Patterns of European Diagnoses and Prescribing

Bernie O'Brien

Health Economics Research
Department of Economics, Brunel University

Office of Health Economics
12 Whitehall
London SW1A 2DY

January 1984

Patterns of European Diagnoses and Prescribing

Bernie O'Brien

Health Economics Research
Department of Economics, Brunel University

Office of Health Economics
12 Whitehall
London SW1A 2DY

January 1984

Office of Health Economics

The Office of Health Economics was founded in 1962 by the Association of the British Pharmaceutical Industry. Its terms of reference are:

To undertake research on the economic aspects of medical care.
To investigate other health and social problems.
To collect data from other countries.
To publish results, data and conclusions relevant to the above.

The Office of Health Economics welcomes financial support and discussions on research problems with any persons or bodies interested in its work.

Contents

List of tables (see Appendix B)

Acknowledgement

This study was made possible by the co-operation of Intercontinental Medical Statistics who provided the data on which the study is based. Particular thanks are due to Werner David, Graham Hewitt and Sandra Keane for their assistance and helpful advice.

Introduction

In the summer of 1982 the Medico-Pharmaceutical Forum held a meeting on 'Disparities in European Medicine'. The aim was to compare and contrast the various aspects of health and medical care in Europe. Disparities were not difficult to find. The conclusion of the meeting endorsed the theme; despite the growth in European communication and development of the EEC, the harmonisation of European medical practice has been very slow, indeed 'convergence is a long way off' (*Lancet*, 1982).

An important area of international disparity that has received some attention is pharmaceutical consumption. Gisbert (1980) analysed European expenditure data on nine groups of medicines for the 1970s and found large differences between countries. Similarly, Dunlop and Inch (1972) used sales information to 'portray some of the odd divergencies which occur in different parts of Europe in pharmaceutical and medical practice'. Abel-Smith and Grandjeat (1978) produced a wealth of information for the European Commission and emphasised the importance of differences in the organisation and financing of health care when considering differences in pharmaceutical consumption. More recently, Friebal (1982) analysed the utilisation of seven groups of medicines in ten European countries and found wide disparities.

But to what extent are European disparities in prescribing the consequence of disparities in European health? International differences in the former can only usefully be analysed in the context of the latter. Thus Abel-Smith and Grandjeat (1978) noted prescribing differences and suggested where future research should be aimed:

'It would be of considerable interest to see how far the differences in the number of prescription items are due to differences in morbidity or differences in the extent to which doctors use pharmaceuticals for particular conditions.'

Subsequent attempts to bring together the available information on morbidity and prescribing are noticeable by their absence. Although the World Health Organisation's Drug Utilisation Research Group (DURG) continues to be active in refining methods for measuring drug consumption, the availability and comparability of European morbidity data is poor.

The aim of the present study is to conduct a comparative analysis of diagnosis and prescribing using sample survey data on five major European countries – France, Federal Germany, Italy, Spain and the UK. The data source was the Medical Data Index (MDI, 1982 data) which is an international sample survey of prescribing doctors conducted quarterly by the market research agency IMS International – known as Intercontinental Medical Statistics in the UK (see Appendix A).

After an initial discussion of the aims and limitations of the study the leading diagnoses are presented and analysed in the context of previous studies and findings. The second section analyses the rates of drug treatment and prescribing and considers the question of doctor and patient incentives under different methods of primary care organisation. The third section examines the leading drugs prescribed in each country and devotes brief discussion to the issue of measurement of drug utilisation. Finally, for the three most significant diagnoses across all the countries, the study considers what drugs are prescribed and possible differences in treatment regimes and fashions between the countries..

1 Diagnosis analysis

1.1 The context: Europe's changing health

It is recognised that the practice of medicine is not an exact and precise science but an art. Although the laws of natural science may be invoked by the individual practitioner, the art of ascertaining patient ailments and prescribing treatment is essentially judgemental. 'Getting a second opinion' is a phrase which is traditionally associated with doctors and their diagnoses.

Diagnostic disagreement between practitioners is a well documented aspect of many areas of medicine. Examples include Bakwin's famous 1945 study of medical opinion regarding tonsillectomy for a sample of children (see Malleson, 1973) and more recent contributions from the world of dentistry (Elderton and Nuttall, 1983, Main and Basker, 1983). Often such differences are 'explained', as with tonsillectomy, in terms of individual practitioners' attitudes towards treatment fashions of the day. In general there are two main considerations which help to place such disparities in a historical context.

(1) Due to improvements in the basic human condition such as environmental changes, improved nutrition, better housing, etc and the contributions of medical care – especially immunisation programmes – the acute infectious diseases of the past (eg cholera, typhoid, TB, smallpox) have given way to the chronic, degenerative diseases of modern life (eg heart disease, cancer). One of the consequences of this changing disease pattern has been that general medicine and diagnosis has necessarily become far more dependent on the judgement and opinions of medical practitioners and the attitudes and expectations of the population as a whole. The extent to which a patient's blood pressure is judged to be high, low, or normal is an obvious example which has received much debate (see Cochrane, 1971, p 48). The diagnostic choice is increasingly not in terms of black or white but in terms of the many shades of grey.

(2) Along with this movement away from the acute/infectious towards the chronic/degenerative there has been the overall growth in the degree of sophistication and specialisation of medicine. Diagnostic categories are continually being refined and subdivided as our knowledge of disease processes increases. Such change suggests that the doctor's *choice* of a specific diagnosis, given very general symptoms for a patient, has increased greatly. As such choice grows we might expect diagnostic opinions to remain varied.

It is this problem of potential variability in medical opinion and clinical judgements which makes international comparisons of diagnoses an extremely hazardous affair. The main interest in diagnoses is as an indication of morbidity, yet international (or intranational) disparities in diagnoses can occur for either of two basic reasons:

(i) There may be *genuine* differences between countries in the levels and types of morbidity presented to a given group of doctors.

(ii) The same symptoms or morbidity information may be presented by patients, but the *interpretation* and consequent diagnosis may vary between doctors and countries.

International disparities in diagnoses will be due to a combination of these two elements. On the one hand there will be the *predisposing* factors such as population age, sex, diet, housing, education and attitudes towards ill health and medicine. Secondly, there will be the *enabling* factors which include the availability, organisation and financing of health care. This latter group also includes areas such as medical education, the availability of pharmacological information and the influence of any treatment 'fashions'. The aim of the study is not to offer any definitive epidemiological analysis of the diagnosis data presented, but rather to note differences in predisposing factors and attempt to 'explain' residual differences in diagnoses between coutries in terms of some of the available evidence on enabling factors.

1.2 Some predisposing factors

The basic demographic information for the five countries is presented in Table 1 along with crude birth and death rates and basic health indicators in Table 2. In addition, Table 3 gives annual consumption figures for alcohol and cigarettes.

A variety of indices have shown that consultation rates in general practice are higher for women than men (Verbrugge, 1979, Cartwright and Anderson, 1981). This difference betwen the sexes being most pronounced with females between the age limits of child bearing. Although the female/male population ratio is greater than one in all five countries – reflecting the fact that women live longer than men – this imbalance is greatest in Germany where 52.4 per cent of the population is female.

Probably the most important factor influencing consultation/diagnosis rates and drug consumption is age. Abel-Smith and Grandjeat (1978) found that consumption of pharmaceuticals by 'pensioners' (over 65) was significantly higher than the national average in a number of European countries. UK surveys (Cartwright and Anderson, 1981) show that consultation rates for those over 65 are approximately 50 per cent higher than the average. In the UK one in three prescriptions is dispensed to the elderly – this level of consumption being almost twice the per capita UK average (OHE, 1980). In general the relationship between age and consultation tends to be 'U' shaped with high rates

for the very young and the aged. As Table 1 suggests, Spain has the fastest growing population of the five countries with relatively high birth and low death rates. Consequently it has the 'youngest' population of the five, with just over 10 per cent of Spaniards over 65 years. In contrast, just over 15 per cent of Germans are over 65 years reflecting an older population with the highest death and lowest birth rates of the five countries.

Table 3 indicates annual consumption of two commodities which have adverse effects on health. Clearly, in any detailed analysis it would be desirable to consider a whole range of consumption variables. Limiting the consideration to these two predisposing factors indicates that the Germans appear to smoke most cigarettes per capita while the French consume the most alcohol – more than double the amount the average UK person drinks.

This very brief overview of some of the predisposing factors does not indicate very large differences between the countries in terms of population characteristics and mortality. But there may be some important omissions. Some predisposing factors are less easy to quantify. One important factor will be international differences in *attitudes* towards health, health care and illness. Such attitudes in combination with general expectations about health will influence an individual's perception of his need for health care and the extent to which he 'demands' health care by consulting a medical practitioner.

1.3 Consultations and diagnoses

Consultation rates are often reported as basic morbidity indicators and measures of primary care utilisation. The method of data collection is usually one of patient self-reporting (as in the UK General Household Survey) or monitoring of a sample of GPs. Widely differing estimates of consultation rates suggest that both approaches may have their limitations.

The MDI database reports diagnoses rather than consultations. In the majority of cases the two will be synonymous. However, the possibility of 'co-diagnosis' does exist – individual patients may be suffering from two unrelated ailments (eg bronchitis and a broken leg) – and the doctor would record two diagnoses for the one consultation. This being so, it seems reasonable to argue that data on diagnoses will tend to be a more sensitive indicator of illness episodes and morbidity than consultations.

Clearly, consultations or diagnoses made in general practice will not provide a comprehensive basis for making *overall* morbidity comparisons between countries. Many contacts with the health care systems are often made direct to the hospital sector (eg accidents and emergencies). Furthermore the propensity or desire to visit a doctor or seek any form of medication – for a given state of illness – will obviously vary both *between* and *within* national populations. Numerous studies have investigated the extent of the so-called 'Iceberg of Sickness' and found that the majority of illness goes undetected. Horder and Horder (1954) estimated that only a third of illness reached a medical agency, but even this may be an over-estimate because more recent work shows, for example, that only one in 184 episodes of headaches was taken to a doctor (Banks *et al,* 1975). In a 1949 UK survey, Logan and Brook (1957) found that less than one in four of those complaining of illness had seen a doctor about the complaint.

The main problem with diagnosis data is that of repeat consultations for the same ailment. In practice, therefore, they cannot simply be taken as a measure of the incidence of disease, but rather as a measure of the reported workload of doctors. Higher numbers of diagnoses in one country compared with another may merely indicate that, in the former, doctors see patients more often for the same amount of illness as occurs in the latter. Furthermore, consultation rates for short term minor ailments will be influenced by institutional factors such as employees' requirements regarding sickness absenteeism and benefit. For example, the changeover to self-certification in the UK in June 1982 may well reduce consultations for minor ailments because individuals can now certify their own illness (O'Brien, 1982b).

Table 4 presents the total diagnosis data in annual and per capita form (DX/POP). In the UK, for example, 388 million diagnoses were made by GPs which represents an average of nearly 7 diagnoses per person for the year. Although data on diagnoses is not available for Germany, the number of treated patients (TDX) for the same period was 558 million. Assuming that diagnosis is a necessary prerequisite of treatment in the vast majority of cases, it can be estimated that the Germans receive *at least* nine diagnoses each in a year; easily the highest rate for the five countries.

Only a very limited amount of information on international consultation rates is available for comparison with the present findings on diagnosis rates. Abel-Smith and Grandjeat (1978) cite annual consultation rates of 3.5 for the UK, 11.5 for Italy and 12 for Germany. It is interesting to note that these *consultation* rates generally accord with the present findings on *diagnosis* rates for Germany and Italy, but the present estimate of UK diagnosis rates is nearly twice that of consultations in the previous study, which was based on General Household Survey data. At present there is no simple way of determining whether this difference is a statistical artefact or due to a higher rate of co-diagnoses in UK consultations.

1.4 Range and specificity of diagnoses

Diagnoses are defined and coded according to the World Health Organisation's International Classification of Diseases (ICD), (WHO, 1965 eighth revision). For each country the leading twenty diagnoses are listed in Tables 5 to 9. For more general comparison purposes the distribution of these specific diagnoses by the general WHO

chapter heading (eg 'Diseases of the Respiratory System') is presented in Table 10.

A basic observation can be made at the outset about the distribution or range of diagnoses within each country. In Spain and France the 'Top 20' diagnoses account for nearly 37 per cent of all diagnoses, whereas the figure for Italy is 42.4 per cent and for the UK and Germany is about 47 per cent. Thus it might be tempting to draw the conclusion that basic disparities exist in the 'range' of diagnoses being utilised.

However, this conclusion must be qualified. Much of the reason lies with the 'Don't Know' morbidity category – ICD number 769, 'Other ill-defined and unknown causes of morbidity and mortality' – which accounts for nearly 4 per cent of all diagnoses in Germany and appears to be the leading UK diagnosis, being 7.5 per cent of all UK diagnoses. However, although coded as unknown morbidity, nearly 85 per cent of this category is the result of poor survey response – where doctors have 'not stated' diagnoses rather than 'not known' them. (See Appendix A).

By re-percentaging this group over known diagnoses for the UK and Germany, the leading twenty *specific* diagnoses in these two countries account for between 44 per cent and 42 per cent of all diagnoses; similar to the figure for Italy (42.4 per cent). That the French and Spanish figures are significantly lower (36.5 per cent) suggests either a greater variety of morbidity is experienced, or a greater variety of *interpretation* of symptoms and consequent diagnoses are made by French and Spanish doctors.

1.5 Top twenty diagnoses by ICD chapter

Table 10 groups the leading twenty diagnoses for each country under the relevant chapter headings of the ICD. Each chapter heading represents a broad grouping or category of disease. The associated range of diagnosis numbers are given in brackets for each chapter. The data are presented as percentages of the leading twenty diagnoses occurring in each of the chapters.

