The Interdepartmental Steering Group on Resistance to Antibiotics and other Antimicrobial Agents

Clinical Prescribing Subgroup

Optimising the clinical use of antimicrobials:

Report and recommendations for further work

June 2001
**Optimising the clinical use of antimicrobials:**
Report from the Clinical Prescribing Subgroup of the Interdepartmental Steering Group on Antimicrobial Resistance

**Summary**

The Clinical Prescribing Subgroup (CPSG) of the Interdepartmental Steering Group on Antimicrobial Resistance (IDSG) was established in September 1999 to oversee implementation of those elements of the UK Antimicrobial Resistance Strategy relevant to the clinical prescribing of antimicrobials.

The CPSG has approached the topic under five broad headings:

- The evidence base for good practice: the development, availability, accessibility and use of guidelines and other information
- Prescribing support: the infrastructure and mechanisms to help prescribers adhere to good practice
- Professional education
- Surveillance, as it relates to prescribing
- Monitoring, evaluation and feedback, including development of a framework for monitoring progress in this field.

The Group has also worked closely with the Research Subgroup of the IDSG in developing a UK research strategy for antimicrobial resistance.

A large amount of work has been undertaken in this field over the last few years, by a variety of organisations. Significant areas of progress are summarised in Box 1.

Some impediments have also been identified, however, which impinge on our ability to monitor the effectiveness and overall impact of work in this area. For instance, while comprehensive data on levels of prescribing of antimicrobials are available nationally for primary care (and are showing a declining trend), national capture of hospital prescribing information has yet to be achieved.

The quality of prescribing is also not easily monitored. More demographic information and the use of diagnostic codes in association with prescribing would help. Both of these would be greatly facilitated by the wider introduction of electronic prescribing and electronic patient records. The CPSG is concerned lest the timetable for implementing these slips. One requirement for implementation of electronic prescribing is a unified drug dictionary. This does not currently exist, although the Group heard that this is being addressed.

Monitoring the relationship between prescribing and resistance will be easier once the planned roll-out has been achieved, region by region, of a national surveillance scheme based on the capture of Routinely Generated antimicrobial
Susceptibility Data (RGSD). This should be completed by the Public Health Laboratory Service in April 2002 [but has since slipped].

The more rapid availability – and use - of microbiological confirmation of diagnoses would also be expected to facilitate rational antimicrobial prescribing. Development of rapid, including near-patient, tests should assist, but there is also room for improvement in the provision, and use, of current microbiological services and advice.

Some priority areas for future work have been identified.
Box 1 Progress during 2000/01: Significant developments in support of quality antimicrobial prescribing

I. Guidelines

Development
- Microbiological input to PRODIGY guidelines
- PHLS prescribing guidance template for use in primary care
- CPSG revisit of the SMAC ‘Four things you can do’ recommendations

Access
- Establishment of the communicable disease branch of the National electronic Library for Health (pilot website).

II. Prescribing advice and support

National Prescribing Centre Resources
- Practical clinical governance in primary care (audit handbook based on antimicrobial resistance)
- Change management resource pack: ‘Managing antimicrobial resistance – a practical guide’
- Area prescribing Committees - maintaining effectiveness in the modern NHS.

NHS
- Launch of Medicines Management Performance Framework in Hospitals
- Moves to make generic antibiotics/analgesics available for out of hours consultations in the NHS
- Production of an exemplar algorithm-based pager-sized card for hospital medical staff, summarising antibiotic prescribing policy

III. Education

- Establishment by the BSAC of a working group to scope possible production of resources for undergraduate education
- Publication of results of outreach workshops in primary care in Gloucestershire

IV. Surveillance

- Plans in place to roll out comprehensive national antimicrobial resistance surveillance based on capture of all routinely generated laboratory susceptibility data

V. Monitoring

- NHS survey of implementation of action in Acute Trusts
1. Introduction

The Clinical Prescribing Subgroup (CPSG) of the Interdepartmental Steering Group (IDSG) on Resistance to Antibiotics and other Antimicrobial Agents was established in September 1999 to oversee the implementation of those elements of the UK Antimicrobial Resistance Strategy relating to the clinical prescribing of antimicrobials. This report covers its work to 2001. It summarises the main achievements, identifies some important impediments to progress, and, finally, sets out a plan for further work. Throughout the report, it should be noted that while references are mostly to arrangements in England or England and Wales, alternative arrangements, often with different names, exist in the other UK administrations. For instance, in Scotland, Primary Care Trusts will differ from the organisations with the same name in England and Wales, Local Health Care Cooperatives take the place of PCGs and the prescribing information system equivalent to PACT in England and Wales is the Scottish Prescribing Analysis (SPA).

The Subgroup’s full remit is in Box 2 below. Membership (Annex A) comprised both officials and relevant experts, some of whom were co-opted during the course of the first year to fill identified gaps (for example, academic general practice, pharmaco-epidemiology and the pharmaceutical industry). Cross membership between the main Interdepartmental Steering Group and its other Subgroups (Research, Public Education) facilitated co-ordination within the overall strategy.

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<th>Box 2</th>
<th>Clinical Prescribing Group: Terms of Reference</th>
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<td>Within the framework of the Government’s antimicrobial resistance strategy, and building on the commitments given in the Government’s response to the House of Lords Science and Technology Committee Report, the recommendations of the SMAC Report and the Copenhagen Conference, to undertake a two year programme of activities to:</td>
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<tr>
<td>I.</td>
<td>develop and take forward plans for implementing those recommendations and commitments related to optimising the clinical prescribing of antimicrobials in the UK, particularly in respect of guidelines for the treatment of and prophylaxis for infections in all health care settings and contributing to the work on decision-support systems for antimicrobial prescribing, such as PRODIGY;</td>
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<td>II.</td>
<td>establish a framework for monitoring progress across the range of clinical prescribing initiatives, at national, regional and local levels. Through this, monitor progress, foster appropriate national, regional and local networks and ensure the dissemination of relevant information to health professionals;</td>
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<td>III.</td>
<td>ensure that health professionals are fully informed of, and receive the same timely messages, as those given to the public in the parallel work to be undertaken to increase public understanding of the ways to use antimicrobials in clinical care that are consistent with maintaining their general effectiveness; and</td>
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<td>IV.</td>
<td>report regularly to the Interdepartmental Steering Group on Resistance to Antibiotics and Other Antimicrobial Agents, with full reports at the end of the first and second years.</td>
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1.1 The year in context

Antimicrobial resistance maintained a high profile during this period of the CPSG’s work:

- The Government’s antimicrobial resistance strategy was published;
- The House of Lords Select Committee on Science and Technology revisited the topic and reviewed progress since its original report in 1998;
- Progress was made in establishing an overarching Government Scientific Advisory Committee on Antimicrobial Resistance *(it is recognised that once this Committee is established, it will advise on future policy and strategy, and the requirement for, and role of, this or a similar group will need to be reviewed)* [Now established].
- On the international front, the World Health Organization issued a draft Global Strategy for the Containment of Antimicrobial Resistance, and the European Commission convened a Working Party to prepare guidance on prudent clinical use of antimicrobials relevant to EU Member States. This latter work is ongoing.
- Under the Swedish Presidency of the EU, a follow up meeting of Member States representatives was convened in Visby, Sweden, in June 2001 to review progress across Europe since the Danish conference in 1998 and make recommendations.

Other relevant parallel activities included:

- In close liaison with the CPSG, the Research Subgroup of the IDSG developed a draft medium term research strategy, which complements this report;
- Guidance to the NHS was issued by the NHS Executive indicating that antimicrobial resistance, together with hospital acquired infection, was ‘work which must be done’ alongside the main Ministerial priorities for the NHS;
- A consultation document on Nurse Prescribing was published which included questions on the suitability of antimicrobials for prescribing by nurses.

