cannot see that happening because they are an essential part of our educational fabric. The special health authorities are the nearest we have to the United States' National Institutes of Health. Their future cannot be judged in short term market terms.

RS: But might not the Hammersmith follow the model of some of the top hospitals in the United States and

charge a premium price for treating difficult cases from all over the country?

JS: It would mean having a very different structure, including having highly developed marketing and lots of private facilities. I can't see that being reasonable at the moment. In some respects the American health care systems have more problems than our own.

Medicine in Europe

Medical manpower

Stephen Brearley

Planning of medical manpower has been practised for decades in the United Kingdom. But this is not the case in many of its partners in the European Community (EC). Control of medical student numbers in line with the expected demand for doctors occurs in, at most, two other EC states (box) but in most of the rest there has been a substantial overproduction of doctors, which has led to considerable, and in some cases catastrophic, medical unemployment.

Determination of medical student numbers

Numerus clausus* related to manpower needs	Denmark United Kingdom (Finland) (Iceland) (Norway) (Sweden)
Numerus clausus* related to educational capacity of medical schools	Germany Ireland Netherlands Spain (Austria) (Switzerland)
Other control mechanism	Belgium France
No effective control	Greece Italy
No medical school	Luxembourg

*Limitation of the number of medical school places.

This is a matter of concern to British doctors for two reasons. Firstly, as a member of the European Community, the United Kingdom has implemented its medical directives, which give all doctors who are nationals of community countries and hold medical qualifications granted in those countries the right to practise anywhere in the community. Over 1000 such doctors are now coming to the United Kingdom each year, something that was not foreseen when medical manpower was last scrutinised. Secondly, as a partner in the medical community of Europe, the United Kingdom has an interest in standards of training and practice throughout the EC and these are inevitably jeopardised where student and trainee numbers are excessive and many doctors have insufficient work.

To a greater or lesser degree these concerns are shared by all the medical associations in the EC. They were set out by the EC's standing committee of doctors in its 1985 Cannes declaration, which called for urgent measures to establish manpower planning machinery in all member states. In practice, the liberal constitutions adopted by several states after the second world war make the introduction of such measures

difficult as they would infringe the guaranteed right of citizens to higher education. In general, medical manpower planning does not figure highly among the priorities of national governments or the European Commission, and in the past 10 years only one country, France, has made a serious attempt to reduce its overproduction of doctors.

This ambivalence on the part of governments reflects the nature of most of the health care systems in Europe. Whereas the British government is a virtual monopoly employer of doctors and controls the number of posts available, most European doctors are in free practice, recouping their fees through a social security system. Any appropriately qualified doctor can set up a practice and so there is no fixed number of medical jobs. In such a system the demand for doctors cannot be measured and the supply tends to be left to market forces. This laissez faire approach has led to a trebling in the number of doctors in the 12 EC countries since the early 1950s.

Inexact data

Where medical manpower planning is not practised reliable manpower data tend not to be collected. All data on manpower are therefore inexact, and such data as are available need to be interpreted with caution. National registers of doctors, such as that maintained by the General Medical Council, may not include retired doctors, unemployed doctors, or those who are not working for a variety of other reasons. Government data may relate only to doctors working in government funded posts or registered with the social security system. Even the definition of a doctor is variable. French internes are still technically students until they obtain their MD by thesis, usually three or four years after beginning their postgraduate training.

Several bodies have investigated EC medical manpower: the Statistical Office of the European Communities (1984), the Standing Committee of Doctors of the EC (1988), and the Permanent Working Group of European Junior Hospital Doctors (1991). The permanent working group's study, reported at a Symposium in Florence in October but so far unpublished, is the most comprehensive to date. A synopsis is given in table I.

No one knows how many doctors there are in Italy and Greece. No distinction was made between doctors and dentists in Italy until recently. There is practically no limit on the numbers admitted to medical school and, of those who obtain medical degrees, a considerable number never find medical work. Greece has a numerus clausus (a limit on the number of medical school places) but many of the Greeks who obtain a medical degree bypass it by going abroad to begin their studies, usually in eastern Europe or Italy. They

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are then entitled to return to Greece to complete the course.

Germany is one of the countries that has difficulty in reducing its intake into medical schools for legal reasons. The number of places is fixed, but in relation to the educational capacity of the schools rather than to manpower needs. Because of Germany's size its over-production in absolute numbers is among the largest in the community. Unemployment is growing rapidly, and some junior doctors are working without pay in the hope of furthering their training and ultimately obtaining a post. The largest group of continental doctors coming to the United Kingdom is German and, after reunification, the right to free migration is being extended to doctors from the former East Germany.