Even though we have an *incomplete* picture of all diagnoses, the most striking feature about Table 10 is the lack of international uniformity. Even allowing for the large number of not stated UK diagnoses the significance of 'Diseases of the Respiratory System' (VIII) in the UK is low compared with Spain where it accounts for 41.9 per cent of the leading diagnoses. 'Disease of the Circulatory System' (VII) are easily the most significant of the leading French diagnoses (31 per cent). It is also interesting to witness the contrast between the percentage of leading French, German and Italian diagnoses for 'Diseases of the Digestive System' (IX) being 3.6 per cent, 7.4 per cent and 17.1 per cent respectively.

A clear difference between the countries is the significance of 'Infective and Parasitic Diseases' (I) which only feature in the leading diagnoses of Spain, Italy and France. By contrast a similarity between all five countries is that 'Neoplasms' (II) and 'Diseases of the Blood and Blood Forming Organs' (IV) are not leading diagnostic groups along with items such as genito-urinary diseases and pregnancy complications. A high degree of variation exists in chapter (V) 'Mental Disorders' which accounts for only 4.6 per cent of leading Spanish diagnoses compared with (at least) 16.5 per cent of leading UK diagnoses.

Another obvious difference between the countries is the significance of contraception in the leading diagnoses (which comes under Supplementary Classification (Y00–Y89)). Not surprisingly, the dominantly Catholic countries of Spain, France and Italy do not have contraception amongst their leading diagnoses, whereas the opposite is true of the UK and Germany where attitudes towards contraception are less dominated by the doctrine of the Catholic Church.

Grouping the leading diagnoses by chapter headings also illustrates the broad differences between the countries in terms of *chronic* and *acute* morbidity. For example, the Spaniards experience a high proportion of acute respiratory disease (eg colds and flu) – short term infections which are typically 'cured' quickly – whereas the French and Germans appear to experience more long term degenerative diseases of the circulatory system. However, although primary care utilisation is a useful guide to the point-prevalence of specific diseases, prevalence provides no information on the *length of time* these ailments last. The importance of this distinction would be highlighted by a comparison of international morbidity rates using a measure of 'working days lost due to sickness absence' – a measure which is sometimes used as a proxy for morbidity.

1.6 Top twenty diagnoses by ICD number

While providing a useful basis for general comparison and discussion, narrow consideration of disease groups under chapter headings may obscure wider disparities which exist at the level of actual diagnoses. The study now focuses on specific diagnoses – the top twenty from each country – and considers similarities and differences in morbidity experience. Table 5 to 9 list the leading diagnoses in each country.

Combining the experience of the five countries, a total of nearly 97 million diagnoses of Essential Benign Hypertension (401) – high blood pressure – are made each year. This ranges from 433 diagnoses per 1,000 population in Italy – 6 per cent of all diagnoses – to the Spanish rate of 244 per 1,000 population despite being the leading Spanish diagnosis at 3.3 per cent of all diagnoses. This type of high blood pressure – termed essential because it is of unknown cause – is easily the most significant diagnosis for the five European countries as a whole. Although little is known about the causes of essential hypertension, it is known that blood pressure generally increases with age. Other

contributory factors may include diet (eg salt intake and obesity) and environmental or psychological factors.

Another common group of ailments comprises the common cold, influenza, asthma, bronchitis and tonsillitis – all diseases of the respiratory system (chapter VIII). As noted earlier, nearly 42 per cent of the twenty leading diagnoses in Spain occur in this chapter. The combination of acute (466), chronic (491), and unqualified (490) bronchitis represents an annual total of 17 million diagnoses in Spain – a rate of about 458 per 1,000 population or 6 per cent of all diagnoses. By comparison only 2.7 per cent of all UK diagnoses are for 'Bronchitis Unqualified' (490); acute and chronic bronchitis not being listed amongst the leading twenty diagnoses. This amounts to a rate per 1,000 population of only 184 – nearly a third of the combined Spanish rate.

Such findings are surprising and conflict with the findings of earlier studies. Dunlop and Inch (1972) for example, in a review of variations in European medical practice, stated the received wisdom that 'bronchitis, for instance, is known as the English disease, and in its chronic form is far more prevalent in Britain than in many countries in Western Europe'.

Probably the most frequent everyday ailment is the common cold – acute nasopharyngitis (460). Initial reading of the data suggests that colds are more frequently incurred in France than in Germany and the UK – the diagnosis rates per 1,000 population for the three countries being 180, 93 and 81 respectively. But a deal of caution must be exercised when interpreting such differences. One source of variance may well be climatic – the incidence of epidemics of colds and influenza being highly variable.

But even allowing for such elements as climate, why should three neighbouring European countries have such differing experience with the common cold? Much of the answer may lie in what the data cannot measure. Some individuals with a cold may not consult a doctor for formal diagnosis but will take the initiative of self-medication and purchase over-the-counter drugs. Thus rates of diagnosis for such minor ailments may vary between countries, but this will reflect such things as general (national) attitudes towards illness (eg degrees of hypochondria) and the price and availability of over-the-counter drugs for self-medication. The high rate of French diagnosis may well be influenced by the French restrictions on the advertising of over-the-counter drugs – patients being less aware of the medicines available.

A further consideration is that 'acute upper respiratory infections of multiple or unspecified site' (465) accounts for 145 diagnoses per 1,000 population in the UK. This might be interpreted as a tendency for UK doctors to record *unspecific* but localised symptoms of the common cold, rather than the specific entity of acute nasopharyngitis. The international disparity may be a semantic one – the problem of defining when a cold is a cold – rather than a genuine difference in the incidence of acute nasopharyngitis.

On average nearly 10 per cent of the leading twenty diagnoses occur in chapter (V) 'Mental Disorders'. This ranges from about 16.5 per cent in the UK to only 4.6 per cent in Spain. The two main diagnoses in this chapter are neuroses (300), and 'Special symptoms not elsewhere classified' (306) which includes items such as disorders of sleep, nervous tics, and anorexia nervosa. The present data suggest that the British are the most neurotic of the five nations – neurosis being at least 5 per cent of all diagnoses – closely followed by the French (4.1 per cent) and the Italians (3.2 per cent). However, the French also have the symptoms of 'nervousness and debility' (790) as their fourth ranking diagnosis, accounting for a further 2.5 per cent of all diagnoses. It is noticeable that the Germans represent the European paragon of mental stability, being the only nation not to register neuroses as a leading diagnosis.

A large number of predisposing factors must be taken into consideration with such disease categories as neuroses and mental disorders. There are international differences in the stigma associated with mental disorder. These broad cultural influences will strongly influence doctor and patient attitudes towards such ailments.

Italy exhibits by far the highest proportion of diseases of the digestive system in its leading diagnoses – 17 per cent of the leading twenty. These include disorders of the stomach, intestine, and liver. Surprisingly, France does not register diseases of the liver in its leading twenty diagnoses, despite the fact that the French are the one nation in Europe who consume more alchohol per capita than the Italians. See Table 3.

Perhaps a stylised view of the French and the Italians is one of gastronomy. It seems reasonable to argue that international disparities in the prevalence of digestive diseases will be related to differences in *what* is eaten and *how* it is eaten. The relationship between food and health is one that attracts increasing attention. On such an issue it is interesting to speculate whether international differences in attitudes towards (or availability of) health education is a significant predisposing factor.

The leading German diagnosis 'other myocardial insufficiency' (428) presents a curious anomaly in the reported morbidity picture. Despite the fact that it accounts for just over 25 million German diagnoses per annum – 4.6 per cent of all German diagnoses – this particular diagnosis is only found in the leading twenty of one other country from the five; France, where it represents only 3 million diagnoses. However, no other specific heart disease or symptom is listed in the leading German diagnoses. In contrast, Italy, Spain and France all experience 'Chronic Ischaemic Heart Disease' (412) as a leading diagnosis along with 'Symptomatic Heart Disease' (427) and 'Angina Pectoris' (413) in the UK. This seems to be a case where differences in terminology may explain much of the anomaly.

1.7 Morbidity versus mortality

Attempts to verify or refute the present findings on diagnoses are difficult due to the absence of reliable and comparable morbidity data. International comparisons are often made using mortality data as a proxy for morbidity. The study by Dunlop and Inch (1972) drew inferences about morbidity from information on causes of death. But such an association requires the leap of faith that patterns of illness are mirrored by causes of death. The reporting of bronchitis in Spain serves as a useful example. WHO listings of mortality from bronchitis, emphysema and asthma (ICD 'A' list, A93) show the UK rate as about twice that of Spain, an observation not borne out by our findings on diagnosis activity.

A further concern is that the 'morbidity picture' derived from IMS data varies from other sources of morbidity information. Although this study is really only concerned with 'popular' diagnoses in each country, to what extent does the IMS diagnosis data agree with other morbidity sources? A recent UK study (Balarajan, Stanners and Machin, 1983) used the IMS Medical Data Index to examine trends in UK primary care. As part of their exercise they compared IMS data on the various disease headings with alternative sources, namely the General Household Survey and the National Morbidity Study. The authors found a large degree of agreement between the IMS measure and the other two.

Comparisons of both morbidity and mortality data suffer from variations in terminology. A recent EEC working party on respiratory disease (Kelson and Heller, 1983) noted this difficulty in relation to certification of death and found 'large between – and within – country variations in the causes of death assigned by doctors on the basis of the same clinical information'. With such international disagreement on causes of death it seems unlikely that uniformity on diagnoses will exist. In terms of the dichotomy presented at the beginning of this section, evidence is still in short supply on the extent to which *interpretation* of the same symptoms varies systematically between doctors of various countries.

2 Treatment, prescribing and incentives

In establishing and examining the link between diagnosis data as a measure of morbidity and prescription data, some additional information is required. To what extent are patients receiving diagnosis actually *treated* by prescription? This leads on to the broader consideration of the various enabling factors, typically the product of the organisation and financing of health care, which influence prescribing and drug utilisation.

2.1 To treat or not to treat?

The MDI survey data focuses on three elements of the doctor-patient contact; total number of diagnoses (DX), number of treated patients (TDX), and number of prescriptions (RX). Treated patients are those patients diagnosed and treated by a prescription, and will not be a record of non-drug treatment events. The prescriptions variable is a record of items *written* by doctors rather than items *dispensed* by pharmacists; typically official prescription data is only available in the latter form.

The difference between items prescribed and those dispensed can be seen as an element of patient non-compliance. In the case of the UK, comparing IMS estimates of total prescriptions written with DHSS estimates of items dispensed yields only a small disparity; this small element of non-compliance might be influenced by elements such as pharmacy availability (location) and patient co-payment schemes such as prescription charges. (O'Brien, 1982a.)

In Table 4 some basic calculations have been performed on the three variables. Total diagnoses (DX) and prescriptions per head of population (RX/POP) are presented. Dividing treated patients by total diagnoses (TDX/DX) provides a measure of what might be termed 'propensity to drug treatment'. (Note that this calculation cannot be performed for Germany because data on diagnoses was not available, only that on treated patients.) Dividing total prescriptions by treated patients (RX/TDX) provides a measure of how many drug items an individual treated patient is likely to receive, defined here as 'the propensity to prescribe'. Finally, (RX/DX) combines the two previous measures for the aggregate ratio of prescriptions written to diagnoses made.

Table 4 shows that Italy and Germany have the highest rates of prescription per head of population, being 11.26 and 11.18 per annum respectively – but France has the highest overall ratio of prescriptions to diagnoses (1.5). Noticeably, the UK is the only country where this ratio is less than one and diagnoses exceed prescriptions. For purposes of comparison, Table 11 gives the findings of Abel-Smith and Grandjeat (1978) on prescriptions per capita in 1975. They bear close similarity with the findings except for Italy; but the Italian changeover to a National Health Service in 1980 may explain some of this sharp difference.

Table 11 also presents IMS estimates of the universe of prescribing doctors in each country. These vary widely from 20.2 per 10,000 population in Spain, down to only 4.9 in the UK. In countries such as Italy (18.5) the doctor supply is high due to a policy of open entry to medical schools and minimal medical manpower regulation. The supply of prescribing doctors is an important qualification to the basic findings on prescribing rates. Germany has virtually the same number of prescriptions per capita as Italy, but prescribed by about half the number of doctors. (But these considerations should be viewed in the context of the particular IMS samples, see Appendix A.) In general the present findings endorse those of Abel-Smith and Grandjeat (1978) that 'there does not appear to be a relationship between the number of doctors per 10,000 population and the rate of prescribing'.

Not all diagnoses result in drug therapy and prescription. The percentage of diagnoses resulting in prescription is 95 per cent in Italy, compared with 74 per cent in the UK. General interpretation of this observation is that Italian doctors still have a higher 'propensity to drug treatment' than any of the other countries (excluding Germany which remains unknown). Obviously, different diseases and diagnoses lend themselves more readily to drug treatment than others. However, investigating this general finding at the level of specific diagnoses – the three most common diagnoses discussed later – the same pattern emerges, with Italy having the highest TDX/DX ratio and the UK the lowest.

Finally, using the revised denominator of treated patients it is possible to determine what might be called the 'propensity to prescribe' – the number of prescriptions per head of treated patients. This ratio is highest for France 1.92 and lowest for Germany 1.24.

Summarising, Italian doctors display the highest 'propensity to drug treatment' of the five countries. However, given that diagnosis has been made, the highest 'propensity to prescribe' drug items is by French doctors. UK doctors have the lowest propensity to drug treatment and prescription for the five countries.