Two new antimicrobials active against gram positive cocci were introduced: quinupristine/dalfopristin requires central venous access (which limits its use); linezolid, an oxazolididine, is administered either orally or intravenously and has the potential for wider use.

Overall antimicrobial prescribing in primary care in the UK continued to decline. A paper comparing out-patient antibiotic sales in 1997 put this into a European context, with the UK having the 6th lowest use in a league table of Member States after the Netherlands, Denmark, Sweden, Germany and Austria. The UK had a relatively high ratio of use of wise-spectrum compared with narrow spectrum penicillins, however, compared with some of the overall lower users.

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1.2 The challenge

Early in the course of the Subgroup’s work it became apparent that a wide range of activity aiming to support or promote the optimal clinical use of antimicrobials was already underway, at central, regional and local levels and under the aegis of a variety of agencies. Most are listed below; more detail on some is contained in the recent progress report prepared by the IDSG at the request of the House of Lords Select Committee for Science and Technology.

The challenge for the CPSG has been to develop a framework within which good practices could be identified, co-ordinated and promulgated, gaps identified, and standards developed, monitored and, where necessary, improved, without unnecessary burden or duplication of effort.

In this context, antimicrobial prescribing fits well within the **Clinical Governance framework**, which itself consists of four main elements:

- Clear lines of responsibility and accountability for the quality of clinical care
- Clear policies aimed at managing risks
- Procedures for all professional groups to identify and remedy poor performance
- A comprehensive programme of quality improvement activities, including
  - Clinical guidelines/evidence based practice
  - Continuing professional development
  - Effective monitoring of clinical care
  - Clinical audit
  - Research and development
  - Caldicott principles

The CPSG has been concerned mainly with the fourth element, i.e. quality improvement. The topic was divided into five (overlapping) areas of activity:

- **The ‘evidence base’ for good practice**: the development, availability, accessibility and use of guidelines and other information on the treatment and prevention of infections
- **Prescribing support: the infrastructure and mechanisms to help prescribers adhere to good practice** and effect change where necessary
- **Professional education**
- **Surveillance** (as it relates to prescribing)
- **Monitoring, evaluation and feedback**

1.3 Definition of prudent prescribing

The starting point for the CPSG’s work was to define **optimal or prudent prescribing** and determine how it could be measured. The World Health Organisation’s proposed definition of prudent prescribing is:
'The cost-effective use of antimicrobials which maximises their clinical therapeutic effect, while minimising both drug-related toxicity and the development of antimicrobial resistance.'

The CPSG has adopted the more comprehensive definition also used by the IDSG Research Subgroup:

‘The use of antimicrobials in the most appropriate way for the treatment or prevention of human infectious diseases, having regard to the diagnosis (or presumed diagnosis), evidence of clinical effectiveness, likely benefits, safety, cost (in comparison with alternative choices), and propensity for the emergence of resistance. The most appropriate way implies that the choice, route, dose, frequency and duration of administration have been rigorously determined.’

In line with this definition, the CPSG considered that prudent (or optimal) use meant both ‘less’, there still being leeway to reduce unnecessary use, and ‘appropriate’ (not only the right antibiotic but also the right dose, administered by the most appropriate route and for the right length of time to effect a clinical cure, while minimising side effects and the development of resistance). Monitoring the appropriateness of antimicrobial prescribing presents the greater challenge.

The CPSG considered at some length whether more limited use of antimicrobials, in order to preserve their effectiveness for future patients, would still allow clinicians to practice in such a way as to ensure optimal benefit for individual patients in their care. In general, the CPSG believes these two aims are not mutually exclusive, the issue being one of quality prescribing. Nonetheless, a watching brief is required to monitor whether any community benefit from reduced prescribing, in terms of antimicrobial resistance, is offset by adverse effects on clinical outcomes. If significant adverse clinical outcomes (for example, quinsy or mastoiditis) were seen to increase, treatment guidelines would need to be reviewed. Routine surveillance will not necessarily answer such questions, though it should provide the trigger to initiate further work; the need for outcomes data generally was referred to the Research Subgroup as an important area in which studies need to be set up.

The CPSG pointed out that antimicrobials themselves could have adverse effects for the individual, and this needed to be taken into the equation. The main thrust of the Government’s public and professional education so far has concentrated on the special nature of antimicrobials and the need to conserve them by using them carefully. This positive approach has been widely praised. While recognising this, the CPSG felt that in future campaigns, more attention could be given to the possible adverse effects of antimicrobials for the individual, ie:

i. antimicrobials are powerful drugs, and there is a risk of adverse reactions with no health gain where they are prescribed unnecessarily or where the risk of a side effect outweighs the possible benefit; and

ii. the possible consequences of a change, or induction of resistance, in the ‘helpful’ normal flora (the ‘good’ bacteria). In this context, how prior exposure to antibiotics could affect a patient’s chances of
developing a resistant infection on a subsequent occasion might be more effective than a message about global resistance levels.

At no time should better prescribing initiatives be seen either by health professionals or the public primarily as a means for HAs, PCGs/PCTs or the Government to cut costs. In some circumstances, appropriate use of antibiotics could increase costs.
2. Progress in the five action areas

2.1 The evidence base: establishing good prescribing practice

2.1.1 Guidelines

The CPSG endorses previous recommendations that local, evidence based, guidelines on the prevention and management of common infections are a prerequisite for appropriate antimicrobial prescribing. Where possible, these should be based on principles established in national guidance and guidelines must evolve with the evidence, where this is available. At a minimum all guidelines should:

- be dated
- be reviewed at agreed intervals by a multidisciplinary team – with as wide a consultation as possible
- contain information on choice(s) of antimicrobial (if any), dose, dosing schedule, route and duration of therapy, contra-indications and unwanted effects, including propensity for resistance. An alternative choice is required in case of contra-indication or intolerance to the drug of first choice, or infection by a resistant organism.

At the same time, the CPSG warns about too rigid an approach to guidelines which could, for example, by promoting widespread adherence to a single, narrowly defined guideline, actually increase pressure for the emergence of resistance to a recommended drug. Some diversity should be encouraged where appropriate.

The need for guidelines in some cases extends beyond the confines of the prevention and management of infection. Guidelines on the management of conditions such as acute dental pain, for example, may reduce the need for empirical antibiotic prescriptions.

National guidelines for primary care

National guidance for many of the common conditions seen in primary care is already available for those general practitioners using the PRODIGY electronic prescribing support package. A welcome development has been the inclusion of microbiological input (through the PHLS, BSAC and members of the CPSG) into the development of the relevant guidelines. In future, PRODIGY guidelines will be developed under the aegis of the National Institute for Clinical Excellence (NICE). The CPSG wishes to see the momentum for developing and updating these guidelines maintained.

One new initiative has been the development by the PHLS of an evidence-based prescribing guidance template, for use in primary care as the starting point for local guideline development. The CPSG contributed to the development of the template which has now been widely consulted on and made available on the PHLS website. The template grades the evidence. It will continue to evolve as comments are fed back and new evidence accrues.
The National Prescribing Centre (NPC) has also developed a useful literature review relevant to community based prescribing (Pack 1), for use with its resource pack on improving antimicrobial prescribing (see paragraph 28 below).

**SMAC recommendations revisited**
The SMAC report *The Path of Least Resistance* recommended, as a starting point for prudent antimicrobial prescribing, a list of ‘Four things you can do’ to make a difference (Box 3).

