation for a quick cure in the form of antibiotics. Patients’ past experience often drives these expectations—antibiotics worked before so I want some now—and an inconsistent approach to antibiotic prescribing in a geographical area or between clinical settings (for example, clinicians within a practice, the out-of-hours service, NHS Direct or in the acute and community setting in an area) can exacerbate the problem. Patients, especially if English is not their first language, lack access to clear, easily understood information about common infections and their treatment, and therefore they do not feel they have control over the management of their condition. Moreover the public antibiotic campaigns have not been reinforced in the primary care consultation.

Participants indicated that antibiotic public education campaigns should be timely (during the peak prescribing period) and promoted in areas where they will most influence patients seeking antibiotics. A high-profile campaign in pharmacies and primary care waiting areas using a dedicated campaign area with posters and videos may ensure that any messages are not lost amidst a sea of other information leaflets. The public campaign should be reinforced verbally during patient consultations for infections. Patients should receive information during the consultation about treatment options, including clear messages and reasons about the likely benefits (or lack of) and harms of treating with antibiotics. All patients should be given advice about the likely duration of symptoms, self-care and what should prompt reconsultation, and those receiving a prescription for antibiotics should be given advice about the importance of completing the antibiotic course. Training and educational materials should be provided to those working in both hospital and community settings so that in- and out-of-hours systems are giving the same advice and treatment options. Public education campaigns need to be repeated and education should be started as early as possible. e-Bug is an example of an educational resource that teaches children in schools across Europe about microbes and antibiotic use.30

**Barriers related to clinicians’ attitudes, beliefs and skills and how to overcome them**

Clinicians have many competing interests, and keeping antimicrobial resistance and prudent prescribing high on the agenda is a major challenge. Many do not see antibiotic resistance as a serious societal problem, and therefore many primary care clinicians do not see the need to decrease antimicrobial resistance and prescribing as a high priority. It is not generally regarded as a patient safety issue as it now is in the hospital setting;31 furthermore, clinicians are often more swayed by perceived risks of complications from not prescribing and therefore choose to treat empirically or with more broad-spectrum antibiotics. Microbiologists and medicine managers talk about inappropriate antibiotic prescribing, but this is often not clearly defined for each infection. Currently, as mentioned above, there are a large number of sources of information about antibiotic prescribing, and this may result in confusion and inconsistent messages. Due to the way prescribing analysis and cost tabulation (PACT) data are collected, clinicians in the UK32 do not have access to their own antibiotic prescribing rates for different infections and, surprisingly, it is not possible on most primary care computer coding systems to link a prescription with a clinical diagnosis. Thus, it is difficult to determine how appropriate a clinician’s prescribing is without patient note searches.

Approaches aimed at improving antibiotic prescribing in the community need to address the importance and confidence of change covered in the simple cognitive model above. As a priority, antimicrobial resistance needs to be moved up the political and professional agenda, through government, the professional societies, public campaigns, press coverage and education. We need to incentivize clinicians to change by increasing their awareness of the importance of antibiotic resistance through focused campaigns and education. To increase clinicians’ confidence in achieving change they need to be provided with evidence-based, feasible approaches and tools to help achieve change. Learning modules based on behaviour change theories, educational theories and evidence from the field of healthcare communication, and drawing on the latest scientific evidence, need to be developed for clinicians. Successful modules have included videos, demonstrating how to elicit and address patient concerns, and examples of good and poor communication skills. Such modules need to be directed at clinicians working in other healthcare settings, such as out-of-hours, accident and emergency departments, NHS Direct and pharmacies, as well as in general practice. The use of well-designed patient information leaflets and booklets should be encouraged. Guidance should be available through a single portal that clinicians can easily access during a consultation. Information on the expected time-course for common infections, identifying patients at risk of complications and viable alternatives to antibiotics, needs to be readily available. To facilitate feedback on antibiotic use to clinicians, primary care computer systems and PACT data need to be able to link diagnoses to their prescriptions. While we await these systems we should promote the improved use of antibiotics by discouraging their use for respiratory infections and monitoring their use. Examples would be audits of over-the-telephone antibiotic prescriptions, the use of broad-spectrum antibiotics in the winter respiratory season and delayed antibiotic prescriptions. Incentive schemes to improve prescribing have been used successfully in some primary care trusts.

In addition, an ongoing programme of research is needed in order to monitor antibiotic prescribing and resistance trends, to provide greater evidence on the identification of those most likely to benefit from antibiotic treatment and to develop and evaluate new interventions aimed at modifying prescribing behaviour.

**The way forward**

These concepts form a framework for those involved in promoting prudent antibiotic use in primary care settings. The long-term
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Transparency declarations

C. A. M. M. has the following non-financial interests that may be relevant to the submitted work: she leads the writing and review of the HPA Management of Infection Guide for primary care; she is a member of the Department of Health Advisory Committee on Antimicrobial Resistance and Healthcare-Associated Infections and the Prescribing and Public Education Sub-Groups of this Committee; and she is a member of the NICE self-limiting respiratory tract infection guideline development group.

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