2.2 Doctor incentives

If there is no clear relationship between doctor supply and prescribing rates, what additional 'enabling' factors need to be taken into consideration? In attempting to 'explain' international differences in prescribing rates, previous studies have pointed to differences in the organisation and financing of European health care systems. Treatment and prescribing rates may vary

between countries because of the varying economic incentives that medical practitioners are subject to when selling their services. Thus Abel-Smith and Grandjeat (1978) stated that it is 'noticeable that in the three countries (UK, Netherlands and Denmark) with the lowest average number of prescription items per person per year, doctors were not paid on a fee-for-service basis under the compulsory health insurance of health service scheme, while in all the countries with a high average number of prescription items doctors were paid on a fee-for-service basis.'

The present findings endorse this observation. France, Germany and Spain all have relatively high prescribing rates, and all are countries which have insurance based health care systems where doctors are paid on the basis of fee-for-service. With such a method of doctor remuneration there exists a financial incentive for doctors to increase the number of patient treatments as this will increase their income. In contrast, GPs in the UK are paid mainly on a capitation principle – a fixed amount for each individual on their 'list', irrespective of the number of treatment episodes (although fees are paid for some treatments). By comparison, the UK has a relatively low prescribing rate of 6.3 items per person per year.

The case of Italy is especially interesting in this context. In recent years the Italian health care system has undergone radical changes – switching from an insurance based system to a tax-financed National Health Service similar to the UK's on 1st January 1980. Whereas previously Italian doctors were paid fee-for-service, they are now paid on a capitation basis similar to the British GP. Although the present figures for 1982 suggest that prescription items per capita in Italy are still relatively high (11.3), the suggestion is of a large fall since the same variable was measured by Abel-Smith and Grandjeat in 1975 as being 21. (Although the accuracy of this latter figure has recently been questioned (Abel-Smith, 1983).)

2.3 Patient disincentives

Rising costs of pharmaceutical services are a source of concern for most European countries. An important influence on both the *level* and *type* of prescribing within individual countries will be the type of policies adopted to control these costs. The five countries considered here all implement some policy of patient co-payment with prescription drugs; patients either pay some fixed amount or a proportion of the cost of the drug prescribed. But the basis for the payment varies between the countries. The various national policies are summarised below:

France: IMS estimate that about 50 per cent of all prescriptions are fully reimbursed. Important 'life saving' medicines are re-imbursed at a rate of 70 per cent and minor treatments at a rate of 40 per cent. There is a trend towards reclassifying selected reimbursable medicines into the less generously reimbursed lists. Recent changes have included the transfer of 15 products from the fully-reimbursed list to the 70 per cent reimbursement list, and the transfer of about 1,200 products from the 70 per cent reimbursement list to the 40 per cent reimbursement list. Also, until 1983, the French system differed from other European countries in that the patient initially paid the whole cost of the medicine and then 'claimed back' the share of the cost covered by health insurance. In other countries the health insurance scheme pays the pharmacist direct.

Germany: The patient pays a fixed charge for each drug prescribed. This charge was raised from DM 1.50 to DM 2.00 on 1st January 1983. The remainder of the cost is reimbursed to the pharmacist from the Sick Fund. From 1st April 1983 cough and cold products, mouth and throat antiseptics, laxatives and travel sickness remedies, will be excluded from reimbursements.

United Kingdom: The patient pays a fixed charge for each drug item prescribed. On 1st April 1983 this was increased from £1.30 to £1.40 per item. However, the charge is waived for old age pensioners, those on social security and those with certain chronic diseases. In practice only about a quarter to a third of all prescriptions attract the charge.

Italy: At present, about 1,200 priority pharmaceuticals are exempt from any patient contribution. All other products listed in the Prontuario Terapeutico (numbering about 5,000) are subject to a patient contribution graded as follows:

Product Price	*Patient Contribution*
Up to Lit. 999	Lit. 200
From Lit. 1,000 to 3,000	Lit. 400
More than Lit. 3,000	Lit. 600

New proposals for drug reimbursement have been published recently by the Ministry of Health. Under these proposals, about 1,400 priority products would be exempt from any patient contribution and all other products would be subject to a patient contribution of 15 per cent of the price or Lit. 10,000, whichever is lower. In addition, a patient would pay a flat rate fee of Lit. 1,500 per prescription.

Spain: Contraceptives, dietary products and over-the-counter products are non-reimbursable. For the vast majority of reimbursable medicines, the patient pays a contribution of 40 per cent of the cost. For a small number of priority drugs, the patient contribution is 10 per cent.

The use of patient co-payment for prescriptions both to raise revenue and regulate utilisation appears to be growing in Europe. However, the basis for this charge varies between countries. In countries other than the UK, the emphasis is on exempting certain 'luxury' drugs from re-imbursement – the rationale being that these items are usually inexpensive remedies which are available over the counter, thus increasing the incentive for self medication and reducing the call

on doctors' time for minor ailments. In the UK, the system remains one of exempting certain patients from reimbursement rather than certain drugs.

As reviews of health care systems have shown, there is a diversity of methods of organisation and financing of health care in Europe (see, Abel-Smith and Maynard, 1978). These differences will influence rates of diagnosis, treatment and prescribing. Both patient and prescriber will face very different incentives and influences which will affect drug utilisation.

On the one hand, rates of treatment and prescribing will be influenced by the supply of doctors and the method of remuneration; insurance based systems with fee-per-service payment providing an economic incentive to 'over-treat'. But high prescribing rates and concern about pharmaceutical expenditure have resulted in policies of cost containment; specifically policies of selective re-imbursement and patient co-payment based on drug type. The exception to this general outline is the UK (and latterly, Italy) where GPs are paid on a capitation basis – which provides little incentive to maximise treatment – and patient groups, rather than drugs, are selectively re-imbursed.

3 Drug analysis

Having investigated some of the disparities that exist between the five countries in terms of diagnoses and prescribing rates, the paper now considers the specific drugs prescribed as indicated by prescription volume data from the Medical Data Index. However, some preliminary discussion is required in answer to two basic questions: What is the method of classification of drugs into therapeutic groups? How appropriate is the unit of prescriptions as an indicator of drug utilisation as compared with cost/sales measures or the Defined Daily Dose (DDD)?

3.1 Drug clasification systems

Essentially, drugs can be classified in three ways: (a) by chemical name, (b) by pharmacological action and (c) therapeutic use. But as Lunde *et al* (1979) observes, 'so far no single and generally accepted drug classification system has been adopted on a worldwide scale'. An entirely chemical system might seem logical, but medical interpretation would be limited because of widely different therapeutic applications of quite similar chemical entities. Similarly, an entirely therapeutic classification would be ambiguous when one drug was used for widely different clinical indications.

Not surprisingly, the most powerful and useful systems developed so far, which minimise ambiguity in interpretation, are compromises between the methods. The present data is classified according to the system known as the Anatomical-Therapeutic-Chemical System (ATC). This system groups pharmaceutical products into thirteen general groups according to the body system on which they act, eg A = Alimentary Tract, B = Blood and blood forming organs. Each of these general groups are divided into main groups, which are in turn divided into sub-groups and therapy classes. Consider the example below:

Figure 1

Example of Anatomical-Therapeutic-Chemical classification system

N5B1 = Non-Barbiturate Plain

General Group	N = Central Nervous System
Main Group	N5 = Psycholeptics
Sub Group	N5B = Hypnotics and Sedatives
Therapeutic Class	N5B1 = Non-Barbiturate Plain

3.2 Drug utilisation: which unit of measurement?

The use of drugs can be measured in a variety of ways: the number of prescriptions written or dispensed; the weight of drugs; the number of packages, tablets or other dispensing forms; the number of people using drugs; or the value of sales of a drug. Clearly the choice of any one measure will depend upon the nature of the study. However, the main consideration is that the chosen unit should be standard through time and across countries.

The use of sales data on particular branded goods or therapeutic groups – such as that provided by the monthly IMS publication 'The British Pharmaceutical Index' – provides a *value* measure of drug usages. But if some indication of population drug *consumption* is required, such a sales measure may be misleading for a variety of reasons. A major drawback is the international variability of drug prices (Cooper, 1975, Reekie, 1981) due to differences in domestic industry pricing policies, government price regulation and exchange rate fluctuations. Furthermore, *within* countries the cost of production and price of different *types* of drugs will vary, with some drugs commanding 'premium prices' (Reekie and Weber, 1979). For example, in 1980 the average UK net ingredient cost of drugs for the cardiovascular system was 346.2 pence compared with 155.3 pence for drugs for the central nervous system (OHE, 1981).

Although the number of prescriptions written for a given drug is a more relevant epidemiological measure of drug utilisation (but again, not a measure of actual consumption), the number of drug units (tablets, pills, potions etc) given per prescription may vary widely. Clearly an individual doctor would base his judgement on the duration of compliance with the drug that would constitute an effective dosage. But for a given ailment, dosages may fluctuate between doctors. For example, in the UK the overall reduction in numbers of prescriptions dispensed since 1978 may be the result of increased dosages being prescribed at less frequent intervals (OHE, 1980). A possible rationale for this being that UK doctors, faced with increased patient demands, use prescribing as a means of rationing time in consultation (O'Brien, 1982a).

To some extent the Defined Daily Dose (DDD) overcomes the dosage variability problem. The defined dose for each drug is determined by a panel of experts, and by combining this with prescribing volume data the measure of DDD per thousand population per day can be determined. The application of this method forms the basis for much of the work of the WHO Drug Utilisation Research Group (WHO, 1979). However, a major limitation is that such a comprehensive listing of DDDs is only currently available in Scandinavian countries (Baksaas Aasen, I. *et al*, 1975), and as Hemminki (1982) points out the DDD has particular problems in the measurement of psychotropic drugs.

Clearly there are important qualifications which should be made when interpreting the MDI information presented here as a broad measure of drug utilisation. It is based only on numbers of prescriptions written, regardless of length of

treatment. However, this type of prescription data frequently remains the best general indicator for this type of comparative analysis.

3.3 Prescribing range and drug availability

Data was made available on the leading twenty drug sub-groups in each country (eg N5B, Hypnotics and Sedatives) and the leading twenty products by brand name. Due to the commercial value of the market research data on leading brands, this information is not listed; but broad summary conclusions are drawn from it.

A useful starting point is the consideration of what might be termed the 'prescribing range' – what proportion of all prescriptions are accounted for by the leading twenty sub-groups and leading twenty products? Table 12 summarises this information. Just over 60 per cent of all UK prescriptions are for the Top 20 drug sub-groups, compared with 47 per cent in Italy. But a much larger disparity arises with the range of products prescribed – 22.4 per cent of all UK prescriptions are for the leading twenty products, compared with only 11.4 per cent in Spain. Furthermore, the UK is the only country to list any unbranded (generic) products in its leading twenty. Why the disparity?

It seems reasonable to argue that the 'range' of items available as ethical prescription drugs in a given country will be strongly influenced by 'supply side' forces such as the interaction of pharmaceutical marketing and government attitudes on pharmaceutical competition and drug safety. Some countries emphasise the need for detailed drug monitoring to detect adverse reactions more than others. (For a review of some UK adverse reactions since Thalidomide see Venning, 1983.) The extent to which drug availability and in turn prescribing differences between countries result from different attitudes towards drug safety would require another study to analyse, but an example will serve to illustrate the point. Dunlop and Inch (1972) discuss the use of amidopyrine which was widely available through Europe as an effective analgesic; often used in combinations with aspirin. However, the drug had been withdrawn from the UK market due to its association with agranulocytosis; a blood disease causing sometimes fatal susceptibility to infection. Yet at the time of their study they note that this drug was 'freely available to the general public in Germany'. Tognoni (1980) also drew attention to the continued use of amidopyrine and the lack of systematic monitoring of drug reactions in Italy.

Clearly the many 'supply side' influences which restrict drug availability in some countries and not in others will be a source of international disparities in prescribing. Tognoni (1981) notes the proliferation of benzodiazepine 'me too' drugs is greater in Spain and Italy (17 molecules on both markets) than the UK (8 molecules). Does this demonstrate a greater Italian need for such drugs or (more probably) less stringent regulation in the marketing of such drugs? However, it is interesting to note that despite the proliferation of such drugs on the Italian market, overall utilisation is relatively low in Italy and Spain as Table 19 suggests.

3.4 Comparison by general anatomical group

Following a similar pattern to the diagnosis analysis, the leading drug sub-groups have been placed in the wider context of their general anatomical groups. Thus Table 13 shows the percentage breakdown of the leading twenty drug sub-groups across the respective anatomical headings. The patterns of drug usage presented by this analysis must be viewed in the light of the diagnosis patterns which have been discussed so far, with the major differences in morbidity being reflected in drug usage.

In France, Italy and Germany the greatest proportion of the leading twenty drug sub-groups come under the general anatomical heading of Cardiovascular System (C). In contrast, reflecting a higher extent of diagnosis of mental disorders in the UK, the leading British drug consumption is of drugs such as tranquillisers, hypnotics and sedatives; in Spain it is drugs for the respiratory system (cough and cold preparations etc); Italy also has a high use of drugs for the alimentary tract and metabolism (antacids, cholagogues etc) reflecting its high rate of diagnoses of diseases of the digestive system.

Thus in general, the broad classification of leading prescription drugs by General Group headings reflects the morbidity findings by ICD Chapter headings.

3.5 Leading twenty drug sub-groups prescribed

While providing a useful basis for general comparison, narrow consideration of leading prescriptions by general anatomical group is a relatively blunt medium for discussing specific drug disparities between countries. To sharpen the focus it is necessary to concentrate specifically on the leading twenty drug sub-groups in each country used in Tables 14–18.

On the basis of prescriptions, Non-narcotic analgesics (N2B) is the highest ranked drug sub-group in France, Germany and UK – in Italy and Spain it is ranked fourth and third respectively. 7 per cent of all prescriptions in the UK are for these types of drugs and 6.5 per cent in France – being rates of 454 and 655 per 1,000 population respectively. Drugs classified as non-narcotic analgesics are household names – aspirin and paracetamol possibly being the most well known examples. Typically these drugs are used for the relief of pain in minor conditions (eg headache, toothache etc), whereas narcotic analgesics are more suited for relief of more severe pains. Narcotic analgesics are only available on prescription, whereas a number of non-narcotic analgesics – the everyday painkillers – can be purchased over-the-counter. The high rate of French prescribing of these drugs probably reflects low over-the-counter purchases due to the restriction

on public advertising of medicines in France.

