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The state of play in the battle against antimicrobial resistance: a general practitioner perspective

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This article summarizes personal reflections from the perspective of general practice on developments with regard to antibiotic resistance and the containment of antibiotic prescribing during the lifetime of the Specialist Advisory Committee on Antimicrobial Resistance in England. These reflections concern the entry of antibiotics into the food chain, recent extensions of prescribing responsibilities and developments towards improved surveillance and reduced antibiotic prescribing. A large gap remains between the scientific appreciation of the risks from antimicrobial resistance and effective means to measure it and thereby hopefully control it.

Keywords: prescribing, surveillance, food chain

Introduction

The Specialist Advisory Committee on Antimicrobial Resistance (SACAR) was set up in 2001 following the publication of the Standing Medical Advisory Committee report.[1] I was invited to join mainly because of experience in disease surveillance in the community. As this committee approaches the end of its life, it is timely to reflect on recent developments, particularly on those issues which concern general practice.

The papers circulated prior to the initial meeting of the committee contained two surprises. Firstly, in the UK more antibiotics were given to animals than to humans (subsequently reported by the Health Protection Agency)[2] and this was one of the factors influencing the development of antibiotic resistance. Since then there have been substantial reductions in livestock (food animals) but the total quantity of antibiotics given to them did not change between 1998 and 2005, whereas imports of meat and meat products have increased substantially.[3,4] These are not likely to contain less antibiotics and thus the risks associated with introduction into the food chain have increased. Secondly, the balance of evidence on which the belief that inappropriate prescribing in general practice influenced the development of antibiotic resistance was inconclusive. With minor exceptions,[5] most publications fail to reach a definitive conclusion associating the two.[6–9] The difficulty of interpretation lies in the wide variation in patient investigation and laboratory practice both within and between countries.[8,10–13]

In the initial Government response, three key elements of its strategy were identified, namely surveillance, prudent antimicrobial use and infection control.[14] All carried resource implications, which from the SACAR perspective seems to have resulted in a competition for funding rather than the development of an integrated package.

Surveillance

Surveillance of persons presenting for healthcare is as close to complete population-based surveillance as is realistically achievable. However, the value of existing information on resistance available to guide general practitioners remains limited and difficult to interpret.[15] Limitations include the lack of a population denominator, bias in case sampling, inadequate distinction between community- and hospital-acquired infections, multiple investigation of the same patient, inconsistencies in recording and inconsistencies in laboratory procedures.[6,15–19] Individual accessible patient-linked data are needed for surveillance.[20] I earnestly hoped that the establishment of SACAR would generate a momentum that would lead to a programme of structured surveillance in a network of dedicated practices linked to a limited number of laboratories in which all aspects of recording and reporting problems would be subject to continuous quality control,[8,9,13,15] resulting in integrated disease and microbiological surveillance as encouraged in the government response.[14] I have long since abandoned the thought that this could be achieved by riding on the back of information gathered haphazardly from specimens taken as part of routine patient management (though information gathered in this way should not be wasted). Excepting for officially notifiable diseases, investigation in the National Health Service (NHS) is restricted to patients for

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personal case management and not for community protection. The chief arguments against structured surveillance in primary care relate to perceptions of cost. Few things cannot be measured, but how much does it cost and who pays (or which pocket does it come out of)? The major costs would be for enhanced microbiological investigation as the costs of enhancing a disease surveillance network to include routine microbiology would be relatively small.

Several specific projects have been completed successfully and it is appropriate here to acknowledge the work of McNulty, Mant and Mayon-White and their collaborating practices in Gloucestershire and Oxfordshire. These have chipped away at particular problems although the findings have rarely been generalizable to the whole country nor applicable to later time periods. The problem of antimicrobial resistance is dynamic: the need is for contemporary data about viruses as well as bacteria and their respective resistance patterns. Virological investigation is expensive and even less part of routine management in primary care than bacteriological investigation.

Systematic data entry

Consistent recording is essential in order to monitor trends and recognize change. Currently, there is no systematic approach to data entry in general practice records and no standard laboratory computer technology whereby practice-based patient records can be updated linking diagnostic, prescribing and laboratory data from one episode of illness. The extensive use of free text, especially in relation to the recording of information about minor illnesses militates against automated investigation of patient records. The quality outcomes framework could perhaps be exploited to achieve high-quality standardized recording ensuring that all important information is entered in an accessible coded form and is not hidden in free text. It is essential when reporting information on disease or prescriptions that missing links between them and changes over time are clearly exposed to ensure the validity of the interpretation. In the analysis of trends, particular care is needed where interpretation is based on changing proportions or rates based on anything other than age-specific populations.

