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# PRESCRIBING IN GENERAL PRACTICE 2

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## General-practitioner prescribing

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**D**UNLOP (1969) suggested that "Modern drugs are such potent weapons that the responsibility for their safe production and use can no longer be left entirely to the manufacturer and prescriber", and Owen (1976) has suggested economies in general-practitioner prescribing. The increasing potency and expense of modern drugs threatens to erode the established principle of clinical autonomy to prescribers (*Lancet*, 1976). In an attempt to assess how far, if at all, such erosion is justified, this review integrates much of the recent research on general-practitioner prescribing.

### Cost of prescribing

Although the total net ingredient cost of prescribed drugs has risen by 130 per cent from about £106.25 millions in 1966 to £245.75 millions in 1974, over the same period the proportion of the total NHS budget absorbed by general-practitioner pharmaceutical services has remained remarkably constant at around ten per cent and, in fact, fell to 7.25 per cent in 1975 (DHSS, 1975). The number of prescriptions issued per person on NHS prescribing lists has risen only slightly (7.75 per cent) over the same period. Thus the increase in cost is largely accounted for by an increase of 105 per cent in the average net ingredient cost per prescription, a similar finding to that of the Hinchliffe Committee (Ministry of Health, 1959) who nearly 20 years ago investigated rising drug costs during the initial ten years of the NHS. Dunlop (1969) suggested that the major factor in the increasing cost per prescription was too ready acceptance by prescribers of expensive new preparations and not monetary inflation of the cost of existing drugs. Certainly, a small number of prescriptions for highly expensive drugs can greatly increase the average cost per prescription. Opit and Farmer (1974) found that over a quarter of the total cost of 5,000 prescription items from one area was accounted for by only four per cent of the items, and six per cent of the total cost by a single drug ('Intal').

Pointing out that, "everything to do with the cost of drugs has strong emotional, social and political over-

tones", Robertson and his colleagues (1975) presented a balanced view of prescribing costs and possible economies. National spending on pets, alcohol and tobacco, taking each individually, is much greater than the total drug bill, and the consumption and cost of prescribed medicine is lower in the UK than in some other western countries (Kohn and White, 1976; Owen, 1976). Miller and Smith (1960) contended that the rising drug bill was the inevitable price of the present scientific revolution in medicine. Other authors, notably Illich (1975), have presented a diametrically opposite view of recent medical developments. There is little, if any, evidence that the patients of doctors with higher prescribing costs are in any way better treated than those of more economic prescribers (or vice versa). More information related to patient care is required before the extent of possible prescribing economies can be defined.

### Aspects of prescribing behaviour

Although increasing interest in general-practitioner prescribing appears to have been largely precipitated by increasing costs, other aspects, particularly those which might reflect on quality of prescribing, are possibly of greater fundamental importance.

Three separate approaches can be discerned in studies of general-practitioner prescribing. The first, typical of earlier studies, is a descriptive approach based usually upon retrospective research of records. The second is a more deductive approach, attempting to link the prescribing behaviour of doctors with morbidity and therapeutic intent, and the third, a sociological approach, uses questionnaire and interview methods in an attempt to discover the influence of personal differences on prescribing behaviour. Although many studies do not neatly fit into these categories, it is helpful to attempt to classify them under these headings.

In addition, the important subject of awareness of unwanted effects of drugs will be discussed.

#### 1. Descriptive studies

a) *Variation in prescribing frequency and cost.* Early studies based on the retrospective analysis of prescriptions and descriptive information regarding large

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numbers of doctors and their practices detected substantial variation in prescribing frequency and cost between different geographical areas (DHSS, 1975; Dunlop, 1953; Martin, 1957) and different doctors in the same area (Benjamin and Ashe, 1964; Dunnell and Cartwright, 1972; Lee *et al.*, 1964 and 1965; Ministry of Health, 1964). These studies mostly suggested that, on the available evidence, such prescribing variations could not be accounted for by morbidity differentials alone. Contrary to Dunlop's findings, both Benjamin and Ashe, and Dunnell and Cartwright found prescribing frequency to decline with increasing list size. They also found younger doctors to be more expensive prescribers. The major reasons for variations in prescribing remained, however, largely unaccounted for.

*b) Variation in range of drugs used.* Later studies (Bain and Haines, 1975; Berkeley and Richardson, 1973; Bodenham and Wellman, 1972; Stolley *et al.*, 1972a) identified similar large variations between general practitioners in the number of drugs used although many drugs were found to be used only once, and a few drugs account for a large proportion of total prescriptions. For example, in their study of 91 North American physicians, of whom 47 were specialists, Stolley and his group found that 100 to 500 different drugs had been used with a mean of 270 per doctor. Bain and Haines, in a study of five general practitioners in a Scottish new town, found that 76 per cent of prescriptions were accounted for by 117 preparations, although a total of 564 separate preparations had been used. Thirty per cent of their prescriptions were for antibiotics and psychotropics—a finding which correlates well with the larger American study.

