The average interval of time between GOS sight tests*

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It is very clear from what has been written in the optometric press that Professor Dunn was held in great esteem and admired by many people. His death was a tragic loss to the profession and he will be sadly missed by his friends and colleagues alike. In his professional life he held many positions — including secretary of LRH, secretary of the BOA, Editor of *The Ophthalmic Optician* and *BJPO* and for the last 12 years he was a Professor at The City University, most recently Head of Department. He was a tireless worker with a legendary capacity for hard work. He was dedicated to optometry — within education and the profession itself.

He had unique skills as a teacher with enormous appeal and popularity. He was patient and inspiring — committed to his students, always willing to listen and help. He was not an easy man to take argument with and could be extremely forthright, but he had a tender caring side, particularly when dealing with the very young and aged. In his love and concern for the profession, he saw optometry very much as a caring eyecare service to the public and was dedicated to optometric professionalism.

The author is particularly grateful to Gerald for his encouragement and support with the present enterprise. He had worked hard to persuade the General Optical Council to finance more research. This study centres around questionnaires sent to ophthalmic opticians and ophthalmic medical practitioners in the latter half of last year— 'Optometric manpower and the need for vision care⁹. These sought to do a number of things including assessing vision care need

Need for sight tests

The question of *need has* been neglected. No serious attempt has been made to examine it. This study was not to an attempt to produce definitive results, but simply an attempt to find a starting point for discussion. Of course optometrists do more than carry out sight tests and eye examinations, but this is their main activity. How many sight tests ought there be carried out nationally each year?

In the 12-month period under scrutiny, 11.9 million GOS sight tests were carried out on a United Kingdom population of 56.75 million — 21 sight tests per 100 people per annum. This gives an average of one sight test every four years, nine months for every man, woman and child in the country.

This average is, of course, a misleading measure of central tendency. Many people never visit an optometrist and in these circumstances averages must be treated with caution. It has been estimated that 8 million adults have never been examined by an OO or OMP and 19 million do not have regular eye examinations.

One of the questions in the two surveys asked OOs and OMPs what they believed 'should be the average time between sight tests'. They were asked to give an answer in months for people who wore spectacles and people who did not wear spectacles — in five-year age bands. Thus, if many people never have their sight tested, and many people rarely visit an OO or OMP, than those who do visit a practitioner will do so more often than the once every 4.8 years mentioned. A significant number of practitioners objected that virtually everyone over the age of 50 must

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Fig 1: GOS sight tests per 100 people each year for the UK

May 1951	
May 1061 CEn par single vision long and C1 par hitagel long	
August 1969	
April 1971£3.50	
January 1976£2.25 per single-vision lens and £4.55 per bifocal lens	
April 1977 £2.90 per single-vision lens and £5.50 per bifocal lens	
April 1982£3.70 per single-vision lens and £7.90 per bifocal lens	
December 1984 unregistered spectacle sellers allowed	
April 1985 NHS spectacles restricted to under 16s	

have been prescribed spectacles, but 6 per cent of these people do not wear spectacles.

Little consideration appears to have been given to how often people *should have* a sight test and eye examination, yet this is central to the issue of vision care. If we are going to plan effectively for optometric vision care in the future we need to know what the future demand will be.

One can look at the annual growth in sight

testing (Fig 1) and attempt to extrapolate the curve mathematically (eg, French and Loran, 1983; and Fig 2), but exponential growth cannot continue indefinitely. Growth must slow from the present rate of increase of roundabout two and a half per cent per annum and eventually cease when a saturation point must be reached — and we need to have some idea of what the limit to this growth is or at least *ought* to be.

Mathematical projections can only give a rough indication of the future. They cannot be precise. They will not account for the occasional slumps, nor will they account for spurts like that in recent years following the change in the law (Fig 1).

Time between sight tests

Obviously, different people should seek a GOS sight test at differing intervals of time. Writing in 1974 the Economist Intelligence Unit suggested:

...(a) that children under 16 years of age be examined three times while at school — at 5, 10 and 14 years of age; (b) that amongst people between the ages of 17 and 49—the half of whom are non-spectacle wearers be seen at 10-year intervals and the other half of spectacle wearers be examined at three-year intervals; (c) that of the over-50s — one-third be examined every five years and the remaining two-thirds every two years.

This formula was used by French and Loran (1983) to calculate target ceilings for sight testing for the UK — an estimated 15.7 million in 1980, rising to 16.9 million by 2018 based on the then projections of population growth.

