Optometry manpower up to the year 2000 and beyond

Part 1: The past and present

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It is four years since Alpine and Jack's 1979 supplementary report on professional manpower was published and we thought it was time to take a fresh look at the question of recruitment numbers for optometry. At the present time, university departments have been obliged to restrict their admission of United Kingdom or 'home' students. Each university has been instructed to reduce its intake so that a new, lower level of home student numbers may be achieved by the time of the 1984-1985 session, and we wanted to examine the long-term consequences of this new, lower level for the profession's future. In this, the first part of our report, we are mainly concerned with the past and present; looking at factors which enable us to predict future manpower patterns. In the second part (to be published in our next issue) we will look more to the future, particularly in terms of the number of practitioners and workloads, and consider the implications

Previous manpower studies have tended to restrict their projections to the near future, although 'ultimate' numbers have occasionally been referred to. Alpine and Jack (1979) looked little further than 1989 in their own investigation. In some ways this is a sensible strategy as it is unrealistic to expect that any set of assumptions will remain true and unchanged, particularly when their consequences have been foretold. On the other hand such short-term projections do not always provide the necessary 'perspective' for an effective understanding of developments.

It should also be noted that 1989 is almost upon us. Departments of Optometry/ Ophthalmic Optics (we will be using the two terms interchangeably) have already made their offers to candidates for October 1983 entry and thus the number of new registrations four years later in 1987 has virtually been determined. Any move to alter recruitment to the profession must face up to a four-year lag or more before the effect of any changes begins to be felt. And in practice even greater foresight is required to take into account the training personnel and other factors.

We will be looking forward to the year 2000 and beyond, refining and correcting the assumptions of earlier studies, and taking a *continuous* look at the future; earlier studies have tended to look at just two or three *isolated* years.

The distribution of the ages of United Kingdom ophthalmic opticians whose names are listed in the Register of the General Optical Council is essentially bimodal. There are two main peaks — one at around the normal age of retirement of 65 stemming from an exceptional influx in the 1920s and 1930s, and the other at the age of the new recruits to the profession. The histogram (Figure 1) gives the age distribution according to the GOC figures for the end of 1982 (GOC, 1983).

As is well known, the recruitment rate has increased since the Register was set up in 1958 and over this period of time this has been counterbalanced by the high retirement rate. Inspection of the histogram confirms that changes in the influx of male optometrists have not been large and makes clear the fact that the increased recruitment has mainly been due to a continued increase in female optometrists who now account for around half of the students.

Numbers of new entrants to optometry

Figure 2 shows the annual numbers of ophthalmic optics graduates produced by the six UK institutions since the first BSc degrees were awarded in June, 1967. Each has shown substantial, if irregular, increases over the years in response to the demands of the profession and applicants (French, 1982a) and each is near its peak. As can be seen, individual numbers of graduates are currently of the order of 70 for City, 50 for Aston, and 40 for Bradford, Glasgow, UMIST and UWIST.

From a national point of view we are more concerned with the aggregate position and Figure 3 shows the total numbers of students entering training, graduating with degrees and then registering with the GOC. It is clear from this that admissions to the six UK institutions flattened to form a plateau around 1972, with a maximum in 1978 followed by a slight decline since then. Similarly, the total number of graduates per year shows only a very modest increase between 1976 and 1982, and one would have expected its maximum to have been reached

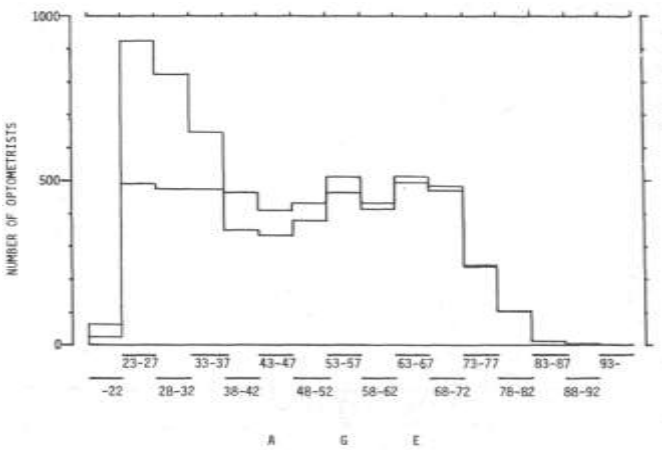

Fig 1: UK optometrists on Register at end of 1982

The upper line gives the frequency of men and women ophthalmic opticians combined for the given ages. The lower line is for men only. Frequencies are for the five-year age bands indicated

