# The working lives of optometrists 

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Today 28 per cent of those on the GOC Register and around 60 per cent of new recruits are women. The full-time equivalent values (FTEs) of OOs as a function of their age and sex in mid-1986 have been estimated by French (1987). The effective strength of the registered men is 82 per cent and that of registered women 68 per cent. The overall strength of the Register is 78 per cent and women contribute 25 per cent of this total which for mid-1986 was equivalent to 4,970 full-time optometrists.

Unfortunately, these figures do not permit us to estimate the relative contribution of the men and women recruits without an investigation of their working lives. The strengths are for men and women on the Register and attention needs to be taken of differential losses and gains in Register numbers due to immigration and emigration, death and retirement. Analysis of the 1986 questionnaire (French, 1987) and statistics for the GOC permit us to obtain the missing information.

## Retirement

Comparison of the annual GOC statistics enables us to assess the losses to the Register (eg, French and Loran, 1983a). There is, of course, a marked increase in the region of 65 years of age for men but the lack of older women amongst OOs leaves a question mark over their likely retirement age. They might tend to retire at the same age as men. It has been suggested that on average a woman OO's working life could be longer than a man's because not only do they live longer but on average they are younger when they begin their course (French and Loran, 1983b). Against this, they might be expected to retire a couple of years earlier because of their younger husbands ( 2.1 years on average according to the questionnaire results) or five years earlier because of the long-term statutory retirement age differential ( 60 for women as against 65 for men). Tables 1 and 2 show the median, quartile and 5 percentile expectations for end of full-time working and final working as a function of age and sex. The differences between medians for each sex revealed here are generally zero to five years. The difference anticipated by veterinary surgeons planning to retire during the next ten years is six years with expected ages of 63 for men and 57 for women (Ministry d¥ Agriculture, 1985). Thus, what evidence there is suggests that the traditional difference is expected to be maintained. 674


Minimum sample size of $n=10$

Table 2: Actual or anticipated retirement age
$\left.\begin{array}{lccccc}\text { Male } & \begin{array}{c}\text { Percentile } \\ \text { for } 5.00\end{array} & \begin{array}{c}\text { Actual or anticipated age } \\ \text { Percentile } \\ \text { for } 25.00\end{array} & \text { Median }\end{array} \begin{array}{c}\text { Percentile } \\ \text { for } 75.00\end{array}\right)$ Valid N

Table 1 shows that there are significant numbers of men (as well as women) who anticipate ceasing full-time practice at age 55 or earlier, and Table 2 shows there are a few who expect to retire completely by 50 or 55 .

Assuming that a student goes straight from school to join an optometry course and then qualifies a year after graduation, he would normally expect to have a potential working life of 43 years to take him to 65 years of age. Each OO was asked to estimate his/her past and future full-time and part-time working, excluding time off work, and the findings are given in Figure 1 in terms of Full Time years and in Table 3 expressed as a percentage of the 43 years. The youngest men estimated their working life at 36 FTE years on average less than the theoretical 43 available between 22 and 65. There was a small increase in working life estimates by people as they approached retirement age, which can be accounted for by the loss of people from the Register with plans for retiring early.

The youngest women (those under 25 years of age) estimated their working lives at 31 or 32 FTE years - five years less than that of the corresponding men. But the estimates for older women instead of increasing (as the men's had done) decreased to a minimum of 22 to 25 FTE years for those in their late 30s and early 40 s . There is more than one interpretation of the lower estimates given by older women. There may be a tendency amongst the youngest women to underestimate the time they will take off due to family commitments and for the older women to make more realistic assessments, or it could be that younger women intend to make their career a more full-time one.

