

CHOICE AND ORDERING OF MEDICAL SCHOOL APPLICATIONS: CAUSE FOR CONCERN

I. C. McMANUS

P. RICHARDS

St Mary's Hospital Medical School, London W2 1PG

Summary The probability of admission to medical school in the UK can be predicted from the choices of schools and their order on the UCCA form, even after academic factors have been taken into account. The effect may of itself influence a candidate's chance of admission by a factor of about four times. This situation justifies the recurrent complaints of applicants about the problems of medical school choice and ordering. The disadvantage imposed on many applicants would be reduced if rank ordering of choices was replaced by alphabetical ordering.

INTRODUCTION

MEDICAL school applicants in the UK experience great difficulty in choosing and ranking their five choices of medical school.^{1,2} Two particular problems arise: some schools are more oversubscribed than others relative to the number of places available; and some schools are more likely to reject automatically those candidates who place them low on the list of choices. In this paper we examine all medical school applications in the UK for the years 1975–84, in order to assess the importance of these processes in successful application.

METHOD

UCCA (Universities' Central Council on Admissions) provided computer readable summaries of university applications and eventual acceptances for 1975–84. Statistical analyses were done with the SPSS-X³ and GLIM⁴ packages. Except where otherwise stated, all analyses are restricted to "home" candidates, defined in terms of UCCA's residential category—a definition which helps universities to define the fees payable by students, and which relates closely to domicile and fairly closely to nationality.

RESULTS

7211 573 university applications were made during 1975–84 by 1556 309 applicants, some of whom applied in

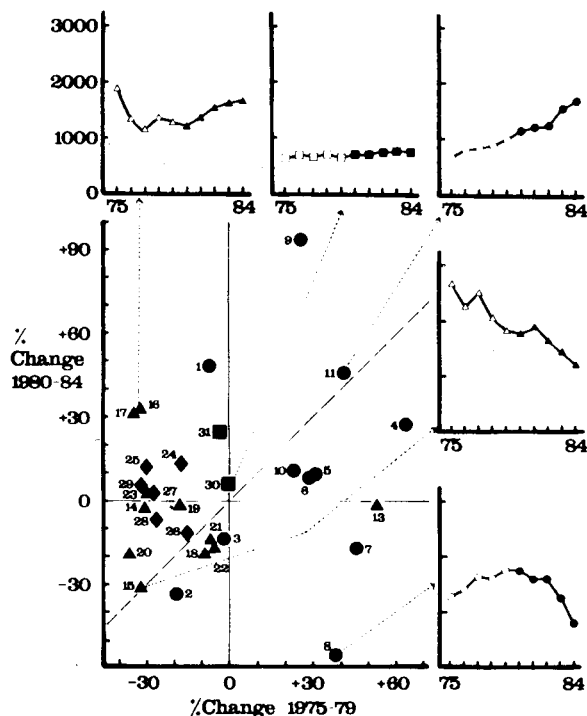


Fig 1—Percentage changes in numbers of applicants to individual medical schools over the period 1975–79 and 1980–84.

● = London schools; ■ = Oxbridge; ▲ = other schools in England and Wales; ◆ = Scotland and Northern Ireland. Five individual schools are shown in detail to illustrate the range of changes for individual years from 1975–84. School no 12 is absent from the figure as it ceased to admit students in its own right during the second period studied.

more than one year, and of whom 689 568 were accepted. 6359 210 applications were from home candidates, of whom 643 478 were accepted. 425 973 home applications (80 157 non-home) were made for admission to medical schools, by 93 617 home applicants (18 162 non-home), of whom 31 911 (1221 non-home) were accepted.