*c) Variation in selection of drugs.* The wide variation in the total number of different drugs used by individual doctors suggests that there may also be significant variation in the frequency of selection of individual drugs. In their study of 250,000 prescriptions issued by general practitioners in three English towns, Lee and his colleagues (1965) found such variation, particularly in the use of amphetamines and antidepressants. Similar differences in the use of amphetamines (Hood and Wade, 1968) and of other drugs, such as 'Mandrax' (Wade and Hood, 1972a) and chloramphenicol (Wade, 1966), have been found among Northern Irish general practitioners, using the drug information system described by Elmes and his associates (1976). In a meticulous study of the psychotropic drug prescribing of 48 general practitioners in the midlands, Parish (1971) found differences in the use of both different therapeutic subgroups and particular drugs. He has also (Parish, 1973) discussed factors responsible for increased prescribing of these drugs. In their study of 155 general practitioners in north-east Scotland, Howie and his colleagues (1971) found that use of antibiotics by individual doctors varied from 24 per cent to 100 per cent of new respiratory illnesses and, although there were areas of apparent controversy, there was substantial agreement, par-

ticularly over the use of penicillin for tonsillitis and the avoidance of tetracycline for children.

## *2. Studies linking prescribing behaviour with morbidity*

Several large and important studies have related the public consumption of prescribed and non-prescribed drugs to individually perceived morbidity, but not specifically to the therapeutic intentions of doctors (Dunnell and Cartwright, 1972; Jefferys *et al.*, 1960; Kohn and White, 1976; Wadsworth *et al.*, 1971).

A pioneering study by Eimerl (1962), of his own prescribing over four weeks, linked his prescription of drugs to each patient's sex, age and diagnosis and his own estimate of therapeutic intent and level of diagnosis. The studies of Parish (1971) and Howie and his colleagues (1971) typify more recent developments in this approach. Both studies refer to the difficulties in interpretation caused by variations in diagnostic terminology. In a later study of 7,515 patients with respiratory illness, seen by 62 general practitioners, Howie (1973) found that relating prescribing of antibiotics to symptom complexes such as 'purulent spit with chest signs', rather than conventional diagnostic terms such as 'tracheitis' or 'bronchitis', enabled him to identify a consensus of prescribing patterns more informatively. Using a simple simulation technique Howie (1974) has found that decisions on management of new respiratory illness in general practice may be made independently of diagnostic decisions, contrary to conventional hospital-based teaching.

Such work may assist the development of a new generation of studies of prescribing and morbidity in general practice, including evaluation of specific prescribing policies, as recently exemplified by a randomized controlled trial of antibiotics in patients with cough and purulent sputum (Stott and West, 1976).

## *3. Studies of personal differences influencing prescribing behaviour*

As with all behavioural variations, individual prescribing habits must depend to some extent on personal differences in intellect, attitudes, and experience. Parish (1971) reviewed previous work in this field and outlined some neglected areas for future study (Parish, 1974). Most studies have concentrated on two main aspects: (a) the influence of personal attitudes and training and (b) the influence of different sources of prescribing information.

*a) The influence of personal attitudes and training.* In a development of the study by Lee and his co-workers (1965), Joyce *et al.* (1968) sought reasons for differences in the prescribing rates of 93 general practitioners in three English towns by examining the doctors' practices, personal characteristics and attitudes to medical problems. In general, lower prescribing rates were associated with the possession of higher qualific-

ations and an "orientation toward the whole person".

Stolley and Lasagna (1969) reviewed information about physicians' prescribing patterns collected from three main sources: market research data, hospital studies, and community practice studies, the latter including some of the work previously described. With other co-workers (Stolley *et al.*, 1972b) they later reported an assessment, made by 33 nationally acknowledged experts, of the views obtained from 37 North American physicians (including 29 general practitioners) about their prescription of 'Ritalin', 'Equagesic', chloramphenicol, vitamin B<sub>12</sub>, and oral contraceptives. Those doctors rated as better prescribers were more recent graduates with a more formal postgraduate educational experience, had a greater concern with psychosocial and qualitative aspects of medical care, and had more critical views of the pharmaceutical industry, advocating greater state control of drug quality and costs. They worked in larger practices with more ancillary help, spent less time with each patient and were more willing to seek a second opinion. Some of the attributes found by these workers to be characteristic of 'better' prescribers have also been found in both British (Mechanic, 1968 and 1970) and North American studies (Clute, 1963; Peterson *et al.*, 1956) to be associated with other aspects of high quality care.

