Drug usage in general practice

An analysis of the drugs prescribed by a sample of the doctors participating in the 1969/70 North-east Scotland work-load study

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THE inception of the National Health Service provided new opportunities for the study of the prescribing habits of general practitioners. Early surveys (Dunlop, Henderson and Inch, 1952; Dunlop, Inch and Paul, 1953) showed marked regional variations in the number of prescriptions but little variation in the types of drugs. A detailed study of three towns in England (Lee, 1964; Weatherall, 1964; Lee, Draper and Weatherall, 1965; Joyce, Last and Weatherall, 1968) showed local variations in prescribing which persisted for most of the categories of drugs. The variation between doctors was still striking even when prescribing was considered by partnerships, and was not accounted for by differences in distribution of particular diseases.

Not more than 15 per cent of the variation in individual prescribing could have been accounted for by the personal factors studied, and the conclusion was that the main influence on a doctor's prescribing was the town in which he works. Wilson (1963) found a consistency in prescribing for most categories of disease by the same doctor.

In Scotland, over 5,000 different drugs are prescribed by general practitioners during a year (Bodenham and Wellman, 1972) but a comparatively small number of drugs (536) account for 82 per cent of all prescriptions. The number of different drugs used by an individual general practitioner has been commented on by Wilson (1971), who was subjectively confident that he only used a small number of well-tried drugs but found from analysis of records that he used 148 different drugs in one year.

A recent editorial (*Update Plus*, 1971) suggested that more analysis is needed of the types of drug prescribed in general practice. The purpose of this survey is to examine the range of drugs used by a sample of doctors in the North-east of Scotland, and to study the variation between them in prescribing for different diseases during a period of one year.

Method

A sample of 12 general practitioners was randomly selected from the 147 doctors who took part in a study of general-practitioner consultations in North-east Scotland (Richardson *et al.*, 1972).

Of the 12 general practitioners in the sample, four practised in the city, three in towns and five were in rural practices. List sizes varied from 1,000 to 2,600. Five of the practices were single-handed and one of these and one partnership were dispensing practices. Three of the doctors were female, and their list sizes varied from 1,500 to 2,300. All the doctors had been qualified foı ten years or more (up to 36 years) and nine were graduates of Aberdeen University.

In the original study of workload, doctors were asked to record nine items of information, including diagnosis and drugs prescribed, about every consultation on one day a fortnight during a period of one year. Drugs used were coded, using the method employed in the compilation of the Aberdeen and Dundee drug information system, and

then analysed for each doctor in relation to location of consultation, and whether it was a first or a return contact. The following definitions were used:

'Drug'—a single drug preparation prescribed by its approved or proprietary name.

'Compound'—a preparation of two or more drugs, prescribed by an approved or proprietary name, and classified by the main active constituent of the combination.

'Prescription'—each individual item prescribed for a patient.

Results

A total of 7,379 consultations were recorded by the 12 doctors and 5,730 prescriptions were given at these consultations. The distribution was, as follows:

No drug given=2,593 (35 per cent) consultations.

One drug given=3,840 (52 per cent) consultations.

More than one drug=946 (13 per cent) consultations.

The prescribing rate was 1·2 items for each of the 65 per cent of consultations in which a drug was prescribed.

The number of different drugs recorded was 401 as well as a further 91 preparations which were compounds of these drugs. There was a wide variation in the frequency of usage by drug category, as shown in Table 1.

TABLE 1

FREQUENCY OF DRUG PRESCRIBING

Drug category, by system of action	*Total prescriptions (per cent)*	*Different drugs*	*Drug prescribed only once*	*Compound preparation*
1. Nervous system	*31·9* (n=1827)	101	32	26
2. Autonomic nervous system	*7·1* (n=406)	32	7	11
3. Cardiovascular and haemopoetic systems	*14·1* (n=809)	52	15	10
5. Hormones and synthetic substitutes	7·6 (n=435)	33	10	13
6. Metabolism, nutrition and electrolyte balance	*8·4* (n=484)	40	16	4
7. Anti-infective agents	*24·4* (n=1397)	89	26	16
9. Miscellaneous	*6·5* (n=372)	54	20	11
Total	*100* (n=5730)	401	126	91

(The numbers 4 and 8 were not used in the drug-code categories)

From the figures in Table 1, it is seen that 126 drugs (31·4 per cent of total drugs) were prescribed on one occasion only, and it was found that more than half the drugs recorded by all the doctors were used in three or less of all prescriptions. Twelve drugs were used in 2,013 (42·1 per cent) of the consultations at which a prescription was given.

