Learning Medicine

Choosing a medical school

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The 29 university medical schools in the United Kingdom (see table), of which 10 are in London, are similar in quality but differ in environment and in the emphasis of their courses. In respect to formal education it probably does not matter very much where you study, but in respect to attitudes it is important to find a place that suits your personality and outlook because you are likely to learn best there; self learning is important throughout the course, and is the essence of clinical training.

The choice of a medical school may seem arbitrary and difficult. The information given by a prospectus is often sketchy and difficult to evaluate. Far reaching decisions are made on slender evidence, often on the opinion of a single friendly doctor who, as like as not, is as fiercely loyal to his old school (perhaps experienced many years ago) as he is ill informed about others. Careers teachers often find it difficult to keep up to date with the changing courses in medical schools and often continue to plough furrows which have yielded a good crop in the past. Many considerations enter the equation, most of them matters of individual preference rather than differences of intrinsic merit. Some are geographical, some academic, some cultural, and some strategic.

Some students prefer to study near home; many like to go far away. Doctors tend to settle in the vicinity of their medical school so if you are determined to settle in Northumberland it makes more sense to apply to Newcastle than to Bristol. It is also wise to note that the universities of Scotland and Northern Ireland predominantly admit Scots and Irishmen respectively, although this may simply reflect patterns of application rather than bias in acceptance.

Geographical considerations are sometimes less sophisticated. There may, for example, perhaps be an element of truth in the rumour that many Welsh students apply to St Mary's Hospital Medical School because it is situated close to Paddington Station, the terminus of the south Wales railway line. A more predictable reason this than that of an applicant who presented herself one September day at St George's Hospital Medical School years ago when it was at Hyde Park Corner. When asked by the dean the reason for her late, personal application she replied that Hyde Park Corner was on her way to Harrods.

The size of a university city influences many applicants: some deliberately choose to study in the largest industrial cities such as London, Manchester or Glasgow, where the most complex interplay of medical and social needs is to be found; others prefer smaller university cities such as Cambridge or St Andrews, where the university is not so dominated by the city. A third group combines the cloistered abstraction of basic medical sciences in Oxford or Cambridge (not to mention the

uncloistered extracurricular activities) with clinical studies in a large city, usually London.

The size of the medical school or the university itself is another consideration. Many prefer the more personal atmosphere of relatively small classes and the friendliness of relatively small societies and clubs; on the other hand, larger institutions may offer a greater diversity of teachers and a wider range of activities. Most medical schools admit between 100 and 120 students each year (see table). The potential disadvantage of the large Cambridge intake is offset by the personal environment of life and tutorials in individual colleges.

Approximate annual entry to basic medical science courses in United Kingdom medical schools 1983

	Annual entry		Annual entry
Birmingham*	160	Manchester*	200
Bristol*	130	Newcastle*	130
Cambridge	210	Nottingham	130
Leeds*	160	Oxford	100
Leicester	100	Sheffield*	150
Liverpool	150	Southampton	120
London:			
Charing Cross and Westminster	155	Belfast*	150
King's	105		
The London and St Bartholomew's†	210	Aberdeen*	130
Royal Free	100	Dundee*	110
St George's	140	Edinburgh*	180
St Mary's	100	Glasgow	200
United Schools of Guy's		St Andrews	80
and St Thomas's	195		
University College and Middlesex†	195	Welsh National*	150

*School offering a premedical (1st MB) course.

†Although The London and St Bartholomew's medical schools and University College and Middlesex medical schools are grouped together for the purposes of student entry quotas, they handle their admissions separately.

Women often wonder whether they stand a better chance of acceptance at some schools and a smaller chance at others simply because they are women. The proportion of women accepted is not fixed, and women do not seem to have a better or worse chance of acceptance at any particular school. In 1981 43% of first year medical students and 41% of all applicants for medicine were women, and the proportion is increasing.

Premedical and preclinical courses

Students who have not studied science at A level and who can afford a premedical year at university need to choose one of the 11 universities which offer a 1st MB course (see table). This one year course is occupied with the study of chemistry, physics and biology leading to the 1st MB examination, an alternative entry qualification to medicine. Economic pressures have reduced the number of these courses but they provide a quicker method of entry than a two year A level course.

The medical degree course proper starts with preclinical training in the sciences particularly relevant to medicine. Norm-

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ally the whole medical course is taken at one university, but many Oxford and Cambridge students undertake clinical training in London and most St Andrew's students in Manchester. London University has more than one preclinical medical school within its faculty of medicine and when applying to read medicine in London students must specify the particular medical school; elsewhere in Britain the university alone is nominated.