An important main group within the category of drugs acting on the central nervous system are the Psycholeptics (N5); nominally the sub-groups (N5A) neuroleptics, (N5B) Hypnotics and Sedatives, and (N5C) Tranquillisers. Due to the significance of this group, the distinctions between the sub-groups is given brief exposition.

3.6 Psycholeptic drugs

Sub-classifications within the psycholeptics (N5) are often unclear for specific drugs. Essentially the main distinctions are between the neuroleptics (N5A) which are *major* tranquillisers or anti-psychotic drugs (used to treat serious psychological disorders such as schizophrenia and mania) eg Chlorpromazine (Largactil) and minor tranquillisers (N5C) which are used primarily to treat anxiety states. One of the main elements in this group are the benzodiazepine compounds – for example diazepam (eg Valium) and chlorodiazepoxide (eg Librium) being the best known.

The benzodiazepines are also the most common class of drugs used as hypnotics and sedatives (N5B). The hypno-sedative drugs depress brain function; in small doses they are used as *sedatives* (to calm you down) and in large doses as *hypnotics* (to send you to sleep). Benzodiazepines specifically designed as hypnotics include nitrazepam (eg Mogadon) and flurazepam (eg Dalmane). Anti-depressants (N6A) are a form of psycho-analeptic drug; some may be ambiguous in classification because of compounds available which may include sedatives, for example anitriptyline (eg Tryptizol), or include stimulants (eg protriptyline). In some cases, to obtain the desired medical effect, it may be necessary to combine anti-depressant drugs with a major or minor tranquilliser.

Reflecting the relatively high proportion of mental disorders reported in the leading diagnoses, the UK has the greatest proportion of psycholeptic and psycho-analeptic drugs in its leading prescriptions. (However, in terms of prescriptions per capita the French lead the field.) Hypnotics and sedatives – ranked fourth – account for 4.5 per cent of all UK prescriptions, tranquillisers (minor) for 4.1 per cent and anti-depressants for 2.2 per cent. These figures are halved when Italian prescribing is considered, with 1.6 per cent of all prescriptions for tranquillisers and 1.5 per cent for hypnotics and sedatives.

A significant percentage of all UK prescriptions (2.2 per cent) are for Anti-depressants (N6A) – although this type of drug is not found in the leading drug sub-groups of the other countries. Are the British more prone to depression than other Europeans, or is this type of treatment simply more widely used by UK doctors than their European counterparts?

Psycholeptics are effective anti-anxiety potions which have become regarded as an antidote to the 'stresses and strains' of everyday life. One UK study emphasised the importance of the social context in which these drugs are consumed and showed that consumers were 'predominantly female and middle-aged' (Cooperstock and Lennard, 1979). Skegg, Doll and Perry (1977) in a UK survey found that one-fifth of prescriptions were for psycholeptics and that female consumption was more than twice the male. Similarly, in a sample study of nine European countries, Balter *et al*, (1974) showed that twice as many females consumed anti-anxiety sedative drugs and consumers were mostly over the age of 45.

A few studies have focused on the question of international disparities in psycholeptic (psychotropic) drug utilisation, using a variety of consumption units for comparison. Table 19 summarises the present findings in terms of prescriptions per capita and compares them with Balter's survey of usage and Friebal's (1982) estimates based on the Defined Daily Dose. There is broad agreement between the various methods in the ranking of the five countries in terms of drug usage; France being significantly ahead of countries like Spain and Italy.

However, as Laporte *et al*, (1981) has argued, there are many 'hidden sedatives and hypnotics' on the Spanish market – where a high proportion of sedative-hypnotic drugs are not classified as such because they are marketed in fixed-dose combinations with other therapeutic agents.

Disparities in psycholeptic drug utilisation will in part be determined by consumer attitude towards these drugs. Balter's (1974) survey is useful in this context – where respondents were asked whether they thought tranquillisers 'do more harm than good'. As Table 20 illustrates the majority of Italian respondents (54 per cent) answered this question with the affirmative, whereas only 34 per cent of UK respondents thought the net effect was harm rather than good.

3.7 Cardiovascular drugs

Table 13 illustrates the significance of cardiovascular drugs; nearly 30 per cent of the leading twenty drug sub-groups prescribed in Germany are for these drugs. The main group is split between Cardiac Therapy (C1), Hypotensives (C2), Diuretics (C3), Peripheral Vasodilators (C4), Vasoprotectives (C5), Other cardiac and circulatory products (C6), and Beta-Blocking agents (C7).

Many of the cardiovascular drugs are used to treat high blood pressure – a leading diagnosis in all five nations. The specific comparison and discussion of prescribing for hypertension is undertaken in the final section which compares prescribing for specific diagnoses across the countries. The main point to note is that a doctor is often presented with a deal of choice in the treatment of hypertension. It is unclear why some nations favour diuretics, others anti-hypertensives or hypotensives, or

beta-blockers, or any combination of these drugs, which often act in very different pharmacological ways to combat the same problem.

An interesting comparison is the use of peripheral vasodilators. Until recently treatment of heart failure was a combination of restoring contractibility using cardiac glycoside and relieving congestion using diuretics. Cardiac glycoside combinations (C1A) remain popular in Germany and Italy where they represent 4.4 per cent and 2.2 per cent of all prescriptions respectively – but they do not feature in the leading prescribed drugs of the other countries. Vasodilators can be used to alleviate heart failure; their function being to dilate the blood vessels – which may have narrowed due to arterial disease – in order to improve cardiac output. Peripheral vasodilators are more popular in France and Spain – 4.4 per cent and 3.7 per cent of all prescriptions – than in Italy (2.2 per cent) and Germany (2.7 per cent). In the UK, although there is heavy use of diuretics and thiazides for hypertension, peripheral vasodilators do not occur in the leading prescription drug groups.

In the UK 3.3 per cent of all prescriptions are written for beta-blocking agents – drugs which slow down the heart rate to relieve anginal pain or reduce the blood pressure. Despite the common experience with hypertension throughout Europe, beta-blockers do not feature amongst the leading drugs prescribed in the other countries. Conversely, Myocardial Therapy (C1D) ranks in the top ten drug groups for all countries except the UK where it does not appear in the leading drugs prescribed. The reasons for such differences are not immediately clear. However, the fact that Beta Blockers were a British innovation, manufactured by ICI, may go some way towards explaining the preference for their use by UK doctors.

3.8 Drugs for the respiratory system

Not surprisingly, the prescribing in Spain reflects the relatively high occurrence of the various types of bronchitis and colds. Expectorants (R5C) are the most commonly prescribed group – (6.7 per cent of all prescriptions) – accounting for 24 million prescriptions annually. Expectorants – which are used to liquify sputum and allow the patient to cough effectively – are also very popular in Italy, being 4.7 per cent of all prescriptions. Again British doctors differ from other nations with respect to the popularity of this group of drugs – only 1.6 per cent of all United Kingdom prescriptions being for them. Why the disparity? The availability of over-the-counter cough and cold prescriptions is obviously one consideration, as is the information made available to doctors regarding the effectiveness of expectorants. For example, examination of the British doctors' prescribing handbook – The British National Formulary (BMA, 1982) – yields the following entry under expectorants: 'There is no scientific basis for prescribing these drugs although a harmless expectorant mixture may have a useful role as a placebo' (p 102). But to what extent will this view about the efficacy of expectorants be held in other countries? Clearly, an important source of prescribing differences between countries will be differences in the information available to prescribers on the efficacy of different drugs.

Another important group of drugs under the main group of anti-asthmatics (R3) are the Bronchodilators (R3A). Drugs such as Salbutamol are available in a variety of forms for asthma sufferers, ranging from aerosol inhalation to tablets and injection. The main effect of such drugs is to relax the bronchial muscles which produce the symptoms of asthma when they become tightened. Asthma was listed in the leading twenty diagnoses of the United Kingdom, Italy and Spain. Accordingly bronchodilators in these countries account for 4.7 per cent, 2.2 per cent and 2.4 per cent of all prescriptions respectively. Asthma is not listed as a leading diagnosis in Germany and France and consequently bronchodilators are less frequently prescribed.

3.9 Other drug groups

Anti-rheumatic non-steroids (M1A) are the leading drug sub-group in Italy with 40 million prescriptions written annually. Just over 6 per cent of Spanish prescriptions are for this type of drug, and 5 per cent of United Kingdom and French prescriptions. This type of anti-inflammatory drug is prescribed less in Germany, and this may refelct the fact that Osteoarthritis is not as significant a diagnosis in Germany as in other countries. However, German doctors do prescribe the related topical anti-rheumatics (M2A) at a rate of 25 million per annum, whereas none of the other four countries list these drugs in their leading twenty sub-groups.

The prescribing of tonics (A13A) remains popular in Spain and Italy, but not in the other three countries. Often the benefit to the patient is a simple placebo effect. The prescribing of tonics has been frequently debated – as Parish (1976) states: 'Pharmacologists are highly critical of the whole concept of tonics and their criticism has influenced prescribing doctors.' Again, international differences in prescribing will be a combination of availability of over-the-counter tonics and the attitudes of patient and doctor to the use of such placebos.

The high per capita consumption of alcohol in Italy gives the Italians cause for concern about their livers. Doctors annually prescribe just over 30 million prescriptions under the main group of Cholagogues and hepatic protectors (A5). The aim of these drugs is to stimulate the flow of bile and to protect the liver from damage. These drugs do not register in the leading sub-groups of the other countries. This seems curious in the case of France – the one country in Europe which has a higher per capita consumption of alcohol than Italy (Popham, Schmidt, de Lint, 1975).

Another interesting disparity concerns the use of broad spectrum penicillins (J1C) – antibiotics used

to treat infections. Germany is the only country of the five which does not have this drug sub-group in the leading twenty. The high usage in Spain, Italy and France is probably due to the fact that diagnoses of 'Infective and Parasitic diseases' (Chapter 1, ICD) are present in the leading diagnoses. In the United Kingdom it may be that chauvinistic preferance for a major British innovation influences prescribers in their favour.

4 Prescribing patterns for given diagnoses

Having analysed the leading twenty diagnoses in each of the countries and discussed some of the leading therapeutic groups prescribed, the study now concentrates on three of the most significant diagnoses taken across all the countries in order to examine the type and rate of prescription of drugs for each diagnosis in each country. The three diagnoses are:

(1) Essential benign hypertension (ICD 401)
(2) Diabetes Mellitus (ICD 250)
(3) Bronchitis unqualified (ICD 490)

Essentially the question in this section is: how do the doctors of different European countries treat the same diagnosis? Obviously the definitional caveats made earlier about how doctors utilise these specific diagnosis categories still apply. However, the object of this section is to attempt to standardise events by diagnosis category and then observe differences in prescribing.

4.1 Essential benign hypertension (ICD 401)

The majority of cases of hypertension – high blood pressure – are primary (essential) rather than secondary. In primary hypertension no underlying cause can be found; whereas secondary hypertension might follow kidney disease, adrenal disorders, or malfunction of the endocrine glands.

The recommended drug therapy for raised blood pressure varies in type and intensity with the severity of the problem. But to label a patient as having mild, moderate or severe hypertension the doctor must invoke some notion of what 'normal' blood pressure is. As Parish (1976) states, 'we are interested in high blood pressure because there is an increased predisposition to illness and death amongst people with a blood pressure raised above "normal" '. But normal blood pressure is not an absolute and immutable medical benchmark – it varies with age, sex, exercise, food, smoking, and emotion. Cochrane (1971) is highly critical of defining arbitrary 'normal limits' for blood pressure distributions based on deviations from some mean. Clearly one source of disparity betwen doctors of various countries will be the practical problem of accurately measuring blood pressure and the judgemental problem of diagnosing and treating mild, moderate or severe hypertension.

A variety of drugs are available for the treatment of hypertension. A basic distinction to make is between the potent and centrally-acting anti-hypertensive (hypotensive) drugs – eg Methyldopa, Clonidine – and non-centrally-acting agents such as diuretics, beta blockers and peripheral vasodilators. In making a choice between treatment regimes a doctor must balance the potency of drugs like methyldopa with the side effects associated with its use. Increasingly, beta blockers and diuretics are being used because of their fewer side effects.

Diuretics act upon the kidneys to produce an increased output of sodium salt and water in the urine. Thiazide diuretics are used in small doses to lower blood pressure, either alone or in combination with other anti-hypertensive drugs. The two drugs are often used in combination because salt retention is a side effect of some hypotensive drugs. Beta blockers are effective anti-hypertensive drugs but as the British National Formulary (BMA, 1982) notes, 'their mode of action in lowering blood pressure remains contentious'. Essentially they block nerve impulses in the heart and slow down the heart rate to reduce blood pressure by dilating veins which may have narrowed due to disease.

Clearly an important feature of prescribing drugs to combat hypertension is the wide choice of pharmacological action and drug type that the doctor faces. Given the complementary nature of some of the drugs many combination products (eg hypotensive and diuretic) are now marketed. However, in the case of the UK the BNF warns 'drug combinations are sometimes used, but these are to be avoided in the interests of keeping treatment uncomplicated'. Also, on the question of drug combination for types, a recent contribution to the *British Medical Journal* stated: 'many patients who are being treated with a combination of a Beta blocker and a diuretic are receiving unnecessarily large amounts of diuretic without benefit to their blood pressure and with adverse metabolic consequences' (MacGregor *et al*, 1983).