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<tr>
<th><strong>Box 3 SMAC recommendations: Four things you can do</strong></th>
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<tr>
<td>• No prescribing of antimicrobials for simple coughs and colds</td>
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<tr>
<td>• No prescribing of antimicrobials for viral sore throats</td>
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<tr>
<td>• Limit prescribing for uncomplicated cystitis to three days in otherwise fit women</td>
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<td>• Limit prescribing of antibiotics over the telephone to exceptional cases</td>
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In keeping with the principle that guidance should be kept under review, and prompted by some criticisms of the original recommendations, the CPSG revisited them to determine whether they remained valid. Its conclusions are at Annex B.

**Dental practice**
‘Adult antimicrobial prescribing in primary dental care for general dental practitioners’ produced by the Faculty of General Dental Practitioners complements the Dental Practitioners Formulary, providing authoritative advice on dental prescribing. It covers topics such as antimicrobial resistance and prescribing indications for dental infections and, in addition, offers advice on the management of antibiotic prophylaxis.

**Access to guidelines**
To improve ready access to guidance, the Group welcomed the establishment of the Communicable Diseases ‘branch’ of the National electronic Library for Health (NeLH) and sees the potential for this to be a future prime ‘one stop’ site for quality marked guidelines on the management of infection, relevant to the UK. Several members of the CPSG are now involved in this work.

**Future work**
In many cases evidence-based guidance is either not available, or its status is not clear, or it is not readily accessible. This makes the development of local guidelines difficult, and results in duplication of effort and sometimes conflicting advice. **Future work required includes**

- A review of existing national guidance, and identification of areas where national guidelines most urgently need to be developed or assessed. It is anticipated that this work will be done in conjunction with the National electronic Library for Health, and that new guideline development will fall, at least in part, to the National Institute for Clinical Excellence and its equivalents in the devolved administrations (in Scotland, the Scottish Intercollegiate Guidelines Network (SIGN) and the Health Technology
Board for Scotland (HTBS)), to professional groups and through the Research Strategy.

- A review of areas where joint guidance with an integrated approach to management may be appropriate, e.g. the management of acute dental pain.
- A review of local guidelines and development of pointers for good practice in local guideline development.
- The CPSG noted also the importance of research into the effectiveness of guidelines in influencing prescribing behaviour as well as clinical outcome, an issue again taken up in the Research Strategy.

2.2 Prescribing advice and support: helping doctors adhere to good prescribing practice

2.2.1 Organisational arrangements: The network approach

The CPSG has considered the organisational arrangements for providing advice and support to promote quality prescribing of antimicrobials within the NHS and, if necessary, effect change. Clear allocation of responsibilities is needed, but the CPSG has also been mindful of its remit to foster networks through which good practice can be promulgated. It considers that the minimum requirements, as listed in Box 4, largely exist, but must be used actively and effectively in conjunction with any additional local arrangements (some of those considered by the CPSG are outlined below).

The National Prescribing Centre (NPC) and Scottish Medicines Resource Centre (SMRC) are NHS organisations set up ‘to facilitate the promotion of high quality, cost-effective prescribing and medicines management through a co-ordinated and prioritised programme of activities aimed at supporting all relevant professionals and senior managers working in the modern NHS’. They thus already provide a central focus for provision of support for good prescribing. The CPSG endorses three resources relevant to antimicrobial prescribing which the NPC has recently produced:

- ‘Managing antimicrobial resistance – a practical guide’ - a change management resource pack for the use of prescribing advisers working with GPs (Summer 2000); this is described in more detail in the Education section of this report.

The ‘Area Prescribing Committees’ document describes in detail the pivotal role of Area Prescribing Committees (APCs) in providing advice and encouraging a strategic and cohesive approach to prescribing across health authorities, hospital and community trusts, PCTs and PCGs, especially where issues affect both primary and secondary care. The guidance sets out the key players who need to be involved, the
links with Trust Drug and Therapeutics Committees and PCG/PCT Prescribing Groups and Prescribing Advisers, with examples of activities which help to make an APC effective. It provides a useful diagram of the relationships between NHS organisations, bodies and the APC.

Among other local approaches, the Group heard of one proposal for a City-wide antimicrobial resistance strategy:

A consultant microbiologist post was proposed, to visit, liaise with, teach and otherwise influence the practice of all the prescribers in a city-wide area. This would be done in association with pharmacy leads, and be supported by a clinical scientist post. The appointed person would be responsible for City-wide surveillance and local education and health promotion for the population.

*Other health care professionals, including all community nurses, community pharmacists and dental practitioners, have an important role to play in reinforcing messages to patients – and require the appropriate training.*

**2.2.2 Ways of improving adherence to good prescribing practice**

While previous reports have encouraged a variety of measures to improve prescribing, the CPSG noted that their use and effectiveness had not always been rigorously assessed in terms of changing prescribing behaviour and patient expectations. The need for rigorous appraisal has been referred to the Research Subgroup for consideration as part of the overall antimicrobial resistance research strategy.

In its first year, the Group focused mainly on primary care and concentrated on collecting a range of information and examples of methods practitioners have developed and used to improve their prescribing.

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Box 4: Responsibilities and organisational arrangements in the NHS to support quality antimicrobial prescribing

Central responsibility:
NHS Executive Public Health Development Branch, supported by DH Pharmacy and Prescribing and Communicable Diseases (including nursing) policy branches. Implementation overseen by the Interdepartmental Steering Group on Antimicrobial Resistance (ISG).

Other relevant central organisations/arrangements include:
- National Prescribing Centre (NPC) (SMRC in Scotland)
- National Institute for Clinical Excellence (NICE) (and Scottish Intercollegiate Guidelines Network (SIGN))
- Health Technology Assessment (HTA) (and Health Technology Board for Scotland (HTBS))
- Prescribing Group for the NHS IT Strategy
- Prescribing Advisers’ Forum (and Scottish Prescribing Advisers Association (SPAA))

Regional responsibilities:
Regional Directors of Public Health, supported by Regional Epidemiologists and Prescribing and Performance Management leads.

Local responsibilities and arrangements:
Area Prescribing Committees, responsible for linking arrangements across their HAs/Hospital and Primary Care Trusts.

At HA or Hospital and Primary Care Trust level:
- Clearly defined Board level responsibility and lines of accountability
- Prescribing adviser or lead clinician/pharmacist
- Antimicrobial prescribing subgroup/subcommittee of the Trust Drug and Therapeutics Committee or PCG/PCT Prescribing Group (in areas with several PCTs, this may be a district committee), with:
  ♦ Responsibility for antimicrobial prescribing and support, including for a written antimicrobial policy, arrangements for monitoring and agreeing triggers for action, and an annual programme with clearly defined objectives agreed by the Trust /PCT Board
  ♦ Formal links to the Trust / PCT Board, Trust/District Infection Control Committee, Clinical Governance Committee and Area Prescribing Committee
  ♦ Membership to include a representative of the Chief Executive, the prescribing adviser/lead, a pharmacist, medical microbiologist and senior clinician [although in some areas it may not be possible for the medical microbiologist to attend every PCT’s antimicrobial prescribing group]
  - A written antimicrobial policy, dated and reviewed annually.
Local antibiotic policies

Some important points to be considered in the development of local antibiotic policies were agreed:

- **Cost:** Policies should avoid strategies that focus purely on costs as this can result in inappropriate prescribing. For example, the spectrum of antibacterial activity, the propensity for an antimicrobial to produce resistance and local resistance levels must be taken into account. A potential trap is thinking that the cheapest and oldest antibiotics produce less selection pressure for resistance. If they are less effective in a given case and result in treatment failure, the opposite may be true because further rounds of therapy may be necessary which will add further pressures for resistance; moreover, many resistances to older agents (notably trimethoprim and ampicillin) are on multi-resistance plasmids and there is the potential for these to be selected by the use of these drugs. If there are significant local resistance levels to a particular, but cheap, antimicrobial, some of the same considerations apply.

