Middle Articles

Prescribing and the British National Formulary

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The *British National Formulary (B.N.F.)* is produced by the Joint Formulary Committee of the British Medical Association and the Pharmaceutical Society of Great Britain. The Committee claims that the preparations included in the *B.N.F.* can serve almost all the requirements of prescribers, whether in hospital or in general practice. The investigation reported in this paper was carried out to examine this claim as regards general practice. Further, in view of the discussion in recent years of the cost of prescribing in the National Health Service (Ministry of Health, 1956, 1959, 1964), it was designed to discover whether economies in the cost of prescribing might result from a wider use of the *B.N.F.*

Methods

In Northern Ireland, prescription forms which have been handed to pharmacists when patients receive their drugs are sent to the Northern Ireland General Health Services Board for costing so that the Board may reimburse the pharmacists. With the cooperation of the Board and with precautions to ensure confidentiality three samples of prescriptions were obtained:

1. *All the prescriptions presented to a single pharmacy in an urban area during June 1965.*—These came from many different practices and there was no reason to believe that they did not represent a random sample of prescriptions being written in the area during that month.

2. *All prescriptions written by the doctors working in two separate practices, A and B, in a small rural town during June 1965.*—The practices were of similar size and served an apparently similar cross-section of the community. They were chosen because one (Practice A) had prescribing costs that had been persistently above the average for Northern Ireland for many years, and the other (Practice B) had costs that had been persistently lower than the average.

Every prescription for drugs on each form was examined by one of the authors or their colleagues to determine whether it was for: (1) A preparation in the 1963 edition of the *B.N.F.* (this was the current edition in June 1965). (2) A proprietary preparation for which either an exact *B.N.F.* equivalent could be substituted or, if this was not possible, for which a *B.N.F.* preparation could be substituted which would have substantially similar effects for the patient. (3) A proprietary preparation for which there was no suitable alternative in the *B.N.F.*

As this was done, an "amended" list of the prescriptions was prepared in which *B.N.F.* preparations were substituted whenever possible. In these amended lists prescriptions for dressings and appliances were left unchanged, and no changes were made in the quantities of drugs to be supplied. A random sample of about one-third of the prescriptions and the

suggested alternatives was discussed in detail with an experienced general practitioner. The original sample of prescriptions was then submitted to the Pricing Bureau of the Northern Ireland General Health Services Board for costing, and the amended lists were also costed.

Results

The assessment of the prescriptions is shown in Table I. In the three samples between 73% and 83% of prescriptions were for drug preparations not in the *B.N.F.* In the opinion of the investigators a high proportion of these prescriptions could have been written for *B.N.F.* preparations. Indeed, a number of the preparations originally prescribed, such as analgesic tablets containing amphetamine, iron preparations containing little iron, and preparations containing phenylbutazone and steroids in fixed amounts, were thought to be inferior to alternatives available in the *B.N.F.*

TABLE I.—Assessment of Prescriptions

	General Sample	Practice A	Practice B
	No.	No.	No.
Total forms	455	968	969
For prescriptions from the <i>B.N.F.</i>	695	1,558	1,294
For proprietary preparations judged to have alternative in <i>B.N.F.</i>	110 (16%)	195 (13%)	313 (24%)
For proprietary preparations judged to have no alternative in <i>B.N.F.</i>	526 (76%)	1,265 (81%)	866 (67%)
For dressings and appliances	32 (5%)	36 (2%)	75 (6%)
	27 (4%)	62 (4%)	46 (4%)

Some proprietary preparations which were prescribed were more elegantly formulated than the appropriate *B.N.F.* preparations, and it is accepted that there may at times have been a special need to prescribe a proprietary drug because of some idiosyncrasy or some special requirement of an individual patient.

Sometimes a single proprietary substance contained two or more active ingredients, and more than one preparation from the *B.N.F.* had to be substituted in its place.

The number of preparations prescribed for which there was no suitable alternative in the *B.N.F.* was between 2% and 6%. There were, for example, prescriptions for three drugs which had been recently introduced and were not in the 1963 edition of the *B.N.F.*; methyldopa (Aldomet), indomethacin (Indocid), and amitriptyline (Tryptizol; Saroten).

Estimated Reduction of Cost by use of the *B.N.F.*

The cost of the original prescriptions and of the amended lists is shown in Table II. Although in a few instances the

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change from a proprietary preparation to a *B.N.F.* drug caused an increase in price, there was an overall reduction in cost by the use of the *B.N.F.* In the case of the general sample the reduction was of the order of 30% of the original cost: for Practice A it was about 36% and for Practice B it was 14% of the original cost.

TABLE II.—Cost of Prescriptions

	Original Cost			Estimated if <i>B.N.F.</i> Used		
	£	s.	d.	£	s.	d.
General sample	324	5	0½	219	8	10
Practice A	761	6	0½	489	18	10½
„ B	471	16	1	403	8	11½

Specific Examples of Price Differences

Analgesic Preparations.—There was sometimes a great difference in cost between a preparation ordered by its proprietary name and the same preparation ordered by its approved name in the *B.N.F.* Many of the proprietary compound analgesic tablets were more expensive than *B.N.F.* preparations and were unlikely to have any appreciably greater therapeutic efficiency.