Applications to particular medical schools showed large variations from year to year (fig 1), although the number of entrants changed little, rising only by about 2.5% per annum. Fig 1 reveals several trends; applications to Oxford

TABLE I—ACCEPTANCES TO UK MEDICAL SCHOOLS IN 1975–84 ACCORDING TO POSITION OF SCHOOL ON UCCA FORM, AND CALCULATION OF LIKELIHOOD RATIO

Rank order	No accepted	No rejected	Total applications	% accepted
1	16 791	76 822	93 613	17.9
2	7963	82 331	90 294	8.8
3	3714	82 971	86 685	4.3
4	1961	78 194	80 155	2.4
5	1482	73 744	75 226	7.5
Total	31 911	394 062	425 973	7.5

$$\text{Likelihood ratio} = \frac{24\,754 \times 151\,938}{3443 \times 159\,153} = 6.86 \times$$

TABLE II—EXAMPLE OF CALCULATION OF ESTIMATED PROBABILITY OF ACCEPTANCE FOR AN INDIVIDUAL CANDIDATE APPLYING FOR YEAR Y (HYPOTHETICAL DATA)

Position on form (P)	Med school chosen (S)	Total applicants in year Y putting school S in position P (A)	Total entrants to school S putting school in position P (E)	E as a proportion of A
1	26	500	80	0.16
2	17	700	63	0.09
3	3	600	12	0.02
4	10	900	18	0.02
5	6	400	4	0.01

Total estimated probability of acceptance = 0.30.

or Cambridge ("Oxbridge") increased slightly, on average by 11.1%, over the years 1975–84; applications to London medical schools increased substantially, by 50.2%, and those for other schools in England and Wales and in Scotland and Northern Ireland decreased by 21.1% and 16.9%, respectively. Within each group there were clear exceptions to these broad trends.

Applicants were more likely to go to schools placed high on their list of preferences (table 1). A conventional likelihood ratio shows that applicants are 6.86 times more likely to go to their first or second than to their fourth or fifth choice. Fig 2 shows likelihood ratios for individual medical schools, calculated separately for 1975–79 and 1980–84. A school rejecting all candidates placing it fourth or fifth would have a ratio of infinity; the highest value in fig 2 is a ratio of 68:1 for school 18 for the period 1980–84, during which time 564 out of 4460 applicants placing the school first or second were accepted, compared with 5 of 2344 (0.2%) applicants placing it fourth or fifth. Considering those five schools with likelihood ratios of greater than 20 during the five years from 1980–84, there were 8516 applications by candidates placing them fourth or fifth, of whom only 27 (0.3%) were accepted.

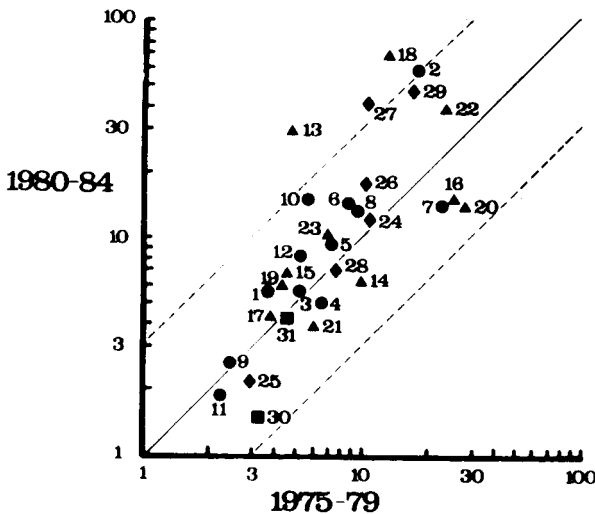


Fig 2—Relative likelihood of acceptance (plotted on logarithmic scales) at 1st or 2nd choice school as compared with 4th or 5th choice school, for applicants to British medical schools, in the period 1975–79 and 1980–84.

Code numbers alongside points are arbitrary, but correspond to those in fig 1. The main diagonal indicates the line of equality, and the two parallel diagonals indicate a difference of a factor of three between the first and second periods.

To all intents and purposes those applicants may be considered to have wasted their choices, in view of the very low probability of acceptance.

Fig 2 also shows that, during the decade, four schools became at least three times less likely to accept candidates placing them in low positions, and concurrently these schools changed their entries in the summary of selection policy published by the Secondary Heads' Association.^{5,6} This implies, when taken with the fact that in several universities medical applicants fared differently from non-medical, that rejection of candidates placing schools fourth or fifth is a result of policy, rather than appraisals of individual merit. Analysis by individual subjects shows that the effect is greater for veterinary medicine, dentistry, and medicine than for all other subjects.