The conclusions of all such qualitative studies must be interpreted with caution due to their necessarily empirical basis and possible national differences in clinical practice, but both American and British studies appear to agree that more desirable prescribing patterns are associated with a more psychosocial orientation and greater formal postgraduate education.

*b) The influence of different sources of prescribing information.* Results of studies in this area are difficult to evaluate, as the assessment of usefulness of information is purely subjective and the basis for comparison of different sources varies from study to study. The comparison of commercial and non-commercial sources of information is probably of greatest interest. The most detailed British study (of 463 principals) formed part of the report of the Sainsbury Committee (Ministry of Health, 1967). Information from drug company representatives was ranked highest for usefulness regarding the existence of new drugs, and much lower for drug efficacy, whereas journals ranked highest for the latter information. Drug firm meetings, commercial literature and advertising were considered much less useful for both types of information. Contrary to the findings of Trounce (1968) and Wilson and his associates (1963a and b) no appreciable differences related to age of doctor or size of partnership were found. Other studies, both in Britain (Dunnell and Cartwright, 1972) and in North America (Becker *et al.*, 1972) and reviews (Herman and Rodowskas, 1976; Worthen, 1973) have tended to confirm the Committee's general findings. Commercial expenditure on promotional activities was estimated by the Committee to be £15.4

millions during 1965, or £550 per doctor, yet Stimson (1975), in an analysis of 590 different drug advertisements in medical journals, concluded that these gave comparatively little useful information.

Regarding non-commercial sources of information Durno and Gill's (1974) finding that the *Prescribers' Journal* was one of the most frequently read medical journals, accorded with an earlier finding of the Committee, and that of Wade (1968).

Lastly, in a unique recent study, Williamson (1975) assessed how 140 general practitioners evaluated the risks attached to use of new drugs. He found that most doctors took at least a year to adopt a new drug from the time of its initial marketing, and that, for example, the influence of the advice of consultants and colleagues was not great in low-risk situations, but increased with the perceived degree of risk.

#### *4. Awareness of harmful effects of drugs*

Finally, the occurrence of harmful drug effects, and awareness among general practitioners of the potential for them may reflect how much they revise and update their knowledge of therapeutics. Mulroy (1973) estimated that one consultation in every 40 in his practice of 6,200 patients was the result of iatrogenic disease. Petrie and his colleagues (1974) found that, on average, 185 general practitioners were aware of only 17 out of 50 selected interactions included in their questionnaire, although the rarity with which general practitioners encounter important clinical consequences from theoretical interactions may partially account for this (Durno, 1973). The slow response of general practitioners to reports of serious adverse reactions to chloramphenicol (Wade, 1966; Meade, 1967) and amphetamines and isoprenaline containing aerosols (Wade and Hood, 1972b) has been disputed by Collier (1973) with regard to high-dose oestrogen oral contraceptives, although greater public pressure was undoubtedly an important factor in this latter case.

The simple device ('Medidisc') for rapidly identifying potential drug interactions, developed by Whiting *et al.* (1973), is an important recent advance, as the potential for possible drug interaction is disquietingly large (Dollery, 1972). McGregor's (1963) plea for circumspection in prescribing has therefore been re-emphasized recently (*British Medical Journal*, 1976).

#### **Conclusions**

Although there is some evidence for the existence of a significant amount of frequent and expensive prescribing and lack of therapeutic knowledge, particularly in the area of drug interaction, the difficulties of research in this field are such that only tentative conclusions can be drawn from the otherwise plentiful existing data.

A more accurate definition of morbidity and therapeutic intent in general practice might assist the development of future studies designed to elucidate the effect of inter-doctor prescribing variations on the care of

patients. Previous qualitative studies of prescribing are necessarily based on more empirical criteria and the results obtained must be interpreted accordingly.

Even in the absence of satisfactory information on quality of prescribing, more attention should be paid to continuing education in therapeutics for general practitioners, as there is already enough evidence for the existence of a significant degree of unsatisfactory prescribing. In planning the content of such a development, the uniqueness of prescribing in the general-practice as opposed to the hospital setting must be recognized (*Journal of the Royal College of General Practitioners*, 1973), including the important influence of psychological and social factors on drug prescribing for physical complaints (Howie, 1976). Herxheimer and Twycross (1976) have identified a particularly suitable method for this type of teaching.

Finally, if we, as general practitioners, are unwilling to support the development of better systems of continuous review of prescribing patterns as a basis for such continuing education, there may be increasing support for those, such as McCarthy (1974), who advocate greater administrative restrictions of prescribing on a more empirical basis.

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