- **Code of practice for access to pharmaceutical representatives:** Policies should include an agreed code of practice to prevent unrestricted access of industry representatives to health care professionals, particularly doctors in training. The code should also cover commercial sponsorship. The involvement of the relevant antimicrobial prescribing committee is helpful to ensure that any antibiotic use influenced by industry representatives is in line with local policy.

- **The value of practice-wide policies:** A practice-wide policy in one Beacon Practice enabled it to reduce total antimicrobial prescribing markedly compared with other local practices. While some aspects of this particular policy were queried (e.g. an agreement to limit microbiological sampling), the CPSG accepted the conclusion that practice-wide policies, by encouraging local ownership and giving consistent messages to patients, are more likely to result in consistency of prescribing behaviour and to be successful.

- **Practice formularies and limited lists** are helpful. In secondary care in particular, the practice of making some drugs available only on the signature of a named clinician should be included.

**Computer assisted prompts**

While written policies, guidelines and information documents are useful, they can contribute to information overload and the information may not be readily available for checking against at the time the patient is seen. Many prescriptions are now computer-generated. The GP Administration System for Scotland (GPASS) has a formulary option which allows the dose of drug and length of course to be pre-set (though it can be overridden), helping to ensure that recommendations (such as that for a three day course of antibiotic for uncomplicated urinary tract infection (UTI) are always observed. Computer assisted prompts can include information on specimen collection and interpretation of results as well as antibiotic therapy. They help to maintain uniformity practice-wide and can reduce the need for computerised
reminders, loose-leaf practice manuals and educational activities to implement some changes. The CPSG heard anecdotally that even in practices in which it is installed, the PRODIGY system in England is relatively little used. This requires verification. If confirmed, the reasons for non-use need further investigation so that they can be addressed.

### Availability of microbiological support

The support of the local medical microbiology laboratory is considered essential to optimal antimicrobial prescribing. Important aspects of this microbiological support extend beyond merely being a provider of microbiological results:

- Local laboratories must provide a timely service for accepting and processing specimens and delivering results;
- The laboratory, in keeping with CPA accreditation, must supply an up to date manual for Primary Care to ensure that advice on the appropriate collection and transport of specimens, the availability of clinical microbiology advice and information on laboratory methods is current.
- Laboratories need to ensure that their antibiotic susceptibility testing protocols equate to those antibiotics being used in the community, and they should issue and interpret information on routinely generated susceptibility data for local users;
- This information, identifying local trends in antimicrobial resistance, must be fed into local guideline, policy and formulary development and the microbiologist should be involved in this process.

The CPSG believes that more emphasis should be put on timely microbiological diagnosis to support good prescribing. This is partly an issue of delivery of current services; the development of more rapid, including so called ‘near patient’, diagnostic tests is also important and is another area that has been highlighted for further research. Whatever the method used, however, microbiological results need to be viewed in the light of carriage rates and the potential benefit/disbenefit of prescribing.

### Starter packs of appropriate antibiotics and analgesics

Several members of the CPSG felt strongly that steps should be taken by the NHS to ensure the availability of appropriate antibiotics for GPs to leave with patients following domiciliary or out of hours consultations, where treatment cannot be delayed until a full prescription is obtained. GPs may use starter packs for this purpose, but may currently have access only to starter packs of patented wide-spectrum antibiotics (which may have been supplied as physician’s samples). This encourages inappropriate use of wide spectrum antibiotics not only for initial treatment, but also for continuation of treatment as it is unlikely a different antibiotic would be prescribed to complete the course. The CPSG recommended that starter packs of generic antibiotics be made more widely available for this purpose. Packs of analgesics should also be readily available as they may settle symptoms on their own and avoid the need for an antimicrobial. Guidance on how starter packs may be manufactured and accessed was provided to regional prescribing and pharmacy leads.

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In further discussion it was brought to the CPSG’s attention that a recent report on out of hours services, on behalf of the Department of Health, recommended that if needed, the full course of antibiotics and/or analgesics should be provided at the time of consultation. If this recommendation is implemented it would obviate the need for starter packs. The topic needs to be returned to once a decision has been made.

**Information for patients**

The CPSG discussed measures which have previously been identified as helpful to GPs in resisting patient pressure – or perceived patient pressure - to prescribe antimicrobials inappropriately, and had a few reservations about some:

- **Written handouts or other information for patients** (Kenny et al- see NPC literature review)
- ‘No prescription’ pads, produced as part of the Government’s public education campaign, had been greeted internationally with enthusiasm and had been seen as an innovative approach. Anecdotally, the Group heard that while some GPs welcomed them and found them useful, others had said they would not use them. The CPSG **recommended that a comprehensive assessment be undertaken**;
- **Shared screens** in PRODIGY, with the ability to print out an advice sheet. It was not clear how many GPs actually used PRODIGY in this way and whether there had been feedback on its usefulness. There was some concern that printing out the patient component of the screen tied up the practice printer and interfered with other work, although **single sheet printers are now rapidly being introduced**.
- **Delayed prescriptions** (this issue is addressed in more detail in the discussion in Annex B).

**Avoidance of perverse performance indicators that penalise the good prescriber**

The group were alerted to this potential discrimination against good prescribing. They agreed that it was important to ensure that any prescribing indicators were appropriate and interpreted with appropriate caution (see Monitoring, below).

**Advice and support in secondary care**

Prescribing support is less well-developed in secondary care.

The **Medicines Management Performance Framework is a new initiative which has been launched in NHS Hospitals**. It includes a self-assessment tool which was to be completed and signed by the Trust Chief Executive, Medical Director and Chief Pharmacist and returned to Regional Offices by 30 April 2001. The self-assessment tool examines systems in place within Trusts to ensure clinical and cost effective use of medicines. These systems must include appropriate antimicrobial policies consistent with HSC 1999/049 and the British Society for Antimicrobial Chemotherapy guidance. Trusts will produce action plans where systems are to be developed, which will be followed up by Regional Offices. The Audit Commission has highlighted medicines management as a topic for it’s future work programme.

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(expected to begin November 2001). This framework will allow preparative work in this area.

The Group learnt that the BSAC plans to review its earlier advice on the minimum requirements for a hospital-based antimicrobial prescribing policy, and welcomes this initiative.

**Improving awareness and use of a hospital's antibiotic policy:** the CPSG also welcomed an initiative by one Trust to make the 'rule base' available at the time and place of prescribing by redrafting the antibiotic policy in diagrammatic form and in a size suitable for printing on a sticky label the size of a pager. The labels were overlaid with a sheet of plastic and distributed to all the House staff - cost 5p per person. ⁶

**Pharmacists** play a key role in monitoring and advising on antimicrobial therapy. In one NHS Trust, a specialist clinical pharmacist works exclusively on antimicrobials with a senior lecturer in infection control and hospital epidemiology as a **Prescribing team** (as recommended at the Copenhagen conference). The potential for greater use of this, or a similar arrangement should be explored.

**Tools to improve prescribing in secondary care** include:

- **Formularies:** as for primary care, based on appropriateness and not simply on reducing direct drug costs. They need to reflect local (unit) epidemiology and prevalence of resistance.
- **Automatic stop** arrangements for prescriptions for antimicrobials
- **Electronic prescribing and computerised decision-support mechanisms**.⁷

Only five sites in England are actively using electronic prescribing and/or clinical decision support:

Queens Hospital, Burton on Trent  
Arrowe Park Hospital, Wirral  
Winchester and Eastleigh NHS Trust (same system as Wirral)  
Southmead Hospital, Bristol  
Renal Unit, Queen Elizabeth II Hospital, Birmingham

Members of the CPSG attended two national **workshops on electronic prescribing** run by the NHS Executive. The systems were presented and are described in outline in the appendix. **X of the four systems contained some element of clinical decision support (CDS). None was as advanced as the system in Salt Lake City.**⁸ **One fundamental restriction on the rapid and safe implementation of electronic prescribing and medicines administration (EPMA) is the lack of a unified drug dictionary across the NHS. The provision of real-time clinical decision support (CDS) using rules-based systems is one of the significant benefits of moving**

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towards advanced EPMA systems. The CPSG understands that work is in progress to address this.