Although the question used in these surveys sought to break down the population by age and into spectacle wearers and non-spectacle wearers, it clearly does not result in entirely homogeneous groups. Family background, occupation, type of prescription and so on will all suggest differing times between tests. However, it was not felt practical to make the question more detailed than this. Instead I requested practitioners to assess the average. The full question was as follows:

It is difficult to talk about "average" or "typical" patients. Obviously some patients should visit an OO/OMP more frequently than others and practitioners will no doubt give appropriate advice, but based upon your knowledge and professional experience, and considering matters such as a patient's health, safety and happiness, please estimate how often, on average, people in the following age groups and categories should visit an OO or OMP. What do you believe should be the average time between (General Ophthalmic Service) sight tests? Please enter number of months in the boxes ... If you have no idea or consider the question unreasonable please tick the decline-to-judge box.'

Before the questionnaire was distributed it was not certain how many practitioners would be willing to commit themselves. It was possible that most might feel estimation too difficult, but as it turned out, the decline-to-judge group were in the minority. Many OOs send out reminders and one would guess that many of these practitioners would normally have written on the patient's record when the next check or reminder would be appropriate. This is not to say that this would be the practice of all practitioners.

Roughly one in 10 optometrists declined to judge each of the non-spectacle wearing age categories, although one in seven declined to judge the under-fives. Ophthalmic medical practitioners were a little more reluctant to make judgements with the percentage of 'don't knows/declines to say' varying from almost one in four for some of the younger age groups (five to 40 years of age) to one in six for 450



Fig 2: Past and future GOS sight tests in the UK each year. The future curve assumes continued exponential (constant percentage) growth



Fig 3: Proportion of optometrist (n=2,070) and ophthalmic medical practitioners (n-350) declining to estimate what the average interval between sight tests should be for spectacle wearers and non-spectacle wearers by five-year age groups



Fig 4: Median estimates of what the average interval between sight tests should be for spectacle wearers and non-spectacle wearers by five-year age groups

some older spectacle wearers. Again, a high proportion (almost one in three) declined to judge the less than five years of age group. These percentages are summarised in Fig 3. Some of those who declined to judge, volunteered that they found the task too difficult, while others felt that in view of the heterogeneity of the groups, estimates would either be misleading or the results misused to imply fixed intervals.

The average time between sight tests for spectacle wearers produced less uncertainty, with typically only one in 20 of OOs declining to judge. For OMPs this proportion was around one in 12 for the five to 50 age group, one in eight for the under-fives and for the over-50s a proportion which increases to one in six for those over 80 years of age.

A small but significant number of practitioners (particularly OMPs) inserted zeros for the intervals between tests in certain categories. The question had in fact given examples over a broad range:

'Examples: if you feel an appropriate average time between tests was (say) 20 years then please enter 240 months... for two and a half years enter 30 months...'

- and there was space to enter an interval of up to 999 months or 83 years (the practitioners were not constrained to pre-set intervals). Some of those entering zero months added comments — for example, to the effect that they did not believe in regular sight testing and felt that this should be left entirely to the patient. The question had not actually specified that testing should necessarily be carried out at' fixed, regular intervals irrespectively — this is another issue entirely. The drift of those entering zeros appeared to be not that they thought a short time appropriate but that the time between sight tests for people in these particular categories should be long.

Because of this, parametric statistics were not felt to be particularly appropriate and attention focused on the percentile measures of time between tests. As it turned out the number of practitioners entering zeros did not appear to affect these statistics. In most cases whether the zeros were interpreted as equivalent to an average five years or 83 years would make no difference to the percentiles shown because there were relatively few of them.

On advice from our medical consultant the question was modified very slightly for OMPs with an additional reason being given for ticking the 'decline to judge' box— 'If ... you do not see patients in a particular age group.' The following was also added by way of explanation in an attempt to facilitate cooperation: 'We appreciate that five-year age bands are rather narrow, but this enables you to establish your own age groupings and assists us with the computer analysis.'

The median results are given in Fig 4. Figures which are multiples of 12 months predominate for both OOs and OMPs (24 months — two years in particular) as might be expected, except that periods of time of less than a year are often given for young children. The median represents perhaps the most



Fig 5: Distribution of estimates of what the average interval between sight tests for spectacle wearers by five-year age groups should be according to OMPs. 'Percentile' abbreviated to '%'



Fig 6: Distribution of estimates of what the average interval between sight tests for non-spectacle wearers by five-year age groups should be according to OMPs. 'Percentile' abbreviated to '%'.



Fig 7: Distribution of estimates of what the average interval between sight tests for spectacle wearers by five-year age groups should be according to OOs. 'Percentile' abbreviated to '%'.

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important statistic concentrating on 'middle¹ opinions and giving no weight to any extremes. For non-spectacle wearers the middle opinion of OOs is that on average people between the ages of 20 and 75 should visit an OO or OMP once every two years (it goes without saying that the appropriate interval will, of course, be shorter or longer for some people) with the older and younger people making more frequent visits.

