remains a formidable, worldwide threat to health, particularly to children in poor populations. Clearly, this is an international problem requiring new approaches to combating an old foe, who once again is winning the battle.

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Lessons from international experience in controlling pharmaceutical expenditure II: influencing doctors

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This is the second of three papers that review international policies to control spending on drugs and to improve the efficiency of drug use. This paper reviews policies influencing doctors' prescribing of drugs—particularly the use of budgetary restrictions, information and feedback, and guidelines—and evaluates the impact of these policies. Studies evaluating incentive systems are limited, but evidence suggests that providing information on its own will not lead to substantial changes in practice and that more active strategies should be evaluated

In Britain several initiatives have been introduced with the aim of improving the efficiency of general practitioners' prescribing behaviour. These include providing data on prescribing analysis and cost (PACT), indicative prescribing budgets, and general practice fundholding. The impact of these policies on prescribing costs has been inadequately evaluated, but it seems to have been limited.[1] Can British policy makers learn from other countries' initiatives?

In this paper we examine the impact of policies aimed at directly influencing doctors' prescribing practice. Details of our literature search are in the first paper in this series.

Budgetary restrictions

In Germany budgetary restrictions were introduced in January 1993 that placed a limit on drug costs. The first DM280m (£130m) spent above this limit is paid for out of physicians' remuneration budgets. It was not anticipated that this would have a dramatic effect on doctors' prescribing as it represented only 1% of their total income from treating patients with statutory health insurance. However, there was an immediate and pronounced drop in the number of prescriptions, from 795 million in 1992 to 712 million in 1993. This was accompanied by a change in the product mix of prescribed drugs, in particular a move to generic substitutes and older established drugs. Spending on drugs in 1993 was 25% lower than in 1992.[2] Since then prescriptions have tended to increase back to the initial level, but it is claimed that the scheme has realised savings of about 10% of the drugs budget. Monitoring of drug prescriptions by the Scientific Institute of the Federal Association of Local Funds suggested that savings on "dubious" products amounted to DM1.8bn (£900m) and that the shift to generic drugs produced savings of DM350m (£170m).[3] It has been suggested that physicians have shifted costs by referring more patients to hospitals,[2] but this study is small and may not be generalisable. A formal analysis of trend is not available for these changes, and it is not possible to identify the extent to which it may be attributable to other policies or chance.[4] However, budgetary initiatives have suggested that drug costs may be guided by financial incentives or penalties for doctors working within a global drug budget, and this approach may warrant further attention and rigorous evaluation.

Individual general practice budgets have been introduced in Britain (through the practice level fundholding and indicative prescribing schemes) and New Zealand and are being considered in Italy. In Britain budgetary control may have provided an incentive to constrain the costs of prescribing and to increase the proportion of generic drugs dispensed.[5,6] However, these effects may not be sustained.[7] It is difficult to assess how financial incentives influence prescribing as most studies of fundholding have been descriptive and none is adequately controlled.[8] In New Zealand it has been claimed that budget holding has considerably slowed the rate of growth in drug costs where it has been implemented, but reluctance to change the drugs of patients with chronic illnesses may reduce the impact of this policy.[9]

Information and feedback to physicians

The English prescribing analysis and cost (PACT) scheme disseminates information about prescribing behaviour to general practitioners in the hope that it will increase their awareness of costs. Prescriptions are collated by a national authority, and information is fed back to general practitioners on a quarterly basis, either in a simple "headline" format or in more detail when this is requested or when a practice's costs are substantially greater than the local average. Comparisons between practices and the local average are weighted by prescribing units, refined in 1993, which take account of patients' age, sex, and frequency of consultation but not of the effectiveness or cost effectiveness of drugs.

Several countries have information feedback systems for physicians similar to the PACT scheme. However, most of these strategies are not enforced, and information may be ignored. This is thought to be the case in France, where data on prescription costs in relation to consultations are tracked and fed back to physicians to enable them to monitor their own prescribing patterns. In Germany sickness funds compare doctors' prescribing with the average levels of prescribing by colleagues. In New Zealand the Preferred Medicines Concept provides information on general practitioners' prescribing patterns in relation to the national average. All these schemes are advisory and provide information on the volume of prescribing and on cost, but, crucially, they do not give information on the cost effectiveness of prescribing and so may penalise the use of expensive drugs that have benefits worth the extra cost.

In the Netherlands information is provided to prescribing physicians on the relative value of drugs in practice. There are also regulations that limit the quantity of drugs that can be prescribed under the reimbursement scheme, with the aim of preventing waste and excessive use of drugs through high quantity prescriptions.[10] Thus, if a doctor "overprescribes" the excess will not be reimbursed. In some American health maintenance organisations clinicians have discretionary salary increments which they receive if they have used health care resources efficiently, but it is not clear how efficiency is defined.

Prescribing guidelines

In France a national contract has introduced national medical guidelines for doctors with respect to diagnosis and treatments, including prescriptions for antibiotics, non-steroidal anti-inflammatory drugs, drugs for elderly patients, and oral contraceptives.[11] Currently, 147 guidelines are in force covering a total of 47 areas of medicine, and about 12 of these relate to the prescribing of drugs. As an incentive for following these guidelines, doctors were awarded a 5% increase in their fees, and those who fail dramatically to comply with the guidelines face fines.