The need to develop a national specification for pharmacy systems was highlighted at the electronic prescribing workshops. A user specification developed in the South West region could be used to inform the development of a national specification.

2.3 Professional education

2.3.1 Undergraduate education

A BSAC survey of teaching in medical schools undertaken by questionnaire to microbiologists and published in 1993 revealed considerable variation in approach, content and depth of undergraduate teaching about antimicrobial chemotherapy. There is a widely held view that the introduction of the new curriculum for medical students, with its emphasis on themes, may have adversely affected teaching on antimicrobial prescribing, particularly within the overall context of the prevention and management of infection and infectious disease. These topics might not be covered in the themes taught and may be overlooked in small group teaching. Infectious Diseases may be an optional module.

The impression needs to be investigated, but information on current curricula content is difficult to obtain. The CPSG felt that a further survey, preferably through deans of medical faculties rather than through personal contacts, could be helpful as a preliminary to devising ways to address the issue. The CMO’s approval was obtained for such a survey of medical schools (dental and veterinary schools could follow; a survey of schools of pharmacy is already planned). His preference, however, was for a wider survey of overall teaching on infection and infectious diseases as part of the Communicable Disease Strategy currently being developed. The survey is therefore yet to be undertaken.

The aim must be for graduates to have a working knowledge of the diagnosis and treatment of common bacterial infections. The CPSG would like to reach a position to be able to recommend to the Deans of Medical Schools that a basic understanding of common bacteria, the diseases they cause, common antibiotics, their pharmacology and application in hospital and community guidelines, are integrated (themed) as core topics throughout the undergraduate curriculum. In addition, these subjects should be regularly examined in both theoretical and clinical examinations. (Similar principles apply to the teaching about common bacterial infections and antibiotic prescribing in schools of dentistry, pharmacy and nursing.)

In the meantime, the Group was told of a national initiative in Australia for a core therapeutics curriculum which included the production of source materials for undergraduate teaching. This could be used as a role model, with materials already in use in UK Schools such as Nottingham University supplemented by newly developed

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teaching resources. The CPSG strongly supported the establishment of a small BSAC working party which aims to adopt an outcomes based approach to education on management of infection, supported by a curriculum map. This would allow medical schools to flexibly adapt their teaching commitments, while helping to ensure that students graduate with the knowledge base to be effective and competent practitioners in this field. The CPSG looks to the BSAC group for further advice on taking this work forward. The feasibility of producing similar materials – or adapting these - for use in undergraduate teaching in dentistry, pharmacy and nursing could then be considered.

2.3.2 Postgraduate education

It remains a concern that junior doctors, who are responsible for most hospital based antimicrobial prescribing, remain ill equipped to take on this role. The principles and practice of prescribing should be an essential part of their educational programme. Close cooperation between the GMC and Royal Colleges is essential to ensure that this is integral to postgraduate training and that it can be measured and audited.

The importance of keeping abreast of good antimicrobial prescribing practice means that continuous professional development should include CME material for all practitioners who continue to prescribe these agents regularly.

2.3.3 Continuing professional education

Professional education on antimicrobials and their appropriate use should be embedded into all CPD programmes.

The National Prescribing Centre's resource pack for managing antibiotic resistance, described earlier, is designed for the use of prescribing advisers, working in an educational setting with local GPs. The pack has been launched region by region at a series of dedicated workshops led by prescribing advisers using the resource packs. These describe the evidence base for community prescribing of antibiotics and provide a comprehensive resource on how to improve prescribing practice. This includes a video-tape with seven role-play scenarios involving a doctor and a patient (actress). Each scenario is about a self-limiting illness for which an antibiotic is not clinically indicated.

Outreach work

A recent systematic review of interventions to improve professional practice confirmed that outreach visits are the most effective education medium. Outreach work includes visits to practices by local microbiologists or pharmacists.

A study in Gloucestershire confirmed that microbiologist-led outreach workshops held in the primary care setting can help to rationalise antibiotic prescribing. Prescribing of broad-spectrum antibiotics (quinolones, cephalosporins and co-amoxiclav) declined by 15.4% across one county when 54% of GPs attended

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workshops. This compared with a 6.5% increase in a neighbouring county where workshops were not held. 11

2.4 Surveillance relevant to prescribing

2.4.1 Surveillance needs

The CPSG has considered surveillance needs to support quality antimicrobial prescribing, and its views have been fed into the developing surveillance schemes. Broadly the needs for information are:

- The prevalence of, and trends in, antimicrobial susceptibilities for key organisms/conditions, as far as possible representative of the patients being treated;
- The effect these resistances are likely to have on clinical outcome;
- Unusual resistances: hospitals in particular need to be aware of the occurrence of unusual resistance phenotypes (e.g. vancomycin-resistant \(S. aureus\)) that they may encounter;
- The likely relationship between prescribing patterns and the emergence of resistance.

A means is required to differentiate between an increase in infection due to a particular organisms, including resistant ones, and an increase in the proportion of infections which are caused by resistant organisms.

These needs require a combination of basic ‘broad brush’ surveillance, specific organism/disease based surveillance and special studies.

Since surveillance provides the data to inform practice, support of quality surveillance should be a routine part of clinical practice. This includes the appropriate referral of isolates, where indicated, to the national reference laboratory for confirmation or further analysis. To increase cost-effectiveness and minimise the load on data providers, surveillance of antimicrobial susceptibility must be developed in conjunction with other surveillance, including, in particular, surveillance of hospital (or health care) associated infections.

The CPSG agreed that national roll out, region by region, of the surveillance scheme based on capture of Routinely Generated Susceptibility Data (RGSD), which was piloted in the Trent Region, was an imperative for providing the basic ‘broad brush’ approach. The roll-out of this scheme, over a two year period, was agreed between the Department and the PHLS in the summer of 2000. During the first year, significant work had to be undertaken to modify the electronic data capture systems used by the PHLS for routine national surveillance of infections in order to accommodate the additional requirements of antimicrobial susceptibility surveillance. This work has now been completed and RGSD surveillance is expected to be in place in all regions by March 2002. This scheme supplements the various specialised organism/disease based surveillance schemes currently in operation (in particular for bacteraemias, tuberculosis and gastrointestinal infections).

The RGSD type of surveillance is less selective than most other laboratory based antimicrobial susceptibility surveillance schemes, and therefore likely to be more representative of prevalent organisms. Such mass information can thus be related to prescribing and population denominators. It is nonetheless constrained by data quality issues including sampling practices among practitioners, which is known to vary widely, variations in laboratory methods and capabilities and the variable ranges of antibiotics tested by different laboratories. Parallel validation work is therefore essential, as well as informed interpretation of the results.

From 1 April 2001, participation in a national hospital acquired infection surveillance scheme will be mandatory for NHS hospitals in England. This will start with data collection of *Staphylococcus aureus* bacteraemias, including MRSA, and will be extended over time.

*Sentinel surveys of resistance* are run from the PHLS Antimicrobial Resistance Laboratory (ARMRL). These surveys examine smaller numbers of isolates using standardised methods, and serve a different purpose. Since they are still dependent on sampling patterns, the organisms tested may not be representative. Data from the two types of scheme are used to validate each other. Organisms examined thus far include gram-positive cocci (*S. aureus*, enterococci and pneumococci) also *Pseudomonas aeruginosa*. A survey of acinetobacter is underway.