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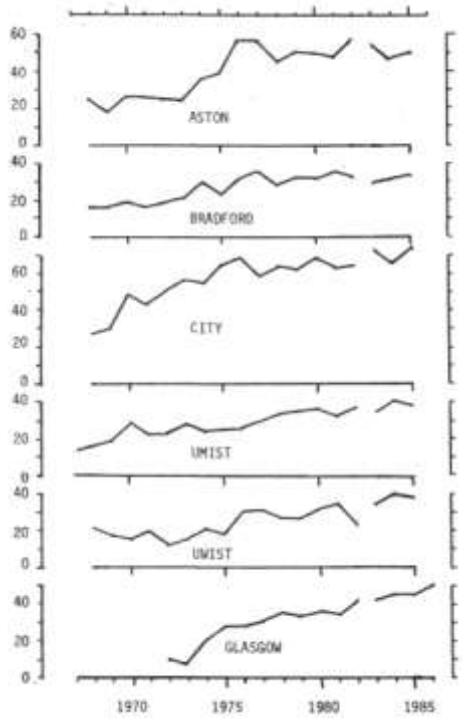
Fig 2: Annual number of UK optometry graduates

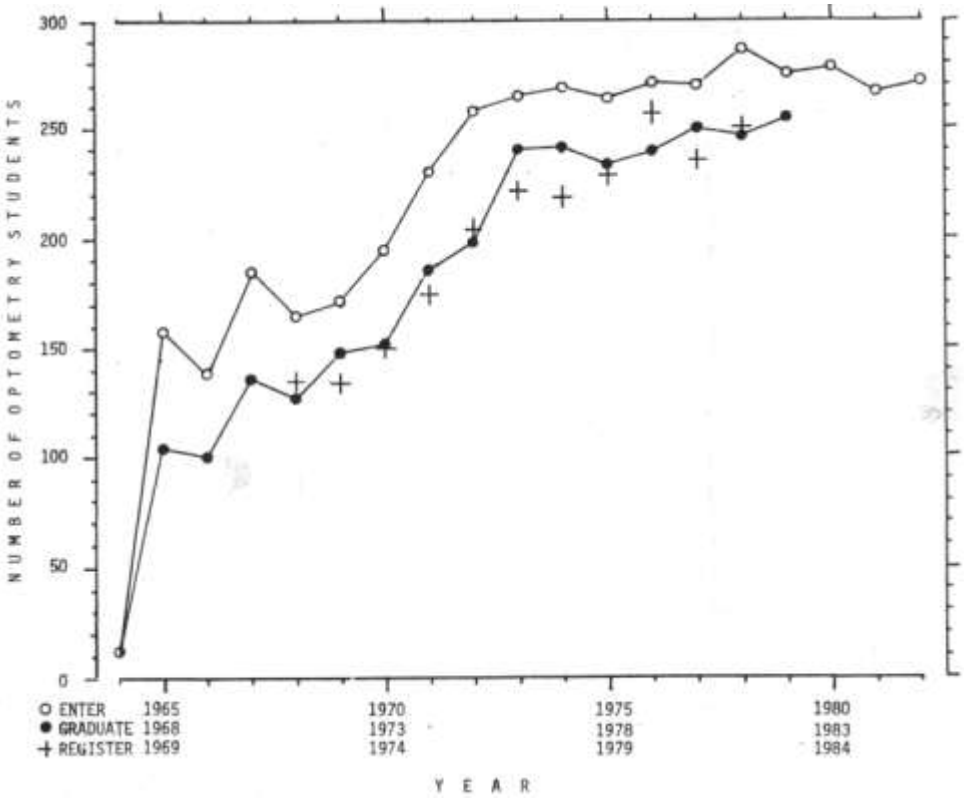


Graduate figures are given from 1967 (the year of first graduations) until 1982. The figures for 1983 onwards are the numbers of undergraduates in training as of January 1983, and the actual number of graduates for these years will be smaller due to drop outs

in 1982. The graph for UK-trained, new registrations under section 3, subsection 3 of the 1958 Opticians Act differs from the former two graphs on account of its rather sharp peak in 1980 (GOC's Table N minus Table M). This was largely a consequence of changes in professional examination procedures and one would now expect to see the annual numbers maintained close to those of the graduation curve.

It is not too difficult to estimate the professional recruitment figures from the training institutions over the next few years. Figure 2 also contains the numbers of undergraduates currently pursuing their degrees, although some of these will undoubtedly fail their examinations and withdraw from the courses. However, the aggregate of these candidates and even the totals in Figure 3 are limited in their usefulness. The real interest for the UK profession lies in the number of *home* entrants to courses, that is the numbers in Figure 3 *after* overseas students have been subtracted. The Government has set upper limits for the number of home students that universities may admit and each university's central authority has passed down what it considers to be appropriate ceilings for each, individual department. At the time of writing, the position has been obscured by a December House of Lords decision which has once more complicated the distinction between home and overseas students[2].