The overall influence of the particular pattern of applications was assessed by calculating for each applicant an "estimated probability of acceptance" based solely on the medical schools chosen and the order in which those schools were placed. For example, if school A were placed third on the form by an applicant in 1980, we found how many applicants applying to A in 1980 had put the school third, how many were accepted, and hence the probability of an application being successful. The process was repeated for the other four choices and the five probabilities were summed to give the overall probability (table 11).

The distribution of estimated probabilities for 59 622 home applicants who had made all five choices for medicine in 1975–84, and who had not included Oxbridge among the applications, was remarkably wide. It had a mean of 0.357 (SD 0.0804) with 2.5th and 97.5th percentiles of 0.23 and 0.54. This means that a candidate 2 SDs above the mean had a 3.9 times increased likelihood of acceptance compared with a candidate 2 SD below the mean.

A similar calculation considering only choice of universities and ignoring order gave a distribution with SD of 0.0649, implying that 65.2% of the variance in estimated probabilities is attributable to choice of universities, and 34.8% to their ordering on the UCCA form. Fig 3 shows a close relation between the *actual* proportions of candidates accepted and the *estimated* probability of acceptance calculated solely from the choice and ordering of schools.

Why the correlation of estimated and actual probabilities of acceptance? This might be because better qualified candidates receive better careers advice and hence are more likely to be accepted. We examined this possibility by reanalysing data from the St Mary's survey of medical student selection,⁷ in which the likelihood of acceptance at *any* UK medical school was related to O and A level achievement, early UCCA application, and having a

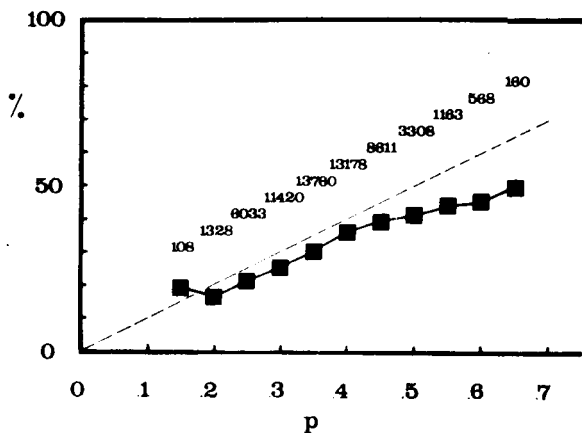


Fig 3—Probability of acceptance (ordinate) of 59 662 home applicants at a UK medical school, in relation to estimated probability of acceptance based on choice and ordering of medical schools (abscissa).

Diagonal line indicates the line of equality.

medical parent. We calculated an estimated probability of acceptance, by the method of table II, for all 962 UK nationals, who had not applied to Oxbridge and had made all five choices for medicine. When known predictors were taken into account by multiple logistic regression, the additional effect of the estimated probability of acceptance upon actual acceptance was significant (chi-squared = 9.3, 1 df, $p < .005$), with a standardised regression coefficient of $1.356 \times$ (95% confidence intervals $1.113 \times -1.654 \times$). For individuals 2 SDs above and below the mean estimated probability of acceptance, the higher scorer is $3.387 \times$ (95% confidence intervals $1.534 \times -7.478 \times$) more likely to be admitted to medical school, given equivalent O and A levels, medical background, and date of application. Academic credentials therefore have hardly altered the effect of choice and ordering.

DISCUSSION

Numbers of applicants to different medical schools varied substantially over a period of ten years, and schools differed as to the degree to which they rejected applicants who placed them low on the UCCA form. Taken together these factors mean that some candidates are seriously disadvantaged relative to others with similar qualifications.