The drug categories were divided into 44 sub-divisions, and the largest of these was the prescriptions for antibiotics (19 per cent of all prescriptions). The next commonest were antitussives (nine per cent), hypnotics and sedatives (eight per cent) and then antihistaminics, analgesics and tranquillisers with about six per cent in each group.

The proportion of drugs used once only varied from 22 per cent of the drugs in the autonomic nervous system category, to 40 per cent of drugs in the metabolism and nutrition category. A similar pattern was found in the sub-groups with, for example six out of 26 antibiotics being used once only (benzyl penicillin, benzathine penicillin, methicillin, gentamycin, cycloserine and lincomycin), and six out of 18 antihistaminics being used once only (embramine, dimethindene, chlorcyclizine, buclizine, diphenylpyraline and carbinoxamine).

At the opposite end of the frequency scale 12 drugs were each used on more than 100 occasions (Table 2).

TABLE 2
FREQUENCY OF COMMONEST DRUGS

Drug	*Prescriptions*
Phenoxymethyl-penicillin	362
Paracetamol	263
Oxytetracycline	246
Ampicillin	171
'Benylin'	156
Diazepam	131
'Betnovate'	129
'Navidrex'	125
Acetylsalicylic acid	111
Aluminium hydroxide	110
Nitrazepam	107
'Actifed'	102

The total number of prescriptions given by each doctor, in the sample of work studied, ranged from 294 to 937 with an average of 478. The percentage of prescriptions in each drug category is shown in Table 3.

The frequency of prescriptions within each drug category, related to each doctor's total number of prescriptions, showed several significant deviations in all categories except category five (hormones). To find if there was an association between high use of one category and low use of another category, the percentages were ranked in order of frequency for each doctor. No significant association was found between the doctors. For example, a high use of category one drugs was not always associated with low use of category seven drugs.

The doctors varied in the drug that they each prescribed most frequently; in four it was phenoxymethyl-penicillin, two paracetamol, two ampicillin and in one each oxytetracycline, 'Benylin', 'Navidrex' and codeine.

When the frequency of prescriptions in each sub-group of the drug category was studied, considerable variations were found. In some groups, such as the prescriptions for antibiotics (Figure 1) there was a high prescribing rate for a small number of drugs, whereas in the prescriptions for local antiseptics (Figure 2) there was a low prescribing rate for most of the drugs in the group.

From Table 1 it is seen that 401 different drugs were prescribed by the group of doctors. In this sample the individual doctor's use of drugs ranged from 84 to 175 different drugs. When the relative numbers of drugs from each drug category were compared it was found that there was a highly significant degree of agreement between the doctors in the types of drugs which they prescribed.

The possibility was considered that the number of drugs used might be influenced by the proportion of consultations at which a prescription was given or by the number of

TABLE 3

PERCENTAGE OF PRESCRIPTIONS IN EACH DRUG CATEGORY

Drug category by system of action	*Doctor*											
	A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*K*	*L*
1. Nervous system	*44**	*29*	*24**	*30*	*31*	*32*	*36*	*34*	*29*	*37*	*33*	*24**
2. Autonomic nervous system	*5*	*8*	*3*	*7*	*6*	*14**	*9*	*4*	*7*	*6*	*7*	*10*
3. Cardiovascular and haemopoetic systems	*11*	*8**	*24**	*19**	*14**	*11*	*8**	*10*	*16*	*13*	*16*	*13*
5. Hormones and synthetic substitutes	*8*	*8*	*4*	*7*	*9*	*7*	*8*	*8*	*5*	*7*	*10*	*10*
6. Metabolism, nutrition and electrolyte balance	*7*	*3**	*8*	*11**	*7*	*8*	*10*	*11*	*14**	*6*	*6*	*7*
7. Anti-infective agents	*18**	*37**	*28*	*20**	*24**	*25*	*23*	*25*	*18**	*26*	*24*	*33**
9. Miscellaneous	*8*	*7*	*9*	*6*	*9*	*4*	*6*	*8*	*10**	*4*	*4*	*3**
Total prescriptions (*100*%)	612	302	395	937	449	314	477	294	496	500	330	626

*Significant variations.