Fig 3: Annual aggregate UK optometry recruits



The above graphs show the annual figures for the number of students *entering* ophthalmic optics degree courses (open circles), *graduating* with degrees (solid circles), and *registering* with the GOC according to section 3(3) of the 1958 Opticians Act (crosses) after training at United Kingdom institutions (1 972 registrations onwards). English and Welsh optometry degrees normally take three years compared with four years in Scotland

The results of our enquiries to optometry departments in January suggested that for October 1983 approximate home targets would be Aston - 40, Bradford - 30, City -65, Glasgow - 50, UMIST - 30 and UWIST -30. This gives a total of 245 home entrants which we can compare with recent statistics published by UCCA for university admissions supplemented by appropriate information supplied by courtesy of Glasgow College of Technology. These are given in Table 1. On the face of it one would expect home students to remain in this country, at least for a while after registration, but a few may be obliged to return abroad despite having been eligible for Local Education Authority grants. Likewise, one might expect overseas students to return home as soon as they achieve registration, but in fact some will remain in this country — for example because they married British nationals. The classification of students as 'home' and 'overseas' is a complex matter and criteria have varied over the years. Ignoring these complications, however, it appears from Table 1 that the annual number of home admissions to UK optometry departments will have been reduced by around 9 per cent from its peak of 269 in 1980 to 245 for 1983, It is difficult to predict the figures for October 1984 entry. It may well be around 245 home students again, but there is the possibility that it may be less. At present if university lecturers in optometry departments retire or resign then there is the distinct possibility that they will not be replaced. Such staff losses might put extra

Table 1. Recent admissions to BSc optometry courses

Year	Overseas	Home	total
1983	?	245*	?
1982	23	251	274
1981	15	258	273
1980	15	269	284
1979	20	260	280

This table gives the number of entrants to ophthalmic optics courses in England, Scotland and Wales in recent years. Figures published by UCCA for the universities have been adjusted to include entrants to Glasgow College of Technology. It is interesting and cautionary to note that UCCA's figures are, on average, of the order of one per cent higher than those supplied to the GOC by the optometry departments. The reason for this small but significant discrepancy is not known for sure although it may be noted that different university personnel would be involved in forwarding the information at slightly different times in the year. *The home figure for 1983 represents the aggregate of home targets imposed on university departments as of January 1983 together with a prediction from Glasgow. The number of overseas students admitted in 1983 will depend upon the resources available for teaching them and the applicants' success in achieving the examination targets set by admissions tutors. The Government has imposed no limits on overseas numbers at the time of writing.

[2]Many, but not all, overseas students now on degree courses apparently have a legal right to a grant from Local Education Authorities on the same basis as home students although their earlier applications may have been unsuccessful. In May the Government passed a Bill to re-establish the status quo from next year.

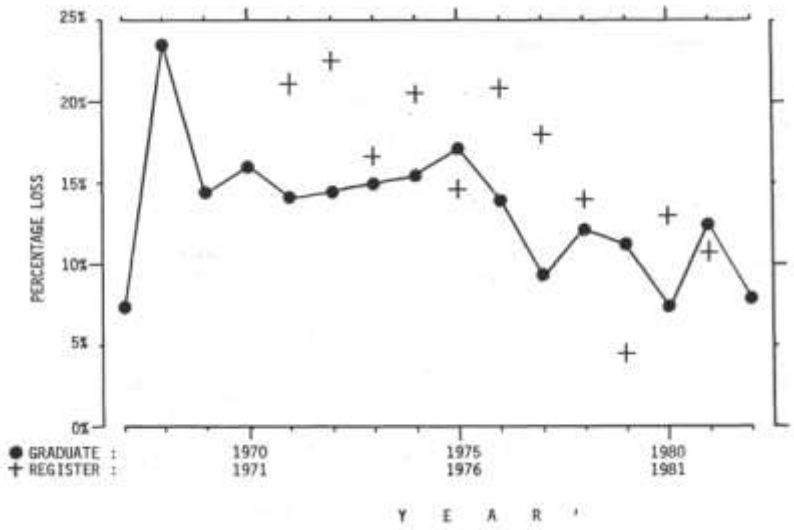
pressure on individual departments and lead them to reduce their intakes further. Indeed, there is already the 'suggestion' at UMIST that the Ophthalmic Optics Department should reduce its annual admission of home students to an average 28 or 29 in place of the present 30, which itself should be compared with the earlier maximum of 36. If this suggestion was enforced[3] it would reduce the home intake for the year 1984-1985 to a radical low of 23, although this would be for one year only. Thus 245 can be seen as a realistic new upper limit to the annual admissions of UK students from 1983 onwards unless there is a change in education policy in this country; a possibility which cannot be ruled out, particularly in view of the forthcoming elections. But even at this late stage one still might expect further adjustments in the departments' January targets for October 1983.[4]

If the six institutions admit 245 home students each year then how many graduates will be produced and how many new entrants will there be to the profession? Figure 4 shows the annual aggregate wastage rates from 1964 until the present. The percentage failing to graduate has fallen from its early level close to 15 per cent for each year of entry to around 10 per cent for post-1973 entrants. This drop was mainly a consequence of the increased competition for places and the higher qualifications of the entrants (French, 1982b). The numbers of final year students for 1983 suggests that 10 years later this record will more than have been maintained. Our own experience at UMIST, where course failure rates at present appear to be of the order of one student in 36 over three years (zero for some intakes), suggest that 5 per cent overall should be achievable, although 7.5 per cent may be more realistic.