Tables 22–26 list the five leading drug sub-groups prescribed for hypertension in each country. Nearly 40 per cent of the hypertension scripts in Germany are for the combination drugs (C2C) hypotensives and diuretics, they are also the most prescribed in Spain and Italy. However, the data suggests that UK and French doctors do not favour the use of this combination. How much of UK doctor reluctance to use such combinations is the result of advice similar to that given in the British National Formulary above? Clearly, reluctance in the use of drug combinations is not an attitude common to all countries.

In general, the data indicates that German and Italian doctors favour the use of the centrally-acting hypotensive drugs as a means of reducing blood pressure, while UK and French doctors tend to favour the use of thiazides and diuretics. However, UK and German doctors are similar in that they prescribe a high proportion of beta-blocking agents both plain (C7A) and in combination with other drugs (C7B).

In many respects the international differences in prescribing for hypertension reflects the lack of consensus within the medical profession about 'the best way' to treat the problem. Then again, the German propensity for the use of potent

hypotensives may reflect a higher incidence of severe or moderate hypertension, (classified under Essential Benign Hypertension 401) compared with more mild hypertension in other countries.

4.2 Diabetes mellitus (ICD 250)

Diabetes Mellitus is a disorder characterised by the diminished effectiveness or absence of insulin – a hormone produced in the pancreas and responsible for lowering the blood sugar level. The problem may be caused by failure of the pancreas to produce insulin, the production of ineffective insulin or a combination of both. Glucose is over-produced and under-used resulting in a high blood sugar level – hyperglycaemia.

There are two main approaches to the drug treatment of diabetes. Insulin can be taken by injection or blood-sugar lowering drugs by mouth – known as oral hypoglycaemic drugs, examples are tolbutamide and phenformin.

The use of these oral anti-diabetic drugs has been the source of some controversy in recent times. In a review of the evidence of their effectiveness, Shen and Bresler (1977) were highly critical. In addition, drugs such as phenformin were associated with an adverse side effect known as lactic acidosis. This particular drug was banned from sale in the USA in 1977 but is still freely available on prescription in Europe.

Such controversy forms the backcloth for the choice of treatment that the doctor must make for diabetes. The risks of side effects must be balanced against the benefit to the patient of taking a drug by mouth rather than injection. Doctors must make a judgement about the effectiveness of hypoglycaemics compared with non-drug treatment such as diet. The extent to which doctors in a given country receive guidance on such decisions may be a source of disparity in prescribing. UK doctors, for example, are given the following advice from the BNF 'Oral hypoglycaemic drugs should not be used until patients have been shown not to respond adequately to a period of at least one month's restriction of energy and carbohydrate intake. They should be used to augment the effect of diet, and not to replace it.'

Tables 28–32 list the five leading drug sub-groups prescribed for diabetes mellitus in each country. Choosing sub-groups rather than main-groups shows the important split between insulin (A10A) and oral antidiabetics (A10B) which are both in the main group of antidiabetic therapy (A10).

In all five countries the vast majority of drugs prescribed for diabeties are oral antidiabetics. This ranges from 72.2 per cent in Italy, about 60 per cent in Germany, France and Spain, but only 45 per cent in the UK. The data suggests that UK doctors favour diagnostic tests such as (V4B) urine tests (22.6 per cent) far more than any of the other countries. Approximately 20 per cent of diabetes scripts are for insulin in four of the five countries, the exception being Spain at 8 per cent.

4.3 Bronchitis unqualified (ICD 490)

Bronchitis is the inflammation of the bronchi or air passages of the lungs. It may be acute or chronic. The WHO disease classification lists three categories: acute bronchitis and bronchiolitis (466), chronic bronchitis (491) and bronchitis unqualified (490), where the doctor does not specify acute or chronic.

Acute bronchitis very often occurs as the sequel to a common cold or as the result of an attack of influenza. Infections spread from the trachea to the smaller bronchioles and in the extreme may cause bronchopneumonia. Chronic bronchitis, as the label suggests, is a more long term disease where the bronchi are irritated and recurring infections produce a state of progressive slow destruction of lung tissue. (For more detailed discussion of bronchitis, see OHE, 1977.)

As with hypertension, distinctions between acute and chronic bronchitis are judgements which may be arbitrary at the margin. Wide variations may be present between *all* doctors, this difference being compounded by national differences in medical training and medical fashion.

Treatment of bronchitis (especially chronic) can be a complex issue. In many instances the avoidance of cold, damp, dust, fumes and smoke will be more effective than drug therapy. Certain cough sedatives or expectorants may be prescribed to make coughing more effective. In the case of acute bronchitis or recurring infection in chronic bronchitis a course of antibiotics may be prescribed.

Tables 34–38 list the five leading drug sub-groups prescribed for bronchitis unqualified (490) in the five countries. The most noticeable feature of this data is that expectorants form a high proportion of prescriptions in all countries except the UK. They account for 49 per cent of all bronchitis scripts in Italy but only 12 per cent in the UK. As discussed earlier, this may be the influence of the British National Formulary's opinion of expectorants as having 'no scientific basis' for their use other than as a placebo (BMA, 1982).

Similarly cough sedatives (R5D) are more popular in European countries other than the UK. The leading drugs prescribed for bronchitis in the UK are antibiotics to combat infection – (JIC) Broad Spectrum penicillin and (JIA) Tetracyclines and combinations.

The use of bronchodilators (R3A) – drugs which dilate the bronchioles to assist breathing (mainly used for asthma) – varies considerably between the five countries. They are most popular with Spanish doctors, being 14 per cent of all bronchitis scripts and UK doctors (11.6 per cent), whereas in Italy they only account for 4.2 per cent of bronchitis scripts.

It is apparent from this Chapter that there are significant differences between European countries in the prescribing of drugs for specific diagnoses. If

an individual patient were to take his ailment to each of the five countries, even if doctors arrived at the same diagnosis, the likelihood is that the drugs prescribed would be different both in type and quantity.

There appears to be no simple explanation about why these differences arise. As with diagnoses, prescribing of medicines is an art as much as a science – the art of judging which drug for which ailment. Information and education on pharmacology will vary between countries. A brief review of the medical literature will confirm that debates continue about effectiveness and drug safety; the 'best' drug for an individual treatment may not always be the most safe and effective for that clinical indication in general. At best, the evidence presented here suggests that drug treatments vary between countries; the way in which treatment preferences are arrived at is an area ripe for future investigation.

5 Overview

5.1 Summary of main findings

Some of the main results of the study are summarised below (all figures relate to 1982 data):

(1) Approximately 388 million diagnoses are made annually by UK general practitioners – 180 million (47 per cent) of these are for the leading 20 diagnoses. A similar proportion of total diagnoses occurs in the 'Top 20' of the other four countries.

(2) Estimated annual diagnoses per capita in the UK are 6.93. This compares with rates of 7.35 in Spain, 7.72 in Italy, 6.66 in France and a lower estimate of 9.95 in Germany (where only data on treated patients is available). The relationship between diagnosis and consultation rates is less clear, thus comparisons with 'official' estimates of the latter are limited.

(3) Essential benign hypertension (401) is the leading diagnoses in three of the countries and in the top three of the other two. In the UK this diagnosis accounts for 4.8 per cent of all diagnoses – a rate of 333 per thousand population. The greatest occurrence of hypertension is in Italy (433 per thousand population) and the lowest is Spain (244 per thousand population).

(4) Acute, chronic and unqualified bronchitis are all leading Spanish diagnoses – an annual total of 452 diagnoses per thousand population. By comparison only bronchitis unqualified is a leading UK diagnosis with an annual total of 214 diagnoses per thousand population.

(5) The leading UK diagnosis is neuroses with an annual diagnosis rate of 355 per thousand population. This compares with rates of 248 for Italy, 127 for Spain and 272 for France. German doctors do not list neuroses as a leading diagnosis.

(6) Total annual prescription items per capita were found to be 6.53 in the UK, 9.6 in Spain, 10.04 in France, 11.18 in Germany and 11.26 in Italy. The ratio of all drug-treated patients to all patients diagnosed – the propensity to treat – was found to be highest (95 per cent) in Italy and lowest (74 per cent) in the UK. However, the number of prescription items per treated patient was highest in France (1.93) and lowest in the UK (1.26). The UK is the only country of the five where the number of diagnoses made exceeds the number of prescriptions written.

(7) 60 per cent of all UK prescriptions are written for the leading twenty second-level drug subgroups. The figure for the other four countries is approximately 50 per cent. This suggests that the 'range' of items prescribed is less varied in the UK than in other countries. Furthermore, the UK is the only country of the five with any unbranded products (5 in 1982) in its leading twenty products.

(8) Non-narcotic analgesics (N2B) is the leading drug subgroup prescribed in France, Germany and the UK and it is in the top four of Italy and Spain.

(9) 2.2 per cent of total prescriptions (8 million) are written annually in the UK for anti-depressants (N6A) – a drug subgroup which does not appear in the leading twenty of other countries. 4.1 per cent of all UK prescriptions are for tranquillisers (N5C) and 4.5 per cent for hypnotics and sedatives (N5B).

(10) In the treatment of hypertension German and Italian doctors favour the use of centrally-acting hypotensive drugs, while UK and French doctors favour the use of thiazides and diuretics.

(11) In the treatment of diabetes, oral antidiabetics are most popular in Italy – 72 per cent of all diabetes scripts – and least popular in the UK (45 per cent).

(12) In the treatment of bronchitis there seems to be international disagreement on the use of expectorants. 49 per cent of Italian bronchitis scripts are for expectorants compared with 12 per cent in the UK. Spanish and UK doctors favour the use of bronchodilators more than Italian doctors.

5.2 Discussion

The significance attached to the findings of this study will vary. Critics will stress the inherent problems of population inference from any sample and especially the comparability problems between countries. It is readily conceded that these are important qualifications to be made when interpreting the data. It is not always possible to compare like with like. The value of the exercise is that this commercial data source (IMS) offers alternative and complementary measures of morbidity and drug utilisation to the limited non-commercial sources. Clearly there is a great deal of scope for expanding existing epidemiological knowledge using this data source. One recent example of time series use of IMS data on UK primary health care is by Balarajan, Stannes and Machin (1983).

Although the aim of this study has been to illuminate disparities in European primary health care, the existence of such differences should not necessarily be seen as a bad thing. Indeed, it is by examining these differences and attempting to relate them to other variables that it becomes possible to make predictions about the outcome of changing certain of the parameters. The establishment of the new Italian health service is a prime example. In the light of the available comparative evidence it is tempting to predict falling prescription rates as the financing of health care and consequent incentive structures become similar to the UK.

On the question of diagnosis as a consistent indicator of morbidity much can be speculated but

little concluded with any degree of confidence. At one level it may be possible to take the use of ICD classifications at face value. The major problem is the uncertainty surrounding the same *interpretation* of symptoms between countries. The present study can only speculate in which areas this appears to be a problem eg diagnosis of the common cold and the use of the various categories of heart disease. Future research is needed of the type that Kelson and Heller (1983) have undertaken with respect to death certification. Doctors from various countries could be presented with a hypothetical sample of patients and symptoms thus allowing differences in diagnostic and treatment prescription to be more accurately monitored and compared.

Despite these interpretational problems, the present findings do indicate significant differences in patterns of morbidity. Some of these disparities– such as the high incidence of bronchitis in Spain relative to the UK – are surprising. Other observations reflect national attitudes or cultural norms – for example, the British appear to be a highly neurotic nation, especially in relation to the Germans. Furthermore, behavioural and consumption factors such as diet and alcohol intake appear to be important predisposing influences on morbidity patterns.

In general, the leading prescription drugs reflect the leading diagnoses in a country. UK doctors prescribe a relatively high number of tranquillisers, sedatives and anti-depressants due to the significance of neuroses and other mental disorders in the leading diagnoses. In Italy hepatic liver protectors are popular to prevent and combat liver damage from high per capita alcohol consumption. In Germany cardiac glycosides are popular, reflecting the high incidence of heart failure recorded.

At the level of specific diagnoses there are differences in treatment fashions and prescribing. Consider the example of hypertension – some countries favour diuretics, others beta-blockers, others combination drugs. We can only speculate why these exist. Individual practitioners must make choices about treatment regimes. Such choices are influenced by the type and availability of information on individual drug efficacy and safety. Furthermore the actual availability of certain preparations may be constrained by government or promoted by industry. Indeed it may be the case that the focus of this study on the 'demand side' is misguided and that differences in 'supply side' influences (eg medical education and industry marketing) between countries would better explain disparities in drugs prescribed. This is a question for further research which cannot be answered here.

Appendix

Appendix A: The data

Data were obtained from Intercontinental Medical Statistics (IMS) on the twenty leading diagnoses in each of the specified countries, the twenty leading drug groups prescribed, the twenty leading products and the drugs prescribed for the three most significant diagnoses. The database used was the Medical Data Index (MDI). The MDI is published quarterly for IMS subscribers and is designed to 'provide a regular analysis of prescribing by General Practitioners, relating drugs prescribed to patients and diagnoses made' (IMS, 1981). Quarterly data is projected to give moving annual totals (MAT). Diagnoses are defined and coded according to the World Health Organisation's International Classification of Diseases (ICD) (WHO, 1965 eighth revision), and drugs are classified using the Anatomical Therapeutic Chemical system which is described in Chapter Three.

The method of sampling doctors varies between countries. In the UK, 500 *different* General Practitioners are sampled each quarter, each of whom reports for a period of seven consecutive days using the IMS casebook provided. Samples are structured by regional location of doctor and years since qualifying as a GP. In other countries the samples contain a varying degree of specialists who prescribe in the community. Thus the sampled doctors are not always and everywhere GPs in the same sense as those who contract their services to the NHS in the UK. The mix of doctors in each sample is intended to reflect the mix within the community. In countries other than the UK IMS rely upon a 'panel' of doctors who regularly report each quarter.