Surveys suggest that 75% of French doctors are prescribing in line with the new treatment guidelines.[12] The introduction of the guidelines was associated with a 15% reduction in prescribing of antibiotics in the first six months of 1994 (though this might be accounted for by fewer large flu epidemics and other potential biases). Prescriptions of non-steroidal anti-inflammatory drugs and antiulcer drugs have also been reduced, apparently as a result of the guidelines. However, rigorous analysis of the available data has not been done. It is also worth noting that France has particularly high rates of drug prescribing, so that there is considerable scope for reduction. In 1994, 17 doctors were fined up to Fr15 000 (£2000) for repeatedly failing to observe the treatment guidelines.[13]

Other countries use guidelines to inform professional behaviour, including the cost effectiveness of prescribing. Thus, in the United States the Agency for Health Care Policy and Research produces guidelines (for example, on pressure ulcers[14] and on benign prostatic hyperplasia[15]), and in Britain the Department of Health commissions effective health care bulletins (such as on treating depression[16]). However, these are advisory schemes without clear incentives to reward compliance.

In Germany guidelines were introduced in 1995 to define the average prescription volume for each medical specialty according to therapeutic use and category of drug. The guidelines were formulated so that the total volume of prescriptions does not exceed the regional budget and are therefore used as a means of budgetary control. Physicians are reviewed on the basis of these guidelines, and if their prescription level is more than 15% above the average they receive a visit from pharmaceutical advisers to discuss their rates of prescription.

Part of New Zealand's Preferred Medicines Concept aims to give general practitioners information on drugs and to provide administrative support to help them develop their own "preferred medicines lists" in a "critical and rational" manner. Again use of these lists is voluntary, providing guidelines for choosing drugs without explicit incentives to reward compliance.[17]

Role of drugs industry

The drugs industry also plays an important role in disseminating information to prescribers, not all of

which may be considered educational.[18] The need for careful regulation of the advice and information given to general practitioners is shown by the attempt of the United States Food and Drug Administration to warn doctors about the use of propoxyphene.[19]

In the 1970s this commonly prescribed analgesic was discovered to be at best no more effective than aspirin and paracetamol while its potential for addiction, abuse, and risk of overdose was considerably higher. As the Food and Drug Administration had no physician education programme, it required the manufacturers of propoxyphene to conduct a mailed and person to person education campaign conveying the dangers of the drug to high risk patients and in combination with alcohol or other drugs. Drug companies' sales representatives were used to convey these messages. However, the Food and Drug Administration found that the principal manufacturer of propoxyphene (Eli Lilly) failed to meet its commitment in this campaign. Not only did less than 10% of the information provided convey suitable warnings, but over 75% of representatives gave doctors free samples of propoxyphene products. Furthermore, sales commissions for propoxyphene remained, giving representatives an economic incentive to continue to promote its use.

This shows the perverse incentives that can result from using representatives of the drugs industry to educate doctors and highlights the need for quality control of industry advice to prescribers to ensure that it encourages cost effective treatment.

Can policies aimed at doctors lead to more efficient use of drugs?

In a review of behavioural interventions aimed directly at doctors and other relevant health professionals Soumerai *et al* concluded that it was possible to influence prescribing through various means,[20] most notably by educational outreach visits modelled on the activities of drug company representatives.[21] Although such approaches may contribute to policies encouraging the cost effective use of drugs and may benefit patients, they may not be a solution by themselves. In Britain the effectiveness and cost effectiveness of such interventions needs to be established in rigorous pragmatic evaluations. Such an evaluation has now been commissioned. Regulatory change may contribute substantially to the impact of such schemes. However, unless this is 2based on evidence on effectiveness and cost effectiveness and not simply on containing costs, it may fail to improve efficiency of prescribing. Current initiatives in Britain are also lacking when compared with what is known from rigorous research on the impact of strategies to change professional behaviour.[22]

There is a growing body of evidence to show that providing information on its own will not lead to substantial changes in practice. More active strategies such as educational outreach show promise but have not yet been evaluated rigorously in Britain.[22] We could not find any methodologically sound evaluations of incentive systems aimed at prescribers. Observational studies apparently showing substantial effects from such policies are promising, but evaluation in experimental or quasi-experimental studies is required before evidence based policy decisions can be made.

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A MEMORABLE PATIENT

"There's something you ought to know"

He had come up to the clinic because he had Parkinson's disease. But my eye was caught by the prominent Heberden's nodes on the index finger of his right hand. They reminded me that a couple of days earlier I had heard a rheumatologist friend say that osteoarthritis was often surprisingly symmetrical in its distribution. Someone with osteoarthritis of the knee, for example, was more likely to have the same trouble with the opposite knee than with a hip. I picked up my patient's other hand to check this theory. Not a Heberden's node to be seen. The hypothesis had fallen at the first fence.

I tried to explain my interest in his distal inter-phalangeal joints. He smiled: "Doctor, there's something you ought to know." In 1943 he had been in Italy advancing north towards Rome with the Royal Hampshires. They had been held up in the battle at Monte Cassino. One night he had picked up a rock and smashed it down on the tip of his right index finger—"so that I couldn't squeeze a trigger." The self inflicted wound had not worked. They had made him fight on. But that moment of panic had stigmatised his finger for ever.

There is probably no moral in this tale, but I was touched that he should tell such an unflattering story about himself to stop me drawing a false conclusion from the asymmetrical Heberden's nodes.—CHRISTOPHER MARTYN *is a clinical scientist at the Medical Research Council's Environmental Epidemiology Unit at Southampton*