Figures 3 and 4 show that these days the losses between entry to a course and registration are not too different to those between entry and graduation. A few students may fail their degrees but still continue with their studies and finally register after taking the appropriate College examinations. On the other hand, a few students will graduate in ophthalmic optics, but then turn their back on the profession without entering the pre-registration year. The wastage rates shown in Figure 4 are for all students (home *and* overseas) and may exaggerate the problem as some overseas students return home without trying for GOC registration. The loss for 1963-1968 entrants to universities was already quite low at 15 per cent (BUCOO, 1975). Our figures for degree students, only, appear a little higher from 1972 to 1977. The registration loss has remained similar to that for graduation, particularly if we make allowance for the overseas students. We feel that the loss for home students in the future might be limited to 5 per cent, although,

^The University Grants Committee is enforcing its home targets at the university level by 'fining' those universities that exceed their targets.

Figure 4: Quasi-wastage rates for optometry



The above graphs show the *approximate* percentage wastage rates for optometry undergraduates. Degree courses were first instituted in 1964. The wastage rates were calculated by dividing graduation and appropriate registration totals by the corresponding course entry totals. These would be three years prior in the case of English and Welsh degrees, but four years earlier with Scottish degrees. The graduation loss for 1967 represents just one university course. The graduation loss for 1968 is misleading as no allowance is made for students taking longer than standard to graduate without actually failing their courses. Resit delays for degrees and registrations mean that any point above may be too high or too low in representing a *true* loss, but overall this effect should be self-cancelling and not distort the trends too much from 1969 graduation onwards. Graduation losses are shown as solid circles, while registration losses are indicated by crosses. It is important to note that some of the registration loss shown is not genuine as it will be due to overseas students returning home with degrees but not having entered the pre-registration year

again, 7.5 per cent may be more realistic.

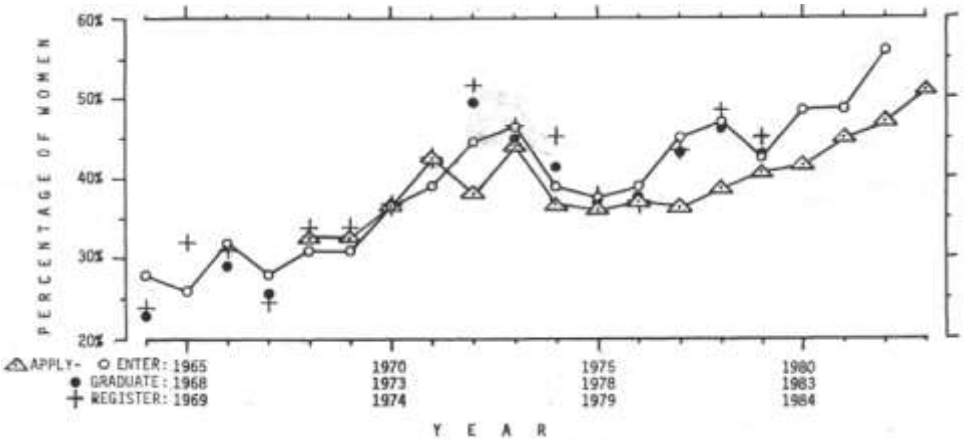
A loss of between 5 per cent and 10 per cent for 245 home intakes from 1983 onwards would mean annual new registrations of UK OOs of 220 to 230 via the usual manner of entry from 1987 onwards. This number is fairly similar to the assumptions of Alpine and Jack (1978) and Bennett (1978).

Age and sex of new entrants

In order to predict future professional numbers we also need to estimate the age and sex distribution of the UK OOs who enter the Register each year. The percentage of women undergoing training can be assessed at various stages. Clearly, we are most interested in the proportions registering each year, but the statistics for entry to the six training institutions point further into the future. If there is no essential difference between the two sets of data then the latter will be a better indicator of future trends. The percentages for those entering, graduating and registering are presented graphically in Figure 5 for the years since

[4]Only four months later in May, Aston no longer had a ceiling for home intakes and was expecting to take 45 to 50, while UMIST was being restricted to 25 to 30.