	Price per 100 s. d.
Paracetamol Tab. <i>B.N.F.</i> contains 500 mg. paracetamol	2 5
Panadol Tab. contains 500 mg. paracetamol	5 3
Lobak Tab. contains 450 mg. paracetamol and 100 mg. chlormezanone	18 8
Distalgic Tab. contains 325 mg. paracetamol and 32.5 mg. dextropropoxyphene	10 8

Prescriptions for analgesics were common in all three samples of scripts. In Practice A there were 95 prescriptions for Panadol: changing these prescriptions to paracetamol would have reduced the cost by £13 9s. 2d., and this change could have made no appreciable difference to the patients.

Iron-containing Preparations.—The price difference between the most frequently prescribed proprietary preparations and the *B.N.F.* preparations was considerable.

	Price per 100 s. d.
Ferrous sulphate Tab. <i>B.N.F.</i> contains: 200 mg. ferrous sulphate≡60 mg. elemental iron	8
Ferrous gluconate Tab. <i>B.N.F.</i> contains: 300 mg. ferrous gluconate≡36 mg. elemental iron	1 5
Feospan spansules. Each contains: 150 mg. ferrous sulphate and aneurine hydrochloride	18 4
Ferraplex B Tab. contains 167 mg. ferrous sulphate and vitamins	6 2
Rarical Tab. contains ferrous calcium citrate≡25 mg. elemental iron and calcium salts and aneurine hydrochloride	5 1

If vitamins are needed:

Aneurine compound tablets <i>B.N.F.</i>	100 tabs. cost 1s.
Vitamin capsules <i>B.P.C.</i>	100 caps. cost 2s. 4d.

Antacids.—A wide variety of proprietary preparations were prescribed. Because of the chronic nature of dyspeptic illness they were often prescribed in large quantities. It is unlikely that these proprietary preparations offered patients any substantial additional therapeutic efficacy over the *B.N.F.* preparations, but they were much more expensive.

	Price per 100 s. d.
Magnesium trisilicate compound Tab. <i>B.N.F.</i> contains aluminium hydroxide and mag. trisilicate	2 0
Aluminium hydroxide Tab. <i>B.N.F.</i>	3 0
Actal Tab. contains sodium polyhydroxyaluminium and monocarbonate hexitol complex	5 10
Prodexin Tab. contains aluminium glycinate and magnesium carbonate	9 8½
Roter Tab. contains magnesium carbonate, bismuth subnitrate, and frangula	13 6
Rabro Tab. contains liquorice, bismuth subnitrate, magnesium and sodium bicarbonates, frangula, and calamus	15 2

Antibesity Drugs.—These were prescribed more often than might have been expected. There was a considerable difference in price between the *B.N.F.* preparations and some of the proprietaries.

	Price per 100 s. d.
Dexamphetamine Tab. <i>B.N.F.</i> contains 5 mg. dexamphetamine	10
Dexedrine Tab. contains 5 mg. dexamphetamine	3 0
Durophet capsule contains 12.5 mg. laevo- and dextro-amphetamine	8 4
Preludin Tab. contains 25 mg. phenmetrazine	13 4

Tranquillizers.—The single most frequently prescribed tranquillizer in these samples of scripts was Librium (chlordiazepoxide). There is evidence that this is one of the pharmaceutical preparations most often prescribed in general practice in Northern Ireland. There are many possible explanations for this. There is a high incidence of minor psychiatric illness among patients seen in general practice, and it has been suggested that this preparation may be used as a substitute for a prolonged interview with a patient when this is impossible on account of the demands of practice. It is in the *B.N.F.*, and was the same price—16s. 5d. per 100 tablets (10 mg.)—whether prescribed under its trade name or its approved name. Meprobamate (Equanil) was another commonly prescribed tranquillizer. It is in the *B.N.F.*, and costs 12s. 7d. per 100 tablets (400 mg.) whether prescribed under its trade or approved name. Whether the use of these tranquillizers in preference to small doses of barbiturates offers any substantial advantage to the majority of patients has never been convincingly demonstrated. One hundred tablets of phenobarbitone (30 mg.) cost 5d.

Quantities Prescribed.—Some prescriptions were for surprisingly large quantities. Often when an analgesic tablet was prescribed “2 tablets S.O.S.” there would be instructions to supply 100 tablets. This would be justified for patients with long-lasting chronic conditions but would be unreasonably large if a patient had an ephemeral and self-limiting pain. Antacid prescriptions were often prescribed by some practitioners in quantities of 32 oz. (908 ml.). The pharmacist who supplies this amount is entitled to a double prescribing fee.