All London's medical schools belong to the faculty of medicine of London University although they were originally founded by their associated teaching hospitals. Many are older than the University itself. Two, University College and King's College, provide the first two years of the course (or three years if an intercalated BSc is taken—see below) in the environment of a multifaculty college; the last two years and nine months are spent mainly in the associated teaching hospital and clinical school, which in the case of University College is University College Hospital on the same campus and for King's College is King's College Hospital, several miles away in south London. The other London medical schools are solely concerned with medical (and, in some cases, dental) education and research; looking after patients in the adjacent teaching hospital is an integral part of both clinical teaching and research.

The relative merits of studying medicine either in a university outside London or in a multifaculty college of London University or at a hospital medical school in London University are not quite as clear cut as might be supposed. Certainly, medical students are more likely to form friendships with non-medical students in a multifaculty setting, notwithstanding their tendency to club together and keep their own company. On the other hand, many students at hospital medical schools in London live for a time in halls of residence which accept students of many faculties and many medical students make a substantial contribution to both sport and culture in college and university regardless of where they live or to which college they belong.

Medical schools outside London teach the basic medical sciences alongside other courses with a varying degree of separation from the clinical school. St Andrews University has no clinical school of its own.

A few preclinical courses, such as those at Oxford and Cambridge, teach the sciences basic to medicine very much in isolation from their applications in clinical medicine. At the other end of the spectrum are Nottingham and Newcastle in the provinces and, in London, St George's Hospital Medical School and the Royal Free Hospital Medical School, where the preclinical courses concentrate particularly on aspects of anatomy, physiology, biochemistry, and pharmacology most relevant to medicine, using patients to show examples of disorders of structure and function whenever possible. The other medical schools occupy intermediate positions. Science is more easily integrated with medicine where hospital and medical school are side by side. Integration of medical sciences and clinical medicine is popular with students because most of them like to see where their studies are leading.

Many courses introduce some contact with patients in the first preclinical year, not with the purpose of starting clinical training so soon but to establish the patient as central to the course. At Nottingham, however, the preclinical course is an integral part of the clinical course: students are introduced to talking and listening to patients and to examining them in the first year and have an opportunity to practise these clinical skills throughout the course. Although labour intensive for staff, this approach is popular and useful.

The preclinical course in most universities leads to the 2nd MB examination or its equivalent in two years. Oxford and Cambridge have a three year preclinical course leading to a BA degree (taken in medical sciences in spite of its "arts" title) with a wide range of options in the third year. Nottingham also has an initial three year course which embraces basic medical sciences and relevant aspects of clinical medicine; the third year is an honours course leading to a BMedSci degree for all successful candidates. At most of the other universities medical students have the opportunity to study in depth a

science relevant to medicine for an honours BSc degree during an extra (third) preclinical year "intercalated" between the preclinical and clinical course. For students at schools providing the more conventional courses this intercalated BSc year provides the best opportunity during the preclinical years to explore, discover, and think. Southampton gives all students a project combining clinical and basic medical science which occupies the major part of their fourth year.

Medical students are eligible for a mandatory grant from local education authorities which covers all fees and contributes to maintenance calculated according to parental and personal income. An intercalated BSc year, which lengthens the medical course to nearly six years, is not covered by these grants, but grants calculated on the same basis are available to the candidates selected through the Medical Research Council; there are enough of these grants to enable 10-15% of all students to take an intercalated BSc degree.

The clinical course

The clinical course at most universities lasts two years and nine months. In Nottingham the clinical component of the first three years enables the purely clinical course to be reduced to two years and three months so that the total length of the course is five years. The Cambridge course is five years and three months if clinical studies are also undertaken in Cambridge. But if preclinical studies at Cambridge are followed by clinical studies elsewhere both the Cambridge course and the Oxford course are five years and nine months, as is a course at a London medical school which includes an intercalated year for a BSc.

Two other considerations concerning the clinical course are relevant but difficult to find out about in any detail from the outside—namely, the number of patients available in relation to the number of students and the amount of clinical responsibility given to students during the course. To some extent these matters are interrelated and are two of the things to ask about when visiting a school.

Clinical training is still largely a matter of apprenticeship; the more patients there are per student the better. It is difficult to feel involved and so to learn at the back of a large group gathered around a patient's bed. Schools serving populous areas have an advantage in this respect. There is much to be said for undertaking part of the clinical training programme at district general hospitals associated with the main teaching centre to balance the relatively specialised clinical experience in the central teaching hospital. Some schools are so situated that their students can work at an associated district general hospital while remaining based on and enjoying the academic and extra-curricular activities of the medical school throughout their whole undergraduate medical training. Other schools send students away for up to one year of their course. The prospectus often gives some information, but once again personal inquiry may be necessary.