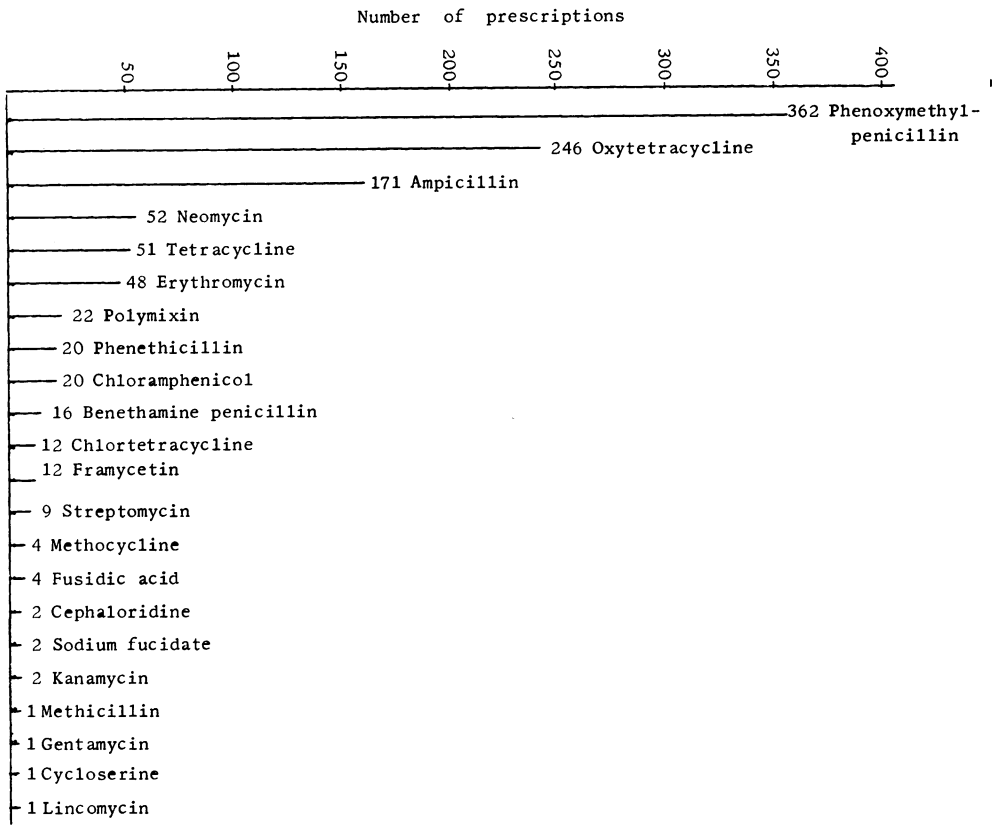

FIGURE 1
Antibiotic prescriptions

prescriptions in each drug category. No significant association was found between individual doctors in their frequency of use of drugs, their prescribing rate and the percentage of consultations at which a prescription was given.

Discussion

From this study it is apparent that a considerable number of different drugs was used by this group of general practitioners—an average of 116 with a range of 84 to 175. The study covered 26 randomly-selected recording days during a period of one year. If the total prescribing for a year had been included the number of different drugs would probably be higher; thus the individual doctor's range of drugs recorded in this study may be taken as a minimum.

One third of the 401 drugs prescribed by this group of doctors were used once only. The reasons for these single prescriptions may vary—for example, the doctor's choice, a consultant's advice, or the use of a drug sample—but they represent an area of prescribing where the doctor's experience of a drug is limited. If the prescribing was considered for a complete year, then many of these would no longer be single prescriptions, though no doubt other drugs would be recorded as being used once only.

When the rarely prescribed drugs were examined, it was found that some of these were simple drugs that one might expect to have been used more often. The possibility that there was some under-recording by the doctors was considered. In the study the prescribing rate was 1·2 items for each of the consultations at which a prescription was given. The