Figure 5: Percentage of women and optometry training



The points plotted above represent the percentage of women *applying* to university degree courses (triangles), *entering* BSc courses of ophthalmic optics (open circles), *graduating* from BSc courses (solid circles) and *registering* with the GOC under section 3, subsection 3 (crosses). In considering the future of the profession we are most concerned with registration figures, but admission and application figures point further into the future. Differences among admission, graduation and registration percentages appear small and of little consequence, whereas there appear to be important and systematic differences between admission and application curves. The divergence between the 1972-enter, and 1975-graduate and 1976-register figures appears surprisingly large and somewhat isolated. In view of this and the data's age we cannot rule out a flaw in the data at this point

1964. The proportion of female recruits increased to reach a maximum in the early 1970s before falling, but in the last few years it has risen again to reach a new peak of almost 60 per cent. In 1978 Alpine and Jack projected a 40 per cent figure for women, although they revised this to 45 per cent a year later. In view of society's increasing egalitarianism, we would expect to see a substantial proportion of women recruits maintained. Thus 50 per cent might seem to be a reasonable average figure over future years, but this would ignore a subtle and important point.

There is one further statistic which enables us to look a further year into the future — that is the proportion of women amongst the *applicants.* For the years 1968 until 1976 the curve for the percentage of female applicants is similar to that for percentage of women amongst degree course entrants. Actually, prior to 1972 the curve for women amongst entry candidates is slightly higher than that for those admitted indicating that the chances of males gaining admittance were slightly higher than for females. From 1972 the position was reversed with women becoming more successful at entering courses. From 1977 the two curves have diverged markedly and for 1982 there were 47 per cent of females amongst the applicants and 56 or 57 per cent amongst the entrants (See Figure 5).

It is important to note that the difference is not an artefact. It is not due to distortions caused by overseas students, and it is unlikely to be a consequence of admission tutor bias. One factor may be the age of the applicants. The men tend to be older than the women and it may well be that the more mature candidates find if more difficult to gain entry. (In the la-t few years at UMIST 79 per cent of home males were under 20 compared with 87 per cent of home females, while with the overseas the corresponding proportions were 36 per cent and 57 per cent). This may be because they are less well qualified on average or because other factors are against them (French, 1982a).

At the undergraduate level most offers are conditional and made without reference to the candidates' sex. It is theoretically possible that a non-conscious bias might creep in when tutors are using their discretion when deciding which candidates to accept from amongst those who have only just failed to make the grades asked of them. We prefer to deduce that the present tilting of the scales in favour of women is largely due to their doing better than men in the A-levels. This is *not* to say that women *in general* are better, but simply that the women *amongst the applicants* tend to do better. This is confirmed by analyses of the performance of candidates under 20 years of age. Table 2 shows the A-level performance of those home applicants under 20 who provisionally or firmly accepted offers from the Ophthalmic Optics Department at UMIST for entry in October 1980, 1981 and 1982. On average the women score around one or two A-level points higher than the men (1.6 for means and 2.5 for medians); a difference which is statistically significant at the $P < 0.001$ level on the non-parametric Mann-Whitney U-test. There is no reason to assume that UMIST receives a very different mix of home students from any of the other university optometry departments.

Inspection of the UCCA figures for 1979 to 1982 shows that the number of females amongst those candidates who put ophthalmic optics first on their UCCA forms has remained at between 400 and 430 each year whereas the number of males has shown a continuous fall from 645 to 470. The figures for the proportion of women amongst applicants shown in Figure 5 are those for applicants to UMIST alone, but where UCCA has published figures these have not differed from UMIST's by more than a single per cent.

It is already clear from the applications for October 1983 that this trend has been maintained. For the first time, as of March 1983, the UMIST ophthalmic optics department has received over 50 per cent of its formal applications from women. This suggests that the proportion of women admitted to UK optometry degree courses later this year will be 55 per cent or 60 per cent. We, therefore, suggest that it is realistic to project that from 1987 onwards 55 per cent of newly registered optometrists will be female. We will also, here, be looking at the consequences of 50 per cent and 60 per cent women as alternative, extreme possibilities. Statistics for the age distribution of entrants to the profession are not readily available. French (1982a) describes the distribution for UMIST degree course entrants but it would be wrong to assume that these were typical without other evidence. Instead, we looked at those taking and passing the professional examinations during 1982 and took their ages as of December 31, 1982. The distributions are given in Table 3. They differ from those assumed by Bennett (1978) and others by being slightly younger but with longer tails of people over 30 years of age. Note that women entrants tend to be younger than the men. Over three-quarters of the women are aged 23 or under compared with only just over 40 per cent of the men. There are more mature male entrants; in particular more men over 30.

Table 2. Aggregate science A-level points score of applicants

Proportions of candidates with at least the following

A-level points or better	Male (per cent)	Female (per cent)
15	1	3
14	2	6
13	6	13
12	9	18
11	15	24
10	21	33
9	27	38
8	32	47
7	37	53
6	43	59
5	51	64
4	58	70
3	65	75
2	74	83
1	85	89
0	100	100

The table shows the percentage of male and female home applicants under 20 years of age who achieved the above number of A-level points in their science A-levels. The candidates are those applying to the UMIST Ophthalmic Optics Department for entry in October 1980, 1981 and 1982 and who provisionally or firmly accepted a conditional or unconditional offer. Grade A=5 points, B=4 points, etc. .. The figures are based on the achievements of 261 men and 232 women. Duplicate subjects (eg, pure maths, and pure and applied maths) are excluded from this scheme. We do not expect UMIST home applicants to differ fundamentally from those applying to other university departments.