As with any sample or survey there may be problems of inference about the 'true' population from which the sample is drawn. With the UK sampling system the benefit of sampling different doctors each quarter is met at the cost of survey response. Thus the leading UK diagnosis is listed as ICD 796 'ill defined symptoms, unknown cause of morbidity'. However IMS estimate that nearly 80 per cent of this category is due to poor survey response – where a GP has not stated a diagnosis rather than not known. Clearly we have no real way of knowing what the unstated diagnoses actually are and must therefore assume a similar distribution to those which are stated – ie in the case of the UK the leading specific diagnosis is ICD 300 Neuroses.

Specific problems of comparability do arise with the German database which does not distinguish between diagnoses (DX) and treated patients (TDX). The numbers given for Germany are therefore treated patients (who receive some kind of drug therapy) and will typically be an underestimate of the number of patients actually diagnosed.

Appendix B: Statistical Appendix

The following tables are mainly obtained from the Medical Data Index and are moving annual totals for September 1982.

The notation used in these tables is explained below:

RX	number of prescriptions written
DX	number of diagnoses made
TDX	number of patients who received some form of drug treatment
POP	population
RX/POP	prescriptions and diagnoses per
DX/POP	head of population
TDX/DX	'The propensity to drug treatment' (being the ratio of drug treated patients to total patients)
RX/TDX	'The propensity to prescribe' (being the number of prescriptions per treated patient)
RX/DX	ratio of prescriptions to diagnoses.

Table 1 *Population characteristics 1982*

	(M) Total	*Per cent Male*	*Per cent 0–14 years*	*Per cent 15–64 years*	*Per cent over 65 years*
UK	56.0	48.7	22.2	63.3	14.5
Spain	37.6	49.1	26.8	62.6	10.6
Italy	57.2	48.9	22.9	64.0	13.1
France	54.0	49.0	22.7	63.3	14.0
Germany	61.7	47.6	19.9	64.9	15.2

Source OECD.

Table 2 *Mortality and health indicators*

	Crude birth rate (000) population (1981)	*Crude death rate (000) population (1981)*	*Infant mortality per 1,000 live births (1978)*	*Expectations of life males aged 45 years*
UK	13.1	11.8	13.1	28.2 (1971)
Spain	14.2	7.6	15.1	29.5 (1976)
Italy	10.9	9.5	17.7	28.6 (1975)
France	14.9	10.3	10.6	28.6 (1976)
Germany	10.1	13.9	14.7	28.1 (1978)

Sources Population Trends (1982).
Health Services in Europe, Vol 2 (1981).

Table 3 *Smoking and alcohol consumption*

	Per capita consumption (1981) of cigarettes	*Per capita (aged over 15) consumption of pure alcohol (1976)*
UK	1,969	9.1
Spain	1,707	n.a.
Italy	1,764	17.3
France	1,581	22.3
Germany	2,100	16.7

Sources World Tobacco.
Davies and Walsh (1979).

Table 4 *Diagnoses and prescriptions: summary table (millions)*

	Population (POP)	*Diagnoses (DX)*	*Treated patients (TDX)*	*Prescription (RX)*	*Diagnoses per capita (DX/POP)*	*Prescription items per capita (RX/POP)*	*Prescriptions per treated patient (RX/TDX)*	*Treated patients per diag (TDX/DX)*	*Prescriptions per diagnoses (RX/DX)*
UK	56.0	388.1	289.0	365.4	6.93	6.53	1.26	0.74	0.94
Spain	37.6	276.3	233.1	360.8	7.35	9.60	1.55	0.84	1.31
Italy	57.2	441.4	421.4	644.3	7.72	11.26	1.53	0.95	1.46
France	54.0	359.4	281.9	542.2	6.66	10.04	1.92	0.78	1.50
Germany*	61.7	558.1	558.1	689.9	9.05	11.18	1.65	*	*

*Data not available for Diagnoses (DX).
Numbers relate to treated patients (TDX).

Table 5 *Italy: leading diagnoses*

Rank	*Diagnoses*	*ICD number*	*Total diagnoses (000's)*	*Diagnoses per 1,000 population*	*As per cent of total diagnoses*
1	Ess. benign hypertension	(401)	24,780	433.2	5.6
2	Osteoarthritis, rel. cond.	(713)	16,652	291.2	3.8
3	Neuroses	(300)	14,175	247.8	3.2
4	Bronchitis unqualified	(490)	13,031	227.8	3.0
5	Diabetes mellitus	(250)	10,503	183.6	2.4
6	Chronic ischaemic heart disease	(412)	9,726	170.0	2.2
7	Acute pharyngitis	(462)	8,849	154.7	2.0
8	Other diseases of liver	(573)	8,713	152.3	2.0
9	Diarrhoeal disease	(009)	8,437	147.5	1.9
10	Acute tonsillitis	(463)	8,279	144.7	1.9
11	Gastritis and duodenitis	(535)	8,186	143.1	1.9
12	Asthma	(493)	8,170	142.8	1.9
13	Function disord. intestin.	(564)	7,887	137.9	1.8
14	Other eczema and dermatitis	(692)	7,807	136.5	1.8
15	Disord. stomach function	(536)	7,225	126.3	1.6
16	Vertebrogenic pain syndrome	(728)	6,010	105.1	1.4
17	Gen. isch. cerebrovas dis.	(437)	5,109	89.3	1.2
18	Acute laryngitis tracheit.	(464)	4,914	85.9	1.1
19	Acute bronchitis, bronchiolitis	(466)	4,542	79.4	1.0
20	Hypertensive heart disease	(402)	4,237	74.1	1.0
	Total of leading twenty:		187,231	3,273.3	42.4
	Total others:		254,173	4,443.6	57.6
	All diagnoses:		441,404	7,716.9	100.0

Table 6 *Spain: leading diagnoses*

Rank	*Diagnoses*	*ICD number*	*Total diagnoses (000's)*	*Diagnoses per 1,000 population*	*As per cent of total diagnoses*
1	Ess. benign hypertension	(401)	9,157	243.5	3.3
2	Bronchitis unqualified	(490)	8,741	232.5	3.2
3	Acute tonsillitis	(463)	8,605	228.9	3.1
4	Osteoarthritis rel. cond.	(713)	7,112	189.1	2.6
5	Acute pharyngitis	(462)	7,110	189.1	2.6
6	Acute nasopharyngitis (c. cold)	(460)	7,056	187.7	2.6
7	Diabetes mellitus	(250)	5,586	148.6	2.0
8	Acute bronchitis, bronchiolitis	(466)	5,447	144.9	2.0
9	Nervousness and debility	(790)	4,575	121.7	1.7
10	Neuroses	(300)	4,758	126.5	1.7
11	Diarrhoeal disease	(009)	4,743	126.1	1.7
12	Symptoms: upper gastro-intestinal tract	(784)	4,447	118.3	1.6
13	Gastritis and duodenitis	(535)	3,564	94.8	1.3
14	Arteriosclerosis NEC	(440)	3,264	86.8	1.2
15	Bronchitis, chronic	(491)	3,047	81.0	1.1
16	Gen. isch. cerebrovasc. dis.	(437)	3,000	79.8	1.1
17	Other eczema and dermatitis	(692)	2,982	79.3	1.1
18	Chronic ischaemic heart disease	(412)	2,918	77.6	1.1
19	Otitis media	(381)	2,736	72.8	1.0
20	Asthma	(493)	1,956	52.0	0.7
	Total of leading twenty:		100,805	2,680.9	36.5
	Total others:		175,478	4,667.0	63.5
	All diagnoses:		276,283	7,347.9	100.0

Table 7 *UK: leading diagnoses*

Rank	*Diagnoses*	*ICD number*	*Total diagnoses (000's)*	*Diagnoses per 1,000 population*	*As per cent of total diagnoses*
1	Ill defined symptoms, unknown cause of morbidity*	(796)	29,103	519.7	7.5
2	Neuroses	(300)	19,850	354.5	5.1
3	Ess. benign hypertension	(401)	18,662	333.3	4.8
4	Osteoarthritis rel. cond.	(713)	10,901	194.4	2.8
5	Bronchitis unqualified	(490)	10,325	184.4	2.7
6	Special symptoms NEC	(306)	10,283	183.6	2.6
7	Contraception	(745)	8,222	146.8	2.1
8	Acute upper respiration infection unspecified	(465)	8,148	145.5	2.1
9	Asthma	(493)	7,948	141.9	2.0
10	Symptomatic heart disease	(427)	7,308	130.5	1.9
11	Other eczema and dermatitis	(692)	6,908	123.4	1.8
12	Symptoms – respiratory system	(783)	6,443	115.1	1.7
13	Arthritis unspecified	(715)	5,257	93.9	1.4
14	Acute tonsillitis	(463)	4,853	86.7	1.3
15	Symptoms – cardiovascular and lymphatic system	(782)	4,737	84.6	1.2
16	Acute nasopharyngitis (c. cold)	(460)	4,538	81.0	1.2
17	Function disorder intestine	(564)	4,480	80.0	1.2
18	Diabetes mellitus	(250)	4,425	79.0	1.1
19	Angina pectoris	(413)	4,338	77.5	1.1
20	Otitis media	(381)	4,254	76.0	1.1
	Total of leading twenty:		180,979	3,231.8	46.7
	Total others:		207,153	3,699.1	53.3
	All diagnoses:		388,133	6,930.9	100.0

*See Appendix A.

Table 8 *Germany: leading diagnoses*

Rank	*Diagnoses*	*ICD number*	*Total diagnoses (000's)*	*Diagnoses per 1,000 population*	*As per cent of total diagnoses*
1	Other myocardial insufficiency	(428)	25,455	412.6	4.6
2	Bronchitis unqualified	(490)	22,610	366.5	4.1
3	Ess. benign hypertension	(401)	22,260	360.8	4.0
4	Ill defined symptoms, unknown cause of morbidity	(796)	21,110	342.1	3.8
5	Other eczema and dermatitis	(692)	15,509	251.4	2.8
6	Influenza unqualified	(470)	15,397	249.5	2.8
7	Special symptoms NEC	(306)	14,841	240.5	2.7
8	Vertebrogenic pain syndrome	(728)	12,626	204.6	2.3
9	Physical disorders of psychic origin	(305)	12,435	201.5	2.2
10	Varicose veins, lower extremities	(454)	11,386	184,5	2.0
11	Chronic pharyngitis, nasopharyngitis	(502)	10,454	169.4	1.9
12	Gastritis and duodenitis	(535)	10,029	162.5	1.8
13	Function. disorder intestine	(564)	9,459	153.3	1.7
14	Headache	(791)	9,122	147.8	1.6
15	Diabetes mellitus	(250)	9,093	147.4	1.6
16	Contraception	(745)	8,483	137.5	1.5
17	Gen. ischaemic cerebrovascular disease	(437)	8,377	135.8	1.5
18	Osteoarthritis rel. condition	(713)	8,016	129.9	1.4
19	Acute tonsillitis	(463)	7,180	116.4	1.3
20	Acute nasopharyngitis (c. cold)	(460)	5,762	93.4	1.0
	Total of leading twenty:		259,604	4,207.5	46.5
	Total others:		298,517	4,838.2	53.5
	All diagnoses:		558,121	9,045.7	100.0

Table 9 *France: leading diagnoses*

Rank	*Diagnoses*	*ICD number*	*Total diagnoses (000's)*	*Diagnoses per 1,000 population*	*As per cent of total diagnoses*
1	Ess. benign hypertension	(401)	21,651	400.9	6.0
2	Neuroses	(300)	14,738	272.9	4.1
3	Acute nasopharyngitis (c. cold)	(460)	9,732	180.2	2.7
4	Nervousness and debility	(790)	8,952	165.8	2.5
5	Acute tonsillitis	(463)	6,964	129.0	1.9
6	Special symptoms NEC	(306)	6,855	126.9	1.9
7	Bronchitis unqualified	(490)	6,524	120.8	1.8
8	Other unspecified circulatory disorder	(459)	5,712	105.8	1.6
9	Diabetes mellitus	(250)	5,452	101.0	1.5
10	Chronic ischaemic heart disease	(412)	5,135	95.1	1.4
11	General ischaemic cerebrovascular disease	(437)	8,408	93.9	1.4
12	Osteoarthritis, rel. cond.	(713)	4,985	92.3	1.4
13	Symptoms respiratory system	(783)	4,971	92.0	1.4
14	Function disord. intestine	(564)	4,714	87.3	1.3
15	Other eczema and dermatitis	(692)	4,165	77.1	1.2
16	Diarrhoeal disease	(009)	3,731	69.1	1.0
17	Otitis media	(381)	3,433	63.6	1.0
18	Other myocardial insufficiency	(428)	3,392	62.8	0.9
19	Influenza unqualified	(470)	2,989	55.4	0.8
20	Acute upper respiratory infection unspecified	(465)	2,119	39.2	0.6
	Total of leading twenty:		131,287	2,431.2	36.5
	Total others:		228,086	4,223.8	63.5
	All diagnoses:		359,373	6,655.0	100.0

Table 10 *Leading twenty diagnoses as distributed by ICD chapter headings*

ICD Chapter heading			*UK*	*Spain*	*Italy*	*Germany*	*France*
I	Infective and parasitic diseases	(000–136)	—	4.4	4.4	—	2.7
II	Neoplasms	(140–239)	—	—	—	—	—
III	Endocrine, nutritional and metabolic diseases	(240–279)	2.3	5.5	5.6	3.4	4.2
IV	Diseases of the blood and blood forming organs	(280–289)	—	—	—	—	—
V	Mental disorders	(290–315)	16.5	4.6	7.4	10.5	16.4
VI	Diseases of the nervous system and sense organs	(320–389)	2.3	2.7	—	—	2.7
VII	Diseases of the circulatory system	(390–458)	16.7	18.4	23.6	26.0	31.0
VIII	Disease of the respiratory system	(460–519)	20.0	41.9	25.6	23.9	21.4
IX	Diseases of the digestive system	(520–577)	2.5	3.5	17.1	7.4	3.6
X	Diseases of the genito-urinary system	(580–629)	—	—	—	—	—
XI	Complications of pregnancy childbirth and puerperium	(630–676)	—	—	—	—	—
XII	Diseases of the skin and subcutaneous tissue	(680–709)	3.9	3.0	4.1	6.0	3.4
XIII	Diseases of the musculo-skeletal system and connective tissue	(710–738)	9.0	7.0	12.2	8.0	3.8
XIV	Congenital anomalies	(740–759)	—	—	—	—	—
XV	Certain causes of perinatal morbidity and mortality	(760–779)	—	—	—	—	—
XVI	Symptoms and ill-defined conditions*	(780–799)	22.3*	9.0	—	11.6	10.8
	Supplementary classifications	(Y00–Y89)	4.5	—	—	3.2	—
	Leading twenty diagnoses:		100%	100%	100%	100%	100%
	Total of all diagnoses:		388,133	276,283	441,404	558,121	359,373
	'Top 20' total:		180,979	100,805	187,213	259,604	131,287
	Percentage:		46.6	36.5	42.4	46.5	36.5

*See Appendix A.