Comparison of Prescribing in Two Practices.—Differences in prescribing in practices A and B are shown in Table I. In practice A 13% of prescriptions were for preparations in the *B.N.F.*; in practice B 24%. The analysis suggests that a much higher proportion of prescriptions—94% and 91%—might reasonably have been for preparations in the *B.N.F.* The costs of the two practices are analysed in Table III. The higher cost of prescribing in practice A was partly due to a greater use of proprietary preparations, but was mainly because of the frequency with which quantities of 100 or 200 tablets were prescribed: this often represented a supply that would last a patient three months. If such large supplies are needed by many patients it might be expected that there would be evidence of more frequent visits to their doctor by the patients in Practice B. There is no such evidence. If the small supplies given in Practice B were adequate it is possible that patients given large quantities either continued to take tablets when there was no need until the supply had finished, or stopped taking their tablets when they noticed that their condition had improved, and then had a large number of unused tablets at home.

TABLE III.—Comparison of Practices

	Practice A (2,988 Patients)		Practice B (3,311 Patients)	
	Original	Estimated if <i>B.N.F.</i> Used	Original	Estimated if <i>B.N.F.</i> Used
No. of scripts	968	968	969	969
„ „ prescriptions	1,558	1,595	1,294	1,341
Cost per form	15s. 8.75d.	10s. 1.47d.	9s. 8.86d.	8s. 4.92d.
„ „ prescription	9s. 9.27d.	6s. 1.72d.	7s. 3.50d.	6s. 0.92d.
„ „ patient	5s. 1.44d.	3s. 3.35d.	2s. 10.19d.	2s. 5.53d.

The use of alternative preparations from the *B.N.F.* made a much greater difference to the prescribing costs of practice A than of practice B: but even in practice B it would have brought about an economy in excess of £500 over a 12-month period.

Conclusions

This analysis suggests that the claim of the Joint Formulary Committee that the preparations in the *B.N.F.* can serve almost all the requirements of prescribers is probably true for general practice and that a substantial reduction in the cost of drugs could be achieved without any appreciable loss to patients. Pharmaceutical services cost the Northern Ireland General Health Services Board more than £5m. in 1965 and the cost of drug-prescribing was over £4.4m. A saving of the order achieved in the general sample of prescriptions in this investigation would represent a reduction of the drug bill by approximately one-third and save over £1m. per annum.

It is also likely that substantial saving would result from more extensive use of the *B.N.F.* in prescribing in hospitals. But in hospitals there is another important reason why the use of the *B.N.F.* should be encouraged. Its use would eliminate, especially for nursing staff, much of the confusion due to the present indiscriminate use of two systems of drug nomenclature and would reduce the chances of error (Crooks, 1965; Crooks *et al.*, 1965; Wallace, 1965) in the administration of drugs on wards.

The detailed investigations here described were difficult and time-consuming, and the decisions made about individual preparations are based on personal opinions and may be justifiably criticized. The findings, however, suggest that there is a need for similar and more extensive investigations of prescribing both in general practice and in hospitals.

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MEDICAL HISTORY

Dr. John Fothergill, Physician and Humanist

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In the middle of the eighteenth century Dr. John Fothergill was one of the most distinguished physicians in this country, though his reputation has weathered less well than that of his near contemporaries Sydenham and Heberden; and there are now few, except medical historians, who remember his name. The main landmarks of his career are easily summarized. He was born on 8 March 1712 near Richmond, in Yorkshire, one of the several children of a Quaker merchant of some local consequence, schooled at Sedbergh, and apprenticed when he was 15 or 16 to an apothecary in Bradford. His apprenticeship ended, he entered the medical school at Edinburgh, which at that date was an exciting place, beginning to seethe with revolutionary new ideas about experimental physiology as the truly scientific basis of medicine— notions caught from the great Boerhaave of Leiden. In Edinburgh Fothergill's ability was soon spotted by Alexander Monro, the famous anatomist, who made use of him to revise his textbook on osteology. He graduated in 1736 with the degree of M.D. by a thesis in Latin on the use of emetics, an essay in therapeutics which now sounds oddly tedious.

Soon after, he moved to London and for a couple of years worked on the wards of St. Thomas's Hospital, famous at this time because of Dr. Richard Mead, who seemed to Johnson to have "lived more in the broad sunshine of life than almost any man." Here, it was related by contemporaries, Fothergill's "application was unremitting, and his comments on the cases often listened to by his seniors." Finally, after making a brief tour of Belgium, Holland, and Germany to see something of medicine in those countries, he set up in practice about 1740 in a house close to Lombard Street, in the City. In 1744 he was admitted a Licentiate of the Royal College of Physicians. That is, in modern terminology, he passed the Membership examination, which then, as now, was something of a hurdle, and he was the first Edinburgh graduate to do so. One can infer what the examination was like around that date from the fascinating account of his own experience given by James Yonge in his diaries, which were published a year or two ago.

Fothergill never became a Fellow of the College because its statutes then restricted the honour to medical graduates of Oxford and Cambridge alone, and in later years he was involved in some bitter wrangles with the College, which stemmed, I

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