Table 3. Age distributions of new entrants to the Register

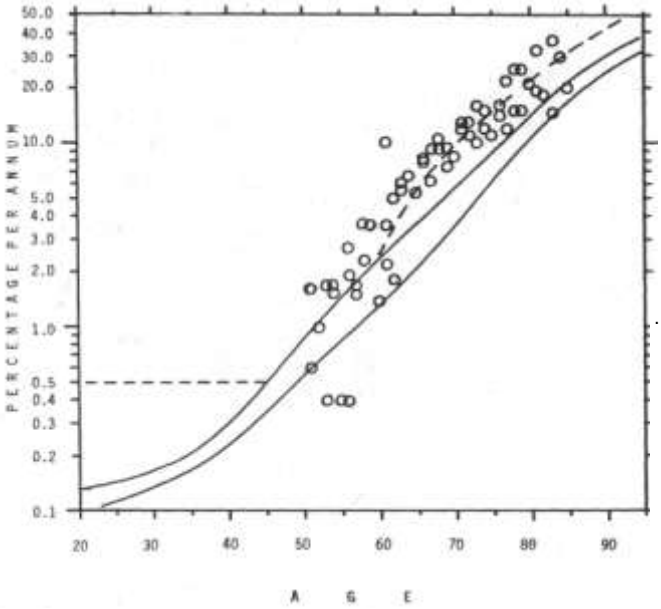
Age	Proportions of men (per cent)	women (per cent)
21	0.0	0.8
22	21.6	38.5
23	21.6	39.3
24	19.2	7.7
25	8.8	3.4
26	5.6	3.4
27	8.8	1.7
28	3.2	1.7
29	3.2	0.1
30	0.0	0.8
31-35	4.8	1.3
36-40	2.4	1.3
41-50	0.8	0.0
21-50	100.0%	100.0

Relative proportions of people at ages from 21 to 50 for UK-trained men and women amongst new entrants to the Register under 3(3) of the Opticians Act. The data represent the ages of those passing the professional examinations in 1982 as of December 31, and are the figures assumed for our model.

Permanent withdrawals from the Register

In order to produce a model to simulate the population of ophthalmic opticians we need to know the withdrawal rates from the profession. If we examine the annual figures published by the GOC over the years 1973 to 1982 then we can calculate the annual percentages of OOs who withdraw from the Register for each five-year age band. Plotting these percentages as ordinates with the mid-point of the five-year bands as abscissa gives us the scatter of points shown in Figure 6. As can be seen, the points do not lie on a smooth curve. They are irregularly distributed as would be expected from sampling theory, but they are also contradictory. This is perhaps not surprising as the data have been collected over a decade during which economic factors have fluctuated widely. Also in Figure 6, are two

Figure 6: Annual withdrawal rates from



The points on the graph (left) .represent actual percentage withdrawals from the Register per annum and have been calculated from the GOC's published data for UK statistics between 1973 and 1982. The ages represent the mid-points of five-year age bands and the figures are for populations which are predominantly male (>90 per cent). A smooth, dotted curve has been drawn through these points to give a subjective fit and provide us with withdrawal rates for our computer model. Points have not been drawn for people of 50 years of age or under as the GOC data would give negative withdrawal rates due to a net gain from recruitment. We have followed earlier studies in assuming an underlying net loss of 0.5 per cent p.a. for optometrists under 45 from emigration, career changes, immigration, etc Superimposed on the graph are two curves representing the probability that death will occur within one year for men and women of the ages given. For ages under 60 and over 45 we used the male mortality figures for our model withdrawal rates

curves representing the annual mortality rates for men and women (CSO, 1983), and it is interesting to see how optometric losses 'parallel' these figures, particularly between 65 and 80 years of age.

To arrive at withdrawal rates for our analysis of the profession we have drawn a simple curve through our collection of points. The fit chosen was a subjective one as there seemed little reason for using more sophisticated techniques. Below the age of 50, GOC figures are of little assistance as here losses are confounded with gains due to older entrants to the profession. Death rates for 20 year olds are estimated at 0.13 per cent per annum for men and 0.09 per cent for women, and increase to the probabilities given in Figure 6. But below 50 there will be permanent withdrawals due to emigration as well as death. Alpine and Jack chose a probability of 0.5 per cent p.a. for the under 45s and we chose to adhere to this figure too.