Table 11 *Prescription items per person per year and prescribing doctors[1] per 10,000 population*

	Per capita RX		*Prescribing doctors per 10,000 population*
	OHE (1983)	*Abel-Smith and Grandjeat (1978)*	
UK	6.5	6.3	4.9
Spain	9.6	—	20.2
Germany	11.2	11.0 (1973)	8.7
France	10.0	10.5	11.3
Italy	11.3	21.0	18.5

1. Universe of prescribing doctors on which IMS sample based.

Table 12 *Prescribing range: drug sub-group and product*

	Percentage of all prescriptions in 'Top 20' drug sub-groups	*Percentage of all prescriptions in 'Top 20' products*	*Number of unbranded products in 'Top 20' products*
UK	61.5	22.4	5
France	51.3	13.2	0
Italy	47.0	12.5	0
Germany	53.5	12.3	0
Spain	50.6	11.4	0

Table 13 *Top twenty drug sub-groups as distributed by general anatomical group*

Code	*Heading*	*UK*	*Spain*	*Italy*	*Germany*	*France*
A	Alimentary tract and metabolism	6.5	13.2	19.4	3.7	6.2
B	Blood and blood forming organs	2.9	—	—	—	—
C	Cardiovascular system	16.3	16.2	25.5	29.2	26.5
D	Dermatologicals	3.6	—	—	—	—
G	Genito-urinary system and sex hormones	3.3	—	3.2	2.6	—
H	Systemic hormonal preps. exc. sex hormone	—	—	—	—	—
J	General anti-infectives systemic	15.4	13.6	7.0	—	6.6
M	Musculo-skeletal system	8.5	14.4	13.4	12.0	12.0
N	Central nervous system	28.9	14.4	13.6	20.4	25.9
P	Parasitology	—	—	—	—	—
R	Respiratory system	14.6	28.2	17.9	26.5	22.8
S	Sensory organs	—	—	—	—	—
V	Various	—	—	—	5.6	—
	Leading 20 drug sub-groups	100%	100%	100%	100%	100%
	Percentage	61.5	50.6	47.0	53.3	51.3
	Number in Top 20	224,628	182,647	302,605	369,014	277,939
	Total prescriptions	365,371	360,849	644,309	689,977	542,233

Table 14 *Spain: leading prescription drugs*

Code	*Anatomical drug sub-group*	*Total prescription (RX) (000's)*	*RX per 1,000 population*	*As per cent of total prescription*
R5C	Expectorants	24,038	639.3	6.7
M1A	Antirheumatic non-steroid	21,950	583.8	6.1
N2B	Non-narcotic analgesics	16,933	450.3	4.7
J1C	Broad spectrum penicillins	15,324	407.6	4.2
C4A	Peripheral vasodilators	13,521	359.6	3.7
A2A	Antacids-antiflatulants	8,807	234.2	2.4
R3A	Bronchodils 7 ant-asthma	8,496	226.0	2.4
R5D	Cough sedatives	7,761	206.4	2.2
N5C	Tranquillisers	7,364	195.9	2.0
C1D	Myocardial therapy	6,680	177.7	1.9
R2A	Pharyngeal preparations	5,880	156.4	1.6
A13A	Tonics	5,643	150.1	1.6
R5A	Cold preparations	5,534	147.2	1.6
J1A	Tetracyclines % combs	5,506	146.4	1.5
A4A	Antiemetics-antinauseants	5,323	141.6	1.5
C2C	Hypotensives and diuretics	5,065	134.7	1.4
M2A	Antirheumatics topical	4,861	129.3	1.3
C3B	Other diuretics	4,709	125.2	1.3
J1F	Macrolides and similar type	4,696	124.9	1.3
A11D	Vit B1 and combs B1, B6, B12	4,554	121.1	1.3
	Total of leading twenty:	182,647	4,857.6	50.6
	Total others:	178,212	4,739.7	49.4
	All prescriptions:	360,849	9,597.0	100.0

Table 15 *UK: leading prescription drugs*

Code	*Anatomical drug sub-group*	*Total prescription (RX) (000's)*	*RX per 1,000 Population*	*As per cent of total prescription*
N2B	Non-narcotic analgesics	25,444	454.4	7.0
M1A	Antirheumatic non-steroid	19,035	339.9	5.2
R3A	Bronchodils and ant-asthma	17,149	306.2	4.7
N5B	Hypnotics and sedatives	16,316	291.4	4.5
C3A	Thiazides and combinations	15,710	280.5	4.3
N5C	Tranquillisers	14,856	265.3	4.1
J1C	Broad spectrum penicillins	14,361	256.4	3.9
C7A	B-blocking agents, plain	11,454	204.5	3.1
R5D	Cough sedatives	9,812	175.2	2.7
C3B	Other diuretics	9,392	167.7	2.6
A2A	Antacids-antiflatulants	8,832	157.7	2.4
J1A	Tetracyclines and combs.	8,082	144.3	2.2
N6A	Anti-depressants	7,980	142.5	2.2
D7A	Top. corticosteroid plain	7,938	141.8	2.2
G3A	Contraceptives nontopical	7,392	132.0	2.0
J1H	Med and narrow spect. penicil	6,645	118.7	1.8
B3A	Haematinics. iron and combs	6,486	115.8	1.8
J1E	Trimethoprim combs	5,935	106.0	1.6
R5C	Expectorants	5,921	105.7	1.6
A4A	Antiemetics-antinauseants	5,886	105.1	1.6
	Total of Leading Twenty:	224,628	4,011.2	61.5
	Total Others:	140,709	2,512.7	38.5
	All Prescriptions:	365,371	6,524.5	100.0

Table 16 *Italy: leading prescription drugs*

Code	*Anatomical drug sub-group*	*Total prescription (RX) (000's)*	*RX per 1,000 population*	*As per cent of total prescription*
M1A	Antirheumatic non-steroid	40,267	703.9	6.2
R5C	Expectorants	30,328	530.2	4.7
C4A	Peripheral vasodilators	27,115	474.0	4.2
N2B	Non-narcotic analgesics	21,121	369.2	3.3
A5B	Hepatic proct lipotropic	19,298	337.4	3.0
C1D	Myocardial therapy	16,232	283.8	2.5
C1A	Cardiac glycosides and comb	14,255	249.2	2.2
R3A	Bronchodils and ant-asthma	13,854	242.2	2.2
J1C	Broad spectrum penicillins	11,888	207.8	1.8
C3B	Other diuretics	11,499	201.0	1.8
A2B	Antipeptic ulcerants	11,086	193.8	1.7
A5A	Cholagogues-choleretics	10,826	189.3	1.7
N5C	Tranquillisers	10,362	181.2	1.6
G1A	Cynae anti-infectives	9,794	171.2	1.5
J1D	Cephalosporins and combs	9,658	168.8	1.5
R5D	Cough sedatives	9,503	166.1	1.5
N5B	Hypnotics and sedatives	9,412	164.5	1.5
A2A	Antacids-antiflatulants	8,976	156.9	1.4
A10B	Oral antidiabetics	8,609	150.5	1.3
C5C	Systemic vasoprotectives	8,523	149.0	1.3
	Total of leading twenty:	302,605	5,290.3	47.0
	Total others:	341,692	5,973.6	53.0
	All prescriptions:	644,309	11,264.1	100.0

Table 17 *France: leading prescription drugs*

Code	*Anatomical drug sub-group*	*Total prescription (RX) (000's)*	*RX per 1,000 population*	*As per cent of total prescription*
N2B	Non-narcotic analgesics	35,395	655.5	6.5
M1A	Antirheumatic non-steroid	25,857	478.8	4.8
C4A	Peripheral vasodilators	23,778	440.3	4.4
N5C	Tranquillisers	22,386	414.6	4.1
R5C	Expectorants	16,376	303.3	3.0
R1A	Nasal decongestants top.	15,153	280.6	2.8
C1D	Myocardial therapy	15,136	280.3	2.8
R5D	Cough sedatives	14,930	276.5	2.8
N5B	Hypnotics and sedatives	14,436	267.3	2.7
C5C	Systemic vasoprotectives	10,297	190.7	1.9
J7A	Vaccines	9,657	178.8	1.8
R2A	Pharyngeal preparations	9,270	171.7	1.7
A2A	Antacids-antiflatulants	8,874	164.3	1.6
C3A	Thiazides and combinations	8,577	158.8	1.6
J1C	Broad spectrum penicillins	8,478	157.0	1.6
A13A	Tonics	8,469	156.8	1.6
C2B	Synthetic hypotensives	8,043	148.9	1.5
M2A	Antirheumatics topical	7,638	141.4	1.4
R3A	Bronchodils and ant-asthma	7,633	141.4	1.4
C3B	Other diuretics	7,558	139.9	1.4
	Total of leading twenty:	277,939	5,147.0	51.3
	Total others:	264,206	4,892.7	48.7
	All prescriptions:	542,233	10,041.4	100.0

Table 18 *Germany: leading prescription drugs*

Code	Anatomical drug sub-group	Total prescription (RX) (000's)	RX per 1,000 population	As per cent of total prescription
N2B	Non-narcotic analgesics	32,950	534.0	4.8
C1A	Cardiac glycosides and comb	30,336	491.7	4.4
M2A	Antirheumatics topical	25,025	405.6	3.6
N5C	Tranquillisers	22,782	369.2	3.3
V3A	Other therapeutic prods	21,021	340.7	3.0
C1D	Myocardial therapy	20,926	339.2	3.0
R2A	Pharyngeal preparations	20,268	328.5	2.9
R5D	Cough sedatives	19,303	312.9	2.8
R5C	Expectorants	19,271	312.3	2.8
M1A	Antirheumatic non-steroid	19,188	310.9	2.8
C4A	Peripheral vasodilators	18,806	304.8	2.7
N5B	Hypnotics and sedatives	18,802	304.7	2.7
R1A	Nasal decongestants top.	17,134	277.7	2.5
A2A	Antacids-antiflatulants	13,520	219.1	2.0
C5B	Top. antivaricose preps	13,084	212.1	1.9
C2C	Hypotensives and diuretics	13,035	211.3	1.9
C1C	Cardiac and respiratory stm	11,878	192.5	1.7
R3A	Bronchodils and ant-asthma	10,935	177.2	1.6
R5A	Cold preparations	10,796	174.9	1.6
G3A	Contraceptives non-topical	9,955	161.3	1.4
	Total of leading twenty:	369,014	5,980.8	53.5
	Total others:	320,970	5,202.1	46.5
	All prescriptions:	689,977	11,182.8	100.0

Table 19 *Psycholeptic drug utilisation*

	Prescriptions per 1,000 population N5C tranquillisers N5B hypnotics and sedatives	Anti-anxiety/ sedative drugs: % of population using drugs in past year[1]	Psycholeptics DDD/1,000 person/day[2]
France	681.88	16.7	85.32
Germany	673.97	14.2	72.42
Spain	195.85*	9.7	54.21
Italy	345.69	11.2	44.70
UK	556.64	14.2	77.79

1. Balter, *et al* (1974).
2. Friebal (1982).
* Does not include N5B.
DDD = Defined daily dose.

Table 20 *Percentage respondents who thought tranquillisers do more harm than good*[1]

France	45.5
Germany	44.6
Spain	45.3
Italy	53.9
UK	34.2

1. Balter, *et al* (1974).

Tables 21–26: Prescribing analysis for essential benign hypertension (401)

Table 21 *Hypertension: summary table*

	RX (000's)	(%)	TDX (000's)	DX (000's)	RX/ TDX	TDX/ DX	RX/ DX
UK	22,335	(6.1)	15,641	18,662	1.43	0.84	1.19
Italy	33,421	(5.2)	24,373	24,780	1.37	0.98	1.35
Germany	25,568	(3.7)	22,260	22,260	1.14	—	—
France	37,254	(6.9)	20,059	21,651	1.85	0.93	1.72
Spain	10,754	(3.0)	8,593	9,157	1.22	0.94	1.14

Table 22 *Germany: leading hypertension prescriptions*

		RX (000's)	%
C2C	Hypotensives and diuretics	9,695	37.9
C7A	Beta blocker, plain	3,480	13.6
C2B	Synthetic hypotensives	2,542	9.9
C7B	Beta blockers, combs.	2,476	9.7
C3A	Thiazides and combs.	2,133	8.3
	All hypertension RXs	25,568	100.0