Ethical issues

The ethics of delivering healthcare are focused on benefits for the individual: public health is no less important. To many, the rights of the individual are championed at the expense of the rights of society generally. If persons use the facilities of the NHS, the information obtained should be available to manage and maximize community health. Individual confidentiality is paramount but for most surveillance purposes, patient-specific information links are needed[20] (a point echoed in the government response[14]) but not patient identification. Surveillance will be greatly hindered if recent proposals to allow persons to 'opt out' of national record systems, either in total or partially are implemented.[21–23] The potential of a fully computerized record for disease surveillance will never be fully realized if critical information is withheld. For example, if, as part of routine management, a drug-resistant influenza virus is isolated, interpretation of its significance will require information on the individual with regard to co-morbidity and drug exposure. If the records are inaccessible or inadequate for the purpose, information highly important to public health will be lost. Surveillance differs from research and requires its own ethical framework.[24]

Prudent prescribing

Prudent prescribing is indefinable.[6] Its achievement depends on knowledge of the causative organism, likely resistance patterns, the clinical significance of the resistance—which may be influenced by the mode of administration (e.g. low-level resistance may not matter when an agent is applied topically resulting in a high local concentration)—and the relationship between resistance and clinical outcome.[13,18] Prescribing guidelines are only likely to be respected if they are evidence based, but most are consensus based[25,26] with much of the information derived from research in which there has been inadequate microbiological investigation. There is no evidence that guidelines minimize antibiotic resistance.[27] Present attitudes towards the prescribing of antimicrobials are excessively based on bacterial causes of infection reflecting the lack of good virological information. However, linked virological and clinical surveillance of respiratory infections has considerably enhanced our understanding of influenza-like illnesses and allows us at least to rationalize the prescribing of antivirals in this particular clinical setting.[28,29]

Many doctors believe that by giving an antibiotic they might be doing some good or at least covering the possibility of a missed diagnosis of significant bacterial disease, with little thought given to the possibility of doing harm. Medical training has improved, but many doctors still see virus infections as minor and self-limiting and therefore in severe illness bacterial causes are considered more likely. Acute bronchitis, which in the elderly is particularly associated with winter excess mortality, is one of the major reasons for the prescription of an antibiotic, but its periodicity is much more closely related to winter viral epidemic diseases.[30–32] As long as the cause of bronchitis is not explained in a scientific way, improvement in the quality of prescribing for it will not be achieved. The same can be said for acute otitis media, though here there is an increasing recognition of its viral aetiology.[32,33]

There have been many publications drawing attention to an undesirable trend towards increased use of newer broad-spectrum antibiotics;[11,34,35] others have exposed some of the downside of inappropriate prescribing.[36–38] However, programmes of medical education targeted at reducing prescribing have met with limited success.[39] The use of 'delayed' prescriptions (prescriptions issued with the recommendation that they should not be dispensed unless the patient does not improve within 24 h) has been successful in reducing the number of antibiotics dispensed, though at some increase in symptom perseverance.[40] With few exceptions,[41] the trials in which this strategy has been tested have not been conducted with comprehensive bacterial and virological evaluation to determine prescription appropriateness.[40,42,43] There have been some interventions which appear to have influenced physician prescribing[37,39,44–46] but none was shown to be effective against the primary objective of reducing antimicrobial resistance.

The success of interventions to reduce prescribing is difficult to judge because acute respiratory infections (the commonest reason for prescribing antibiotics) are now much less frequent than 15 years ago and similar trends in antibiotic prescribing must be seen against that background.[34,47–49] In contrast, the

diagnosis of skin infections and the use of topical antibiotic skin preparations has been roughly stable in recent years, and yet the number of prescriptions for flucloxacillin has increased.[50] Similar trends have been observed in the Netherlands.[34] We must not be lulled into a false sense of security believing the prescribing behaviour of GPs has changed. It is preferable to focus interventions on changing behaviour rather than trying to persuade doctors from evidence of the link between resistance and inappropriate prescribing.[36]

Near-patient tests

Advances in the development of near-patient tests are potentially a mixed blessing. On the positive side more accurate diagnosis is desirable for both individual patient management and for surveillance. The identification of a pathogen is not by itself a sufficient indication for an antibiotic prescription. These tests increase consultation time and carry significant costs that are often disproportionate to their therapeutic benefit. Nevertheless their potential value when used in a dedicated surveillance scheme should be explored.

Extended prescribing

SACAR discouraged the extension of antibiotic prescribing to nurse practitioners and moves to permit over-the-counter use, a recommendation endorsed in the initial government response and by WHO.[14,51] Selected extensions have been made during the lifetime of the committee. There is no basis to believe the development of antibiotic resistance will accelerate but whether these extensions can be described as prudent is debatable.

What of the future?

A recent WHO publication on antimicrobial resistance was prefaced under the heading 'Our window of opportunity is closing'.[52] The lack of new antibiotics, because of the high costs of developing them and the likely limitations of the market may seriously limit our options to control infections within the foreseeable future.[53,54] SACAR has given way to a new committee with a remit combining issues of antibiotic resistance with the control of infection in hospitals (an equally important problem). I view this merger with concern. There is a fundamental need to reduce inappropriate antibiotic prescribing and most of it takes place in general practice. A larger and combined committee is likely to marginalize the issues of reliable data from primary care and put back still further the introduction of a scientifically based surveillance programme on which prescribing can be rationalized. The threat from pandemic influenza has dominated strategic health planning and while this threat must not be underestimated, equal vigour is needed in the context of emerging antibiotic resistance. I wonder, along with others, if there is yet a will to address the need adequately, and how long it will be before we have a scientific basis first to measure and then to tackle the problem.[8,55,56]

Transparency declarations

None to declare.

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