Free migration is also becoming available to doctors from Scandinavia, Austria, Switzerland, and Lichtenstein (the countries of the European Free Trade Association (EFTA)) as the result of the agreement creating a European economic space, which was signed in October. There are approximately one million doctors working in the EC and a further 100 000 in EFTA countries. The number of doctors in any country is, however, a meaningless figure unless related to population size. The number of inhabitants per doctor in each country is given in table I. This shows that medical density within the community varies almost threefold, with the highest densities occurring in countries with little control over medical student numbers and a high proportion of doctors in free practice. Not surprisingly, these are also the countries with the highest levels of medical unemployment and underemployment.

Unemployment and underemployment

One of the problems that has bedevilled the study of medical manpower in Europe is the lack of agreed definitions of the terms used. In an attempt to overcome this the permanent working group has adopted the definitions of employment status set out in the box.

Underemployment is an unfamiliar term in the United Kingdom, but it is applicable to doctors without regular appointments who earn a living from a succession of locum posts, with intervening periods of unemployment. In Europe as a whole it more often applies to doctors in free practice who are consulted by few patients and may lose their skills as a result. They may supplement their incomes by doing non-medical work. Because established posts are the exception in many countries, underemployment is often a bigger problem than unemployment.

Both unemployment and underemployment are extremely difficult to quantify, even in countries with good data on medical manpower. The number of

TABLE 1—Medical demography of the European Community

Country	Medical workforce	No of doctors per head of population	No (%) of unemployed doctors
Belgium	35 000	290	
Denmark	14 505	340	70 (0.5)
France	164 022	336	1 000 (0.6)
Germany	192 480	332	15 400 (8.0)
Greece	35 000	290	
Republic of Ireland	5 571	628	0
Italy	230 265	248	40 000 (17.3)
Luxembourg	700	534	
Netherlands	29 867	492	600 (2.0)
Portugal	24 503	389	0
Spain	131 684	296	6 000 (4.6)
United Kingdom	101 396	562	300 (0.3)
Austria	211 572	352	2 500 (9.0)
Finland	12 317	402	0
Iceland	743	340	0
Norway	11 588	364	0
Sweden	23 565	360	0
Switzerland	20 584	321	620 (0.3)

Employment status

- Unemployment:** A doctor is unemployed when, on a specified date, he or she is eligible to practise but is involuntarily without any form of remunerative work.
- Misemployment:** A doctor is misemployed when, on a specific date, he or she is eligible to practise, is unable to find work as a doctor, but obtains an income by working in a capacity not requiring a medical qualification.
- Underemployment:** A doctor is underemployed if he or she is unable to find medical work during part of the normal working week or if he or she is unable to find sufficient medical work to yield a remuneration appropriate to his or her experience and seniority.
- Long term unemployment** A doctor is long term unemployed when, while having been eligible to practise, he or she has been involuntarily without any remunerative medical work for a continuous period exceeding six calendar months.

Source: Permanent Working Group of European Junior Hospital Doctors (1988).

unemployed and underemployed doctors in the United Kingdom is unknown, though it is believed to be low. The best available estimates for EC and EFTA countries are set out in table I, but it is unlikely that reliable figures can ever be obtained. Furthermore, it is questionable whether the holder of a medical qualification who has never practised and who earns a living outside medicine should still be counted as a doctor. It is possible, however, using computer modelling techniques, to make projections for the supply of and demand for doctors and to derive trends in unemployment. This approach has been adopted in the permanent working group's study and the result is surprising. The present high level of medical unemployment is attributable to a large and uncontrolled increase in medical school output in the 1960s and '70s. The corollary of this is that there will be a boom in medical retirements after the turn of the century. The size of the medical workforce may decrease and there may be a shortage of doctors.

These findings are reassuring in that the upward trend in unemployment seems to be part of a cyclical rather than an inexorable process. Equally, the possibility of a shortage of doctors should give pause for thought to health service planners, particularly in Britain, where there is not a surplus at present. Unfortunately, improvement is likely to come too late to help those doctors, now in their 30s and 40s, who make up the bulk of the unemployed and underemployed and who are likely to remain a lost generation.

Hours of work

Despite the existence of serious medical unemployment, doctors throughout Europe continue to work substantially longer hours than other groups of workers. Once again, study of this question is hampered by the absence of agreed definitions. Hours of work are an issue chiefly for salaried doctors, who are predominantly trainees, but the method by which their hours are counted and remunerated differs from country to country.

A survey of junior doctors' hours of work was carried

TABLE II—Weekly hours of duty of junior doctors

Hours of duty	Country
40-49	Italy Luxemburg
50-59	Belgium Denmark Finland Iceland Norway Sweden Switzerland
60-69	Netherlands Portugal Spain
70-79	Ireland Iceland
More than 80	United Kingdom

Sources: Survey of junior doctors' hours by Permanent Working Group of European Junior Hospital Doctors (1987), Standing Committee of Doctors of the EC's questionnaire on medical demography (1988).

out under the auspices of the permanent working group in 1987 and data have also been collected by the Standing Committee of Doctors of the EC. The results show, not unexpectedly, that trainees in the United Kingdom have the longest hours of work in western Europe (table II). The shortest hours are found in Scandinavia, where several countries have a legal limit on the hours that may be worked. Even where hours are substantially shorter than in the United Kingdom they are often considered to be too long. Junior doctors in the Netherlands are currently engaged in acrimonious negotiations with their government on this subject.