OMPs tend to feel that longer intervals between tests would be more appropriate. While their middle opinion is that two years is appropriate on average for those non-spectacle wearers over 45 and between five and 15, they suggest longer intervals for those between 15 and 45 — rising to five years for people between the ages of 25 and 35.

The middle opinion of OOs for spectacle wearers was very similar to that expressed for non-spectacle wearers. Two years was felt to be an appropriate interval for those between the age of 20 and 70, with shorter periods for older and younger people. OMP middle opinion differed very little from that of middle OOs with it being felt that two years should be the average time between tests for those spectacle wearers between the ages of 20 and 70.

This shows very directly the relative agreement amongst OOs and OMPs concerning what the average interval between sights tests for spectacle wearers should be particularly amongst the 20 to 70-year-olds. It emphasises that the major difference in opinion concerns non-spectacle wearers between the ages of 5 and 40, although opinions do diverge on all people under 15 and over 70.

However, this relative agreement should not be permitted to obscure the wide range of opinions within each practitioner group. These are revealed by Figs 5 to 8 which show the 5, 25, 75 and 95 percentile intervals.

This variation in opinion is greatest for non-spectacle wearers and for OMPs more than OOs. For example, amongst OMPs 5 per cent feel that two years or less is an appropriate interval between tests for non-spectacle wearers aged 20 to 25, whilst 25 per cent feel that it should be 10 years or more.

Table 1 shows the modal estimates of the average time between tests. Here one has simply looked to see what time interval is most frequently given. Practitioners were free to insert any number of months and were not constrained. The result is a table of figures dominated by 24 months — two years. When presented in this way the OMPs' average time between tests appears more similar to the OOs', the difference occurring almost exclusively when there is a switch from 6 to 12 months, 12 to 24 months or 24 months back to 12 months. This brings out clearly the tendency for practitioners to think in terms of six months, one year and two years, but note how the modes for OMPs are less dominant than those for OOs with smaller proportions adhering to them - illustrating once again in another way the greater divergence of opinions amongst OMPs.



Fig 8: Distribution of estimates of what the average interval between sight tests for non-spectacle wearers by five-year age groups should be according to OOs. 'Percentile' abbreviated to '%'.



Fig 9: Assumed proportion of spectacle wearers by five-year age bands ignoring sex

Table 1: Modal value of average time in months between sight tests

		Ophthalmi	ans	Ophthalmic Medical Practitioners				
	Spectacles		No spectacles		Spectacles		No spectacles	
	Mode	(per cent)	Mode	(per cent)	Mode	(per cent)	Mode (per cent)
Age					t to and		10.9429	
4	6	(57)	12	(48)	6	(61)	12	(33)
5-9	6	(82)	12	(54)	6	(52)	12	(30)
10-14	6	(66)	12	(58)	12	(56)	12/24	(27 each)
15-19	12	(61)	12	(45)	12	(60)	24	(26)
20-24	24	(53)	24	(62)	24	(48)	24	(25)
25-29	24	(76)	24	(57)	24	(54)	24	(21)
30-34	24	(76)	24	(56)	24	(49)	24	(19)
35-39	24	(76)	24	(60)	24	(50)	24	(21)
40-44	24	(72)	24	(68)	24	(57)	24	(38)
45-49	24	(69)	24	(66)	24	(60)	24	(47)
50-54	24	(74)	24	(68)	24	(61)	24	(50)
55-59	24	(74)	24	(69)	24	(58)	24	(51)
60-64	24	(66)	24	(63)	24	(53)	24	(48)
65-69	24	(52)	24	(51)	24	(50)	24	(46)
70-74	12	(53)	12	(49)	24	(40)	24	(42)
75-79	12	(58)	12	(54)	12	(37)	24	(36)
80	12	(58)	12	(54)	12	(39)	12	(34)

It also needs to be emphasised that the opinions of ophthalmologists not currently on a Family Practitioner Committee OMP list were not sought. A few OMPs volunteered that they felt this would bias the results and, of course, it is conceivable that the opinions of non-testing ophthalmologists may well differ considerably from those who are active in this area. A few OMPs commented upon what they saw as Vested interest*.

There were other groups whose opinions were not consulted — for example visual physiologists and other scientists carrying out research in vision, and orthoptists. A few hospital OOs were also concerned that their contribution to vision care was not being adequately considered by this study. But once again it needs to be emphasised that the object of the surveys was primarily to look at General Ophthalmic Service sight tests (and not, for example, tests carried out under the Hospital Eye Service or Community Health Service). It is, of course, true that OOs and OMPs have a vested interest in sight testing, but it is equally true that as a group they have the greatest relevant clinical experience.