Clinical apprenticeship should be more than a spectator sport; participation and responsibility are the keys to learning. A Chinese proverb sums it up in the words, "I hear and I forget; I see and I remember; I do and I understand." Some idea of the opportunity offered for personal responsibility may be obtained from the number of students on each clinical attachment because it is difficult for a group of more than five students to take much individual responsibility.

A more specific indication of responsibility may be given by whether or not a school has a period in its curriculum for "shadow" house officer posts: one student is attached to a clinical unit or "firm", preferably a firm which at the time has no other students; the "shadow" both understudies the house officer and takes considerable responsibility for a few patients.

It is also worth inquiring whether clinical students are encouraged to take student assistantships to cover illness or holiday. These assistantships are a demanding experience but a very good way of learning, especially about what is urgent and

what can wait, something textbooks can never communicate so effectively.

At least two other considerations apply to the choice of medical school. Schools differ in tradition, atmosphere, and attitude. Study the prospectus to try to get an idea of whether the personality of a school would fit with your own and discover the school's admission policy concerning A level grades, resits, age, and previous experience. If in doubt it is wise to inquire specifically about your eligibility before risking wasting a choice. Write and ask to be shown around any school which seems attractive.

The second consideration applies after graduation and may therefore seem rather remote but it is important that two good house officer posts should be more or less assured for graduates

immediately they have passed the final MB examination. These posts complete the requirements for full registration with the General Medical Council. All schools have a pool of posts large enough to provide for some if not all their graduates, usually with one post in the central teaching hospital or a nearby university hospital and one further afield to give a balance of emphasis and experience.

One last word: if you want to know about a school, or if you have particular questions concerning your own eligibility, find out for yourself. It is very hard to understand why young adults about to launch themselves on their own careers (or even sometimes prospective mature students) should have letters written by their parents. The first way to persuade a school that your decisions are your own is to speak for yourself.

Aviation Medicine

Special forms of flight

III: Supersonic transport aircraft

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Two major advances were made in the history of aviation during the 1960s: the development of a supersonic transport aircraft and man's conquest of space. These special forms of flight have posed medical problems, the solutions to some of which emphasise that aviation medicine is in the forefront of the practice of preventive medicine.

In 1963 at an early stage in the Concorde project the Anglo-French Concorde Aeromedical Group was formed to consider the aeromedical problems presented by such an advanced aircraft. The most important of these are created by Concorde's high cruising altitude of 60 000 ft (18 288 m).

Loss of cabin pressure

Sudden decompression to altitudes exceeding 52 000 ft (15 850 m) results in unconsciousness within 15 seconds of exposure whether air or pure oxygen is breathed.¹ Oxygen provides adequate protection for healthy subjects to an altitude of 40 000 ft (12 192 m); for passengers, such a supply is available from drop down emergency sets. Protection above this altitude is adequate only if the oxygen is supplied under pressure so that an alveolar oxygen tension greater than 60 mm Hg (7.98 kPa) is maintained.¹ The flight crew of Concorde is, therefore, provided with a supply of oxygen delivered at a mask pressure

not exceeding 30 mm Hg (3.99 kPa). The mask has been specially designed to meet the licensing authorities' requirement that it can be put on within five seconds, which ensures that under the worst possible conditions of decompression the crew is sufficiently protected to start an emergency descent.

The main protection to Concorde's occupants is, however, derived from its deliberately "overengineered" design. The engineering safeguards include a considerable reserve capacity to supply cabin air and the use of small (less than 15.2 cm) diameter windows. Thus if a window is lost at 65 000 ft (19 812 m) the maximum cabin altitude would reach only 36 000 ft (10 973 m) provided that an emergency descent was started within 30 seconds. Within 6.5 minutes cabin altitude would be restored to about 15 000 ft (4572 m). The overall design is such that the cabin altitude will only exceed 25 000 ft (7620 m) after an extremely remote failure (less than one in 10⁷ flying hours).² No decompression incidents have yet been reported during Concorde's commercial service.

Cosmic radiation

We are all exposed to two types of extraterrestrial radiation. Galactic radiation originates from outside the solar system to produce a steady, reasonably predictable, low intensity flux of high energy particles.³ The earth's magnetic field deflects the particles to give considerable protection in equatorial regions, but this effect declines to zero as the polar regions are approached. Further protection is also afforded by the solar interplanetary magnetic field and by the stratospheric absorption of low energy particles. The importance of the latter is that the background radiation dose increases with altitude so that at its cruising altitude Concorde is exposed to a galactic radiation dose of about twice that to which subsonic aircraft are exposed. Total

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