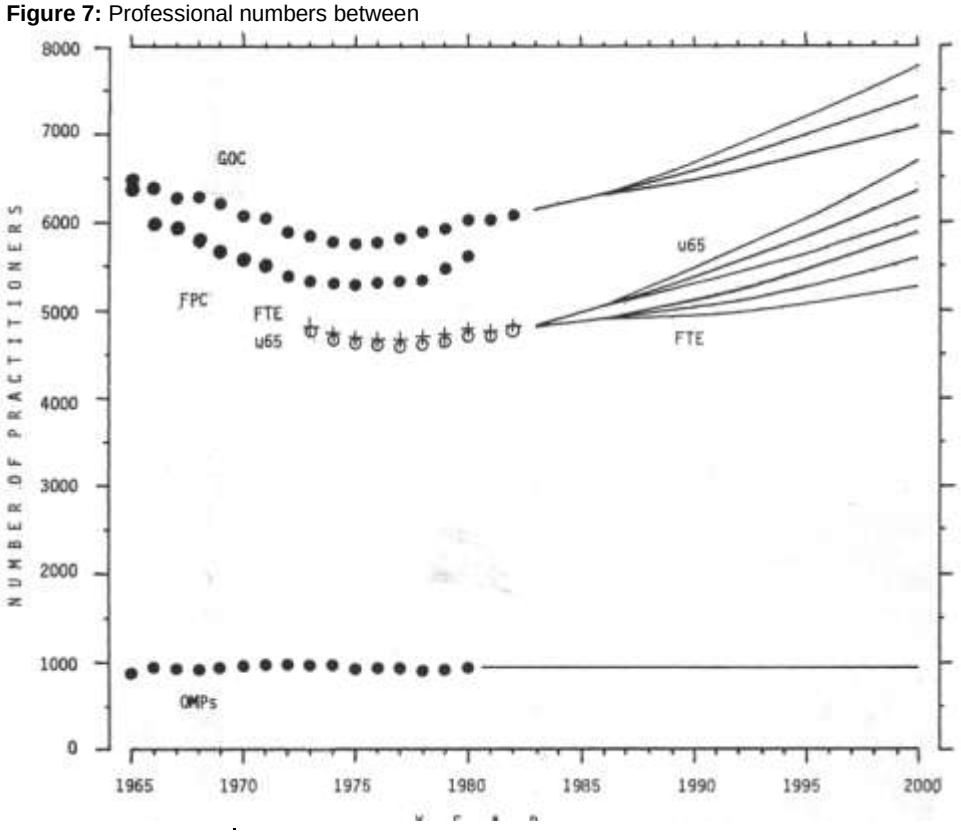
We have already made reference to the increased longevity of women, and this might suggest lower withdrawal rates. On the other hand there is a 'tradition' that women retire five years earlier than men. One would expect a common retirement age will eventually be introduced in the UK and the Government has suggested the age of 63. We have chosen to assume that there will be no sex difference for withdrawal rates from the Register. We could have looked at other professions to seek evidence on this point but concluded that there was unlikely to be a valid parallel with optometry. (Although it is interesting to note that a recent report (Bolt, 1983) commenting upon the steady rise in estimates of activity rates for women doctors noted that by 1979, 86 per cent of women doctors were still working in medicine to some degree compared with 88 per cent of men). We also assume that the 0.5 per cent figure[5] is a *net* underlying change also allowing for qualified optometrists coming from abroad and registering here with the GOC without undertaking training at UK institutions along with British ophthalmic opticians returning home after working abroad.

We have some doubts on this figure, although population projections (OPCS, 1980) assume a net loss due to migration, and the Brain Drain or net outflow of professional and managerial people was on average 16,000 p.a. between 1977 and 1981. One alternative, the male mortality rate, would result in FTE and under-65 statistics 3 per cent higher in 2000 and 5 per cent higher in 2030. (We would not need to depend so heavily on guesstimating if the profession kept more detailed information on its members). It must be remembered that, in common with other people from the same socio-economic status group, opticians live longer than the average people depicted in the Figure 6 graphs.

Temporary withdrawal from professional work

Of course, the major difference between males and females in their employment occurs amongst the under-40s. Women have children and in society at present this means that they withdraw from work for periods of time. For some women the withdrawals may well even be permanent, but for most they are temporary and for a few of short duration. The Economist Intelligence Unit (EIU, 1974) suggested, after some discussion, that women might be expected to lose on aggregate 30 per cent of their working years between the ages of 24 and 38 inclusive —

Figure 7: Professional numbers between



The two sets of dark circles at the top of the graph represent the UK professional numbers based upon the published figures of the GOC and the lists of FPCs for ophthalmic opticians. Those at the bottom show the numbers of OMPs on the FPC lists. Figures are for the UK (England, Scotland, Wales and Northern Ireland) The crosses show the number of OOs who are under 65 years of age, including an adjustment to allow for women under 40 with child commitments (u65), and the open circles show the Full-Time Equivalent optometrists with each OO given a weighting on account of their age and sex according to Table 4 (FTE). It is important to note that these calculations treat chemist and non-chemist opticians alike. The error introduced in this way diminishes with time and it may be noted that the GOC did not distinguish between chemist and non-chemist optometrists after 1976. The median projections to the year 2000 assume 225 UK entrants from 1987 onwards, of whom 55 per cent are assumed to be female. The outlying projections assume 250 entrants (50 per cent female) and 200 entrants (60 per cent female). Alpine (1970) calculated the number of FTE optometrists in 1969 at 4,800, including special weights for chemist OOs

that is 4.5 years. They hedged their bets a little by also looking at withdrawal rates from work of 20 per cent to 40 per cent over the same period of years.