## Leaving the Register

Earlier studies have assumed that OOs tend to stay on the Register when they cease practising for a while, and this also appears to be the practice amongst women dentists despite the high cost of their annual retention fee (Seward and McEwen, 1987). But our sample suggested 4 per cent of all registered

Table 3: Self-estimates of professional life as a percentage of working life

|  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Age | mean (per cent) | SEmean (per cent) | mean (per cent) | SEmean (per cent) |
| $\because 24$ | 83 |  |  | ${ }^{3}$ |
| 25-29 | 84 | + | 66 | 2 |
| 30-34 | 84 | 1 | 61 | 2 |
| 35-39 | 81 | 2 | 59 | 4 |
| 40-44 | 84 | 2 | 51 | 4 |
| 45-49 | 89 | 2 | 61 | 6 |
| 50-54 | 92 | 2 | 68 | 9 |
| 55-59 | 89 | 2 | 64 | 9 |
| 60-64 | 87 | 3 |  |  |
| 65-69 | 89 | 3 |  |  |
| 70-74 | 86 | 6 |  |  |
| 75-79 | 118 | 6 |  |  |

measures are very crude indices of accuracy

Table 4: Temporary withdrawals from the GOC Register by age and sex

|  | 'Have yo the GOC | ver left gister? | sample <br> size | fem <br> 'Have y <br> the GOC | ever left egister?' | $\begin{aligned} & \text { sampl } \\ & \text { size } \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| age | Yes (per cent) | $\begin{aligned} & \text { No } \\ & \text { (per cent) } \end{aligned}$ |  | $\begin{aligned} & \text { Yes } \\ & \text { (per cent) } \end{aligned}$ | $\begin{aligned} & \text { No } \\ & \text { (per cent) } \end{aligned}$ |  |
| .. 24 | 1 | 99 | 74 | 0 | 100 | 68 |
| 25-29 | 1 | 99 | 222 | , | 99 | 200 |
| 30-34 | 2 | 98 | 217 | 6 | 94 | 183 |
| 35-39 | 4 | 96 | 164 | 10 | 90 | 80 |
| 40-44 | 1 | 99 | 152 | 4 | 96 | 45 |
| 45-49 | 2 | 98 | 119 | 13 | 87 | 39 |
| 50-54 | 1 | 99 | 104 | 0 | 100 | 16 |
| 55-59 | 4 | 96 | 96 | 7 | 93 | 15 |
| 60-64 | 3 | 97 | 77 |  |  |  |
| 65-69 | 1 | 99 | 69 |  |  |  |
| 70-74 | 12 | 88 | 66 |  |  |  |
| 75-79 | 20 | 80 | 25 |  |  |  |
| Minimum sample size of $\mathrm{n}=10$ |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

OOs have left it at one time or another. Table 4 shows the proportion of people in the sample who admitted leaving for temporary periods as a function of their age and sex. There is no difference between men and women amongst those in their 20s. For men between 30 and 65 , estimates vary between 1 and 4 per cent to give a weighted average of 2.2 per cent. For women over the age of 30 the proportion is higher at 7.3 per cent.
Table 5 shows clearly that 93 per cent of


Figure 1: Estimated average length of working lives in full time equivalent years as a function of sex and current age of optometrist. The SE mean for men under 70 and women under 35 is one year. That for women between 35 and 49 is two years. Dashed lines indicate the weighted mean FTE working life is 27.2 years for women and 36.8 for men on the Register.
women OOs have married by the time they reach their 30 s so it is clear that the extra 5 per cent temporarily leaving the Register represents a very small proportion of those with family commitments. The great majority of women remain on the Register like their male counterparts.

Respondents were asked to give details if they had left the Register. Most of the 37 men involved did not indicate their reasons for leaving the Register but assuming they did not differ from the rest and weighting their responses this would suggest (from a very small sample) that around 49 per cent had gone abroad, 28 per cent had forgotten to pay their fees, 17 per cent had undertaken other work and 6 per cent had been ill.