Shorter hours are made possible in other countries by three factors. There are more doctors per head of population, trainee numbers are not restricted in line with expected demand for specialists, and the trainees tend to be concentrated in university hospitals or comparable institutions. Specialists in non-training hospitals enjoy little or no junior support but these hospitals do much less emergency work. It is interesting to speculate whether the United Kingdom will have to emulate its neighbours in any of these respects if the intractable problem of hours of work is to be solved.

Older doctors and more women

The proportion of doctors who are women has increased steadily in all European countries. Women currently comprise 28% of the EC medical workforce but a half of those graduating from medical schools. By 2000 approximately one third of practising doctors will be women.

The age structure of the medical profession is much less uniform. Many countries experienced a boom in medical school output in the 1960s and '70s, followed by a gradual decline in the '80s, and where this occurred there is a progressive right shift of the age distribution curve with time.

The proportion of specialists in each country was included in the EC Statistical Office's 1984 report. Fewer than 30% of doctors are specialists in the United Kingdom, the Republic of Ireland, and Denmark, compared with 45-70% in other EC countries, but these figures should be interpreted with caution. In countries where free practice is predominant many specialists practise from their own offices, do not have admitting rights to hospitals, do not carry out invasive treatments, and often provide a degree of general medical service. Patients refer themselves directly to the doctor of their choice, specialist or generalist, and there is intense competition between the two groups for the same patients.

Prospects for medical migration

The United Kingdom has seen a large increase in medical immigration from other EC countries in recent years, but it would be wrong to suppose that similar movements are being seen elsewhere. The United Kingdom is uniquely attractive to medical migrants because employment prospects, at least at senior house officer level, are better than anywhere else and because most doctors know English, the international language of medicine. Entry to specialist training is relatively easy, competition becoming more intense with increasing seniority, whereas in most other European countries there is fierce competition for entry to training programmes but progress thereafter is much more assured.

The 1989 medical manpower census for England and Wales identified 418 junior doctors born in the Republic of Ireland and 935 born in other EC countries. A survey carried out by the Department of Health in 1990 obtained responses from 622 non-Irish EC doctors. Over three quarters were from western Germany (42%), the Netherlands (22%), or Spain (15%). Almost all (89%) were working as house officers or senior house officers. Eighteen per cent intended to settle permanently in the United Kingdom and a further 8% were undecided. Past experience suggests that the number who settle may prove to be greater than the number who came with that intention. It is not yet clear how successful those who attempt to return home will be in finding the posts they are seeking.

The number of British doctors who migrate to other European states is small (perhaps 50 a year, mostly for short periods) and no other country has reported medical migration on a large scale. The numbers migrating are, in fact, disappointingly small. The EC offers an unparalleled range of medical experience, and several bodies have tried to promote short term migration for educational purposes. These initiatives have largely been frustrated by the pressure on posts created by widespread unemployment.

The position is likely to change appreciably in the foreseeable future. In the short term the permanent working group's study suggests that unemployment will get worse in those countries where it is already severe, but the United Kingdom may be short of several thousand doctors by the year 2000. This shortfall is likely to be made up by immigration from countries with high unemployment. In the next century, as medical manpower passes from surplus to deficit, immigration is likely to decline and opportunities abroad may increase. There may be an acute shortage of doctors in the United Kingdom unless corrective action is taken in good time.

ANY QUESTIONS

Is there any evidence that an ioniser or an ozoniser benefits someone with asthma?

In clear air in the countryside there are approximately 1200 positive to 1000 negative ions per cm³. Normally such ions result from cosmic radiation, natural radioactivity, ultraviolet radiation, lightning, waterfalls, and the hot dry winds that blow in various parts of the world. Ionisers are devices that alter the ratio of negatively to positively charged ions in room air, usually by high voltage electric fields. Enhanced numbers of negatively charged particles have been associated with a range of beneficial effects, including a feeling of wellbeing, while the opposite has been reported with an excess of positive ions. Early, usually uncontrolled, studies in patients with bronchial asthma often reported temporary subjective benefit. Small improvements in peak flow were seen in a blind study.¹ No significant effect was found in a six month randomised double blind crossover study in

20 adults with asthma.² Breathing positively charged ionised air increased exercise induced asthma while high concentrations of negatively charged ions slightly decreased exercise induced asthma but had no consistent effect on responsiveness to histamine.³ Ozonisers work on the same principle as ionisers but generate increased concentrations of ozone. Ozone is an irritant and increases bronchial responsiveness; it would be expected to be deleterious in asthma. In general the scientific evidence does not support a beneficial effect of ionisers in asthma.—PHILIP W IND, consultant physician, London

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