As these various surveillance schemes bear fruit, the results will need to be made more readily accessible. The PHLS ARMRL publishes a list of antibiotic/organism types to be alert to via its Newsletter, but this is not widely available. An annual report of antimicrobial susceptibility trends is suggested.

### 2.4.2 Relating resistance to prescribing

The CPSG received papers from Wales, and also presentations from Dr Priest, from Oxford, and Dr Birkin from AmSSU, all of whom had worked on matching prescribing against resistance in defined geographical areas in the community. All had faced methodological problems, and some discrepancies were highlighted. It became apparent that not only were the data difficult to collect and reconcile, but there were many possible factors which might confound the results. Although this is an important area of scientific work, routine collation of these data may not be the most cost-effective approach, the better option perhaps being special studies when routine surveillance or monitoring suggested a problem.

### 2.5 Monitoring, evaluation and feedback

As a framework for monitoring, the CPSG has posed a series of questions (Annex C) addressed ultimately at monitoring the desired outcomes in terms of prescribing and antimicrobial resistance levels. In the meantime, progress must be assessed using process indicators or other surrogate markers. The questions relate to the key issues raised throughout this report. Some are suitable for day to day monitoring, some for audit and some are research topics. Some are suitable for monitoring at all levels (e.g. local, national); some are applicable to particular groups and/or levels.
2.5.1 Overall monitoring

*Is antimicrobial prescribing falling, staying the same or increasing?*

In the community, PACT data allow routine monitoring of overall use of antimicrobials in primary care, broken down by antimicrobial or antimicrobial group. Disadvantages are that it does not allow breakdown by patient group (patient demographic details are not recorded) or clinical diagnosis so that the appropriateness of the prescribing cannot be assessed. *The CPSG suggests that PACT data would be more useful if it included, at the minimum, age and/or codes for the prescribing condition and that the possibility of including these be explored.* A patient identifier and diagnostic code could perhaps be added to the prescription form. Data protection and patient confidentiality issues would of course apply. The expense of implementing such a system may preclude it.

Individual hospitals are able to monitor antimicrobial use, largely using pharmacy stock records. These systems are immensely varied and allow collection of a variable detail of information not easily collated nationally. *A major impediment to progress in monitoring antimicrobial prescribing is the inability to collect hospital prescribing data nationally in a uniform way for public sector use and this needs to be urgently addressed.* While ultimately, the CPSG sees the introduction of electronic prescribing and the electronic patient record (see below) as providing the means to facilitate this monitoring, very few hospitals now have this technology and interim arrangements are required. The CPSG was informed that discussions are underway to obtain national data to the required level of detail, but was frustrated by the slow progress.

*Are the patterns of antimicrobial prescribing reflecting good/improving practice?*

Information is also not routinely available which allows assessment of the quality of prescribing. This again would be greatly facilitated by the introduction of electronic patient records. *The slow roll out of electronic patient records is an impediment to progressing the CPSG's remit for monitoring the quality of prescribing.* In the meantime, routine primary care data allow the use of indicators as pointers to changing trends and possible problems requiring further investigation, for example by audit. The limitations of indicators must be understood, however. They are proxy measures and there may therefore be other, hidden, reasons for the findings. They should be used to identify outlier status and as a hook to initiate a review of the reasons for this. Being an outlier does not necessarily connote poor performance. Punitive monitoring should be avoided, as well as economic incentives for changing antimicrobial use, as this could result in a conflict of interest and could introduce perversities. 12 Suggested indicators are included in the monitoring framework at Annex C.

Additional information which allows community prescribing information to be related to age and clinical condition may come from the General Practice Research Database (GPRD), and MIQUEST system. Electronic transmission of prescriptions, as is being

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12 Prescribing indicators: their uses and validation. *Prescribing Indicators group of the NHS Executive.*
introduced in Scotland is a further potential future source of information both in the community and in hospitals.

**Has the changing pattern of prescribing affected resistance?**
The difficulties in collecting compatible data are referred to in the Surveillance section of this report. Relating data for key organisms, or in particular sites, such as ICUs may be suitable audit topics. Resistance in colonising organisms is an important topic for special studies.

**Has the changing pattern of prescribing affected outcomes?**
Investigation of outcomes – both the gain and the possible loss from using or not using antibiotics - including treatment failures and the incidence of e.g. quinsy, mastoiditis, Lemierre’s disease, or mortality in common conditions are suitable for special studies.

### 2.5.2 Structure, organisation and prescribing support

Regional offices are responsible for monitoring Trust performance. Through the Regional Offices, in the autumn of 2000, the NHS Executive undertook a limited survey of Acute Trusts in England, in conjunction with a survey of action on hospital acquired infection. The questions asked required only yes/no answers, without descriptive qualification. These showed that:

- 77% of responding Trusts had an antimicrobial policy
- 77% of Trusts had included measures to reduce inappropriate antimicrobial prescribing in a policy
- 77% had a nominated lead individual to review prescribing policy
- 59% reported they had arrangements in place to redress shortfalls in antimicrobial prescribing
- only 7% of Trusts had an electronic prescribing system, but in 53% it was included in the local strategy for implementing ‘Information for Health’
- all Regions have undertaken local initiatives to increase professional understanding of antimicrobial resistance
- 4 of the 8 Regions have undertaken local public education initiatives.

### 2.5.3 Audit

In addition to the topics suitable for audit referred to above, some key issues suitable for audit have been identified:

*Primary care*
- Age-related prescribing
- Reduced prescribing for URTI
- Use of 3 day trimethoprim – as opposed to longer duration regimens - for uncomplicated UTI

*Adherence to guidelines and policies* e.g., in hospitals, adherence to guidelines on surgical prophylaxis
Useful resources include

- *NPC's Audit handbook, Managing Antibiotic prescribing.*
- *BSAC minimum requirements for hospital policies*
- *HARMONY as an audit tool –* HARMONY is a European based project which has addressed the control of antimicrobial drug resistance in the hospital setting and has two particularly relevant areas: the development of internal and external quality assurance tools for antimicrobial susceptibility testing and an antimicrobial prescribing policy and process tool.
3. Proposed future programme of work

3.1 General

In its work so far, the CPSG’s focus was on antibiotic prescribing, and mainly in the primary care setting. Hospital prescribing, and issues relating to anti-viral, anti-fungal and anti-parasitic agents also need to be addressed.

The following topics require further work.

3.1.1 Guidelines
- In conjunction with the National electronic Library for Health, and possibly the HTA, a review of available national guidelines and the gaps to be filled
- Liaison with NICE and SIGN and over how those gaps can best be filled (including for PRODIGY guideline development).
- Work with NeLH on building up the Communicable Diseases Library.
- Publish the findings of the review of the SMAC recommendations, perhaps as part of a wider review of progress following the SMAC report.
- Consider development of a guidance document to facilitate the work of those preparing local guidelines and improve consistency of approach
- Review PHLS template for additional areas to cover
- Consider the need for advice on appropriate use of new antimicrobials (linezolid and quinupristine/dalfopristin).