Amongst the 31 women who had left the Register only 15 gave reasons. Analysis of their responses tentatively suggests 54 per cent had been abroad, 39 per cent had been looking after their children and 7 per cent had forgotten. Thus, for both sexes, the major reason for temporarily leaving the Register is going abroad. People who forgot to pay their fees usually carried on practising - in most cases the period of time in question was very short but at least one person had been off the Register for three years. Breaks from the Register for all reasons varied from just a few weeks to 20 years for both sexes. It was possible to estimate the length of the break

Table 5: Marital status of optometrists by age and sex

|  |  | Male arital statu |  | sample |  | Female arital statu |  | Sample |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | single (per cent) | married <br> (per cent) | widowed <br> divorced <br> separated <br> (per cent) |  | single (per cent) | married <br> (per cent) | widowed divorced separated |  |
| $\stackrel{\text { age }}{ }$ | (percem) | (per cent | (per cent) | 73 | ${ }_{\text {(per cent) }}^{63}$ | (percent) 37 | (per cent) | 67 |
| 25-29 | 35 | 64 | 1 | 224 | 26 | 74 | , | 200 |
| 30-34 | 16 | 82 | 2 | 217 | 7 | 91 | 2 | 184 |
| 35.39 | 9 | 87 | 4 | 165 | 6 | 91 | 3 | 80 |
| 40-44 | 4 | 92 | 4 | 152 | 7 | 89 | 4 | 45. |
| 45-49 | 3 | 94 | 3 | 119 | 10 | 85 | 5 | 40 |
| 50-54 | 3 | 93 | 4 | 105 | 25 | 63 | 13 | 16 |
| 55-59 | 3 | 90 | 7 | 96 | 21 | 57 | 21 | 14 |
| 60-64 | 0 | 97 | 3 | 78 |  |  |  |  |
| $65-69$ | 1 | 91 | 7 | 68 |  |  |  |  |
| 70-74 | 3 | 83 | 14 | 65 |  |  |  |  |
| 75-79 | 0 | 88 | 12 | 25 |  |  |  |  |
| 80-84 | 10 | 70 | 20 | 10 |  |  |  |  |