The likelihood ratio due to ordering of choices, as calculated in this paper, has two separate components—a preference by medical schools for candidates who put them high on the UCCA form, and a preference by candidates for schools they put higher on the UCCA form. Although these components cannot be separated by means of the present data (but elsewhere we have demonstrated the latter effect in St Mary's applicants⁸), it is possible to show that preference by schools must be the predominant factor, since a school may express its preference with each application form that arrives, whereas a candidate can only demonstrate a preference when at least two offers have been received. Computer simulations confirm that preferences by candidates have a small effect upon likelihood ratios, which are almost entirely a function of medical school preferences.

It is not clear why some candidates achieve much higher estimated probabilities of acceptance than others, but it may

be that they, their parents, or their career advisers have taken note of such limited background information as has been available (eg, refs 5-7, 9, 10). That many candidates are ignorant of or ignore some factors is shown by the large numbers who continued to put particular schools fourth or fifth on the UCCA form even though those schools had stated in the readily available Secondary Heads' Association booklets^{5,6} that they did not normally consider such applications. Applicants can, however, be forgiven some confusion: for example, although school 2 clearly rejected most fourth and fifth place applicants, it did not confess to such a policy in the 1982 edition of the Secondary Heads' Association booklet (although its prospectus did state that first consideration was given to candidates placing the school high in their order of preference).

We are reassured to find that the newly published *University Entrance 1988: the Official Guide*¹¹ makes readily available for the first time not only the numbers of applicants but also the A level grades achieved by entrants, as well as an indication of the weight actually given to preference ratings. Most of this information was unavailable to the individuals considered in this study. Even inspired use of this information is unlikely entirely to remove the injustice associated with rank ordering. A majority of university and school opinion in a UCCA survey was in favour of abolition of rank ordering,¹² and we understand that the Council of UCCA is about to vote on the same issue.

We do not know of any analyses comparable with this one, but there is no reason why other workers should not use this method. We are uncomfortably aware, however, that more extensive studies involving linkage of records may not be feasible in future because of the decision by UCCA, arising from the provisions of the Data Protection Act of 1984, that data containing names will not be stored for more than three years. We wish to argue that the existence, analysis, and publication of such data is strongly in the interests of current and future candidates for university, and that the public interest is not best served by legislation whose consequence is to lessen the availability of such important information.

We are extremely grateful to Mr M. J. Hiscock, Mr S. Morris, and Mr D. J. Walter, and to the Universities, Central Council on Admissions, for their help in providing data for this and previous studies, and to Prof J. A. Sirs for his valuable criticisms of the script. We also thank Mr P. Taylor, Mr L. Nodes, Mr J. Anderson, and Mr G. Kingston and the staff of Royal Holloway and Bedford New College Computing Centre for their assistance with computing.

REFERENCES

- McManus IC, Richards P. Audit of admission to medical school: III: Applicants' perceptions and proposals for change. *Br Med J* 1984; 289: 1365-67.
- Fulton O, Lamley SAC. University entry: the candidates' view. Cheltenham: UCCA, 1983.
- Baker RJ, Nelder JA. The GLIM system, release 3. Oxford: Numerical Algorithms Group, 1978.
- Anonymous. Statistical package for the social sciences-X. Users's guide. New York: McGraw-Hill, 1983.
- Anonymous. Entrance requirements for medical school. London: Secondary Heads' Association, 1978.
- Anonymous. Entrance requirements for medical school, 3rd ed. London: Secondary Heads' Association, 1982.
- McManus IC, Richards P. Audit of admission to medical school: I: Acceptances and rejects. *Br Med J* 1984; 289: 1201-04.
- McManus IC. Medical students: origins, selections, attitudes and culture, MD thesis, University of London, 1985.
- Westall WG. How to obtain a place in medical school. Cardiff: Westall, 1984.
- Heap B. Degree course offers 1986. London: Careers Consultants, 1985.
- Association of Commonwealth Universities. University entrance 1988: the official guide. London: Association of Commonwealth Universities, 1987.
- Universities Central Council on Admissions. Order of preference: Results of a survey of schools/colleges/careers offices. Cheltenham: UCCA, 1987.