3.1.2 Prescribing support
- Look at ways to spread good prescribing practice
- Discuss the need for recommendations on microbiological support, e.g. costs and benefits of improving turnaround times.
- Consider empirical prescribing versus microbiological testing (particularly for urinary tract infection, with or without dipstick testing).
- How best to work with developing IT programmes to ensure prescribing is accommodated in integrated programmes (especially in secondary care)
- Other means of prescribing support in secondary care
- If nurse prescribing is implemented, look at ways to support nurse prescribers

3.1.3 Education and training
- Undertake survey of Medical Schools, as part of a wider survey on teaching about infection arising from the CMO’s Communicable Disease Strategy
- Continue to work with BSAC on feasibility of producing materials for undergraduate education.
- Provision of postgraduate education/CME/induction of junior doctors

3.1.4 Public education
- Work with Public Education Subgroup on messages for the public
• Work with the Subgroup on building-in evaluation to the next phase of the programme
• Work with Public Education Subgroup on materials for school education
• Continue to work with NHS Direct (and NHS24 in Scotland) to provide information to the public

3.1.5 Surveillance
• Monitoring antimicrobial use in hospitals
• Better linkage of antimicrobial susceptibility surveillance with prescribing data

3.1.6 Monitoring and audit
• Agree the minimum requirements for monitoring and feedback
• Encourage national/local audits

3.1.7 Industry
• It is clear that advertising and promotion can have a profound influence on prescribing. A suggested topic for further investigation, working with industry, is whether advertising and promotion by the pharmaceutical industry can be used to improve the appropriate use of antibiotics.

3.1.8 International
• Increase the UK’s involvement in EU and WHO activity in this field.
• Invite representatives from Sweden and Denmark to a meeting to describe their approaches to optimal prescribing for the control of resistance.
Annex A

Membership of the Clinical Prescribing Subgroup (*Deputies)

Chair: Dr Diana Walford, Director of PHLS, PHLS Headquarters, Colindale

Mr Trevor Beswick, Regional Pharmacy Manager, South West Regional Office
Dr Maura Briscoe, DHSS N Ireland, Belfast
Dr Peter Clappison, DH Pharmacy and Prescribing Branch
Miss Annie Coppell, Deputy Director National Prescribing Centre, Liverpool
Professor Peter Davey, Prof of Infectious Diseases, University of Dundee
Dr Peter Drury, Head of Information Policy Unit, IPU
Professor Brian Duerden, Deputy Director of PHLS, PHLS Headquarters, Colindale
Professor Roger Finch, Professor of Infectious Diseases Nottingham City Hospital
Miss Carole Fry, DH Nursing Division
Dr Judy Gilley, General Practitioner BMA Council, Bedfordshire and Hertfordshire local medical committees
Dr Ian Gould, Consultant Microbiologist, Department of Microbiology Aberdeen
Professor Simon Kroll, Department of Paediatrics, Imperial College School of Medicine
Dr Alison Holmes, Senior Lecturer, Department of Infectious Diseases, Charing Cross and Westminster
  * Ms Wendy Lawson, ID Pharmacist, Hammersmith Hospitals Trust, Charing Cross and Westminster
Dr Jane Leese, DH Public Health Group
Dr Paul Little, Department of General Practice Southampton University
Dr David Livermore, Director, PHLS Antimicrobial Reference and Monitoring Laboratory, Central Public Health Laboratory, Colindale
Dr Clodna McNulty, Consultant Microbiologist and PHLS Primary Care Co-ordinator, Gloucester PHL
Dr Mair Powell, Medicines Control Agency
Dr Keith Ridge, DH Pharmacy and Prescribing Branch
Dr Mike Simmons, National Assembly for Wales, Cardiff
Dr Gillian Smith, PHLS Consultant Epidemiologist, CDSC West Midlands, deputising for Prof Rod Griffiths, Regional Director of Public Health, West Midlands
Dr Keith Struthers, Director/Consultant Microbiologist, Coventry PHL
Mrs Barbara Stuttle, Thameside Community Healthcare, Essex
Dr Martin Wale, PHLS Consultant Epidemiologist CDSC Trent
  * Dr Joan Birkin, AMSSU, CDSC Trent
Professor Julius Weinberg, Pro-Vice Chancellor for Research, City University
Dr Patricia Wilkie, Social Scientist, Royal College of General Practitioners Patient Liaison Group
Professor Richard Wise, Department of Microbiology City Hospital, Birmingham
  * Dr Tim Weller, Consultant Microbiologist, City Hospital Birmingham
Dr Hugh Whyte, Scottish Executive
Dr David Young, DH Information Policy Unit
Dr Richard Tiner, Association of British Pharmaceutical Industries

Mr Bob Fenner, DH Public Health Group
Mr David Howell, DH Public Health Group
Dr Louise Newport, DH Public Health Group
Ms Adiba Enwonwu, DH Public Health Group
Annex B

Review of the SMAC Recommendations: ‘Four things you can do’

1. **No prescribing for simple coughs and colds**

The evidence base for this recommendation was not in doubt, but feedback from the public education campaign suggested that people are still unclear about the natural history of coughs and colds, and think that yellow or green sputum on its own is an indication for an antibiotic. They still think an antibiotic necessary for respiratory symptoms which they feel are worse than a cold. The concept of a simple cough was not necessarily understood by either doctors or patients, especially if there was purulent sputum. The natural history of acute bronchitis is also not generally understood, although there is evidence that, on average, patients, present after 7 days cough which is likely to persist for a further two weeks before complete resolution, whether or not an antibiotic is given. The issue is therefore one of public – and professional – education.

2. **No prescribing of antibiotics for viral sore throats**

Again, the evidence for this recommendation is agreed and, statistically, most sore throats will be viral (generally around 70% are viral and 30% bacterial, where diagnoses are confirmed). The impediment is one of implementation, since there is as yet no easy way to distinguish viral and bacterial sore throats. Knowing this, many doctors feel the need for more helpful guidance in their clinical decision making at the time of presentation, while patients need reassurance that the doctor will know if antibiotics are required.

The CPSG believes that the availability, speed of testing and communication of microbiological results – preferably electronically – is a key issue. Microbiological culture is the ‘gold standard’ for diagnosis. The Group heard that in some places more flexible laboratory services allow faster turnaround of microbiological specimens than the usual minimum of around 48 hours. Near patient tests are not yet routinely available, and these will need to be assessed in ‘field’ conditions. In the meantime, to assist empirical prescribing, the Group welcomed a research project being undertaken by Professor Paul Little to develop a better algorithm for discriminating between viral and bacterial sore throats.

Issuing a delayed prescription is an alternative recommended by SMAC. It is not universally accepted, on the grounds that a patient who is not improving may need to be reviewed by a health professional, but it has been shown to be successful: in one study in which they were issued, 69% of patients did not return to collect their prescription. Whether delay in issuing a prescription might have an adverse effect on outcome whatever the diagnosis, has already been mentioned as a topic for further

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13 Bill Holmes et al and McFarlane et al
research. The benefits in terms of clinical outcome are also thought to be marginal even when antibiotics are prescribed for a confirmed bacterial sore throat, only around 30% of patients benefiting and the benefit being small.

Patients need to be told more about how doctors decide between viral and bacterial sore throats (with an honest appreciation of the uncertainty) and when an antibiotic is needed. Patients also need to know what the options are if they do not begin to feel better within a few days. This should be coupled with advice as to why it is inadvisable to start the antibiotics immediately on a ‘just in case’ basis.

This approach may be more difficult to accept by mothers with febrile and unwell small children and carers of, for example, the very elderly. The CPSG agreed that immediately available, at least starter, packs of generic analgesics were helpful, with instructions to phone for further advice if the child did not improve. The issue of starter packs of generic antibiotics is discussed further at para 39. Sociological influences on prescribing are yet to be fully understood, for example, GPs may be more likely to prescribe antibiotics if their patient is soon to take important examinations.

3. **Limit prescribing for uncomplicated cystitis to three days in otherwise fit women**

SMAC recommended three days’ trimethoprim for uncomplicated cystitis in otherwise fit women. The recommendation had been criticised on the grounds that none of the trials cited had included 3 days’ trimethoprim. Three days’ co-trimoxazole had been shown to be as effective as seven, and seven days’ trimethoprim and co-trimoxazole had been equally effective. The recommendation required acceptance that three days’ trimethoprim and co-trimoxazole were also likely to be equivalent.