## Table 6: Probability of leaving Register within a year

| Men five-year periods aggregate $\rightarrow$ |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Age |  | 1966-1970 <br> percent | five-year periods | 1976-1980 | 1981-1985 | 1966-1985 |
|  |  |  | per cent | per cent | percent | per cent |
| ${ }_{1} 44$ |  | -0.3 | -0.5 | -0.6 | -0.2 | -0.4 |
|  | $\mathrm{n}=$ | 8379 | 8103 | 8638 | 10087 | 35207 |
| 45-49 |  | -0,4 | -0.7 | -0.2 | -1.2 | -0.6 |
|  | $\mathrm{n}=$ | 2670 | 2423 | 2016 | 1707 | 8816 |
| 50-54 |  | -0.8 | -1.1 | -0.5 | -0.2 | -0.7 |
|  | $\mathrm{n}=$ | 3777 | 2565 | 2386 | 1973 | 10701 |
| 55-59 |  | -1.8 | -20 | -2.0 | $-2.3$ | -2.0 |
|  | $\mathrm{n}=$ | 4781 | 3556 | 2445 | 2254 | 13036 |
| 60-64 |  | -5.1 | -5.2 | -3.7 | -5.6 | -4.9 |
|  | $\mathrm{n}=$ | 4569 | 4165 | 3144 | 2138 | 14016 |
| 65-69 |  | -9.5 | -9.7 | -7.6 | -8.7 | -8.9 |
|  | I $=$ | 2604 | 3153 | 3022 | 2297 | 11076 |
| 70-74 |  | -12.4 | -10.8 | $-12.0$ | -12.4 | -11.9 |
|  | $\mathrm{n}=$ | 1238 | 1441 | 1881 | 1908 | 6468 |
| 75-79 |  | -14.6 | -18.1 | $-13.6$ | -16.0 | -15.5 |
|  | $n=$ | 622 | 573 | 773 | 839 | 2807 |
| 80-84 |  | $-20.3$ | -22.1 | -18.3 | -21.6 | -20.8 |
|  | $\mathrm{n}=$ | 192 | 213 | 175 | 348 | 928 |
| 85-89 |  | $-25.5$ | -40.4 | -21.7 | -18.9 | -27.1 |
|  | $n=$ | 51 | 47 | 46 | 37 | 181 |
| 90-94 |  |  | 0.0 | $-14.3$ | $-41.7$ | $-26.1$ |
| $90-94$ | $\mathrm{n}=$ | 0 | 4 | 7 | 12 | 23 |
| Women five-year periods ${ }^{\text {a }}$ |  |  |  |  |  |  |
| age |  | 1966-1970 | 1971-1975 | 1976-1980 | 1981-1985 | 1966-1985 |
|  |  | per cent | per cent | per cent | per cent | per cent |
|  | $\mathrm{n}=$ | 1598 | 2359 | 4100 | -6199 | 14256 |
| 45-49 |  | -5,4 | 1.6 | -0.4 | 0.3 | -0.4 |
|  | $0=$ | 129 | 191 | 268 | 370 | 958 |
| 50-54 |  | -1.2 | $-1.7$ | 0.0 | -1.2 | -0.9 |
|  | $\mathrm{n}=$ | 165 | 118 | 200 | 260 | 743 |
| 55-59 |  | -3.4 | -3,5 | -3.9 | -2.7 | -3.3 |
|  | $n=$ | 175 | 143 | 103 | 188 | 609 |
| 60-64 |  | -6.5 | -6.0 | -5.2 | -8.2 | -6.4 |
|  | $8=$ | 153 | 134 | 116 | 85 | 488 |
| 65.69 |  | -15.8 | $-16.7$ | -6.7 | -7.0 | $-11.5$ |
|  | $\mathrm{n}=$ | 95 -8.6 | 78 -14.3 | 89 | 86 | 348 |
| 70-74 | n | -8.6 35 | -14.3 4.3 | -15.4 | -15.8 | -13.9 |
| 75-79 |  | -13, 3 | -26.7 | -25.0 | -7.1 | -17.9 |
|  | $\mathrm{n}=$ | 15 | 15 | 12 | 14 | 56 |
| Men and Women |  | per cent-0.5 | per cent-0.7 | per cent | percent | per cent |
|  |  |  |  | -0.7 | 0.2 | $-0.5$ |
|  | $\mathrm{n}=$ | 9977 | 10462 | 12738 | 16286 | 49463 |

This table's contents have been deduced from the annual GOC statistics - Tables A. N(Ss:3(3)) and M (assumed 70 per cent male). Loss rates in the above are usually negative-positive percentages reflect net gains for birth years involved. Changes are for five year age bands with average age withimage range given at left. Relative loss (men v . women) for under 45 s is based upon 70 per cent male assumption for $M$. Where aggregate figures are for less than 20 person years they have been excluded - hence none here for men aged 95 and over or womenaged 80 and over. $\mathrm{N}=$ gives the number of person years on which the change is based.
with the GOC for 28 out of 31 women. These gave a weighted median period of three years. Based upon responses of 22 out of 37 men their median break was one year. (The arithmetic mean break was five years for both men and women.)

Of course this does not tell us how many men or women have left the Register permanently prior to normal retirement age. Seward and McEwen (1987) made very strenuous efforts indeed to trace women who had left the Dental Register and asked them whether they were likely to return to practice. Out of over 3,000 women in their sample they found amongst those who declared they would never return to dentistry 11 who had found another job outside dentistry, four who had ceased to practise on marriage, six who had left because of pregnancy, and five who had no desire to work at all. When age was taken into account they found all told only 27 fit, working-age women - less than one per cent of their respondents - who had deserted that profession for good.