Table 23 *Italy: leading hypertension prescriptions*

		RX (000's)	%
C2C	Hypotensives and diuretics	7,179	21.5
C2B	Synthetic hyoptensives	6,758	20.2
C3B	Other diuretics	4,836	14.5
C3A	Thiazides and combs.	3,779	11.3
C7A	Beta blockers, plain	3,653	10.9
	All hypertension RXs	33,421	100.0

Table 24 *France: leading hypertension prescriptions*

		RX (000's)	%
C2B	Synthethic hypotensives	7,384	19.8
C3A	Thiazide and combs	6,482	17.4
C7A	Beta blockers, plain	4,733	12.7
C3B	Other diuretics	4,095	11.0
C4A	Peripheral vasodilators	3,187	8.6
	All hypertension RXs	37,254	100.0

Table 25 *UK: leading hypertension prescriptions*

		RX (000's)	%
C2A	Thiazides and combs.	6,948	31.1
C7A	Beta blockers, plain	5,835	26.1
C2B	Synthetic hypotensives	4,197	18.8
C7B	Beta blockers, comb.	1,817	8.1
C3B	Other diuretics	1,742	7.8
	All hypertension RXs	22,335	100.0

Table 26 *Spain: leading hypertension prescriptions*

		RX (000's)	%
C2C	Hypotensives and diuretics	4,114	38.3
C3B	Other diuretics	2,000	18.6
C2B	Synthetic hypotensives	1,211	11.3
C3A	Thiazide combinations	856	8.0
C7A	Beta blockers, plain	771	7.2
	All hypertension RXs	10,754	100.0

Tables 27–32: Diabetes mellitus (250) analysis

Table 27 *Diabetes: summary table*

	RX (000's)	(%)	TDX (000's)	DX (000's)	RX/ TDX	TDX/ DX	RX/ DX
UK	4,376	(1.2)	3,039	4,425	0.98	0.68	0.98
Italy	11,785	(1.8)	10,188	10,503	1.12	0.97	1.12
Germany	10,307	(1.5)	9,093	9,093	1.13	—	1.13
France	7,389	(1.4)	4,336	5,452	1.36	0.79	1.40
Spain	6,410	(1.8)	5,111	5,732	1.12	0.89	1.12

Table 28 *Germany: leading diabetes prescriptions*

		RX (000's)	%
A10B	Oral antidiabetics	6,272	60.9
A10A	Insulin	2,272	22.0
V3A	Other therap. goods	411	4.0
V4B	Urine tests	129	1.3
V4C	Other diagnostics	126	1.2
	All diabetes RXs	10,307	100.0

Table 29 *Italy: leading diabetes prescriptions*

		RX (000's)	%
A10B	Oral antidiabetics	8,511	72.2
A10A	Insulin	1,980	16.8
C5C	Systemic vasopretectium	334	2.8
C4A	Peripheral vasodilators	163	1.4
A11H	Other plain vitamins	93	1.8
	All diabetes RXs	11,785	100.0

Table 30 *France: leading diabetes prescriptions*

		RX (000's)	%
A10B	Oral antidiabetics	4,484	60.7
A10A	Insulin	588	8.0
V4B	Urine tests	289	3.9
V5A	Surgical antiseptics	196	2.7
C4A	Peripheral vasodilators	193	2.6
	All diabetes RXs	7,389	100.0

Table 31 *UK: leading diabetes prescriptions*

		RX (000's)	%
A10B	Oral antidiabetics	1,979	45.2
V4B	Urine tests	988	22.6
A10A	Insulin	840	19.2
D8A	Antiseptic disinfectants	252	5.8
N2B	Non-narcotic analgesics	41	0.9
	All diabetes RXs	4,376	100.0

Table 32 *Spain: leading diabetes prescriptions*

		RX (000's)	%
A10B	Oral antidiabetics	3,843	59.9
A10A	Insulin	1,476	23.0
A11E	Vitamin B complex	273	4.3
C5C	Systemic vasoprotectives	187	2.9
C4A	Peripheral vasodilators	158	2.5
	All diabetes RXs	6,410	100.0

Tables 33–38: Bronchitis unqualified (490) analysis

Table 33 *Bronchitis unqualified: summary table*

	RX (000's)	(%)	TDX (000's)	DX (000's)	RX/ TDX	TDX/ DX	RX/ DX
UK	4,376	(3.4)	3,039	4,425	0.98	0.69	0.98
Italy	11,785	(3.6)	10,188	10,503	1.12	0.97	1.12
Germany	10,307	(4.2)	9,093	9,093	1.13	—	—
France	7,389	(3.2)	4,336	5,452	1.35	0.80	1.35
Spain	6,410	(4.3)	5,111	5,732	1.12	0.89	1.12

Table 34 *Germany: leading bronchitis unqualified prescriptions*

		RX (000's)	%
R5C	Expectorants	8,450	29.1
R5D	Cough sedatives	8,424	29.0
R3A	Bronchodilators and anti-asthma	2,747	9.5
R4A	Chest rub and inhalants	2,121	7.3
R5F	Other cough and cold preps	1,894	6.5
	All bronchitis unqualified RXs	29,026	100.0

Table 35 *Italy: leading bronchitis unqualified prescriptions*

		RX (000's)	*%*
R5C	Expectorants	11,392	48.6
R5D	Cough sedatives	3,039	13.0
J1D	Cephalosporin and combs	1,441	6.1
J1C	Broad spectrum penicillins	1,344	5.7
R3A	Bronchodilators and anti-asthma	982	4.2
	All bronchitis unqualified RXs	23,464	100.0

Table 36 *France: leading bronchitis unqualified prescriptions*

		RX (000's)	*%*
R5C	Expectorants	3,748	21.3
R5D	Cough sedatives	2,845	16.2
J1C	Broad spectrum pencillins	1,294	7.4
N2B	Non-narcotic analgesics	1,149	6.5
R3A	Bronchodilators and anti-asthma	1,040	5.9
	All bronchitis unqualified RXs	17,592	100.0

Table 37 *UK: leading bronchitis unqualified prescriptions*

		RX (000's)	*%*
J1C	Broad spectrum penicillins	3,038	24.5
J1A	Tetracyclines and combs.	1,817	14.7
R5D	Cough sedatives	1,595	12.9
R5C	Expectorants	1,474	11.9
R3A	Bronchodilators and anti-asthma	1,433	11.6
	All bronchitis unqualified RXs	12,404	100.0

Table 38 *Spain: leading bronchitis unqualified prescriptions*

		RX (000's)	*%*
R5C	Expectorants	6,593	42.5
R3A	Bronchodilators and anti-asthma	2,169	14.0
R5D	Cough sedatives	1,611	10.4
J1C	Broad spectrum penicillins	1,111	7.2
C1E	Other cardiac preparations	610	3.9
	All bronchitis unqualified RXs	15,511	100.0

References

Abel-Smith, B., Grandjeat, P. (1978). *Pharmaceutical Consumption,* Commission of the European Communities, Social Policy Series No 38.

Abel-Smith, B., Maynard, A. (1978). *The Organisation, Financing and Cost of Health Care in the European Community,* Commission of the European Communities, Social Policy Series No 36.

Abel-Smith, B., (1983). 'Personal Communication'.

Baksaas Aasen, I., *et al* (1975). *Drug Dose Statistics: List of Defined Doses for Drugs Registered in Norway.* Oslo, Norsk Medieraldepot, 1975.

Bakwin, H. (1945). Pseudocia Pediatricia. *New England Journal of Medicine,* 232, 691–7.

Balarajan, R., Stannes, A., Machin, D. (1983). 'Trends in Primary Care in the UK', *Journal of Epidemiology and Community Health* 37, 169–175.

Balter, M. B., Levine, J., Manheimer, D. I. (1974). 'Gross-National Study of the Extent of Anti-Anxiety/Sedative Drug Use'. *New England Journal of Medicine.* Vol 290, pp 769–774.

Banks, M. H., Beresford, S. A. A., Morrell, D. C., Wallen, J. J. and Watkins, C.J. (1975) 'Factors Influencing the Demand for Primary Medical Care in Women Aged Twenty to Forty-four: A Preliminary Report'. *International Journal of Epidemiology* 4, 3, pp 189–195.

British Medical Association and The Pharmaceutical Society of Great Britain (1982) *British National Formulary* Number 3.

Cartwright, A. and Anderson, R. (1981). *General Practice Revisited: A second Study of Patients and their Doctors.* Tavistock, London.

Cochrane, A. (1971). *Effectiveness and Efficiency: Random Reflections on Health Services,* Nuffield Provincial Hospitals Trust.

Cooper, M. H. (1975). *European Pharmaceutical Prices.* Croom Helm, London.

Cooperstock, R. and Lennard, H. L. (1979). 'Some Social Meanings of Tranquilliser Use'. *Sociology of Health and Illness.* Vol 1, No 3, pp 331–346.

Davies, P. T. and Walsh, D. (1979). *The Medico-Social Aspects of Alcohol Related Problems in the Countries of Europe.* Report to the Commission of European Communities, Brussels.

Dunlop, D., Inch, R. S. (1972). 'Variations in Pharmaceutical and Medical Practice in Europe'. *British Medical Journal.* 3, pp 749–752.

Elderton, R. J. and Nuttall, N. M. (1983). 'Variation Among Dentists in Planning Treatment'. *British Dental Journal* 154:201.

Euromonitor (1981). *European Marketing Statistics.* Seventeenth Edition.

Friebal, H. (1982). Arzneimittelverbrauch. *Deutsche Apotheker Zeitung.* No 15, 15 April 1982, pp 815–818.

Gisbert, R. (1980). 'The Demand and Consumption of Medicaments in Spain in the Period 1970–1979' *Primeras Jornados sobre Economia de La Salud.* Barcelona, 1980.

Grossman, M. (1972). *The Demand for Health: a Theoretical and Empirical Investigation.* New York.

Hemminki, E. (1982). 'Problems in the Measurement of Psychotropic Drug Consumption'. *American Journal of Hospital Pharmacy* 39: pp 325–329.

Horder, J. and Horder, E. (1954). *Illness in General Practice.* Practitioner 173, pp 177–187.

Intercontinental Medical Statistics (1981). *Medical Data Index: Explanatory Brochure.* IMS Harrow, Middlesex.

Kelson, M. C., Heller, R. F. (1983 forthcoming). 'The Effect of Death Certification and Coding Practices on Observed Differences in Respiratory Disease Mortality in Eight EEC Countries' *Review Francaise d'epidemiologie et de la Santa Publique.*

Lancet (1982). 'Disparities in European Medicine'. *Lancet,* 3 July, pp 26–27.

Laporte, J. *et al* (1981). 'The Utilization of Sedative-Hypnotic Drugs in Spain', in: Tognoni, G., Bellantuono, C. and Lader, M. (eds) (1981). *Epidemiological Impact of Psychotropic Drugs.* Elsevier/North Holland.

Logan, W. P. D. and Brooke, E. M. (1957). 'The Survey of Sickness, 1954–52'. *Studies on Medical and Population Subjects.* 12, HMSO.

MacGregor, G. *et al* (1983). Lack of Effect of Beta-Blocker on Flat Dose Response to Thiazide in Hypertension: Efficacy of Low Dose Thiazide Combined with Beta-Blocker. *British Medical Journal* Vol 286, pp 1535–1538.

McKeown, T. (1979). *The Role of Medicine* Oxford.

Main, D. N. G., and Basker, R. M. (1983). 'Patients Complaining of a Burning Mouth'. *British Dental Journal.* 184:206.

Malleson, A. (1973). 'Need Your Doctor Be So Useless?' Allen and Unwin.

O'Brien, B. J. (1982a). 'Demand for Prescriptions: Dispensing With Charges'. Paper prepared for the Health Economist's Study Group, Brunel University, 5–7 July.

O'Brien, B. J. (1982b). 'Unfit to work – says who?'. *The Health Services* No 38.

Office of Health Economics (1977). *Preventing Bronchitis.*

Office of Health Economics (1980). *Effects of Prescription Charges.* Briefing, No 13.

Office of Health Economics (1981). *Compendium of Health Statistics.* Fourth Edition.

Parish, P. (1976). *Medicines: A Guide for Everybody.* Penguin.

Popham, Schmidt, de Lint (1975). 'The Prevention of Alcoholism: Epidemiological Studies of the Effect of Government Control Measures'. *British Journal of Addiction.* Vol 70, pp 125–144.

Reekie, W. and Weber, M. H. (1979). *Profits, Politics and Drugs.* Macmillan, London.

Reekie, W. D. (1981). *Price Comparisons of Identical Products in Japan, the United States and Europe.* Office of Health Economics.

Shen, S. W. and Bresler, R. (1977). 'Clinical Pharmacology of Oral Antidiabetic Agents'. *New England Journal of Medicine.* vol 296, No 14, pp 787–793.

Skegg, D. C. G., Doll, R., Perry, J. (1977). 'Use of Medicines in

General Practice', *British Medical Journal,* 18 June, pp 1561–1563.

Tognoni, G. *et al.* (1980). 'Present Limitations and Future Possibilities of Drug Surveillance in Italy' in Soda, T. (ed). *Drug Induced Sufferings,* Proceedings of the Kyoto International Conference against Drug-Induced Sufferings 1979.

Tognoni, G. (1981). 'Drug Selection: Controversies and Opportunities', *TIPS*, June 1981, pp 138–141.

Venning, G. R. (1983). 'Identification of Adverse Reactions to New Drugs I: What have been the Important Adverse Reactions Since Thalidomide?' *British Medical Journal*, 15 January, vol. 286, pp 199–202.

Verbrugge, L. M. (1979). 'Female Illness Rates and Illness Behaviour'. *Women and Health*, 4: pp 61–79.

World Health Organisation (1965). *International Classification of Diseases* (8th Revision). WHO, Geneva.

World Health Organisation (1979). *Studies in Drug Utilisation.* WHO Regional Publication, European Series No 8.

Printed by White Crescent Press Ltd, Luton