This year we carried out a straw poll on a small sample of third year female students to see how they viewed their future patterns of employment. Although there was a great variation in their responses, the aggregate effect was that on average they anticipated that if they had children they would lose the equivalent of five or six working years. It is interesting to note their own predicted five to six year loss is not very different from the EIU's figure of 4.5 years, particularly if fecundity and other factors are allowed for. For this reason we decided to accept EIU's suggestion of a 30 per cent loss over a 15-year period. From the responses of our students we decided to place this loss between the years 25 and 39; this enables us to calculate a 'pool' of manpower available to the profession at any one time, although in view of the critical role of women in the profession it would seem more diplomatic to refer to it as the available 'personpower'!

Full-Time Equivalent optometrists

We have added together the total numbers of FPC optometrists in Great Britain (CSO, 1983) and Northern Ireland (CSA, 1982) to give us United Kingdom figures. Some OOs may well be counted twice in this way if they have practised in both Northern Ireland and Great Britain in the same year, but we are advised that the error is probably very small indeed.

We have plotted these totals alongside those obtained from the GOC annual statistics (GOC, 1983), together with corresponding figures for OMPs, in Figure 7. Not all UK OOs in the GOC Register appear in each year's FPC lists. Around one-tenth do not appear to do any NHS work in any one year. This is not just because of the temporary withdrawal of some women with family commitments, but is also due to the temporary withdrawal of some men and the permanent withdrawal of members of both sex (ie, 'retirement') prior to their final decision to leave the Register. If we calculate the number of OOs who are available for full-time work (our previously discussed 'personpower') *and* who are under 65 years of age, then we obtain an even lower curve (Figure 7) with the number of ophthalmic opticians currently just over three-quarters of those appearing in the Register.

The aforementioned statistics tend to represent each optometrist as 'all' or 'nothing' but, of course, there is significant variability in the number of hours or days per week that each optician contributes to GOS work. The opportunity of a flexible pattern of work is thought to be one of the major attractions of the profession to new recruits and something which cannot be overplayed. To account for this factor, previous studies (Alpine, 1967; Alpine, 1970; Bennett, 1977; Alpine and Jack, 1978; Alpine and Jack, 1979) have looked at Full-Time Equivalents for OOs of each sex and age group. Table 4 shows the FTE figures that we have adopted. They have been taken from Bennett (1978) and are his interpretation of Alpine's 1970 figures. We have chosen these over Alpine and Jack's 1978 values because, as Bennett pointed out, the latter's seemed to go too far in minimising the contribution of the older OO. It is difficult to say how valid the figures are today — 14 years since the original survey — but they should serve our present purpose in a reasonably satisfactory fashion, and Alpine and Jack considered them legitimate when they were 10 years old in 1979[6]. The option of working less than a full week is usually the prerogative of the self-employed; be it someone who is employed as a locum or someone who has their own practice. Consulting and managing OOs who work for large firms are as a rule obliged to work a full, five-day week. If we calculate the number of FTE optometrists on this basis (ignoring the distinction between chemist and non-chemist opticians, which GOC published statistics ceased referring to with the report for 1977) we obtain the fourth curve in Figure 7. In 1980 this gives a strength around 80 per cent of the Register total, and it is interesting to note its coincidence with the under-65 curve throughout the period 1973 to 1981.

Table 4. Full-Time Equivalent optometrists

age	men	women
under 25	0.92	0.70
25-29	0.92	0.60
30-39	0.94	0.50
40-44	0.93	0.50
45-49	0.93	0.75
50-54	0.93	0.70
55-59	0.90	0.70
60-64	0.85	0.65
65-69	0.70	0.50
70-74	0.60	0.40
75 and over	0.47	0.30

These are Alpine's Full-Time Equivalent optometrists as interpreted by Bennett (1978) and modified heretogiveafigureforwomenaged75 and over. They indicate the proportion of full time that an optometrist of the indicated age and sex is expected to take part in ophthalmic and dispensing work, on average.

[6]In a small 1980 survey, French *el al* (1981) suggested that among graduates the average working week was 4.2 days (84 per cent of 5 days), but then made no attempt to find what proportion of these 4.2 days was spent on work as an ophthalmic optician. According to the FTE figures discussed, graduates would be expected to work on average 3.8 days (75 per cent FTE) on ophthalmic and dispensing work.