No efforts were made to trace optometrists not currently on the Register. Instead, as already discussed, we asked people to indicate when they thought they would retire. The results (Table 1) made clear that substantial numbers of men intended to retire before 65 and significant numbers of women before 60 , but the 5 percentile point for all age and sex groups was 50 years of age or over. Only three out of 647 men and one out of 508 women indicated a retirement age of less than 45.

People do not always leave the Register upon retiring and as a consequence one would expect the loss for this to be less at the given ages. But expected statistics cannot take into account unanticipated factors like permanent retirement due to death, ill-health or emigration and are therefore perhaps likely to underestimate withdrawals.

## Register loss rates

The GOC's annual statistics give the number of men and women OOs born in five-year periods and have been used as the basis for calculating withdrawal rates from the profession (Alpine, 1970; French and Loran, 1983a). Despite variations from year to year it is probable that 99 per cent of admissions to university optometry departments are less than 40 years of age. It follows that almost all new Register recruits from degree courses will be less than 45 , an age at which virtually all questionnaire respondents anticipated they would still be working. Because of this the current analysis of the annual statistics is divided into two parts: (i) the under-45s, and (ii) the 45 s and over.

Analysis of changes in the GOC five-year totals each year enable us to calculate likely future GOC losses for ages over 45 (see Table 6), reflecting net changes from all sources emigration and immigration, ill-health, death, family reasons and lapses in memory, and examine the variations over a 20 -year period.

Calculation of withdrawal rates for those under 45 years of age is more of a problem. There will be the net change due to the losses and gains already discussed but these will also be confounded with gains from the new optometry graduate registrations. The latter can be calculated by subtracting the GOC's Table M total from its Table N [Ss. 3.(3)] total. Unfortunately, the age distribution of these is not known, nor is the proportion of women amongst the Table M total, although it is usually quite small. If we assume the last is 70 per cent male we can estimate the probability of someone leaving the Register for ages under 45 for both men and women. Aggregating the data for all average ages under 45 we find the loss rates also presented in Table 6.

It is interesting to note that the overall average withdrawal rate over 20 years for under 45 s is 0.5 per cent per annum, exactly that assumed by French and Loran (1983a) and equivalent to the 2.5 per cent for five-year spans assumed by others - Bennett (1978), and Alpine and Jack (1978a, 1978b).
The proportion of single men and single women on the Register both decline with age, as would be expected, but it is interesting to note that amongst women aged over 45 there is a higher proportion who are single. The proportion of widowed, divorced and separated women is also unexpectedly high amongst the over-50s compared with the men, although it needs to be emphasised that the sample size here is rather small.
A similar but less marked trend with a substantial sample is shown amongst women dentists (see Table 7; data from Seward and McEwen, 1987) with the percentage of married women falling from its maximum in the 90 s to 72 per cent. This probably suggests that married women over the age of 50 are more likely to leave the Register than single, widowed or divorced. It is a factor which should be monitored in future years.
Computer simulations using the latest wastage rates in Table 6 and estimated ages at registration suggest a recent median time between registration and full retirement for both men and women OOs of 43 years, with 25 per cent working 37 years or less and 25 per cent 49 years or more. Using the FTE values found by French (1987) they also suggest recent average (arithmetic mean) working lives of 36.2 FTE years for men and 26.1 for women.

It is interesting to compare these recent (but still past) working lives with the plans revealed by the questionnaire responses for the future. According to these, men expect to work a median of 41 years and women 38 years before retiring completely. These figures are shorter than those obtained from the computer model. But when optometrists' plans for full- and part-time working are examined we obtain an arithmetic mean of 36.8 full-time years for men and 27.2 full-time years for women (weighted values of the data summarised in Figure 1). These FTE working

-Rounding errors mean that the total for this column comes to 1809 rather than 1808 , the value returned by the model.

|  | 1986 GOC Register Statistics <br> Prediction |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Profession strength | sum |  | per cent | Actual |  | per cent