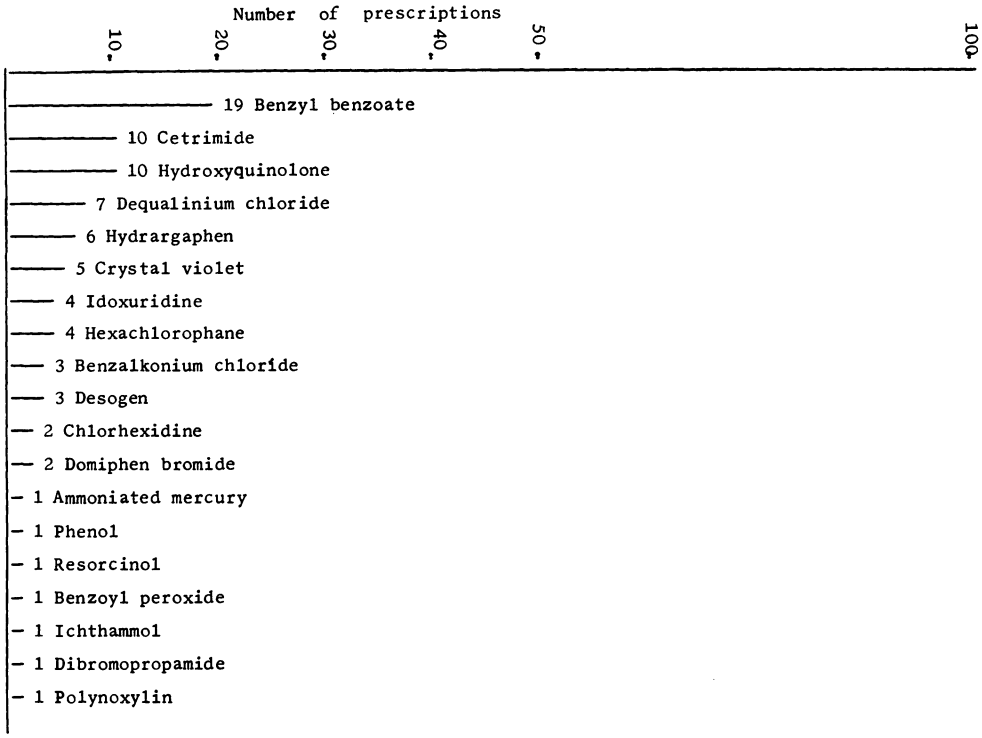

FIGURE 1
Local antiseptic prescriptions

local executive council figures for the average number of items on each prescription form during the six months was 1·35, which suggests that there was some under-recording.

The range of drugs prescribed by each doctor in each drug group showed considerable agreement, but there were significant deviations in the total number of prescriptions in each drug group. The only drug group in which there was uniformity of prescribing was the hormones and synthetic substitutes.

In this study the variations in prescribing were considered in relation to the practice circumstances (list size, location, number of doctors and whether it was a prescribing practice) and to the doctor's characteristics (age, sex, length of time since graduation and postgraduate degrees), but no significant correlations were found.

It appears that, while this group of general practitioners show considerable variability in their prescribing characteristics, there is substantial agreement in their use of the different drug groups. The large number of drugs involved suggests the need for the individual doctor to review carefully the drugs he prescribes, and in a group practice the need for careful and systematic recording of drugs prescribed for the individual patient.

The large number of drugs available presents a particular problem to the new entrant to general practice. A trainee should be encouraged to use a small range of drugs so that he may become familiar with their dosage, contra-indications and possible interactions. The established general practitioner might also benefit from a periodic review of the drugs which he prescribes.

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DRUG PRESCRIPTIONS

A recent report of the sub-committee on the misuse of drugs in Scotland states that in the period January to March 1971 the quantity of amphetamines dispensed in Scotland through the National Health Service decreased by 37 per cent compared with 1970.

During the years 1967–70 there was an eight per cent increase in the prescriptions for hypnotics.

BARBITURATES IN ASTHMA

Continual administration of phenobarbitone is therefore likely to reduce the therapeutic effect of corticosteroids in patients with asthma, and the prescribing of barbiturates might account for the need to increase the dosage of corticosteroids and cause the low plasma-cortisol response which has been observed in some patients. Many proprietary bronchodilator mixtures contain barbiturates.

Moreover, intermittent use of barbiturates could result in instability in requirements in corticosteroid-dependent patients and difficulty in tapering-off dosage. Other hypnotics known to be enzyme-inducers in man include dichloralphenazone and glutethimide, both of which might have a similar adverse effect in corticosteroid-dependent patients. Severely ill asthmatic patients should not be given sedatives, since in respiratory failure there is probably no drug with sedative, hypnotic or tranquillising properties that cannot cause respiratory depression.

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