Need for sight tests

Around 60 per cent of men and two-thirds of women (Central Statistical Office, 1982) wear glasses. Fig 9 summarises the estimated proportions as a function of age (ignoring sex) for the United Kingdom. This information, together with the middle opinions already discussed and population statistics, permits us to calculate the national number of GOS sight tests that the professionals feel should be carried out each year and compare it with the actual number of sight tests paid for under the GOS.

The EIU 1974 formula predicts an ideal ceiling of 27 sight tests per 100 people in the population — that is 15.3 million sight tests per annum for 1986. This is 29 per cent greater than the rate of testing in 1985-1986 (11.9 million) and suggests the potential for a substantial growth in sight tests. Projecting the median figures obtained from OMPs we obtain an even larger figure of 48 sight tests per 100 people per annum — ie, 27 million annually for the UK, more than twice the present figures; whilst from OOs we obtain a higher figure still of 68 tests per 100 people — 39 million sight tests per annum and over three times the 1985/86 UK total.

If we prefer to rely on the most popular or modal response rather than the middle or median opinions then we obtain for OMPs 60 sight tests per 100 people — ie, 34 million annually, and for OOs, 70 sight tests per 100 people, or 40 million annually (Table 2).

Such high ideal-circumstance figures compared with the actual number of tests carried out should not come as a complete surprise. It is clear that two years is very much entrenched amongst a majority of OOs and OMPs. With a UK population of 56.75 million, tests on average every other year across the board would obviously mean 28 million tests per annum. Where there are July 4, 1987 Optometry Today

Table 2: Actual and ideal frequency of sight testing

	Sight	Year when total		
	per 100 people	total for UK population in millions	would be reached assuming exponential* growth at 2.6 per cent/pa	
985-1986 actual	21	11.9	-	
IU 1974 formula	27	15	1998	
Every two years'	50	28	2022	
OMP median	48	27	2019	
MP modes	60	34	2028	
OO median	68	39	2033	
OO modes	70	40	2034	

The growth in GOS sight tests over the last 20 years can be approximated by a curve assuming an increase of a constant 2.6 per cent per annum.

substantial groups with times between tests of less than two years indicated this will have the effect of increasing the total further.

It could be argued that the tendency of practitioners to think largely in terms of six, 12 or 24 months may inflate these 'ideal-circumstance' totals. For example, if projected nationally the difference between 21 and 27 months represents the difference between 32 and 25 million, while that between 18 and 30 months represents 38 to 23 million. Thus a few months either way makes a difference of 6 million per year while six months either way makes 15 million. Leaving this aside, the implication would appear quite clear that professionals believe that far too few sight tests are being carried out - proportionately even fewer than has been suggested before.

Answers to other questions in the questionnaire did reveal a tendency for some OOs to report modes when arithmetic means were requested. It may be that some of these *average* times between tests represent 'typical times' rather than strict averages.

Despite the earlier assertion that the similarities between OO and OMP middle opinions are more striking than the differences, the former does result in an annual total substantially higher than the latter. I hesitate to express an opinion but it does seem to me that these figures will be seen by many as unrealistic, even allowing for the fact that they represent an ideal. Perhaps (I could be wrong) the weakest aspect is the figures for sight testing of non-spectacle wearers amongst the under 15s. These figures provide a major boost to the annual figures. The EIU formula only suggested that children be seen once every five years but fewer than one quarter of OMPs and fewer than 5 per cent of OOs favoured such long intervals.

It needs to be mentioned that at present a significant amount of Vision checking' is carried out which does not find its way into the GOS statistics. Opinions are mixed on its value but teachers do carry out 'vision checks' — as do other groups (nurses, OMPs and GPs). Vision checks of one type or another are also a routine (but very brief) part of paediatricians' health care checks carried out at intervals from birth onwards.

A few OMPs added that they felt that 'sight tests' of young children should only be carried out in hospitals and some felt that OMPs (and even orthoptists) were the appropriate professionals. It is impossible to say whether these opinions represented those of a tiny minority of OMPs or something greater simply because the relevant questions were not asked and these were opinions that were volunteered by just a few.

In pursuit of realism it might be useful to consider the question of the need for doctors. It is often assumed that we could do with more doctors in the Health Service to cope with waiting lists and so on. Despite this there has been unemployment in the medical profession and recruitment to medical schools has been cut. Medical manpower studies now centre to some extent on the question of not how many doctors the UK needs but how many it can afford. Perhaps it is more likely that the question of cost would set a limit on the current exponential growth in sight testing. Perhaps it means that one should consider that there are for all practical purposes no limits to growth in sight tests at the current rate? Assuming the current rate of growth they will not be met before 2019 or later.

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