Hybrid (combination of GOS tests and hours per week), GOS tests, hours per annum, hours per week and days per annum are all Full Time Equivalent 00 statistics. Active indicates the OOs carrying out one or more sight tests in the year - could be closer to 93 per cent for 1986 The hybrid strength may be 78 or 79 per cent, depending on choice of estimation procedure
lives are marginally longer than those suggested by the computer simulation and this may be of note. But it is more interesting that these figures are not only very close to the computer simulation but that they show virtually the same sex ratio of close to threequarters, despite being derived from an entirely independent source.

## Verification of Register model

The computer model used for the GOC Register is written in Turbo Pascal for an IBM PC compatible and is a development of that first used by French and Loran (1983), originally written for a Sinclair Spectrum.

With any computer model its success or failure is dependent upon the quality of the information it is provided with. 'Garbage in' will mean 'garbage out'. Computer technology cannot make a silk purse out of a sow's ear. Instead, considerable care needs to be
taken to ensure that sound information provides sound predictions. The most recent model was validated by setting up a 20 -year simulation. It was provided with the Register totals for 1966, the five-year wastage rates provided by Table 6, and annual recruitment figures were taken as the GOC's Table N less the total given in section 3.3 of Table M. Seventy per cent of the Table M figures were assumed to be male and the age distribution of the new recruits was assumed to be similar to that given in French and Loran, 1983a.

The 1965 Register totals are dated October 25, but from 1968 onwards the date appears to be fixed at December 31. Unfortunately, the Professional Qualifying Examinations have not occurred on the same dates every year. As a consequence, the timing of the main annual influxes to the Register has varied. This is probably one reason why yearly loss rates show a significant variation about the

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figures given in Table 6 and may be why the model over-estimates totals for some years and under-estimates for others.
The biggest discrepancy over the 20-year period is an over-estimation of 73 for 1972and the relative timing of the PQE exams may be a factor, but at the end of the period the prediction for 1986 is just 15 too low for the men and only one too low for the women. Table 8 shows the predicted and actual age distributions. Here the major discrepancies may be due to the lack of detailed knowledge of the age distributions of the new recruits over the years but examination of the predicted and actual professional strengths (Table 8) shows that these variations are relatively inconsequential with all the predicted strengths being within 15 FTE OOs.

Expressed in terms of a percentage of the predicted Register totals the discrepancy is just one per cent for each measure. Variations in the proportion of overseas optometrists amongst the new registrations will also contribute a little towards subsequent variations in loss rates amongst the under 45s.

Not unexpectedly, the use of 20-year (Table 6) instead of five-year average wastage rates leads to inferior predictions for 1986 with resulting totals 30 too low for the men and 53 too high for the women.

## Conclusions

Register loss rates are presented as a function of age and sex for five-year periods from 1966 until 1986.

Women recruits tend to be younger than men, but retire earlier. As a consequence it is not surprising that the period between registration and eventual retirement for both men and women in recent years is estimated at 43 years with a lower quartile of 36 and upper quartile of 49. The plans of optometrists suggest shorter future median working periods of 38 years for women and 41 for men.

Analysis of GOC registration data and reported attendance times suggest recent fulltime equivalent lives of women 72 per cent of
those of men - 26 as against 36 FTE years. The independent plans of today's OOs suggest a very similar ratio of 74 per cent - 27 as against 37 FTE years.

## Acknowledgements

This article is based upon part of the Optometric Manpower and the Need for Vision Care report recently submitted to the GOC. This research was supported financially by the General Optical Council, John H. Chapman Opticians, the Cooperative Wholesale Society Optical Group, G. C. Bateman Opticians, Pilkington Ophthalmic Division, Davis-Watson Opticians, Bausch and Lomb, the Central (Local Optical Committee) Fund, and the Federation of Ophthalmic and Dispensing Opticians.

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