The Group reviewed the evidence that had accrued since the original recommendation and agreed that it stood up to scrutiny. The recommendation was further vindicated when a previously overlooked randomised double-blind trial was brought to the attention of the Group which showed that 3 days’ and 10 days’ trimethoprim were equally effective.  

Evidence that the advice is being heeded came from one English region in which all health authorities were seeing a sharp increase in the use of three day (compared with longer) courses of trimethoprim. This was one of the most visible responses to the House of Lords and SMAC recommendations.

The CPSG is mindful that the possible consequences of greater trimethoprim use include an increase in resistance levels. Local surveillance needs to take account of the possibility that because trimethoprim resistance may be mediated by plasmids which also encode for multiple resistances, wider trimethoprim use may encourage

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17 Smith et al
the emergence of multiresistance to other drugs. The use of trimethoprim as a first line drug should then be reviewed.

As in sore throat, improved bacteriological diagnosis may reduce the use of antibiotics compared with empirical prescribing. An impediment to more rational prescribing for urinary tract infection continues to be the difficulty, and cost, of obtaining a rapid microbiological diagnosis. Routine urinalysis in practice conditions is said to have a low predictive value. However, the CPSG welcomed the decision of the HTA to fund a large study in general practice of the use of urine dipsticks in the assessment and management of urinary tract infection.

4. Limit prescribing over the telephone to exceptional cases

There was a general feeling that this recommendation was too restrictive in that it might militate against the speedy availability of antibiotics for people with conditions associated with recurrent infections, when they were capable of recognising the need themselves, and where time consuming appointments with the doctor and time off work could be avoided. It was felt that a slightly more flexible approach could still be compatible with good antimicrobial prescribing practice. If samples were needed patients could deliver them themselves.
ANNEX C

Framework for monitoring action to optimise the clinical prescribing of antimicrobials

Overall monitoring

- Is antimicrobial prescribing of specific named classes/drugs falling, staying the same or increasing
  a) in the community?
  b) in hospitals?
  (It is suggested that in both community and in hospitals monitoring is concentrated on the 5-10 antimicrobials most commonly used, together with those where there are known, or anticipated, resistance problems.)
- Is antimicrobial prescribing falling in those conditions covered by national professional/public education campaigns?
- Has the collection of prescribing data in hospitals improved?
- Are the patterns of antimicrobial prescribing reflecting good/improving practice?

Suggested indicators include:

Total volume, and use by preparation or class /The increasingly used convention is to measure antimicrobial use by Defined Daily Dose (DDD). This is based on the adult recommended daily dose and is an accepted proxy, although it may give misleading results where children are being treated/

In primary care:
**NB These need validation by the Prescribing Indicators Group**
Number of prescriptions in relation to stratification of patients
Liquid preparations in relation to children on list
% from limited/formulary list
% first line drugs (amox, eryth, tetr, TM)
Improved narrow/broad spectrum antibiotic ratio
Reduced cephalosporin use
Reduced winter peak prescribing
Reduced seasonal variation in prescribing of ciprofloxacin
Reduced [>3 day] use of trimethoprim in primary care

In secondary care
Use of vancomycin
Use of black triangle drugs (or others which should be available only when sanctioned by a named person, normally the clinical microbiologist)
Incidence of clostridium difficile infection.
(Indicators such as ‘<10 quinolone prescriptions per 1000pts/yr’ are considered unsuitable as they do not take into account possible variations in case load.)

♦ Have resistance patterns changed?
♦ Is there evidence that any change in the pattern of resistance is related to prescribing?
♦ Has the changing pattern of prescribing affected clinical outcomes and the incidence of disease-related complications (e.g. quinsy, mastoiditis)? (Suitable for research or special study which Drug and Therapeutic Committees could look at for their own ‘patch’; ICD10 data on admissions year on year would give information for those infections which are precisely defined)
♦ Has there been a change in the incidence of antibiotic-related complications (e.g. pseudomembranous colitis)?

**Guidelines**
- Have national/local guidelines been produced for the management of the common infections/infectious diseases?
  - If not, where are the gaps?
- Are prescribers aware of those guidelines that have been produced?
- Do prescribers use the guidelines of which they are aware?
- Have PRODIGY guidelines continued to be reviewed and extended? Are Prodigy guidelines being used?
- Have guidelines been issued to control the use of linezolid and quinupristine/dalfopristin?
- Does the NeLH contain a comprehensive listing of evidence based good prescribing practice?

**Structure/organisation**
- Are structures/organisation in place to promote optimal prescribing at national, regional and local levels?
  - Board level responsibility?
  - Lead clinician/pharmacist (must be person of suitable seniority and authority) accountable directly to Trust Board?
  - ‘Empowering hospital group’, e.g. prescribing team, supported by all the other structures and with time to provide the function, accountable to the Chief Executive? [For Trusts to devise the most appropriate arrangement]
  - Linked to Clinical Governance?
  - Antimicrobial prescribing subgroup, separate from the Drug and Therapeutics Committee? (analagous to the Infection Control Committee)
  - Recommended membership and links to other relevant committees, e.g. Infection Control Committee?
- Is there a written antibiotic policy at Trust/PCG/PCT level?
  - Within the framework of the policy, is there a restriction policy in place, limiting prescribers for certain antimicrobials?
- Is the policy reviewed annually?
- Programme of activities including education and audit?
♦ Annual report to the Chief Executive?
♦ Medicines Management in hospitals framework/Controls assurance in place?

**Prescribing and prescribing support**
♦ Are decision support systems in place in primary care and are they being used?
♦ Have starter packs (or complete courses) of appropriate antimicrobials (generic or branded) and simple analgesics been introduced?
  ➢ Are they being used?
♦ Are other changes militating against reduced prescribing, including in dentistry e.g. the requirement to see patients within 48 hours (dental emergencies within 24 hours)?
♦ Have decision-support systems been developed/introduced more widely in Acute Trusts?
  ➢ Are they being used?
  ➢ Do they improve prescribing?
♦ Are examples of good practice in prescribing support being disseminated?
♦ Are microbiology services appropriate for the needs for the locality and are they supporting good prescribing?
  ➢ Is there guidance on how to maximise benefit to the patient from the use of microbiology services?
  ➢ Is access to services and/or advice and turnaround of samples appropriate (e.g. is there an extended working day (or 24 hr) service; are results available where appropriate within 24hrs?)
  ➢ Are validated near patient tests available?

**Professional education**
♦ Have new tools been developed to facilitate undergraduate education?
♦ Have new tools been introduced, or is there evidence of adequate coverage of antimicrobials and management of infectious disease in an integrated way in undergraduate curricula?
  ➢ Has (undergraduate) teaching resulted in improved prescribing among doctors?
♦ Is antimicrobial prescribing part of medical and dental house officers’ induction programme?
  ➢ Is it frequent enough to take account of staff turnover?
♦ Have there been sustained efforts aimed at changing prescribing behaviour?
♦ Are there multidisciplinary CPD sessions?
  ➢ Are there multidisciplinary prescribing workshops?
♦ What changes prescribing behaviour?
  ➢ What behaviour change works to improve antimicrobial prescribing? (Research question)

**Surveillance**
♦ Is comprehensive antimicrobial susceptibility surveillance in place?
  ➢ Are all Districts/Trusts participating?
- What are the quality markers?
  - Can antimicrobial resistance data be linked to prescribing?
  - Are data on prescribing practice being fed back to those responsible for prescribing?

**Public Education**
- What are public perceptions about antimicrobial use and resistance
- Have there been sustained efforts aimed at changing the public’s perceptions?
  - Has evaluation been incorporated and what does it show?
- Is NHS Direct [in Scotland, NHS24] providing appropriate information and advice on antimicrobials?